European Agency for Safety and Health at Work

Transportation and storage activities – Evidence from the European Survey of Enterprises on New and Emerging Risks (ESENER)

Report

European Agency for Safety and Health at Work

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Executive Summary

The transportation and storage sector covers a wide range of different industries such as the transport of cargo and passengers, tourism transport, postal and courier services, warehousing and goods storage. Due to the nature of this sector, there is a wide variety of jobs and tasks to be performed. Transportation and storage play a fundamental role within the European Union (EU) economy. In 2020, the sector contained over 1.28 million enterprises in the EU-27, where 99.71% of those were small and medium-sized enterprises (SMEs).[1]

The transportation and storage sector is an important job generator in the EU economy. In 2021, 10,488,000 persons were employed in the transportation and storage sector (NACE Rev. 2 Section H) in the EU, representing around 5.3% of the total number employed. Compared to 2020, the share slightly increased from 5.2% to 5.3%. More than half of the employees are employed in land transport and pipelines, followed by warehousing and support activities for transportation. There have been important labour shortages in the transportation and storage sector (which also has been exacerbated by the recent COVID-19 pandemic). The sector is highly male dominated, whereby only 22% of workers in the sector are women, compared to 46% of women among the total EU-27 employed workforce. The transportation and storage sector can be characterised by its ageing workforce, with a lower share of employees under 24, but a higher share of workers over 50. The transportation and storage sector has a lower percentage of workers in temporary employment and part-time work compared to the percentage of the total EU-27 economy.

Due to the wide range of activities carried out across the various subsectors, the main occupational safety and health (OSH) risks in the transportation and storage sector are varied. Workers in the transportation and storage sector are particularly affected by prolonged sitting, repetitive hand or arm movements, risk of accidents with machines, and lifting or moving heavy loads. Transportation and storage sector workers are also confronted with important psychosocial risks, such as the need to deal with difficult customers, time pressure and the presence of long/irregular working hours. Seventeen per cent of transportation and storage sector establishments suggest that psychosocial risks are more difficult to address than other risks, compared to 22% for the total EU economy. The transportation and storage sector can be characterised as a relatively dangerous sector with the third highest number of non-fatal accidents in the EU (14.3% of all fatal accidents), following the construction and manufacturing sectors. The most common health outcomes refer to musculoskeletal disorders, some of them as a result of accidents, such as dislocations, sprains and strains, and concussions, but also internal injuries, and other conditions such as cardiovascular disease and diabetes. Mental health-related issues linked to fatigue, work-related stress and isolation are also relatively present.

Approximately 79% of transportation and storage sector establishments in the EU-27 regularly carry out workplace risk assessments, which is slightly above the EU-27 average (75%). Larger establishments are far more likely to regularly carry out this type of assessment, and there are significant variations among Member States. Almost half of transportation and storage sector establishments suggest that risk assessments are contracted to external providers, with the most commonly evaluated topic being safety of machines. Additionally, 94% of transportation and storage sector establishments have documented their risk assessments in written form, which is slightly higher than for all EU-27 establishments (92%). **Risk assessments in the transportation and storage sector are more likely to cover workplaces outside the premises of the establishment when compared to the total economy.** The most common reason for not conducting risk assessments is that risks are already known.

The most recurrent practices taken by transportation and storage sector establishments to deal with OSH risks are the provision of equipment to help with lifting or moving and the provision of ergonomic equipment. The most prevalent measure taken in the sector to prevent psychosocial risks refers to allowing employees to take more decisions on how to do their job. **Establishments in the transportation and storage sector are less likely on average to have formal procedures to deal**

[1] See: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Transportation_and_storage_statistics_-_NACE_Rev._2&oldid=567777#Sectoral_analysis

with and prevent psychosocial risks, when compared to the total EU economy. Larger enterprises (250+ employees) are more likely to take such measures.

Around 82% of transportation and storage sector establishments regularly arrange medical examinations, which is a higher share than the EU-27 average, and in some sectors (such as the rail and air transport sectors), regular medical examinations are a fundamental component of an employee's ability to carry out the job. Regarding differences per establishment size, there is a positive relationship with the size of the enterprise, as expected, and significant differences can be seen across Member States. Enterprises in the transportation and storage sector also utilise several health and safety services (either in-house or contracted externally), and the use of these different health and safety services is similar to (or above) the EU-27 average for all establishments, although larger-sized establishments in the sector make a greater use of these services. Even though large establishments may have a well-established OSH department/expert/internal safety officer, they are also more likely to use services of an external provider to support them in their health and safety tasks. This differs quite significantly between Member States, with 86% of establishments in Slovakia and Italy using external providers, and only 16% in Cyprus. **Establishments in the transportation and storage sector are slightly more likely than establishments in other sectors to regularly discuss OSH issues at the top level of management and within staff or team meetings.** Health and safety issues are being discussed more frequently in larger establishments.

Data indicate that in **69% of establishments in the transportation and storage sector with 20 or more employees, team leaders and line managers receive training on how to manage health and safety in their teams**, which is slightly lower than the EU-27 average. Around 80% of establishments with 20 or more employees in the sector provide employees with training in relation to emergency procedures and how to lift and move heavy loads. Around three-quarters (74%) of establishments whose employees are exposed to 'chemical or biological substances' have offered training on the use of dangerous substances to their employees, and 69% of all establishments on proper use and adjustment of their working equipment. By way of contrast, only 35% of transportation and storage sector establishments provide training on psychosocial risks prevention. There are no important differences with the EU-27 average for all sectors, neither in the order nor in the importance of the different issues. The share of establishments in the sector that provide training to employees on different OSH issues is higher among larger establishments than among smaller ones. Approximately 41% of training to employees is provided in other languages, which is by far the largest percentage across the EU-27 sectors, whereby the EU average for all sectors is 21%. Transportation and storage sector establishments are more likely to train employees performing cognitive tasks than those performing physical tasks.

Establishments in the transportation and storage sector report a variety of reasons to engage in OSH practices, including visits by the labour inspectorate. The main drivers in the sector for addressing health and safety are fulfilling legal obligations (90%) and avoiding fines from the labour inspectorate authorities (86%). Around 44% of establishments in the sector have been visited by the labour inspectorate in the last three years, which is slightly above the EU-27 average and significantly more than in some other sectors. However, interviews noted a lack of effectiveness due to lack of available inspectors and comparing data from the Third European Survey of Enterprises on New and Emerging Risks (ESENER 2019) with ESENER 2014 shows that visits of labour inspectorates decreased throughout the period.

In this regard, **the most important difficulties in engaging in OSH management practices in the sector are considered to be the complexity of existing legal obligations followed by lack of time/staff to deal with these issues and existing paperwork**. As far as legal obligations are concerned, there are a number of differences at Member State level in regard to the levels of complexity reported by establishments. As an additional difficulty for engaging in OSH management practices not covered under the ESENER 2019 questionnaire, the use of unregulated/uncontrolled subcontracting should be noted. Other noted difficulties for engaging in OSH management practices mentioned in literature and interviews are the lack of reliable and comparable data on the exposure to occupational hazards of the workers and ensuring that OSH legislation takes into account the practicalities in regard to everyday OSH management practices.

Additional elements influencing OSH management practices include the impact of the COVID-19 pandemic, digitalisation and robotisation, the increasing presence of long-term subcontracting/outsourcing practices, the increasing presence of platform workers, the increasing presence of green practices, several improvements related to technical and organisational changes, and increasing difficulties in finding suitable personnel, exacerbated by the COVID-19 pandemic.

In regard to 'general employee representation' forms, 25% of transportation and storage sector establishments report the presence of a works council, and in 18% there is a trade union representative, which are both larger shares than the EU-27 averages. The presence of 'health and safety representation' forms is higher, as 61% of transportation and storage sector establishments count on a health and safety representative. Larger establishments are more likely to have some form of health and safety representation. One interviewee noted that in relation to works councils, this type of representation can be effective in ensuring good working conditions for employees. However, the effectiveness of these councils is highly dependent on the strength of national legislation (as in rules requiring works councils to be consulted).

Around 55% of the transportation and storage sector establishments that have formal employee representation structures report regular discussions on OSH issues between employee representatives and the management. This percentage is higher than the EU-27 average. Overall, employees in the transportation and storage sector establishments are slightly less likely to be involved in the implementation of OSH-related measures than other sectors (they are reported to be involved in 77% of establishments, compared to the EU-27 average of 80%).

Around 53% of transportation and storage sector establishments that have introduced measures to prevent psychosocial risks have given a role to their employees in the design and set-up of these measures. This share is slightly lower than the EU-27 average (56%). Employees in the sector are less likely to have been involved in identifying possible causes for work-related stress, such as time pressure or difficult clients, when compared to employees in the EU-27 in total.

Several key policy pointers emerge from this study:

- **Policy pointers related to the characteristics of the transportation and storage sector and employment**
  - The analysis show that specific actions need to be tailored towards SMEs. The analyses confirm the importance of introducing ad hoc measures to improve the existing knowledge and expertise among SMEs on OSH issues and their importance.
  - In order to face demographic challenges and labour shortages affecting the transportation and storage sector, the EU will need to deploy new policies regarding youth unemployment and mobility, education and lifelong learning, gender diversity, immigration and retirement.
  - It is highly important that measures are taken to attract young people and women to some of the activities within the sector.
  - Measures must be taken to ensure that employees have adequate OSH protection in the case of long-term subcontracting/outsourcing practices.
  - Certain subsectors within the transportation and storage sector are particularly affected by digital platform work. Existing discussions regarding the proposed EU directive on platform work[2] could have in mind the impact of digital platform work in OSH.

- **Policy pointers related to OSH risks and health outcomes in the transportation and storage sector**
  - The transportation and storage sector contains a number of subsectors that are involved in a wide variety of activities, which lead to different occupational risks and health outcomes based on subsector and roles within it. It is therefore crucial that specific actions are taken to reduce or mitigate the risks that are specific to certain subsectors.

[2] https://ec.europa.eu/social/BlobServlet?docId=24992&langId=en

- More attention should be addressed towards psychosocial risks for workers in the sector, as this study has shown that there are a number of specific issues that are apparent in certain subsectors.
- The transportation and storage sector can be considered a dangerous sector for workers, with a high risk of accidents and health outcomes (when compared to other sectors). Therefore, sufficient access to relevant safety equipment, personal protective equipment and monitoring tools should be available to reduce OSH risks for workers and to ensure they are able to carry out their jobs in a safe manner.
- Diversity characteristics must be considered in the context of OSH policies to ensure that risks affecting certain groups are prevented/mitigated and addressed.

- **Policy pointers related to risk assessments and preventive measures to cope with OSH risks**
  - It is highly important that enterprises ensure that risk assessments become a real instrument to both identify existing workplace-related risk factors that have the potential to cause harm to the workforce in general (and to specific vulnerable groups in particular) and also to prioritise remedial actions to eliminate or control these risks.
  - It is also important to collect relevant information on OSH in the workplace to allow for adapting the work environment to reduce potential risks.

- **Policy pointers on use of health and safety services and other external providers, and access to external sources of OSH information**
  - Labour inspectorates can play a key role, not only in driving compliance and fulfilment of existing OSH legislation (legislation is perceived as sufficient but it is poorly implemented in many cases) but also in providing useful information and advice on how to successfully deal with and improve existing OSH management practices.
  - Actions of labour inspectorates to ensure effective and regular checks of workplaces (both stationary and mobile) will have benefits for the working conditions of workers.
  - Measures must be taken to ensure that workers' health and safety representatives remain accessible to workers in the sector. This is particularly the case for workers in precarious situations and those not working in a fixed physical place.

- **Policy pointers on training on health and safety issues**
  - It is the responsibility of employers in the transportation and storage sector to ensure that everyone in a company (including those not working in a fixed place and part-time and temporary workers) has relevant information on existing and new OSH risks, measures in place to deal with these risks or instructions to follow any emergency procedures.
  - Some groups of workers have particular training needs, which should be considered in the development of training in the sector.
  - Managers and OSH representatives must keep themselves constantly updated with changes and new developments (legislative, operational, etc.) in the OSH field and affecting the daily activities of the company.
  - More awareness of psychosocial risks by managers is needed.
  - To avoid a lack of preparedness for the resulting shift in technologies due to the green transition, employees, enterprises and labour inspectorates must have access to relevant training to be able to work safely with and understand new technologies and their impacts on OSH.

- **Policy pointers on the participation of transportation and storage sector workers in OSH management practices**
  - It is important to ensure that employees participate in the management of OSH within establishments, whereby employees should be involved in the design and implementation of different OSH-related measures.
  - It is also relevant that trade unions, works councils and employers' organisations (continue to) support the implementation of good OSH management practices and encourage establishments and employees to prioritise OSH.

1 General introduction to the report

1.1 Objectives and goals of this report

The transportation and storage sector (NACE Rev. 2 Section H) is an important economic sector in Europe, covering land, water and air transport plus warehousing and support activities for transportation and courier activities.

Table 1 Main sectors comprising transportation and storage activities (NACE Rev. 2 Section H)

Division	Class	Description
49		Land transport and transport via pipelines
	49.1	Passenger rail transport, interurban
	49.2	Freight rail transport
	48.3	Other passenger land transport
	49.4	Freight transport by road and removal services
	49.5	Transport via pipeline
50		Water transport
	50.1	Sea and coastal passenger water transport
	50.2	Sea and coastal freight water transport
	50.3	Inland passenger water transport
	50.4	Inland freight water transport
51		Air transport
	51.1	Passenger air transport
	51.2	Freight air transport and space transport
52		Warehousing and support activities for transportation
	52.1	Warehousing and storage
	52.2	Support activities for transportation
53		Postal and courier activities
	53.1	Postal activities under universal service obligation
	53.2	Other postal and courier activities

Source: Eurostat's NACE classification[3]

The main general goal of this study is to **provide relevant information to understand occupational health and safety (OSH) management practices among European workplaces in the transportation and storage sector**. Other key goals of this study include the identification of the main factors that influence these OSH management practices and the evolution of these practices over the last decade. Specifically, the detailed objectives of this study are the following:

Box 1 Specific goals pursued by this study

- Characterise the workforce of the European transportation and storage sector, as well as the existing business structure of the transportation and storage sector.
- Identify the main working conditions and associated physical, psychosocial and organisational risks particularly present in the transportation and storage sector, as well as identification of the main health problems characteristic of the sector's workers.
- Identify the main OSH management practices among European transportation and storage workplaces and characterise different elements within OSH management practices including:
  - compliance with legal requirements;
  - management commitment;
  - worker involvement and participation;
  - existence of risk assessments and preventive work design measures;
  - availability of (external) expertise and support; and
  - integration with other areas of management, lines of responsibility, etc.
- Identify and capture the main drivers and barriers that influence the management of OSH issues among European workplaces in the transportation and storage sector.
- Identify and define different typologies of sector establishments in their approach to managing OSH at the workplace.
- Identify recent technical, economic, social, organisational and regulatory evolutions in the transportation and storage sector that may influence the management of OSH. This also includes:

[3] See: https://ec.europa.eu/eurostat/web/nace

- paying special attention to the new sections included in the Third European Survey of Enterprises on New and Emerging Risks (ESENER 2019) questionnaire, such as digitalisation and its impact on OSH, as well as the quality of external preventive services and the evaluation of accidents/sickness absence; and
- analysing the specific impact of the COVID-19 pandemic on the recent management of OSH in the transportation and storage sector, identifying main challenges faced by companies and their response.

- Provide a comparative analysis of the OSH management practices within the transportation and storage sector on the basis of:
  - developments over the last decade, using for this purpose information collected from the different waves of the ESENER;
  - practices within transportation and storage workplaces in comparison to the rest of the sectors; and
  - differences between workplace sizes within the transportation and storage sector.

1.2 Key research questions

To achieve the above-mentioned objectives, a list of research questions has been elaborated with the goal of developing this report, as well as the different methodological tools elaborated within the framework of this report.

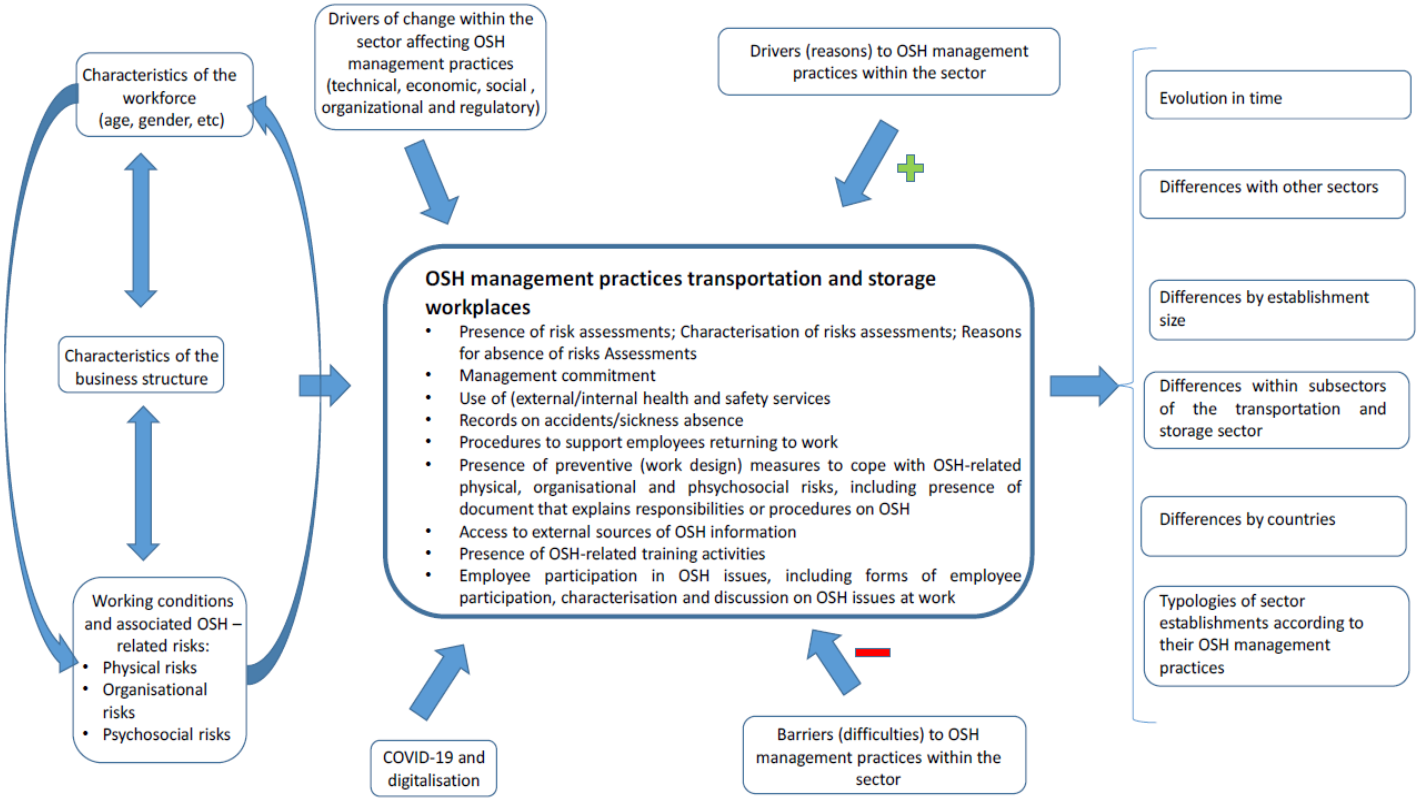
Table 2 Main research questions posed in this study

Research questions
What are the main traits of the workforce of the European transportation and storage sector; What are the main traits of the existing business structure of the transportation and storage sector?
What are the main working conditions and associated physical, psychosocial and organisational risks particularly present in the transportation and storage sector? To what extent is digitalisation extended/influential?
What are the main health outcomes related to the transportation and storage sector? What are the changes in absence (due to sickness and work-related accidents) over the past three years in the transportation and storage sector?
To what extent do European transportation and storage workplaces carry out risk assessments and preventive (work design) measures? To what extent do they comply with existing legal OSH-related requirements?
Do transportation and storage sector establishments have records on accidents/sickness absence? Do they have procedures to support employees returning to work?
To what extent do European transportation and storage workplaces resort to (external) expertise, information and support when managing OSH issues? What is the quality of these external preventive services?
To what extent are managers of transportation and storage workplaces committed to the management of OSH issues; Who is responsible for OSH management within European transportation and storage workplaces?
How is this commitment to OSH management linked with the management of psychosocial risks?
To what extent are OSH-related training practices common among transportation and storage workplaces?
To what extent are documents available that explain responsibilities or procedures on OSH in the transportation and storage sector?
To what extent do transportation and storage workers participate in OSH management practices?
What are the main drivers and barriers that influence these OSH management practices among European workplaces in the transportation and storage sector?
What are the most relevant drivers of change in the transportation and storage sector (technical, economic, social, organisational and regulatory evolutions) that are affecting the management of OSH within sector workplaces?
To what extent do these OSH management practices vary between countries/establishment sizes?
To what extent are OSH management practices within the transportation and storage sector different in comparison to the rest of sectors?
What has been the evolution in the last decade of these OSH management practices?
Is it possible to identify different typologies of sector establishments in their approach to managing OSH at the workplace? What are the main characteristics of these different typologies?
What are the specific challenges of the COVID-19 pandemic on the recent management of OSH in the transportation and storage sector? What has been the companies' response?

1.3 Conceptual framework used in the context of this research

The conceptual framework for analysis is intended at identifying and defining the core issues analysed in the study and supports the interpretation of the results and formulation of policy-relevant conclusions. Figure 1 presents the conceptual framework used for the study.

Figure 1 Conceptual framework for analysis of the transportation and storage sector



Source: Authors' elaboration

At the heart of this conceptual framework are the existing OSH management practices within European transportation and storage workplaces. These practices are affected by several elements, including:

- the characteristics of the workforce (gender, age, level of education);
- the characteristics of the existing business structure (size of establishments); and
- the working conditions faced by transportation and storage workers and associated OSH risk factors, where special attention should be paid to safety, digitalisation, musculoskeletal disorders (MSDs) and psychosocial risks due to the nature of work at the sector's workplaces.

In addition to this, existing OSH management practices within the transportation and storage sector are influenced by other elements. They include:

- drivers of change within the transportation and storage sector: technical, economic, social, organisational, regulatory ones;
- the drivers (reasons) why transportation and storage workplaces develop OSH management practices: legal obligations, meeting expectations from employees, avoiding fines and labour inspections, productivity or reputational reasons, quality of (external) preventive services, etc.;
- the main barriers (difficulties) in addressing OSH issues within transportation and storage workplaces: lack of time/staff, complexity and paperwork, lack of awareness, etc.; and
- the recent effects derived from the COVID-19 pandemic.

All these elements influence the existing OSH management practices within European transportation and storage workplaces in several domains, including:

- presence of risk assessments, characterisation of risk assessments, and reasons for absence of risks assessments;
- management commitment;
- use of (external/internal) health and safety services;
- presence of documents that explain responsibilities or procedures on OSH;
- records on accidents/sickness absence;
- procedures to support employees returning to work;
- presence of preventive (work design) measures to cope with OSH-related physical, organisational and psychosocial risks;
- access to external sources of OSH information;
- presence of OSH-related training activities; and
- employee participation in OSH issues, including forms of employee participation, characterisation and discussion on OSH issues at work.

The study further qualifies the existing OSH management practices and employee participation practices within transportation and storage workplaces, providing information on elements related to:

- the evolution in time of these OSH management practices; and
- the existing differences:
  - with other main economic sectors,
  - by establishment size, and
  - among European countries.

1.4 Methodology used

To answer the different research questions outlined above and meet the main and specific goals of the study, a mixed methodological approach has been used, comprising the following three main methods.

- **Review of studies and literature**

Desk research has been conducted to identify and compile existing relevant information on OSH issues and the transportation and storage sector, with a preference for sources published in the last five to 10 years (since 2013, more or less), including scientific and academic publications, and policy documents. In some select cases, additional literature beyond the 5-to-10-year scope was used (see bibliography included in this report).

- **ESENER Data processing and analysis**

Survey data for the three consecutive ESENER surveys were analysed. Relevant variables from the ESENER surveys are either dummy variables, nominal or ordinal. Relevant descriptive statistics for these types of variables are frequency tables (to examine the distribution of a variable) and cross-tabulations (to compare the distribution of a variable across different groups of establishments: by country, establishment size and sector). In case of cross-tabulations (by country, sector or establishment size class), it is important to assess whether differences between groups that are present in the survey reflect group differences in the population, or whether they may be caused by the sample selection. For each cross-tabulation, Pearson's chi-square test has been used to test the hypothesis that the distribution of a variable is independent from the grouping variable included in the cross tabulation. The study only includes tables and figures where the differences between country, sector and/or establishment size class are significant (at a 5% significance level).

The study mainly focuses on findings from the ESENER 2019 survey, however comparisons of the ESENER 2019 results with the ESENER 2014 and ESENER 2009 results have also been made whenever possible.

- The last two surveys (ESENER 2014 and ESENER 2019) are very similar, not only in terms of topics but also in terms of the wording of the individual questions, the enterprise population covered and the target respondents. The datasets of these two surveys have been merged into

a single dataset (for the relevant questions on OSH management), after which cross-tabulations have been prepared with the survey year (2014 or 2019) as the grouping variable. Also, for these tables, statistical tests have been used to test the hypothesis that the distribution of these variables is the same for the two consecutive surveys.

- The first survey (ESENER 2009) differs from the second and third surveys in several aspects, in the wording of individual questions, the establishment population covered[4] and the target respondents of the survey.[5] As a result, there are only 12 questions on OSH management practices where a comparison between ESENER 2009 and ESENER 2019 is relevant. Even for these questions, a direct comparison of the answers is difficult because of the differences in exact wording and establishment population covered. The dataset with the results from ESENER 2009 has therefore not been merged with the (already merged) dataset with the results from ESENER 2014 and ESENER 2019. Instead, frequency tables for the 12 relevant questions from ESENER 2009 have been prepared, which have been compared in a more qualitative way with the associated tables from ESENER 2014 and ESENER 2019.[6]

Most of the main research questions have been answered using descriptive statistics as discussed above. For three research questions, descriptive statistics alone were not sufficient. For these research questions, multivariate analyses have been performed.

- For two research questions (how commitment to OSH management is linked with the management of psychosocial risks and the main drivers and barriers that influence OSH management practices), regression analysis has been used. The details of these analyses are presented in Annex 1 and Annex 2.
- For one research question, a cluster analysis has been applied (this concerns the research question whether it is possible to identify different typologies of establishments in their approach to managing OSH at the workplace). The details of this analysis are presented in Annex 3. The outcome of this cluster analysis was that no meaningful typology could be identified. Although several typologies could be identified, none of them meet the minimum requirements for a cluster solution to be meaningful.[7] The answer to this research question is therefore negative. For this reason, this report does not include a specific chapter or section on typologies of establishments.

- **Fieldwork research: key informant interviews**

Finally, 10 in-depth interviews have been carried out with selected stakeholders, mostly at the EU level with representative employers and employee organisations. Additional inputs were collected from several national-level stakeholders. In some cases, organisations submitted written questionnaires. The list of interviewed/surveyed organisations is presented in Table 3.

[4] In particular, the ESENER 2009 survey covers establishments with at least 10 employees, while the ESENER 2014 and ESENER 2019 surveys cover establishments with at least five employees.
[5] For ESENER 2009, two types of questionnaires were developed: a management (MM) questionnaire directed at the highest-ranking manager responsible for the coordination of health and safety issues at the establishment, and a questionnaire for the health and safety representative (HSR) of the employee side.
[6] In those cases where the questions are only aimed at establishments with a higher number of employees (20 or 50 and more), the results presented for the relevant ESENER 2009 variables are restricted to the proper establishment size classes (to make them more comparable to the results from ESENER 2014 and ESENER 2019).
[7] In the context of the applied two-step cluster analysis, a cluster solution is interpreted as fair or good when the silhouette measure of the solution meets the lower threshold of 0.25. None of the identified cluster solutions meets this threshold.

Table 3 Overview of interviews/surveyed organisations

Organisation	Sectoral scope
ASA (Airport Services Association)	Air transport
Associated Society of Locomotive Engineers & Firemen (UK)	Land transport (rail)
ASSOTIR (Association of road haulage companies – IT)	Land transport (freight)
ECA (European Cockpit Association AISBL)	Air transport
European Transport Workers' Federation (Passengers working group)	Land transport
Italian Federation of Transport Workers (IT)	All sectors
PostEurop	Postal and courier activities
UNI Europa Post & Logistics	Postal and courier activities
Vereinte Dienstleistungsgewerkschaft (Ver.di) - DE	Land transport (freight) / Postal and courier activities
Belgische Transportbond BTB - BE	Water transport

For the interviews, a questionnaire with the first results from the quantitative analysis was developed. Through the interviews, primary qualitative data on OSH risks/outcomes and OSH management practices within the transportation and storage sector as a whole or within its subsectors have been collected.

2. Characterisation of the transportation and storage sector

2.1 Introduction

This chapter presents a general characterisation of the sector. First, a description is given of the main characteristics in terms of enterprise structure and employment. Next, the main OSH risk factors are discussed, including psychosocial risks. Finally, information is provided on health outcomes within the sector, including information on accidents at work.

2.2 Enterprises and employment

The transportation and storage sector contains many industries, including the transport of cargo and passengers, tourism transport, warehousing and goods storage. Transportation-related buildings or transportation equipment are used as productive assets by enterprises in these industries. This sector consists of five subsectors:

- land transport and transport via pipelines;
- air transport;
- water transport;
- warehousing and support activities for transportation; and
- postal and courier activities.

Due to the nature of this sector, there is a wide variety of jobs and tasks to be performed. For example, the air transport sector forms an extraordinarily complex and varied universe, including the interaction of different activities. These include navigation assistance services, air traffic control services, commercial activities, catering, aeronautical maintenance, ground handling and security (UGT, 2009), and the turnaround of an aircraft requires a complex series of processes, from the moment the aircraft arrives at its gate until it leaves. Many workers are involved in the turnaround, making it a complex matter with many different operations. This heterogeneity of activities implies very specific working conditions for the different types of activities in the sector (Schmitz-Felten, OSHwiki 2022).

As another example, in the rail transport sector the labour market is divided into four subsectors: infrastructure management and passenger, freight and urban rail. The most prevalent jobs in this sector are drivers, rail operation professionals, attendants (passengers only), management, back office, maintenance staff and engineers. Although these main occupations have remained mostly the same in the past decades, the sector has gradually seen a change in what is required of new and existing employees in terms of skill sets, which is having a significant impact on the employer requirements of the already existing occupations (Panteia, 2016; Community of European Railway and Infrastructure Companies (CER), 2016).

The varied types of jobs and tasks across the subsectors within the transportation and storage sector all pose different risks for the workforce, resulting in high accident rates, MSDs, stress and fatigue. Besides these risks, some employees also suffer violence, and many have unusual working times and repetitive and monotonous work.

In 2020, the sector contained over 1.28 million enterprises in the EU-27, where 99.71% of those were SMEs.[8] The number of micro-enterprises[9] has a significant contribution to this percentage as they made up 91.13% of the enterprises in the sector. SMEs are responsible for over 50% of the employment in the sector and are therefore a large contributor to job creation. Around 3,300 large enterprises are responsible for almost 50% (5 million employees) of employment in this sector. More than half of the employees work in land transport and pipeline activities, followed by warehousing and support activities

[8] See: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Transportation_and_storage_statistics_-_NACE_Rev._2&oldid=567777#Sectoral_analysis

[9] Definition taken from 'User guide to the SME Definition', 2005 (https://ec.europa.eu/regional_policy/sources/conferences/state-aid/sme/smedefinitionguide_en.pdf).

for transportation. A detailed overview of the key economic indicators for the transportation and storage sector in 2020 can be found in Table 4.

Table 4 Key economic indicators for the transportation and storage sector, EU-27, 2020

NACE Rev. 2	Sectors	No of enterprises	Turnover (million euro)	Value added (million euro)	No of persons employed	Average employment size
H	Transportation and storage	1,279,000	1,271,000	434,000	10,271,000	8
H49	Land transport and transport via pipelines	966,000	530,000	207,000	5,682,000	6
H491	Passenger rail transport, interurban	221	44,000	19,000	455,000	2,059
H492	Freight rail transport	675	17,000	4,000	125,000	185
H493	Other passenger land transport*	965,000	106,000	57,000	1,792,000	2
H4931	Urban and suburban passenger land transport	14,000	60,000	32,000	735,000	53
H4932	Taxi operation*	895,000	15,000	8,000	551,000	1
H4939	Other passenger land transport	56,000	31,000	17,000	507,000	9
H494	Freight transport by road and removal services	559,000	349,000	119,000	3,283,000	6
H4941	Freight transport by road	547,000	344,000	116,000	3,218,000	6
H4942	Removal services	13,000	5,000	2,000	65,000	5
H495	Transport via pipeline	192	15,000	9,000	27,000	139
H50	Water transport	N/A	N/A	22,000	N/A	n/a
H501	Sea and coastal passenger water transport	6,000	12,000	2,000	82,000	14
H502	Sea and coastal freight water transport	3,000	N/A	N/A	71,000	24
H503	Inland passenger water transport	4,000	1,000	429	20,000	5
H504	Inland freight water transport	5,000	6,000	2,000	48,000	9
H51	Air transport	N/A	60,000	N/A	300,000	n/a
H511	Passenger air transport	N/A	47,000	N/A	281,000	n/a
H512	Freight air transport and space transport	600	13,000	N/A	19,000	32
H5121	Freight air transport	606	13,000*	5,000	19,000	31
H5122	Space transport	0	8	3	24	n/a
H52	Warehousing and support activities for transportation	144,000	440,000	144,000	2,440,000	17
H521	Warehousing and storage	16,000	52,000	19,000	321,000	21
H522	Support activities for transportation	128,000	390,000	125,000	2,100,000	16
H5221	Service activities incidental to land transportation	39,000	59,000	30,000	412,000	11
H5222	Service activities incidental to water transportation	9,000	20,000	11,000	109,000	12
H5223	Service activities incidental to air transportation	6,000	25,000	12,000	254,000	43
H5224	Cargo handling	11,000	24,000	11,000	216,000	20
H5229	Other transportation support activities	64,000	263,000	62,000	1,127,000	18
H53	Postal and courier activities	145,000	123,000	55,000	1,629,000	11
H531	Postal activities under universal service obligation	1,000	37,000	24,000	752,000	666
H532	Other postal and courier activities	144,000	86,000	31,000	878,000	6

(*) Panteia estimate
Source: Eurostat, Structural Business Statistics (sbs_na_1a_se_r2)

As pointed out above, the transportation and storage sector is an important job generator in the EU economy. The EU Labour Force Survey data show that employment in the transportation and storage sector increased between 2012 and 2019 from 9.4 to 10.6 million jobs. However, in 2020 the sector had lost 420,000 jobs, and represented 5.2% of the total employed EU-27 workforce (5.4% in 2019). For

many subsectors, the levels of employment increased in 2021, however, one notable exception remains the air transport sector, which was still feeling the effects of the COVID-19 pandemic (see Table 5).

Table 5 Employment in the transportation and storage sector in the EU-27, 2012-2021 (thousand people)

Year	Land transport and transport via pipelines	Water transport	Air transport	Warehousing and support activities for transportation	Postal and courier activities	Total transportation and storage	Transportation and storage as % all NACE activities
2012	5,150	270	388	2,199	1,489	9,496	5.1%
2013	5,111	267	365	2,393	1,441	9,577	5.2%
2014	5,152	270	370	2,469	1,398	9,659	5.2%
2015	5,180	265	359	2,557	1,453	9,814	5.2%
2016	5,318	279	345	2,667	1,487	10,096	5.3%
2017	5,396	279	352	2,840	1,487	10,354	5.3%
2018	5,518	284	373	2,869	1,461	10,505	5.3%
2019	5,570	304	412	2,920	1,475	10,680	5.4%
2020	5,473	315	389	2,653	1,426	10,256	5.2%
2021	5,557	290	344	2,787	1,512	10,490	5.3%

Source: Eurostat, EU Labour Force Survey

The transportation and storage sector is characterised by a relatively low presence of women workers: 22% of workers in the sector are women, compared to 46% of women among the total EU-27 employed workforce. This segregation is both horizontal (specific industries or sectors of the labour market are mostly made up of one gender) and vertical (opportunities for career progression for women are limited and narrow) (European Commission, 2019). Women are particularly underrepresented in technical jobs (e.g. drivers or pilots). Very often, differences of gender are not considered in risk assessments and in the actions taken to reduce risks, when in reality the factor of gender determines the degree of exposure to the physical and psychosocial risk factors as well as exposure to other and different risks (Interview).

In the air transport sector, it is estimated that around 75-80% of the ground staff workforce is male (Interview). A Panteia study conducted in 2019 indicated that only 3% of heavy goods vehicles (HGVs) drivers are female, and although there are programmes in place to redress this severe imbalance, there is a need for the road transport sector to offer the quality of working life and levels of security that can be found in other areas of the job market (European Commission, 2019). The railway industry is also still a male-dominated field where women are underrepresented. In 2014, women only accounted for 19.8% of the total employment. Gender stereotyping, low quality of work and contracts, low wages, poor career prospects, limited training participation of women, working patterns unsuited for women, and lack of appropriate workplace facilities, adequate tools and procedures to deal with sexual harassment are some of the barriers women encounter in the transport sector (European Parliament, 2022b). However, most countries do have some sort of strategy to increase the total number of women in the workforce, and to thereby balance gender segregation through encouraging women into occupations where they are underrepresented.

Studies also highlight an urgent need to eliminate the entrenched male culture and to provide safe workplaces where women are not exposed to violence and harassment, have full access to proper sanitary facilities and can achieve a good work–life balance (ETT, 2020). In a study published by the European Commission in 2015, several barriers to the employment of women in the rail sector by employers were identified. These barriers include less favourable working conditions in terms of wages, working hours unfavourable to family life, male-centred ergonomic working conditions, and a risk of violence and harassment (CER, 2016; DG MOVE, 2015).

Concerning workers' age, the distribution over age categories is quite similar with the distribution in the overall EU economy. The share of people aged 50 years or over is slightly higher (36%vs 34%) than the share for the total economy and the share in the age category 15-24 is slightly lower (6% vs 8%).

Table 6 Presence of women and age structure in employment, transportation and storage sector versus total EU-27 economy, 2020 (%)

Variables	Transportation and storage sector	Total economy
Sex structure		
- % women in employment	22	46
Age structure		
- % employment 15-24 years old	6	8
- % employment 25-49 years old	58	59
- % employment 50 years or older	36	34

Source: Eurostat, EU Labour Force Survey

Due to the increasing longevity and ageing of the population in most EU Member States, the average employment rate of people aged 55 to 64 increased over the last years. However, capabilities required for jobs in transport, such as vision, cognition, and motor functions like flexibility and coordination, are part of the overall decline of functional capacities after the 50s (Bogataj & Bogataj, 2018). Consequently, population ageing and attracting employees with the right skills will be a key challenge over the next years for the sector, given the conditions it offers (Christidis et al., 2014). Moreover, transport professionals often highlight the accessibility of vehicles as one of the most important issues for older people, together with safety and security (EMTA, 2007).

In some sectors, such as the rail sector, there is evidence of a disadvantageous demographic structure. Enterprises often find it difficult to recruit young employees as well as struggle to retain their older employees (CER, 2016; European Parliament & PricewaterhouseCoopers, 2009; Panteia, 2016). One interviewee explained that, for example, in Italy, the lack of younger drivers joining the profession has resulted in a shortfall of around 25,000 drivers, and that this is a phenomenon that affects all of Europe. In many cases governments and local institutions in Italy have provided grants to help people acquire the relevant driving qualifications.

In the passenger transport sector (specifically, coach and bus), the biggest problem identified in the sector is a shortage of drivers and an ageing workforce, with the average age of a worker in this sector in Belgium, the Netherlands and France being 55+ (Interview). The loading and unloading of luggage present physical risks particularly for older coach drivers, which is something that is expected from them by their employers. Unlike the air transport sector, there are no limits to the number of kilograms a bag can weigh, and older drivers are often unloading luggage weighing more than 30 kg.

According to the EU Labour Force Survey data for 2020, the share of young workers in the transportation and storage sector is lower compared with the whole EU-27 economy. People under 24 account for 6% of total employment in comparison to 8% for the whole economy. A study carried out by Deloitte et al. in 2017 on ‘Making the EU transport sector attractive to future generations’ for the European Commission provides some useful insights. Regarding the views of young people regarding the attractiveness of the transport sector and jobs, the study found that they are poorly informed about what the sector does, what types of jobs are available and what part they might play in it given their educational background. Employers also do not seem to fully appreciate the aspirations of young people with respect to jobs in the sector, whether in terms of money, work–life balance, working conditions, the content and variety of the work, and potential career development, quite apart from more formal industrial relations issues regarding working conditions or contractual arrangements (Deloitte et al., 2017).

The transport sector is marked by high job polarisation and records a positive change in both high-skilled and low-skilled occupations while the proportion of medium-skilled occupations has declined, thus converging with the average changes observed at EU level (Eurofound, 2021). Work intensity is lower for managerial, professional and technical occupations than for other occupations in the transport sector, whereas the reverse is true in other sectors. There is a general downward trend in job quality in the transport sector, and an increase in cognitive tasks and a decline in physical routine tasks, except for in eastern European countries.

Next to gender, and age, it is important to address the important part of **migrants** who are active in the sector. Although conditions and jobs may differ, (im)migrant workers are more frequently occupied in

dangerous and demanding jobs within the sector, namely in road transport as long-distance drivers, in air transport as luggage handlers and cleaners, and in water transport in maintenance and service jobs (EU-OSHA, 2011b). Migrants are often treated unfairly due to language barriers and lack of education (Kwan & Piechocki, 2018). In addition, migrants' risks of labour exploitation are further amplified when workers depend on recruitment agencies for services, including visas; some are entirely dependent on their employers for legal immigration statutes, which exposes them to higher risks of exploitation (FRA, 2019; Kwan & Piechocki, 2018). Lastly, migrant drivers working in the EU road transport industry work excessive hours and must sleep in their trucks after being denied legally mandated rest periods and low wages (Kwan & Piechocki, 2018). Road transport is not the only sector where these allegations have surfaced.

The transportation and storage sector has a **lower percentage of workers in temporary employment and part-time work compared to the percentage of the total economy**. Around 11% of workers in the sector are in temporary employment, which is slightly lower than the share for the total EU. One in eight workers works **part-time** (12%), compared to 22% in the total economy. In total, 6.9% of employees in the transportation and storage sector are in unregistered employment and 4.5% of all employees with no written contract in the EU are in the transportation and storage sector (see Table 7).

Table 7 Characteristics of the transportation and storage sector employment (NACE H) and total economy, EU-27 (%)

Variables	All sectors	Transportation and storage sector
Temporary employment (2021)	14.0%	11%
Part-time work (2021)	22.0%	12%
No written contract of employment (2017)	8.2%	6.9% Of employees in the transportation and storage sector are in unregistered employment. 4.5% Of all employees with no written contract in the EU are in the transportation and storage sector.
Receive envelope wages	5.0%	9% (2007)

Sources: Eurostat, EU Labour Force Survey, EWCS, 2017 and Eurobarometer, 2007, quoted partially in ELA, 2021, Colin C. Williams and Jo Padmore: Envelope Wages in the European Union (2013)

The transport sector also had one of the lowest shares of atypical contracts in 2015. However, **atypical forms of employment are also present in the transportation and storage sector to some extent.** A good example of this can be seen in the air transportation sector and the work of pilots, a sector and occupation for which you may not expect these forms of employment. A recent European study elaborated by DG MOVE shows that a significant percentage of aircrew are employed via alternative atypical employment practices (e.g. temporary work agencies, other intermediaries and self-employment) (DG MOVE, 2019; Turnbull, 2020). Between 9% and 19% of cabin crew and around 8% of pilots are employed via an intermediary manning agency. This includes temporary work agencies with which aircrew have an employment contract but are providing services to the user undertakings (air carriers), working there temporarily under their supervision and direction. In addition, 9% of pilots identify themselves as self-employed (approximately 90% of the self-employed have a contract via an intermediary agency and only a small share directly with an air carrier). In most cases, these self-employed pilots could be considered as working on a 'bogus self-employment' basis since in most cases, they only work for a single air carrier, operate in the same working environment, and carry out the same tasks with permanent employees and accumulate flight hours in the same manner as pilots directly employed by an air carrier.

According to the results of this study, these atypical forms of employment tend to be more prevalent among low-cost carriers and more common among younger aircrew that are just entering the job market with limited experience. Also, the study shows that aircrew in these atypical forms of employment are less satisfied with their working conditions in general. They are also more likely to report that they do not receive sufficient education and training as well as lower levels of satisfaction with their pay. Aircrew associations suggest that these poorer working conditions can lead to increased fatigue and affect the workers' professional judgment, which can be detrimental in a safety environment.

2.3 The main OSH risk factors in the transportation and storage sector

Transportation is a dynamic and rapidly changing sector. The increase in travel (especially air travel) and the free movement of goods have significantly changed the risk exposure for workers within the sector and consequently the impact on health. As an example, airports and airplanes can be very hazardous environments, and workers in air transport are exposed to a wide variety of hazards and risks. The water transport sector also carries a large and varied array of activities, which bring unique challenges in relation to working conditions. Maritime transport working conditions entail long periods at sea, making this group of workers one of the world's most isolated. Additionally, maritime workers also have to deal with cross-cultural differences, and the strains in communication this entails, as well as management challenges, especially regarding safety on board (OSHwiki, 2015).

Therefore, the employees' working conditions must be adapted to ensure the occupational health and safety of workers with respect to technological developments and recent socio-economic trends. As mentioned above, recent socio-economic trends within the transportation sector include the increase of female and migrant workers, the ageing of the workforce, the long and varying working hours (e.g. working in the evening, shifts, at night, on weekends), and COVID-19. More information on the additional elements affecting OSH management practices in the sector can be found in section 4.4.

Working conditions must also be tailored to these socio-economic trends as well as to specific working groups. For instance, the increasing number of migrant workers and women entering the transportation sector must be trained appropriately and working conditions must be adapted adequately to specific worker groups. Overall, the transport workers are not a homogenous group but represent many different occupations with specific working conditions and risks, and varying demands. However, many physical risk factors (such as painful positions, carrying heavy loads, noise and temperature levels, exposure to dangerous substances, etc.) as well as some psychosocial risk factors (such as time pressure, violence and harassment) can be identified within all the transport subsectors.

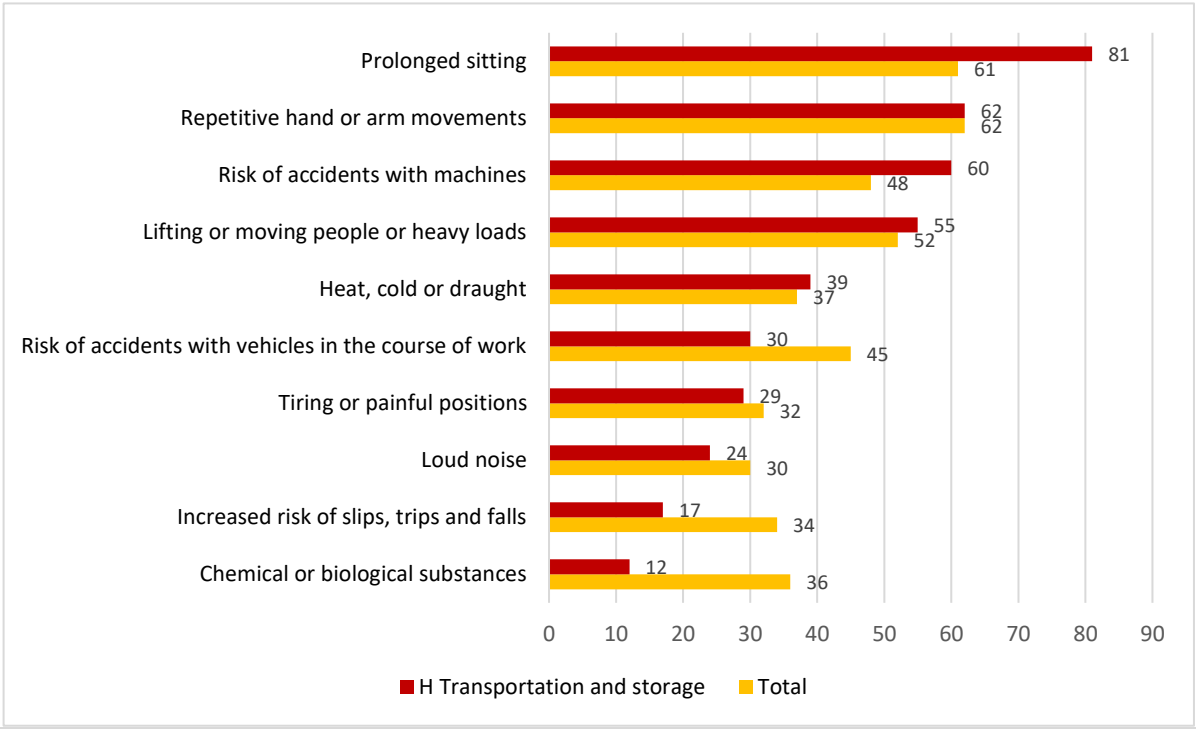
This section of the report analyses the specific OSH risks, including both general OSH risks as well as psychosocial risk factors, that affect workers in the transportation and storage sector.

2.3.1 General OSH risks and hazards

Workers in the transportation and storage sector are exposed to several general OSH risks and hazards that may cause wear and tear on the body and can cause injury. According to the ESENER 2019 results for the EU-27, workers in the transportation and storage sector are particularly exposed to four MSD risk factors, namely, prolonged sitting (81%), repetitive hand or arm movements (62%), risk of accidents with machines (60%), and lifting or moving heavy loads (55%). In the case of prolonged sitting, this is significantly more frequent than when compared to the rest of the total economy (61%).

The comparison with all sectors shows that workers in the transportation and storage sector are less exposed to certain OSH risks, such as chemical or biological substances, increased risk of slips, trips and falls, and loud noises.

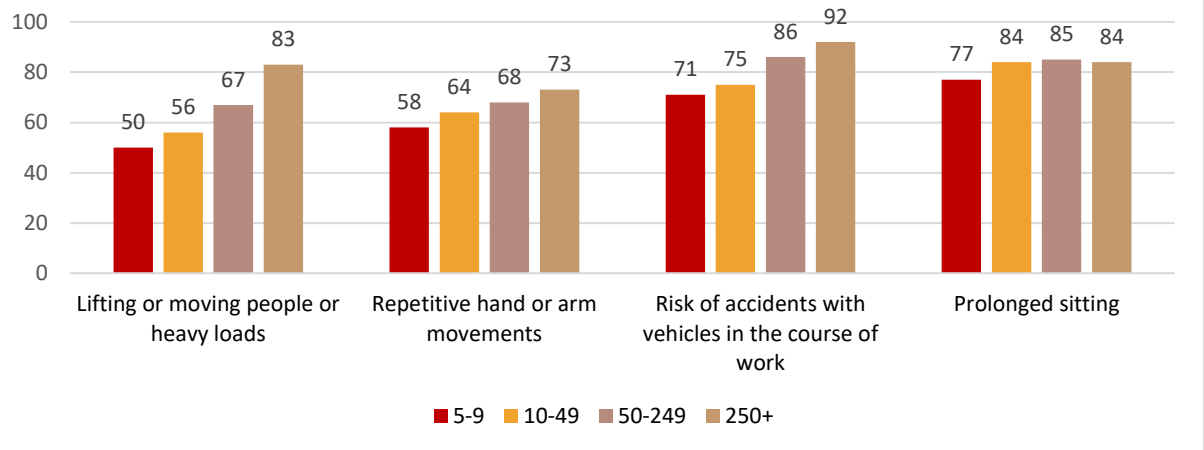
Figure 2 Main OSH risk factors (excluding psychosocial), transportation and storage sector and all sectors, EU-27, 2019 (%)



Base: All sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The ESENER 2019 survey results also show that in most cases large establishments are more likely to identify the presence of ergonomic risks than smaller establishments. This may show that larger establishments are more sensitive to OSH risks and their consequences on their workforce than smaller ones. Prolonged sitting (the most reported ergonomic risk across the transportation and storage sector) seems to be highly prevalent across all enterprise sizes.

Figure 3 Main selected OSH-related physical risks in the transportation and storage sector, by establishment size, EU-27, 2019 (%)



Base: All sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Literature on the topic complements these results and identifies several noteworthy OSH risks and hazards for workers in the transportation and storage sector, resulting in some specific health outcomes (see Table 8).

Table 8 Examples of the main work environment risks in the transportation and storage subsectors

Sector	Examples of potential risks
Land transport	High exposure to road accidents; Accidents caused by non-driving activities; Slips/falls; High prevalence of serious health conditions and chronic diseases; MSDs; Vibration exposure; Loud noise exposure; Exposure to dangerous substances
Water transport	Slips/falls; Excessive noise; Exposure to chemicals/contact with oils and other spills; Dangerous equipment; Long-term exposure to asbestos; Exposure to UV radiation
Air transport	Cosmic radiation; Vibration exposure; Loud noise exposure; MSDs; Exposure to sun and rapidly changing climatic conditions; Exposure to biological agents (infection) incl. diseases not encountered in the country of origin; Exposure to exhaust, incl. diesel exhaust, pesticides/biocides; Prolonged standing; Non-ergonomic sitting; Working in awkward positions and confined spaces; Lifting heavy loads
Warehousing and other support activities	MSDs; Injury caused by powered industrial trucks; Slips/falls; Exposure to hazardous chemicals; Illness caused due to extreme temperature
Postal and courier services	High exposure to road accidents; High exposure to weather and environmental conditions; Slips/falls; Lifting and handling (heavy) parcels/goods; Lack of ergonomic conditions at work; Safety conditions of work equipment and tools; Hazardous materials; Dog attacks

Sources: Vitols & Voss, 2021; EU-OSHA, 2011,a, 2011b; European Transport Safety Council, 2017; Reinhold et al., 2019; Pierce | Skrabanek, 2016; European Commission, 2012; IRU, 2017; EU-OSHA, 2018; Kania, 2018; Christie & Ward, 2019; Egozi et al., 2022;; Gregory, 2021; Harris Federal Employee Law Firm, 2016; Van Belleghem & Bourgeois, 2004

- **OSH risks in the land transport and pipelines sector**

The road transport sector accounts for 40% of all road fatalities in Europe (a driver either at work or on the way to/returning from work). Driver distraction caused by external sources (such as billboards and other road users as well as internal sources such as GPS, mobile phones and passengers) is one of the leading causes of accidents. Another main cause of accidents is driver fatigue, which is linked to industry competitiveness, time constraints and long working hours. Long-haul drivers experience fatigue due to long hours and the monotony of limited activity whilst driving, whereas short-haul drivers experience fatigue resulting from the pressure of large amounts of delivering and driving. Other causes of accidents relate to vehicle blind spots, difficulty in manoeuvring quickly, weather conditions and other reckless drivers. Furthermore, financial incentives to work extra hours cause fatigue for drivers as they are inclined to work more hours and the regular pay is not enough. As drivers are also put under schedule pressure to deliver on time, they may not take breaks or take shortened breaks as well as insufficient rests. Moreover, another factor that is mentioned that caused fatigue is the lack of enforcement of rules by relevant authorities (stakeholder interview). This means operators do not follow the law as they are supposed to. Consequently, operators do not grant their drivers sufficient resting hours as there is a preference towards cost-efficiency and profit maximisation (Vitols & Voss, 2021).

Statistics show that non-driving activities such as loading and unloading account for many accidents that result in drivers sustaining injuries, the most common of which are falls from heights, overexertion, crush injuries and slips/falls. Given the size of the vehicles that truckers operate, it can be difficult to enter/exit and slips and falls may occur (European Transport Safety Council, 2017; Industrial Compliance and Safety, 2021; Mathern, 2019).

Whilst driving activities can be seen as expending little effort (particularly due to technical innovations), there is also a high prevalence of serious health conditions such as obesity, cardiovascular disease, sleep disorders and diabetes. These are attributed to the tendency of leading an unhealthy lifestyle by relying on convenience food and having little to no exercise, made worse by working long and irregular hours. Another physical issue that results from poor nutrition is that they may develop the well-known obstructive sleep apnoea syndrome (OSAS). Besides being a serious risk for accidents, this disorder can hugely affect one's quality of life. Poor sleep quality entails feeling lack of energy, drowsiness, and problems with concentration and mood. Furthermore, many diseases are associated with or worsened by OSAS. The diagnosis of OSAS can lead to loss of the professional driving licence and the fitness-

for-work certification (Lee & Sundar, 2021). Road transport workers (both freight workers and passenger transport workers) often sit for long periods of time in un-ergonomic positions, load/unload (heavy) goods, and are exposed to vibration, combined with a lack of exercise, which often leads to MSDs. One interviewee revealed that workers in this sector often suffer from haemorrhoids and water retention and the sedentary nature of the work also creates accumulation of fat around the waist. A study carried out by Panteia in 2019 on safe parking places showed that there is a lack of safe and secure parking areas for trucks, which had an impact on allowing drivers access to suitable facilities to rest and take a break from work (European Commission, 2019).

Heavy lifting is another occupational risk in this regard especially during loading/unloading of vehicles, as lifting aids and ergonomic/safety equipment may not always be available. Road transport workers are also at risk of inhalation of vapours and fumes such as diesel exhaust and road dust, a carcinogenic mixture. This also occurs at sites where loading/unloading, weighing, cleaning and servicing containers and vehicles take place. Road transport workers also handle dangerous substances and can have accidents/spills (European Transport Safety Council, 2017; Industrial Compliance and Safety, 2021; Mathern, 2019).

An interviewee noted that in the rail sector exposure to hot or cold temperatures caused harmful effects for workers in the sector (particularly drivers), leading to reduced concentration or distraction, reduced vigilance, and fatigue or exhaustion (Interview).

Multiple sources suggest that transportation of gas and oil via pipelines is the safest means of energy transportation over long distances, compared to the transportation by rail or road (Green & Jackson, 2015). However, there are multiple threats such as corrosion, natural disasters, mechanical damage, leaks and explosions that can cause harm to pipeline workers (Bersani et al., 2010; Chen, 2020). As these pipelines contain toxic and hazardous chemicals, any failure can result in damage for the environment, as well as for the community surrounding the pipelines due to fires and explosions (Chen, 2020).

Due to the dangerous nature of this work, pipeline workers face many accidents due to many different factors. There are several accidents that can cause injuries such as fires and explosion, pipelines cut or hit by heavy equipment and vehicles, natural occurrences such as floods and lightning causing damage, welding flaws and equipment failure. These accidents can cause serious burn injuries, to the third degree, brain or head injuries, bone fractures, and back and spine injuries (Biby, 2020).

The exposure to gases, liquids, and hazardous chemicals, such as hydrofluoric acid, anhydrous ammonia and carbon dioxide, can cause great harm as well (Barter, 2020). Exposures to these chemicals can have different effects on the lungs and respiratory system, such as fluid accumulation in the lungs, damaged lung tissue, lung irritation and headaches, and many other claims (CDC, 2018; MSDH, 2001; Wisconsin Department of Health Services, n.d.). Furthermore, skin exposure to hydrofluoric acid and anhydrous ammonia can cause severe burns, skin ulcers and damage to the eyes (CDC, 2018; MSDH, 2001).

- **OSH risks in the water transport sector**

The water transport sector is one of the most physically demanding professions and the most dangerous environments exposed to heavy weather conditions (OSHwiki, 2015). The main OSH risks for the water transport sector include slips and falls, which can lead to broken bones, head injuries and even drowning, excessive noise due to noisy machinery on a vessel, long-term exposure to asbestos, which can cause lung disease, severe fibrosis, and even mesothelioma, burns from chemical hazards and exposure to UV radiation, which creates a risk of developing skin cancer due to exposure (Reinhold et al., 2019; Pierce | Skrabanek, 2016; Carter & Jepsen, 2014; European Commission, 2012).

- **OSH risks in the air transport sector**

Flight crew in aircraft are exposed to noise and vibrations resulting from the moving aircraft. Whole-body vibrations occur during the flight, especially when landing and taking off, or during turbulence. Poor seating with improper shock absorption and long sitting hours in the same position increase the risk of MSDs. Baggage handlers are also at risk of MSDs. They spend long hours on their feet working in awkward body postures, lifting heavy baggage from conveyors to carts and baggage containers for

transport to the plane. Lifting heavy baggage can lead to various ergonomic hazards, resulting in injuries (Schmitz-Felten, OSHwiki 2022).

Working long hours in a pressurised cabin may cause barotrauma during flight. Barotrauma is induced by pressure changes during ascent and descent in aviation, most commonly affecting the middle ear. Barotrauma can be painful, seriously affecting the concentration and working capability of the flight crew. Extremely dry cabin air is a further physical hazard for the flight crew. The relative humidity of aircraft varies from 25% to less than 2% during the flight. Low moisture in the air may lead to dry skin and eyes, and dry mucous membranes in the nose and throat, which can lead to upper respiratory tract infections. Cabin air may also contain germs and viruses, putting the cabin crew at risk of infection caused by breathing the same air as many people living in different geographical regions. Disinfection of aircraft cabins is required by several countries to reduce the accidental spread of parasites via air travel. Flight attendants are exposed to insecticides from spraying or treating the cabin (Schmitz-Felten, OSHwiki 2022).

Cosmic radiation comes from outside the solar system and consists of extremely energetic particles. Most cosmic radiation is adsorbed by the atmosphere. However, doses of cosmic radiation increase with altitude. Flying at higher altitudes common to long-distance flights can expose the flight crew to high levels of cosmic radiation. Flight crews are one of the most exposed professional groups, with annual average exposure at 2.4 millisievert in 2009. According to the German radiation protection monitoring programme, the annual average radiation dose is even higher than for medical staff working in radiology, with an average effective dose under 1.0 millisievert (Schmitz-Felten, OSHwiki 2022).

Flight crew and ground staff may also be occasionally exposed to jet fuel gases. Hazardous substances may enter the cabin air because of the bleed air system. Air is drawn from compressors in the engine and mixed with recirculated air from within the cabin that has passed through filters designed to remove bacteria and viruses. Defective engine seals can result in the release of engine oil into the cabin air. These oils contain ingredients such as tricresyl phosphate (TCP). TCP is suspected of causing aerotoxic syndrome, which is not yet recognised in medicine. Expert opinion differs on the question of TCP levels in cabin air causing neurological harm. Exposure to jet fuel exhaust gases is an issue for ground workers, especially airside due to their proximity to airplanes. Jet fuel exhaust is one of the main concerns at an airport, with a potential health impact, particularly on the respiratory tract. The main polluting substances in this environment are nitrogen oxides, carbon dioxide, carbon monoxide, volatile organic compounds including polycyclic aromatic hydrocarbons, sulfur dioxide, and fine and ultrafine particles (Schmitz-Felten, OSHwiki 2022).

Flight attendants are at risk of musculoskeletal injuries relating to the shoulder, neck and lower back. The risk is related to the amount of overhead reaching, lifting, pushing, pulling, bending and twisting, and working in awkward body postures. Areas of risk for musculoskeletal injuries include handling heavy carry-on baggage, overhead reaching required to get to items within the galley and to access the overhead bins, poor seating for flight attendants and long periods standing, as well as bending and squatting required to reach items within the trolleys and galley in a confined space (Schmitz-Felten, OSHwiki 2022).

Regarding ground staff, driving vehicles (including forklift trucks) or working with ground operations equipment put workers at risk of whole-body vibrations (or parts thereof). Exposure to high-frequency whole-body vibrations over years may cause balance disorders, visual disturbances, stomach problems, reduced fine motor skills or affect the spine. Hand-arm vibrations may cause circulation disorders in fingers (e.g. white fingers disease (or hand-arm vibration syndrome), degenerative changes of the hand bones, finger joints and wrists, as well as of the elbow and shoulder regions (vibration)).

Ground workers operating outside are also exposed to adverse weather conditions and lightning hazards. Workers especially at risk of lightning events include those maintaining airport premises (e.g. mowing grass or repairing runway lighting), those servicing aircraft on ramps (handling baggage, food service, refuelling, tugging and guiding aircraft from/to gates), and ramp agents. Since lightning strikes can cause serious injuries or death, it is important to provide timely alerts to airport personnel so that they can get to safety when lightning is imminent (Schmitz-Felten, OSHwiki 2022).

Aviation security screeners may also be exposed to X-rays while screening carry-on baggage, checked baggage or passengers. A survey performed by NIOSH showed that the radiation doses for baggage

screeners were low, suggesting that the shielding on the machines can be effective in limiting worker exposures. But improper safety equipment as well as improper working practices may lead to an elevated radiation dose. Laser scanners may injure the eyes (safety of machinery and work equipment) (Schmitz-Felten, OSHwiki 2022).

- **OSH risks in the warehousing sector**

Due to the varied nature of the activities in the warehousing and support activities for transportation sector, many different physical risks can be identified. Some risks can be specifically attached to one of the many activities within the sector, but some tend to be present across the entire sector. For instance, MSDs for workers in the sector are caused by heavy lifting, awkward/static working postures and long working duration. For aviation cargo works, an additional factor is the tight space they work in. These symptoms are, but not limited to, muscle strains, chronic lower back pain, shoulder injuries and many more. MSDs can be worsened due to the repetitive nature of the job as well as external factors such as fatigue and/or fast-paced working (IRU, 2017; EU-OSHA, 2018; Kania, 2018).

During the operation of heavy equipment, both operators and pedestrians may be at risk of an injury. If managed improperly, pedestrians may be hit by forklifts or operators may fall from the forklift, causing potential long-term injuries. Warehouse workers and cargo handlers are also exposed to a greater risk of being injured by heavy products cargo falling on them or alternatively falling from heavy duty equipment. The risk to injury is heightened by uneven or slippery floors or the usage of high platforms to load and unload cargo (IRU, 2017; EU-OSHA, 2018; OSHA, n.d.; Kania, 2018).

Freight containers are frequently fumigated with pesticides before shipping to protect cargo from being damaged during the long transport time and prevent the spread of unwanted organisms. Consequently, workers in the warehousing and support activities for transportation sector may face OSH risks from being exposed to the fumigated freight containers. The main types of gases workers may be exposed to include methyl bromide and phosphine, which may cause respiratory issues, including but not limited to cardiac failure, speech impairment, loss of memory and other long-term health effects. If warehouse facilities are poorly ventilated or are exposed to extreme heat, workers may be at risk of falling ill, which may include fainting. Alternatively, if warehouse workers work in refrigerated environments, this also may cause cold stress, including hypothermia and frostbite. Working in the cold may also contribute to worsening MSDs (IRU, 2017; EU-OSHA, 2018; OSHA, n.d.; Kania, 2018).

- **OSH risks in the postal and courier services sector**

There is an extensive amount of literature identifying the main OSH risks for postal and courier sector workers. Postal workers and especially couriers are particularly exposed to classic traffic hazards and risks as they spend considerable time driving (Christie & Ward, 2019; EU-OSHA, 2022b; Egozi et al., 2022; Harris Federal Employee Law Firm, 2016; Gregory, 2021; Van Belleghem & Bourgeois, 2004). Examples of these risks include (unexpected) traffic jams, roadblocks and route deviations, poor road conditions due to weather conditions, difficulties in finding the delivery address or finding a safe space to park, or, in other cases, self-infringements of traffic regulations. Couriers and delivery riders are also at risk of being hit by a vehicle when picking up or delivering goods (Van Belleghem & Bourgeois, 2004).

Most of the work of postal workers and couriers takes place outdoors, where they might be exposed to adverse or extreme weather conditions (rain, snow, extreme cold or heat, high wind, etc.) or high pollution levels (which can cause lung damage) (EU-OSHA, 2011a, 2022b; Van Belleghem & Bourgeois, 2004). This is particularly true for motorcycle and bicycle riders, who are more exposed to traffic and weather elements than car drivers (Gregory, 2021). As postal workers and couriers carry out their activities in any type of weather, a slip or fall is extremely common (Harris Federal Employee Law Firm, 2016). For instance, sidewalks and stairs that have not been cleared of snow can be very slippery and unsafe (Gregory, 2021).

Heavy lifting tasks are another important occupational cumulative risk within the postal and courier services, especially during loading and unloading vehicles and on delivery of parcels and goods (Egozi et al., 2022; EU-OSHA, 2011a, 2022b). In addition, lifting aids and ergonomic and safety equipment may not be available or the workers may depend on the equipment at the site of delivery. Also, the unforeseen shape or weight of the loads may make it difficult to lift or carry them in an ergonomically acceptable way (Van Belleghem & Bourgeois, 2004). Poor clothing or protective equipment, for instance in motorcycle couriers (e.g. helmet with reduced vision, weight of helmet, protective and high-visibility

clothing, etc.), or poorly maintained and poor safety/ergonomic conditions of the vehicle (van, motorcycle, bike) imply an additional occupational risk (Egozi et al., 2022; Gregory, 2021; EU-OSHA, 2022b).

Depending on the type of work, postal and courier/delivery workers may be sitting down for extended periods of time in a rather confined space, in static and awkward postures, and experience cumulative exposure to whole-body vibration and noise (Van Belleghem & Bourgeois, 2004).

Although less common, handling packages containing hazardous material can be dangerous for postal workers[10] if a parcel breaks and its contents get released (EU-OSHA, 2022b; Harris Federal Employee Law Firm, 2016). Parcel delivery workers may not know the content and value of the parcel, which could include hazardous or illegal items.

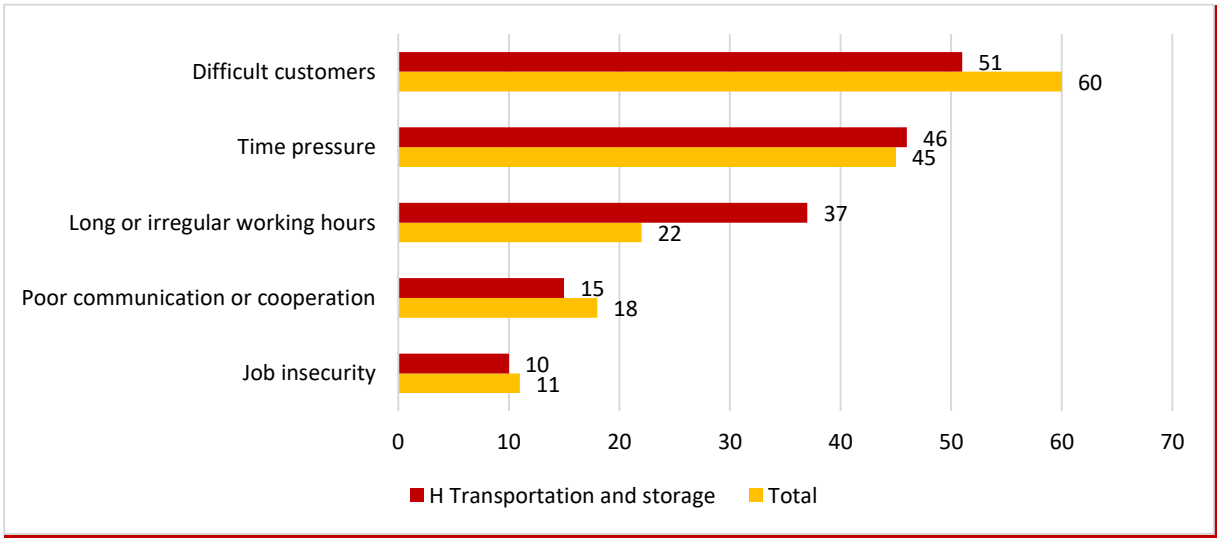
Dog attacks are also something that can affect postal workers and couriers (Harris Federal Employee Law Firm, 2016). For instance, in 2021 a total of 1,673 attacks were recorded across the United Kingdom, with an average of 32 every week, according to Royal Mail, and leaving a percentage of postal workers with permanent and disabling injuries (Sky News, 2022). In the United States, postal workers carry 'Back Off' — a dog repellent made with cayenne pepper extract.

Additionally, the increasing use of mobile phones at work (for instance, to make the driver reachable to respond to changes in routes and other information) may divert the attention of the driver or put them under additional strain (Christie & Ward, 2019; EU-OSHA, 2022b). For example, if they must take notes or consult a map, this increases the risk of being involved in an accident (Gregory, 2021).

2.3.2 Psychosocial and organisational risks

The ESENER 2019 survey results show that the most relevant psychosocial risk factors identified by establishments in the transportation and storage sector include, in order of importance, the need to deal with difficult customers, existing time pressures to do the work and, finally, the presence of long/irregular working hours (51%, 46% and 37% of the sector establishments identify these risks, respectively). The exposure to long/irregular working hours is significantly higher than for the total EU economy (22%). Other risks such as poor communication/cooperation within the organisation or fear of job loss are much less present (15% and 10% of sector establishments mention these elements).

Figure 4 Main psychosocial risks, transportation and storage sector and all sectors, EU-27, 2019 (%)

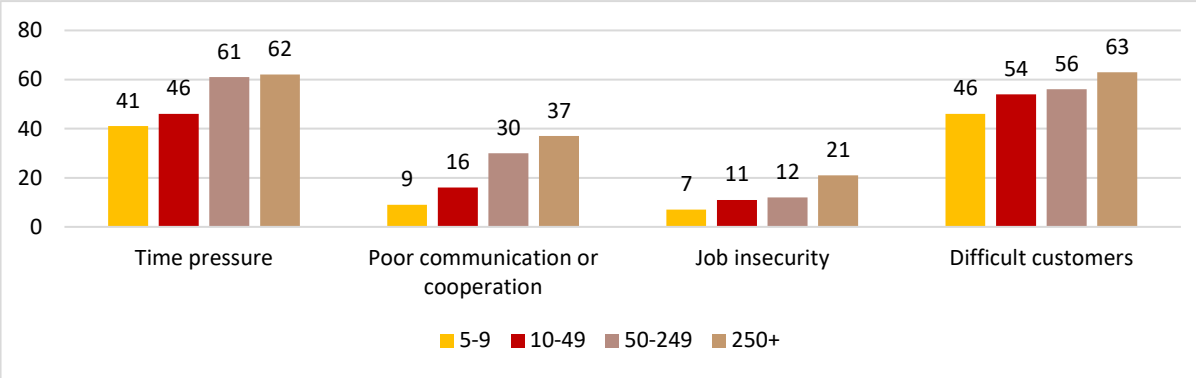


Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

[10] Just to give an example, the USPS was fined in 2016 over US$342,000 by OSHA for exposing Maryland postal workers to bloodborne pathogens in the United States (see: https://www.osha.gov/news/newsreleases/region3/12012016).

Similarly to general OSH risks and hazards, the ESENER 2019 survey also shows that large establishments are more sensitive to these types of risks, in the sense that they identify the presence of occupational psychosocial risk factors to a larger extent than smaller establishments.

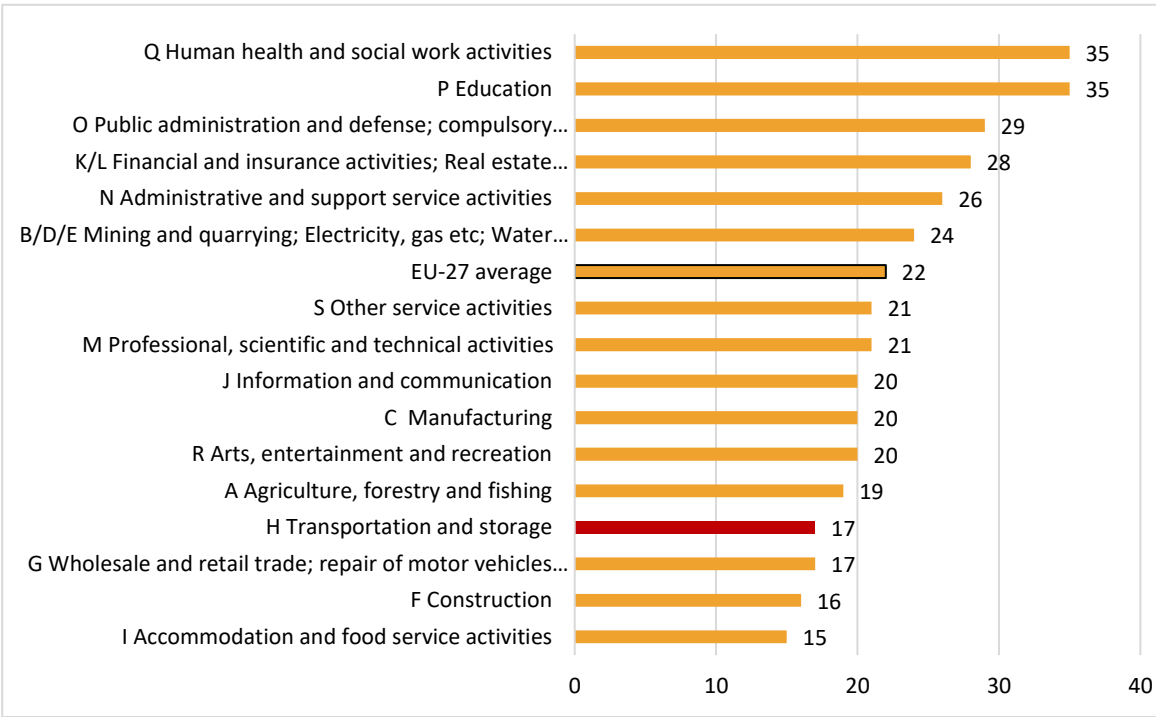
Figure 5 Selected psychosocial risks in the transportation and storage sector, by establishment size, EU-27, 2019 (%)



Source: IKEI/Panteia based on ESENER 2019

Finally, the ESENER 2019 survey results show that up to 11% of transportation and storage sector establishments suggest that psychosocial risks are easier to address than other risks, whereas 17% suggest that they are more difficult as opposed to the 22% share across all sectors (see Figure 6). While the difference with the average is not remarkable, findings suggest that the perception of difficulty when managing psychosocial risks is more often reported precisely among those establishments that are more active in preventing and managing them.

Figure 6 % of establishments that suggest that psychosocial risks are more difficult to address than other risks, by economic sector, 2019

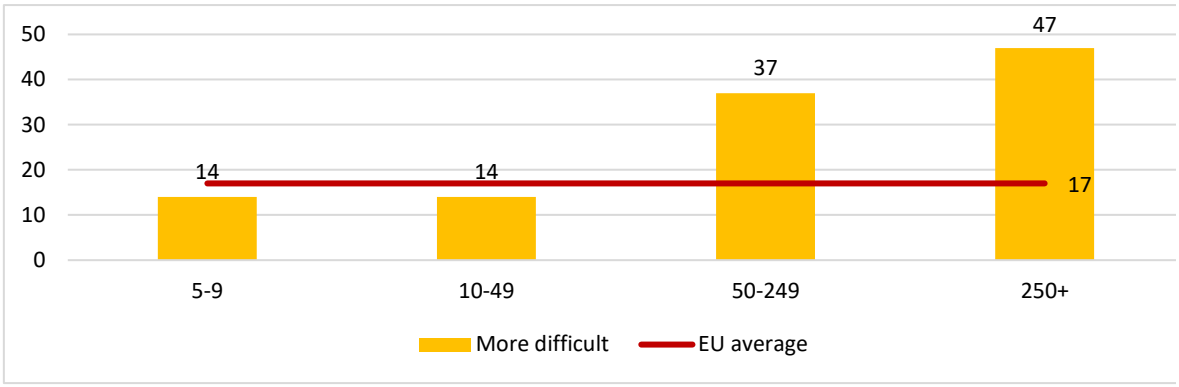


Base: Responses only of those establishments that have identified one or more psychosocial risks / Source: Panteia/IKEI based on ESENER 2019

When considering the size of establishments, larger establishments (250+ employees) suggest that psychosocial risks are more difficult to address than other risks. Around 47% of larger

establishments in the transportation and storage sector suggest these risks are more difficult to address in comparison to 14% of small establishments (5-49 employees).

Figure 7 Establishments in the transportation and storage sector that suggest that psychosocial risks are more difficult to address than other risks, by establishment size, EU-27, 2019 (%)



Base: Responses only of those establishments that have identified one or more psychosocial risks
Source: IKEI/Panteia based on ESENER 2019

Literature on the topic complements the previous results and identifies several noteworthy psychosocial risks for workers in the transportation and storage sector, resulting in some specific health outcomes (for a summary of these risks, see Table 9 and following descriptions based on sector).

Table 9 Examples of potential psychosocial and organisational risks in the transportation and storage sector

Sector	Examples of potential risk factors and health outcomes
Land transport	Stress at work; Risk of harassment and violence; Mental health issues
Water transport	High risk of (potentially serious) accident; Time pressure; High responsibility; Little influence on working/environment/traffic conditions; Work-related stress and burnout syndrome; Erratic work schedules that cause fatigue; Situations of harassment and bullying; Witnessing accidents on board can induce stress-related illnesses such as post-traumatic stress disorder; Remote and isolated work leading to loneliness, homesickness, separation from family; Lack of privacy in confined spaces
Air transport	Fatigue; Stress; Irregular working times; Night shifts; Adaptation for long-distance flying; Working away from home; Extreme responsibility and demanding tasks; Aggression from clients
Postal and courier services	High working rhythms/stress at work; Risk of harassment and violence at work; Poor income conditions, financial risk; Unsocial working hours/periods

Sources: EU-OSHA, 2011a, 2011b, 2011c;; CER & European Transport Workers' Federation (ETF), 2013; Office of Rail Regulation, 2014b; Fan et al., 2018; Blau, 2018; Reinhold et al., 2019; OSHwiki, 2015; Pierce | Skrabanek, 2016; Schmitz-Felten, OSHwiki 2022; Christie and Ward, 2019; EU-OSHA, 2022b; Egozi et al., 2022; Gregory, 2021; Janjevic et al., 2020

What is consistently seen (based on the review of literature and the in-depth interviews) is that workers in the transportation and storage sector are exposed to excessively intense work rhythms, which can lead to occupational diseases linked to both physical and psychosocial spheres. Therefore, the time required to perform any task, of any nature, must be estimated realistically and, consistent with the principles of health and safety, considering necessary breaks and all possible needs related to contingencies and the human factor (e.g. the accumulation of fatigue that may generate the need for longer or more frequent breaks), which are obviously part of working time (Interview). The following sections outline the various psychosocial risk factors that are evident in the individual subsectors.

- **Psychosocial and organisational risks in the land transport sector**

Stress at work is one of the main OSH issues for road transport sector workers. Road transport drivers are at risk of stress caused by time pressure, navigating heavy traffic, and confrontations with other road

users and/or customers. Due to the nature of the work, workers often work alone and have irregular hours, which also contribute to high levels of stress (EU-OSHA, 2011b, 2011c). Multiple studies also indicate that drivers experience mental health issues such as loneliness, depression, chronic sleep problems and anxiety-related issues. One such Australian study found higher rates of psychological distress in truck drivers than the general population (Hanowski et al., 1999). These issues are related to stressful working conditions, unhealthy lifestyles, poor-quality sleep and excessive fatigue.

Staff working in passenger transport services such as railway, bus and taxi services are potentially the most at risk of physical or psychological violence (EU-OSHA, 2011b, 2011c). These workers often work alone and have direct contact with clients, which contribute to the increase in violent incidents. There is some indication that these types of incidents largely go unreported due to fear of consequences for careers and a lack of reporting procedures and training. Besides physical incidents, many workers also experience verbal abuse, threats, intimidation, sexual harassment and stalking. After an incident the worker can suffer both mentally and physically as a result (Fan & Smith, 2018; EU-OSHA, 2011c; Blau, 2018).

The most common psychosocial risks and issues faced by employees in the railway sector, as identified by CER, are violence, harassment, addiction and work-related stress. Such risks pose both a serious threat to the employees' health and also to the performance of the company, having an economic impact on the employers and civil society. Stress is identified as a key health concern and can be costly for both the companies and the individuals. When work-related stress is not properly managed, it can lead to ill health or even an increase in human error in the workplace. Psychosocial risks can also lead to diseases and disorders such as hypertension, diabetes, MSDs, depression and mental exhaustion (CER & ETF, 2013; Office of Rail Regulation, 2014a).

One of the most prominent problems in the rail industry is rail fatigue. Fatigue is often caused by long working hours, big workloads, working late at night or early in the morning, or long exposure to noise. In this regard, noise levels are one of the working conditions in the railway sector that can lead to several health conditions. Workers are exposed to high background noise levels for several parts of their job, such as driving and performing loading and unloading when they board vehicles.

Box 2 'PSR-RAIL' project

During the 'PSR-RAIL' project in 2013, the joint CER/ETF study identified important factors (situations, conditions, etc.) liable to produce psychosocial risks in rail occupations. These factors were divided into six categories. Firstly, work demands, which includes risk related to technology (e.g. challenges from new vs old technologies), workload and time pressure (e.g. traffic or accidents causing delays), structure and communication (e.g. an increasing number of people (from different companies) to deal with to ensure smooth traffic management), and human resources (e.g. responsibility for an increasing number of team members). Secondly, emotional demands, which includes risks such as aggression and violence from passengers but also crisis management or handling money. Thirdly, autonomy with risks such as a lack of resources or interdependency due to work organised along a chain or responsibilities. Fourthly, social links/work relations, with risks relating to the deteriorating public image of railway companies and staff but also the solitary work conditions in the train. Fifthly, conflicting values, with risks related to, for example, the sanction culture vs the recognition of mistakes, known as the lack of 'no blame culture' in the industry. Lastly, socio-economic insecurity, related to, for example, reorganisation and structural changes of rail companies or a lack of information.

Source: CER & ETF, 2013

- **Psychosocial and organisational risks in the water transport sector**

Per sector within the maritime sector (passenger shipping, classic inland shipping, tanker shipping and merchant shipping), the psychosocial risks can be different, based on the circumstances in which employees work. One interviewee revealed that mental health problems are the most common occurrence in workers in the water transport sector. The main psychosocial issues in water transport are:

- work-related stress: depression, burnout syndrome;
- working times: erratic work schedules that cause fatigue;
- situations of harassment and bullying;
- accidents on board: witnessing another person experience a severe accident can induce stress-related illnesses such as post-traumatic stress disorder;
- remote and isolated work: loneliness, homesickness, separation from family; and
- confined spaces: lack of privacy.

Stress can arise from the pressure to be on time at ports, especially the workload associated with this for people who work with containers. Working with people and working with goods can cause different stress factors. Weather conditions can also negatively impact the mental health of sailors. Fatigue is also a large factor. Long working days are prevalent, and sailing times can be 14, 18 hours or continuous. Some companies in this industry therefore ensure that the captains are not alone while sailing to ensure that they stay awake, although this is not standard everywhere.

People are at sea for a long time, which also creates many psychosocial risks. Many family businesses functioned in traditional inland shipping, which meant that the people on board were usually relatives of each other, but that is also becoming less and less (Interview). The language barriers created by multicultural crew can also cause psychosocial problems, as it can lead to feelings of isolation and homesickness for family and home. For instance, in passenger shipping, there are many Filipinos who get a sense of isolation because they are far from home, are financially dependent on their job and encounter language barriers.

- **Psychosocial and organisational risks in the air transport sector**

Flight crew members, including pilots and flight attendants, are exposed to several risks and hazards due to work organisational factors. They work in shifts that involve irregular hours, working weekends and public holidays, and spending time away from home, which adversely affect family responsibilities and leisure activities, and may result in stress and fatigue. The aircraft turnaround process is critical for airlines because they are only able to make profit when passengers and cargo are transported. For that reason, all turnaround activities must be performed in the shortest time possible (a precise and choreographed sequence of events to ensure aircraft depart on schedule as soon as possible) (Interview). This causes time pressure for the workers, leading to negative effects such as: lack of concentration, inadequate decisions, errors, incomplete tasks and stress. Ground staff experience stress for several reasons: in addition to time pressure, work-related stress factors are shift work, high workload, gate changes, early or late arrivals, changes in procedure and equipment malfunction (Schmitz-Felten, OSHwiki 2022).

Flight crews flying on long-haul flights are exposed to changes in working time and sudden climatic changes, followed by changes in circadian rhythm, which leads to several symptoms known as jet lag. Jet lag and night flight may cause extreme fatigue and thus decreased performance and alertness. Also, pilots' anti-social working hours and continuously changing schedules present barriers to maintaining 'healthy lifestyle' routines and accessing help if needed. The flight attendants may also experience violence from distressed or dissatisfied passengers. Passengers who behave in a violent or distressed manner can be a serious threat and a hazard to health and safety for cabin and flight crew and other passengers. Violence from aggressive passengers is also a serious issue for check-in workers. The overbooking policy of some airlines leads to increasing verbal and physical attacks by passengers. According to one interviewee, workers often must deal with frustrated passengers (who can only talk to these ground workers, as the only representatives of the company they can see) (see also Schmitz-Felten, OSHwiki 2022).

Pilot, co-pilot and flight engineers suffer from high stress levels in their workplace. They perform a highly demanding job that requires high levels of knowledge and expertise, and high levels of responsibility for the safety of many passengers. Operating an aircraft overnight, flying in bad weather or in a high-density traffic area, and keeping their flights on time are the most common causes of high pressure for the cockpit crew. Based on one interview, the productivity of pilots has increased a lot over the last 15 years, and their stress levels are also increasing. Stress also affects the performance of other workers in the sector and may cause fatigue. One interviewee indicated that jobs are stressful, mainly because of fast and precise procedures, but also because workers deal with extremely expensive aircraft, and the minimum mistake could have a huge economic impact (see also Schmitz-Felten, OSHwiki 2022).

Box 3 Differences in procedures among airlines

According to an interviewee, work processes among ground operations airside are extremely complex. Low-skilled workers must comply with these very complex routines. A peculiarity, which makes things more complicated, is that each airline company has its own routines/processes, even at the same airport. The ground and air cargo handling industry must adapt to the requirements of each airline (each airline interprets safety requirements in its own way).

Source: Interview

- **Psychosocial and organisational risks in the postal and courier services sector**

The existing demand for fast deliveries and payment per delivery puts extra stress on couriers particularly and increases the risk of having an accident (Egozi et al., 2022; EU-OSHA, 2022b). Thus, courier workers may adopt a series of risky/unsafe traffic behaviours and may bypass basic health and safety principles to meet customers' expectations of rapid deliveries, earn more money and avoid the hefty fines imposed by companies in case of delays (EU-OSHA, 2022b; Janjevic & Winkenbach, 2020). Christie and Ward (2019) found that young people are especially likely to do so. Additional elements such as short-term changes in tasks, the use of remote monitoring/contact systems (drivers receive orders while driving) and long working hours increase existing work pressure (EU-OSHA, 2022b).

Postal and courier workers who deal with clients are particularly exposed to physical or psychological violence and may be victims of assault and robbery (Christie & Ward, 2019; EU-OSHA, 2022b). Thus, they are often first in line to handle complaints from clients who might not be satisfied with the service provided (for example, wrong parcel or long delivery time). Courier workers may also be exposed to other forms of violence and aggression, for example, running the risk of being robbed or exposed to road rage (for instance, some drivers' hostility towards bike riders in general) (Gregory, 2021).

Poor remuneration levels are an important issue, particularly among delivery riders (EU-OSHA, 2022b). In this sense, payments might be based on delivery volumes rather than a fixed weekly/monthly rate or the number of hours spent on the job, which implies an added incentive to 'push' work and accept more orders and ride faster. A study among on-demand food couriers in Edinburgh showed that none of the riders interviewed had the capacity to save or put money aside were an accident to occur. Nor did any worker interviewed currently have a pension or retirement fund (Gregory, 2021).

In the case of delivery riders, delivery demand rises during holidays, weekends and evenings (when daytime workers return home), so peak working times for delivery workers coincide with those periods of the month/year when others relax and spend time with their families (Heiland, 2021).

It is interesting to stress that some of these physical and psychosocial risks may combine themselves to increase existing risks. For instance, several authors suggest that such combinations tend to increase in increment weather (e.g. heavy snow, pouring rain, high wind, stifling humidity or scorching heat) when people are less willing to go out to shops or restaurants. This means that delivery workers tend to face more extreme weather conditions than other travellers (Heiland, 2021).

2.4 Health outcomes within the transportation and storage sector

The exposure of transportation and storage sector workers to physical, ergonomic, safety and psychosocial risk factors results in a series of health outcomes. These outcomes often differ due to the broad nature of the sector, and the variety of activities and situations per subsector. The previous results can be complemented with information stemming from the European Statistics on Accidents at Work (ESAW)[11] elaborated by Eurostat, which allows the quantification of the impacts of these OSH risk factors in terms of accidents at work.

Based upon the available data, it can be said that the transportation and storage sector is a relatively dangerous sector. For instance, in 2020 the transportation and storage sector had the third highest number of fatal accidents in the EU (15% of all fatal accidents), following the construction and manufacturing sectors. The transportation and storage sector incidence rate was 2,351 non-fatal accidents per 100,000 workers in 2020 in comparison to 1,444 in the total economy. The presence of fatal accidents was also higher than for the rest of the economy, as in 2020, the incidence rate of fatal accidents per 100,000 workers in the transportation and storage sector was 4.62 versus 1.77 on average for the whole economy.

[11] See Eurostat: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_at_work_statistics

Table 10 Incidence rate of accidents at work, transportation and storage sector activities vs all activities, EU-27, 2014-2020

Year	Non-fatal accidents		Fatal accidents	
	Transportation and storage sector	EU total	Transportation and storage sector	EU Total
2014	2,877.97	1,706.46	6.17	2.00
2015	2,791.34	1,668.02	6.13	2.01
2016	2,745.28	1,718.32	5.89	1.84
2017	2,964.16	1,703.77	5.66	1.79
2018	2,924.09	1,659.09	5.48	1.77
2019	2,865.78	1,603.13	4.84	1.74
2020	2,350.52	1,443.55	4.62	1.77

Source: Eurostat, European Statistics on Accidents at Work (ESAW)

In total numbers, the transportation and storage sector experienced in 2020 a total of 231,030 accidents at work, where 481 of these were fatal. All in all, accidents in the transportation and storage sector represented 8.4% of the total accidents at work registered in the EU in 2020, whereas fatal accidents represented 14.3% of the total. The growing employment within most subsectors (see Table 5) went hand in hand with rising numbers of accident cases (see Table 13 and Table 14), therefore the non-fatal accident rates did not substantially change until the COVID-19 epidemic, which had a different effect on the subsectors. The decreasing rate in fatal accidents is mostly due to better figures in land transport, which has the highest weight (see Table 14). Road traffic fatalities are decreasing in the EU. Ever safer vehicles and highways, together with the initiatives of the EU, may play an important role in this favourable trend. The continuation thereof is expected as the Vehicle General Safety Regulation is entering into force.

Table 11 Number of accidents at work in the transportation and storage sector and percentage over the total number of accidents at work, EU-27, 2014-2020

Year	Number of accidents in transportation and storage sector			% over total number of accidents		
	Non-fatal	Fatal	Total	Non-fatal	Fatal	Total
2014	241,742	570	242,312	8.0	16.0	8.0
2015	245,403	585	245,988	8.1	16.1	8.1
2016	242,712	562	243,274	7.8	16.8	7.8
2017	272,744	558	273,302	8.8	17.1	8.8
2018	280,234	557	280,791	9.0	16.7	9.0
2019	281,971	511	282,482	9.0	15.0	9.0
2020	230,549	481	231,030	8.4	14.3	8.4

Source: Eurostat, European Statistics on Accidents at Work (ESAW)

Meanwhile, and concerning the distribution of accidents at work according to type of injury, most accidents in the transportation and storage sector result in dislocations, sprains and strains, concussions and internal injuries, and wounds and superficial injuries. It is worth noting the relatively high number of effects of sound, vibration and pressure in relation to the total economy (19.7% of all accidents relating to these effects across the economy).

Table 12 Accidents at work according to type of injury, all NACE activities and transportation and storage sector in the EU-27, 2020

Number of accidents	Transportation and storage sector	Total - all NACE activities	% of the total
Wounds and superficial injuries	43,791	732,924	6.0
Bone fractures	26,481	288,538	9.2
Dislocations, sprains and strains	65,907	675,115	9.8
Traumatic amputations (loss of body parts)	658	11,638	5.7
Concussions and internal injuries	56,522	508,493	11.1
Burns, scalds and frostbites	1,018	38,643	2.6
Poisonings and infections	1,595	158,820	1.0
Drownings and asphyxiations	89	1,020	8.7
Effects of sound, vibration and pressure	1,211	6,148	19.7
Effects of temperature extremes, light and radiation	283	5,513	5.1
Shocks	13,202	98,824	13.4
Multiple injuries	2,716	23,359	11.6
Other not elsewhere mentioned	5,030	68,376	7.4
Unspecified	12,527	121,512	10.3
TOTAL	231,030	2,238,923	10.3

Source: Eurostat, European Statistics on Accidents at Work (ESAW)

The following table provides an overview of the number of non-fatal accidents at work per year based on subsector. As can be seen, land transport activities account for the most accidents at work in the EU (129,513 non-fatal accidents in 2020 in a sector that employed 5,682,218 people), followed by warehousing and support activities (53,496 non-fatal accidents in a sector that employed 2,440,000).

Table 13 Non-fatal accidents at work according to subsector in the EU-27, 2014-2020

	2014	2015	2016	2017	2018	2019	2020
Land transport	140,050	140,928	136,849	147,884	153,009	154,345	129,513
Water transport	3,147	2,906	2,529	3,357	3,443	3,761	2,365
Air transport	11,523	11,307	11,526	11,711	10,439	11,068	4,475
Warehousing and support activities	48,710	52,307	51,857	62,542	65,703	65,605	53,496
Postal and courier activities	38,312	37,954	39,952	47,251	47,641	47,191	40,699

Source: Eurostat, European Statistics on Accidents at Work (ESAW)

Aircraft are also hazardous working environments, especially when moving. Flight attendants are exposed to a high risk of injury through handling heavy baggage, unsafely stored baggage, overhead bins, service trolleys, air stair doors, and slips, trips and falls. Conditions such as turbulence make the on-board environment more dangerous and are the underlying cause for most of the injuries (Schmitz-Felten, OSHwiki 2022). Airport ramps are unique and potentially hazardous work environments. Servicing, maintaining and supporting aircraft operations must be carried out in all kinds of weather, and under time pressure to meet airline schedules. Ramps are busy places of work, noisy and full of vehicles, for example, passenger buses, mobile lounges, fuel trucks, aircraft tugs, aircraft and baggage tractors, and dolly carts.

Workers face many potential hazards, particularly from the movement and operation of aircraft and ground vehicles. Ramp accidents are one of the biggest problems in the air transport industry. Typically, accidents happen when workers are struck by moving objects or crushed. Slips, trips and falls are caused by obstacles on the ramp such as chocks, ground power units, cables, towbars, bonding cables, fuelling hoses and spilt liquids. The most frequent types of injuries are sprains and strains, bruises and contusions, fractures, cuts, lacerations and punctures. Fatal accidents also occur. Aircraft propellers have the potential to cause serious accidents (Schmitz-Felten, OSHwiki 2022; Stolzer et al., 2011).

Many non-fatal incidents in the postal and courier sector, especially threats, simply go unreported because there is no coordinated recording system to process this information or because the workers involved, for example courier services, cannot afford to lose the time to report the incident (EU-OSHA, 2011a). When looking at the number of fatal accidents at work, once again these are most prevalent in the land transportation sector. It should be noted that for the postal and courier sector only, there was a large increase in the number of fatal accidents in the year 2020 when compared to 2019. This may be due to the COVID-19 pandemic when home delivery activities rose and many 'outsiders' from other sectors changed jobs to courier.

Table 14 Fatal accidents at work according to subsector in the EU-27, 2014-2020

	2014	2015	2016	2017	2018	2019	2020
Land transport	458	462	452	445	465	410	380
Water transport	13	11	9	9	5	11	4
Air transport	13	14	11	3	5	10	6
Warehousing and support activities	67	80	70	71	67	64	60
Postal and courier activities	19	18	20	29	14	15	32

Source: Eurostat, European Statistics on Accidents at Work (ESAW)

Of the establishments surveyed in ESENER 2019, 7% in the transportation and storage sector indicated in 2019 that absence due to sickness had increased over the past three years, compared to 10% of the total economy. Larger establishments were relatively more likely to indicate that sickness absence had increased compared to smaller establishments. Regarding whether absence due to work-related accidents had increased over the past years, 2% of establishments in the sector indicated this compared to 3% of the total economy.

MSDs are also a common health outcome for workers in the transportation and storage sector. For instance, in the postal and courier sector, daily delivery work exposes postal workers and couriers to several work-related physical, ergonomic and psychosocial risks that may harm their health. In this sense, one of the most common health outcomes refers to a high presence of MSDs (particularly low-back pain) due to several factors such as cargo handling, repetitive movements, vibration and awkward postures, or high stress levels during the workday (Christie & Ward, 2019; Egozi et al., 2022; Silva et al., 2022). Indeed, according to one study conducted in Israel among couriers, 37% of them reported musculoskeletal pains at least once a day (Egozi et al., 2022). An interviewee also underlined the increasing importance of musculoskeletal issues, particularly among aged workers. Another relevant health outcome refers to 'pneumothorax' problems in young two-wheel courier workers, due to the combination of vibration, awkward and static postures, and climatic conditions (cold) (Van Belleghem & Bourgeois, 2004).

Similarly, workers in the air transport sector are also susceptible to MSDs, as indicated in Table 15.

Table 15 Specific air transport occupations particularly affected by MSDs

Specific occupations	Description
Freight workers	Workers on the ground moving freight on and off airplanes are required to push, pull, load and perform other strenuous motions, putting them at risk for chronic pain and acute musculoskeletal injuries. Fatigue can be especially dangerous for freight workers, as they operate forklifts and other equipment that can cause serious injuries.
Baggage handlers	Baggage handlers carry heavy luggage for up to 8-9 hours per day, often in narrow-body aircraft with small, awkward cargo holds. Workers reach and lift while their backs are bent due to the awkward spaces and they move very heavy weight (according to some estimations, baggage handlers lift five to 10 bags per minute, each of which weighs between 35 and 70 pounds on average). These workers are constantly at risk for MSDs.
Flight attendants	Flight attendants are responsible for assisting passengers during boarding and disembarking, as well as standing behind desks for long periods. They handle carry-on baggage through aircraft, lifting overhead into storage bins and bending to access bags and stored equipment during flights. Chronic fatigue is a common issue, and poor biomechanical technique can cause MSDs and similar afflictions (Lombardo, 2019). Stress is also very common among these workers, since they deal with difficult passengers and long trips through the air several times each day.

Source: Lombardo, 2019

For instance, there is a high prevalence of serious health conditions among road transport workers. Long working hours, atypical working and the unhealthy lifestyle associated with haulage drivers can result in various health conditions such as: obesity, cardiovascular disease, sleep disorders and diabetes. Due to the heavy lifting involved in loading and unloading vehicles, in addition to sitting for long periods of time in un-ergonomic positions, there is also a high rate of MSDs. Exposure to substances such as diesel fumes has been linked to the development of lung cancer and prostate cancer (Mathern, 2019).

Another example includes the prevalence of mental health issues among pilots in the air transport sector. Pilots experience many physical, emotional and environmental stressors. Recent research indicates that given the demands of the job (i.e. anti-social work hours, disturbed sleeping patterns/fatigue, etc.) and nature of the work (i.e. sedentary work, with little or no physical activity, mix of high and low stress periods, isolation), pilots are potentially more at risk for developing mental health issues. Thus, several studies have focused on measuring the prevalence of depression and other common mental disorders in pilots, along with investigating the work-related factors that contribute to depression. For instance, a 2016 study of pilot mental health found that 12.6% of respondents met the threshold for experiencing depression in the last fortnight (Wu et al., 2016). Meanwhile, a recent systematic review of 20 studies examining depression in commercial pilots found that the prevalence of major depressive disorder ranged from 1.9% to 12.6% (Pasha & Stokes, 2018). In this regard, some authors suggest that many pilots have normalised high work-related stress levels and associated mental health problems and often fail to identity that they are suffering (Cahill et al., 2020).

3. OSH Management in the transportation and storage sector

3.1 Introduction

In this chapter, the OSH management practices that exist within the transportation and storage sector are analysed. Focus is specifically on the extent and characterisation of workplace risk assessments and the reasons cited by establishments for not regularly carrying out these assessments. Next, the preventive measures to cope with OSH risk factors are presented, including general health promotion measures and specific measures for preventing OSH risk factors.

Information is also provided on how establishments in the sector utilise health and safety services and external providers, including the arrangement of regular medical examinations to monitor the health of employees, or the use of OSH information from external organisations. Additionally, information is provided regarding the extent to which OSH issues are discussed and OSH-related training takes place at different management levels and on the work floor. Where possible, information over time is provided for the three ESENER surveys.

3.2 Presence and characterisation of risk assessment practices

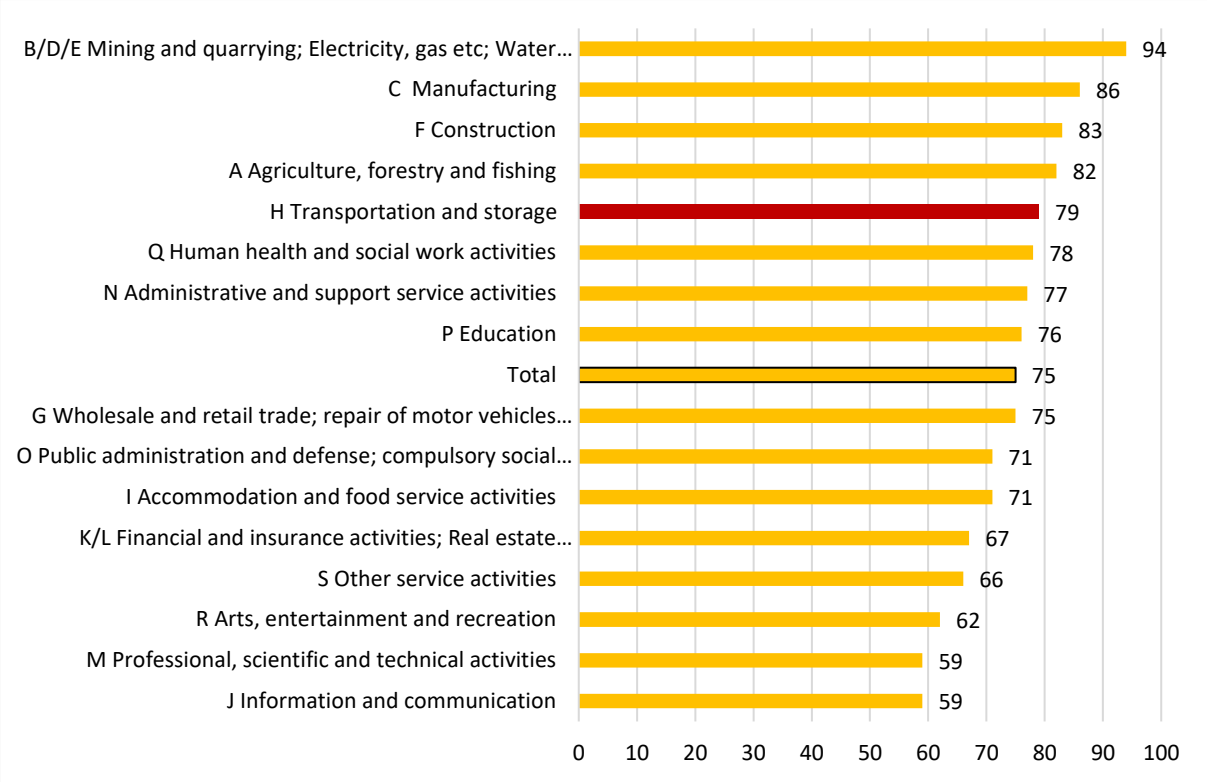
3.2.1 Presence of risk assessment practices

One of the basics of successful OSH management in an organisation is carrying out (regular) risk assessments. It is considered the most important instrument for ensuring safe and healthy workplaces. OSH workplace risk assessments are a comprehensive method for identifying workplace-related risk factors that have the potential to cause harm, analysing, evaluating and prioritising the importance of these risks and the occupational groups affected by them and, finally, upgrading/prioritising/proposing new appropriate ways to eliminate or control these risks. Due to this, risk assessments are considered a vital element within any OSH management plan and are the foundation of the European approach to OSH, as specified in the EU Framework Directive on Safety and Health at Work (Directive 89/391/EEC).[12]

According to ESENER 2019, around 79% of transportation and storage sector establishments in the EU-27 regularly carry out workplace risk assessments. This share is slightly above the EU-27 average (75%), but below other sectors such as Mining and quarrying (94%), Manufacturing (86%), Construction (83%), and Agriculture, forestry and fishing (82%).

[12] See: https://osha.europa.eu/en/legislation/directives/the-osh-framework-directive/the-osh-framework-directive-introduction

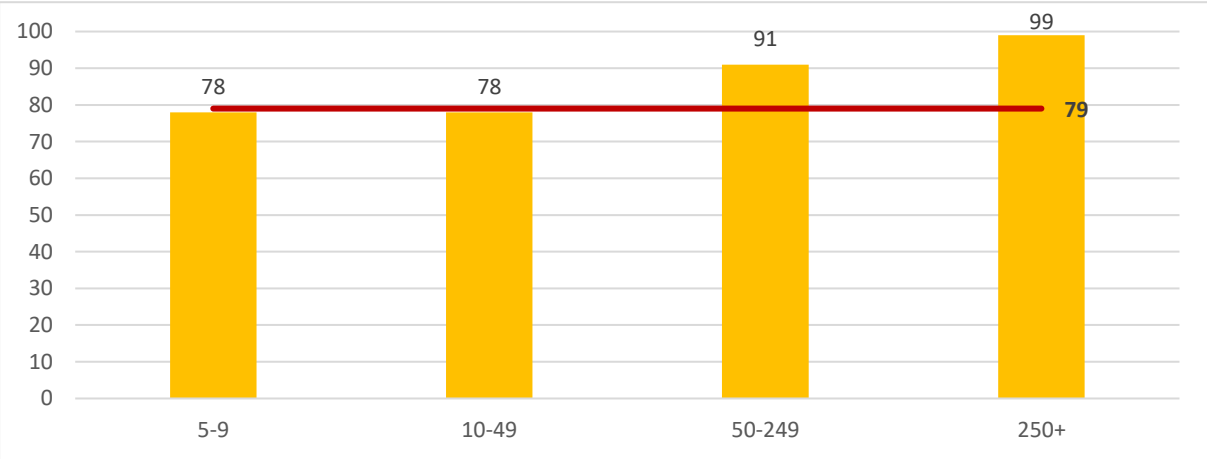
Figure 8 Share of establishments that regularly carry out workplace risk assessments, by sector, EU-27, 2019 (%)



Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Data by size class show that the larger the establishment the more likely it is that this type of assessments are carried out, as expected. Around 78% of micro and small establishments reported carrying out workplace risk assessments, this share progressively increasing up to 91% among medium-sized establishments and 99% among large establishments (250 and more employees).

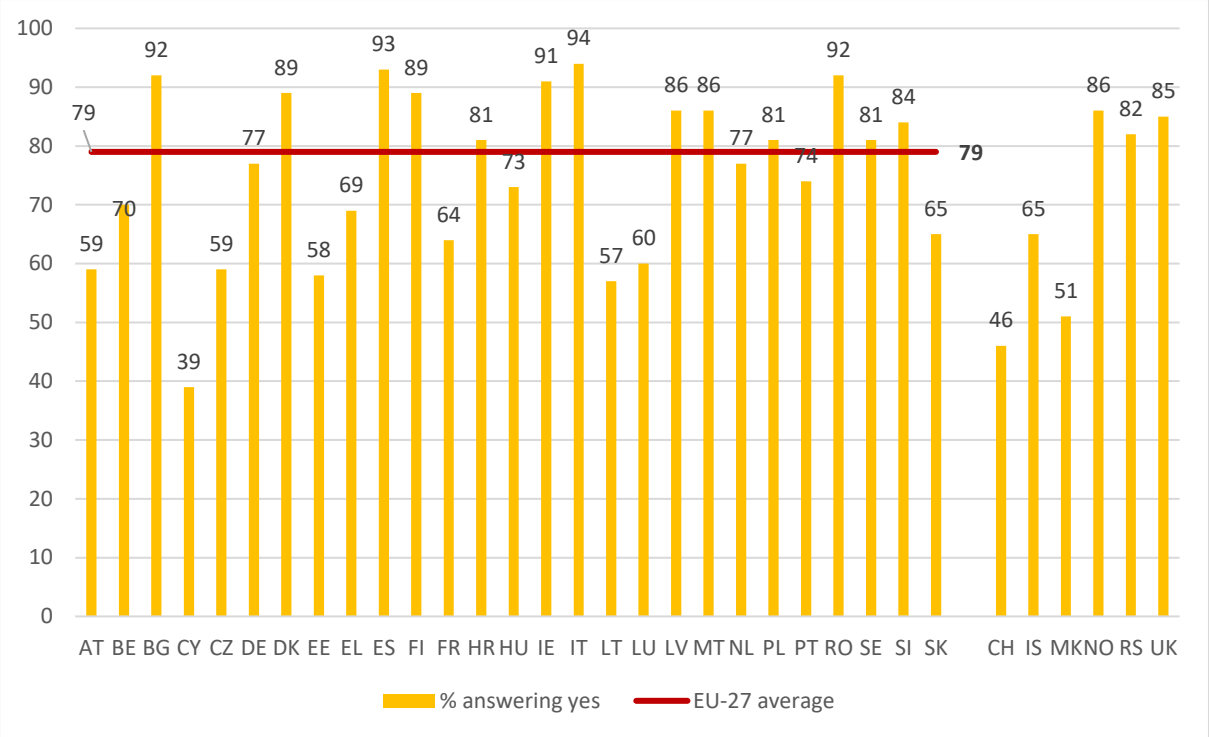
Figure 9 Share of establishments in transportation and storage that regularly carry out workplace risk assessments, by establishment size, EU-27, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The available data show significant variations among Member States. The largest shares of establishments that regularly carry out workplace risk assessments can be found in Italy (94%) followed by Spain (93%), whereas 39% of establishments in Cyprus report regular workplace risk assessments.

Figure 10 Share of establishments in transportation and storage that regularly carry out workplace risk assessments, by country, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

There are positive examples of successful risk assessment practices based on the literature review. Regarding the air transport sector, due to growing research in fatigue in aviation and significant advancements of sleep studies, the aviation industry has reviewed and adapted the flight limitations. In February 2016, the European Aviation Safety Agency implemented new rules known as Flight Time Limitations and presented them in Regulation 83/2014 on Flight Time Limitations.[13] Thus, changes related to flight duty periods, rest times and a redefinition of terminology were implemented. The regulation also stresses that all aircraft operators must implement fatigue risk management (FRM) practices and fatigue training for all staff directly involved in flight operations. Moreover, operators must provide evidence to the authorities that these measures have been taken.

Box 4 Elements to be included in fatigue risk management

1. A description of the philosophy and principles of the operator regarding FRM, referred to as the FRM policy.
2. Documentation of the FRM processes, including a process for making personnel aware of their responsibilities and the procedure for amending this documentation.
3. Scientific principles and knowledge.
4. A hazard identification and risk assessment process that allows managing the operational risk(s) of the operator arising from crew member fatigue on a continuous basis.
5. A risk mitigation process that provides for remedial actions to be implemented promptly, which are necessary to effectively mitigate the operator's risk(s) arising from crew member fatigue and for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions.
6. FRM safety assurance processes.
7. FRM promotion processes.

Source: Regulation 83/2014 on Flight Time Limitations

Similarly, on ships regulative requirements are valid as for other working environments: enterprises must conduct a risk assessment and notify employees of the occupational hazards, the results of the risk

[13] It did so by amending Regulation (EU) No 965/2012 laying down technical requirements and administrative procedures related to air operations. See: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2014:028:0017:0029:EN:PDF

assessment and of the measures to be implemented to prevent damage to health. Maritime safety depends not only on humans and organisations but also on technical components of the ship system, the marine environment factors, as well as the implementation of the proactive safety management system (Reinhold et al., 2019). The literature review shows the importance of these risk assessment practices, as well as the existing legal obligations and then the limitations of some of these assessment practices, with one labour inspector noting that the quality is varied. The main shortages are inadequate levels of risk, absence of assessment of certain occupational hazards, weak connection of usage of personal protective equipment (PPE) and outcomes of risk assessments. Some ship owners do not perceive the importance of risk assessment to avoid occupational accidents and diseases (Reinhold et al., 2019).

Box 5 Weaknesses of risk assessments in the maritime sector

The above-mentioned weakness of risk assessments in the maritime sector were confirmed by an interview with an occupational health physician in the context of a 2019 study: The quality of existing risk assessment varies. It is possible to say that the main weaknesses of the risk assessment are absence of exposure assessment (measurements), unsystematic evaluation and assessment of health risks as well as insufficient assessment of psychosocial and chemicals risks. As opposed to other sectors, the family doctor can also conduct the workers' health examination in the maritime sector. In this situation, sometimes, it means that workers' health examinations are performed without necessary relation to risk assessment and exposure assessment of the hazards in the workplace.

Source: Reinhold et al., 2019

3.2.2 Characterisation of risk assessment practices

This subsection provides further information regarding the characteristics of these risks assessments that are carried out. This includes topics such as the person carrying out the assessments, the elements that are routinely assessed, the type of workplaces assessed and the type of employees included, the frequency of these risks assessments or whether written documentation is stored.

ESENER 2019 data show that 46% of transportation and storage sector establishments indicate that these risk assessments are contracted to external providers, whereas 39% are conducted by internal staff and 14% by both equally. Looking at the Member State level, there are notable differences, with 80% of Spanish establishments using external providers whereas this figure is only 16% for French and Danish establishments. The most common topics that are routinely evaluated in workplace risk assessments are the safety of machines (85%, slightly above the EU-27 average of 83%), as well as dangerous chemical or biological substances (79%) and work postures and physical working demands (78%). Establishments in the transportation and storage sector are more likely to cover workplaces at home (34%) and workplaces outside the premises of the establishment (75%) when compared to the total economy (31% and 65%, respectively), which is to be expected given the nature of the work in the sector.

Forty per cent of establishments with additional persons besides employees on the payroll (subcontractors, temporary agency workers, volunteers) only cover employees on the payroll within their risk assessments, which is lower than for the EU-27 economy (47%), and 83% of the sector establishments confirm that they have conducted their risk assessments in the last two years (slightly higher percentage when compared to EU-27 establishments). Additionally, 94% of transportation and storage sector establishments have documented their risk assessments in written form, which is slightly higher than for all EU-27 establishments (92%).

Table 16 Characterisation of risk assessment practices, transportation and storage sector and all sectors, EU-27, 2019 (%)

	Transportation and storage sector	Total
Main actors involved in their elaboration:		
- Conducted mainly by internal staff	39	42
- Contracted mainly to external providers	46	47
- Both about equally	14	11
Topics routinely evaluated:		
- Safety of machines	85	83
- Dangerous chemical or biological substances (*)	79	86
- Work postures, physical working demands	78	75
- Exposure to noise, vibrations, heat or cold	62	62
- Supervisor–employee relationships	58	55
- Organisational aspects such as work schedules	73	66
Cover workplaces at home (**)	34	31
Cover workplaces outside the premises of establishment (***)	75	65
Cover only people on the payroll (****)	40	47
Carried out in the last two years	83	81
Documented in written form (*****)	94	92

Base: Information from transportation and storage sector establishments that regularly carry out risk assessments
(*) Only establishments reporting the presence of chemical or biological substances as a risk
(**) Establishments where any of the employees regularly work from home
(***) Establishments where any of the employees work anywhere else outside the premises of the establishment
(****) Establishments where additional persons besides employees on the payroll work in the establishment (subcontractors, temporary agency workers, volunteers)
(*****) Responses refer only to the most recent workplace risk assessment carried out by an establishment
Source: Panteia/IKEI based on ESENER 2019

By including establishment size considerations, it is possible to identify an increasing share of establishments that routinely evaluate different topics according to size. For example, 57% of micro establishments that regularly carry out risk assessments report routinely evaluating exposure to noise, vibrations, heat or cold, whereas this percentage goes up to 72% among medium-sized establishments and 91% among large establishments.

Table 17 Type of aspects that are routinely evaluated in workplace risk assessments in the transportation and storage sector by establishment size, EU-27, 2019 (%)

Enterprise size	Safety of machines	Dangerous chemical or biological substances (*)	Work postures, physical working demands	Exposure to noise, vibrations, heat or cold	Supervisor–employee relationships	Organisational aspects such as work schedules
5-9	84	68	74	57	54	70
10-49	84	79	79	63	60	74
50-249	90	93	84	72	64	80
250+	94	96	94	91	66	79
Total transportation and storage sector	85	79	78	62	58	73

(*) Only transportation and storage sector establishments that identify chemical or biological substances as a risk
Base: Information from transportation sector establishments that carry out regular risk assessments / Source: Panteia/IKEI based on ESENER 2019

The literature review shows that there is a variety of practices across the various sectors, ranging from extensive to minimal. For instance, regarding the presence of risk assessment practices in the fumigation of container ports, there are limited risk assessment practices. Few Member States seem to have detailed and adequate guidelines on how to handle freight containers that may be fumigated. One report however has found that various organisations and employers have made guidelines available in regard to the safe handling of fumigated ports (EU-OSHA, 2018). As another risk assessment practice, samples/measures of fumigants are mainly taken by probes that are pushed through rubber seals of the container doors. Through this method, the probes are connected to various monitoring instruments that

can indicate the potential peak exposure to fumigants. However, they measure peak exposure level for personnel opening the containers, rather than the average personal exposure measured in the breathing zone of the workers during unloading. Efficient methods for degasification by forced extract ventilation have been published, but it seems that few locations have access to such ventilation facilities (EU-OSHA, 2018).

In the rail sector, CER and the ETF have jointly published 'A guide to identifying and preventing psychosocial risks at work in the railway sector'. According to the guide, the assessment of the psychosocial risks requires corresponding corrective actions and prevention measures. The guide presents three different avenues of such measures for the rail sector (CER & ETF, 2013):

1. The first (or primary) level involves eliminating and actively managing psychosocial risks at source (e.g. improve work processes of dealing with difficult customers).
2. The second level of prevention aims to help employees cope with the exposure to psychosocial risks (e.g. provide training on dealing with difficult customers to minimise the risk of third-party violence).
3. The third level focuses on containment and thus involves providing a form of psychological support scheme for employees who suffer from work-related disorders.

The example below in relation to the bicycle courier sector provides an overview of the main elements that should be considered regarding conducting a risk assessment.

Table 18 Bicycle couriers: Main elements to be considered in any risk assessment

Key categories	Elements
Essential aspects of the risk assessment	The hazards have been identified and assessed. Protective measures are defined. They are company-specific and concretely formulated. Responsible persons for the implementation of the protective measures and deadlines are defined. The risk assessment as well as protective measures already implemented are regularly reviewed and adjusted if necessary (effectiveness control). Responsibilities for carrying out and updating the risk assessment are defined.
Work equipment, work organisation and personal protective equipment	Safe and regularly inspected work equipment is provided or brought by the bicycle couriers (e.g. bicycle, transport aids). The safe use of mobile devices is ensured (e.g. suitable holding devices on the bicycle). The technical requirements for the fulfilment of the work tasks are given (internet access, software/hardware). It is ensured that the bicycles can be loaded and unloaded safely and that the load does not impair the steerability of the bicycle. Binding weight limits have been set for the bicycles and the backpacks of the bicycle couriers. Compliance with these limits is ensured. Suitable protective equipment will be provided (cycle helmet, high-visibility clothing, weather-protective clothing, safety shoes). There are binding regulations for stopping work due to weather conditions (e.g. temperature, wind, rain, ozone levels). The safe storage of bicycles and, if applicable, batteries is guaranteed (e.g. no access for unauthorised persons).
Working time	There are binding regulations on working hours and their documentation. There are clear break regulations (specifications on the location of breaks and the place of breaks). The employer fulfils their duty of care and keeps an eye on the working hours of the employees. This applies to employment with several employers. The requirements of the Working Hours Act are complied with (ability to plan assignments, limits on maximum working hours, rest breaks, rest periods).
Mental stress	Mental stress is systematically recorded, and appropriate measures are derived. The following stress factors, for example, are considered: time pressure; unclear / incomplete / contradictory information; dealing with difficult customers; language barriers / lack of local knowledge; and lack of feedback or recognition for services rendered.

Key categories	Elements
Information, communication and training	It is ensured that the induction takes place in comprehensible form and language. Feedback and exchange in case of problems and wishes of the employees are possible. Contact persons are known who can assist with questions and problems. Employees are instructed on the following topics: · safe driving and transport (e.g. driving safety training, correct distribution of the load, correct parking of loaded bicycles); · working hours and rest breaks (e.g. working and rest breaks to be taken, documentation of working hours taken, location of breaks); · ergonomics (e.g. bicycle settings, lifting and carrying); · regulations for special cases (e.g. breakdowns, accidents, aggressive customers); and · safe storage of bicycles and, if applicable, batteries / safe charging of batteries, if applicable.

Source: Freie und Hansestadt Hamburg Behörde für Justiz und Verbraucherschutz, 2021 (see https://www.hamburg.de/contentblob/15556350/f400e2dec8d208e619f567e7f4f880e1/data/d22.pdf)

3.2.3 Reasons for not carrying out risk assessment practices regularly

This section looks at the reasons as to why some transportation and storage sector establishments do not regularly carry out risk assessments. The data from ESENER 2019 show that the most common reason for not conducting such assessments is that risks are already known (which was selected by 83% of transportation and storage sector establishments not carrying out risk assessments regularly), followed by the fact that they do not identify major problems (75%). Twenty-three per cent of these establishments indicate a lack of necessary expertise for conducting risk assessments and 14% indicate the fact that the associated procedures are perceived as too burdensome. A possible interpretation of this finding is that establishments are often not aware of the potential risks and consider risk assessment a bureaucratic issue without too much practical value for the business. There are no important differences in comparison to EU-27 average results for all sectors.

Table 19 Reasons why workplace risk assessments are not regularly carried out, EU-27, 2019 (%)

Training topics	Transportation and storage (%)	Total economy (%)
Risks are already known	83	82
No major problems	75	80
Procedure is too burdensome	14	20
Necessary expertise is lacking	23	30

Base: Responses only of those transportation and storage sector establishments that do not regularly carry out workplace risk assessments / Source: Panteia/IKEI based on ESENER 2019

Some literature complements the previous results, in the sense that some of the most critical shortcomings to complying with risk assessment obligations among SMEs include lack of information, poor capacity and skills to deal with these risk assessments and, finally, poor access to effective, specific and specialised technical assistance (EU-OSHA, 2008). In this regard, EU-OSHA has developed the Online interactive Risk Assessment (OiRA) tool to enable micro and small organisations to assess their risks themselves (see Box 6).

Box 6 OiRA: Inline interactive Risk Assessment tool by EU-OSHA

OiRA, the Online interactive Risk Assessment tool, provides the resources and know-how required to enable micro and small organisations to assess their risks themselves. It is a web platform that enables the creation of sectoral risk assessment tools in any language in an easy and standardised way. The aim of OiRA is to provide easy-to-use tools that guide micro and small organisations through the risk assessment process. It is developed and maintained by EU-OSHA. OiRA tools are easily accessible, and they are available for free on the web. There are several specific tools relating to the transportation and storage sector.

Source: OiRA project website (https://oiraproject.eu/en)

A recent study by EU-OSHA that surveyed French micro and small establishments (including those in the transport sector) has highlighted that OiRA helps them to strengthen a systematic approach to risk management. This is particularly the case among enterprises that did not have a risk assessment practice in place before starting with OiRA (EU-OSHA, 2023).

3.2.4 Evolution in time of the reporting and characteristics of workplace risk assessments

Whereas the previous sections provided results from ESENER 2019, this section focuses on the evolution over time. Where relevant, the results from 2019 are compared with the situation in 2014 as the overall methodological approach in both waves was very similar and the questionnaires almost identical. Where possible, comparisons are also made with the results of the first ESENER survey (ESENER 2009), but this is limited as this first survey did not include micro establishments (5-10 employees), the definition of the target respondent was different and there was a large revision of the ESENER 2009 questionnaire.

- **Presence of workplace risk assessments**

In 2019, 79% of the establishments in the transportation and storage sector in the EU carried out a workplace risk assessment. This proportion is slightly higher than in 2014 (78%). In 2009, a similar kind of question was posed. Respondents were asked whether workplaces in their establishment were regularly checked for safety and health issues as part of a risk assessment or similar measure. The share of establishments that answered positive was higher (85%) than in 2014 and 2019. This wave of the survey however did not cover the establishments with five to 10 employees and, as shown in section 3.2.1, the chance that establishments carry out risk assessments increases with size (in terms of number of employees). In addition, the question was not limited to risk assessments only.

Most of the establishments surveyed have carried out a risk assessment recently. In 2019, 92% of the establishments in the transportation and storage sector in the EU have carried out the assessment in the last two years compared to 93% in 2014. The share that has documented the assessment in written form has increased slightly from 93% to 94%.

- **Characteristics of risk assessment practices**

In both the 2014 and 2019 surveys, transportation and storage sector establishments that carry our risk assessments on a regular basis were further surveyed about the characteristics of these risk assessments. The share of EU establishments in which the risk assessments are mainly conducted by internal staff has remained consistent (39% for both years) and the share in which the assessments are mainly carried out by external providers increases slightly (45% and 46%, respectively).

In 2009, the share of establishments where risk assessments were carried by externals was lower than in 2014 and 2019 (42% in 2009). In 2009, 38% of risk assessments were conducted by internal staff, with 20% noting that they were conducted equally by internals and externals.

Table 20 Characterisation of risk assessment practices, transportation and storage sector: Evolution in time 2014 and 2019, transportation and storage sector, establishments that regularly carry out risk assessments, EU-27 (%)

	ESENER 2014	ESENER 2019
Main actors involved in their elaboration:		
- Conducted mainly by internal staff	39	39
- Contracted mainly to external providers	45	46
- Both about equally	16	14
Topics routinely evaluated:		
- Safety of machines	81	85
- Dangerous chemical or biological substances (*)	86	79
- Work postures, physical working demands	76	78
- Exposure to noise, vibrations, heat or cold	65	62
- Supervisor–employee relationships	55	58
- Organisational aspects such as work schedules	67	73
Cover workplaces at home (**)	26	34
Cover only people on the payroll (***)	33	40
Carried out in the last two years	93	92
Documented in written form	93	94

Base: Information from transportation and storage sector establishments that regularly carry out risk assessments
(*) Only establishments reporting the presence of chemical or biological substances as a risk
(**) Establishments where any of the employees regularly work from home

(***) Establishments where additional persons besides employees on the payroll work in the establishment (subcontractors, temporary agency workers, volunteers)
Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

The topics assessed remained similar in 2014 and 2019, but fewer establishments have included dangerous chemical or biological substances in the risk assessment (86% and 79%, respectively). Organisational aspects such as work schedules can be seen more in risk assessments in 2019 when compared to 2014, as with safety of machines and work postures, and physical working demands.

Attention to the health and safety of the workplace at home in the sector seems increased during this period, where in 2019 around one in three establishments with employees regularly working from home cover the workplace at home in their risk assessment. That is in comparison to one in four establishments in 2014. This phenomenon is only likely to have increased since the advent of the COVID-19 pandemic (more information on this can be found in section 4.4.1). The share of establishments that cover only people on the payroll increased from 2014 to 2019 (33% and 40%, respectively).

3.3 Presence of measures to prevent OSH risks, including OSH training activities

3.3.1 General health promotion measures

Establishments may take several measures to prevent OSH risks, some of which are related to general health promotion measures, but also other measures specifically designed to cope with identified OSH risks. For instance, in the road transport sector, some measures to promote health and welfare in road transport include support regarding sleep apnoea, improved diet, providing healthy lunch boxes and improved schedules; redesign of rest areas; back care and driver well-being programmes; real-time management systems for delivery schedules and rest times; and zero alcohol campaigns (EU-OSHA, 2011b). Data from the ESENER 2019 survey results show that 47% of establishments in transportation and storage raise awareness on the prevention of addiction (smoking, alcohol, drugs), which is the highest in the EU-27, followed by 32% that raise awareness on healthy nutrition. Thirty-two per cent of sector establishments promote sports activities outside working hours and 28% promote physical exercise at work (including back exercises, stretching and other).

Table 21 Enterprises indicating measures for health promotion (%), transportation and storage sector and the total economy, 2019

Measures for health promotion	Transportation and storage	Total economy
Raise awareness on healthy nutrition	32	32
Raise awareness on prevention of addiction	47	36
Promote sports activities outside working hours	32	30
Physical exercise at work (including back exercises, stretching and other)	28	27

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The data indicate a positive relation between establishment size and the use of general health promotion measures. For example, measures related to the promotion of physical exercises at work are reported to be taken by 25% of micro establishments (5-9 employees), compared to 63% of large-scale establishments, where this pattern is also visible among other measures.

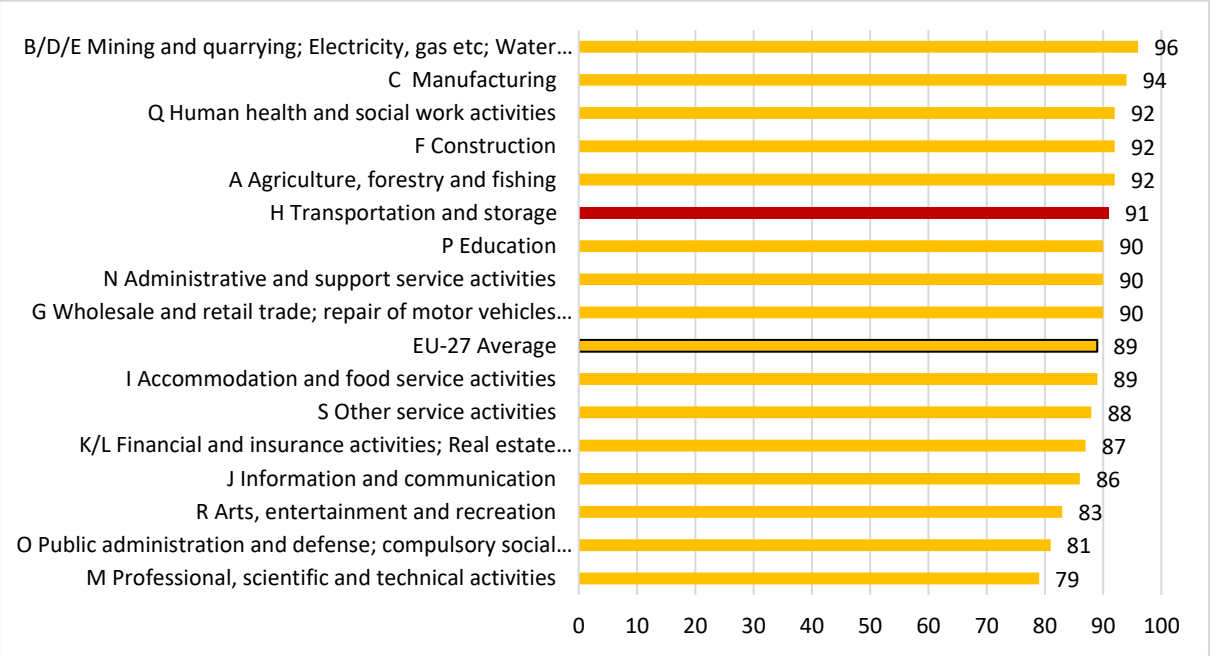
Table 22 Enterprises indicating measures for health promotion (%), by size, 2019

	Healthy nutrition	Prevention of addiction	Sports activities outside working hours	Back exercises at work
5-9	30	45	26	25
10-49	29	43	31	26
50-249	46	66	50	46
250+	59	69	70	63
Total	32	47	32	28

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Regarding the presence of OSH-related documents that explain responsibilities or procedures on health and safety, ESENER 2019 data show that up to 91% of establishments in the transportation and storage sector have got a document in place that explains the responsibilities and procedures in place regarding health and safety, where this percentage is similar to the EU-27 average for all sectors. In general, there are not large differences among sectors, although the professional, scientific and technical activities sector shows a relatively low percentage (79%).

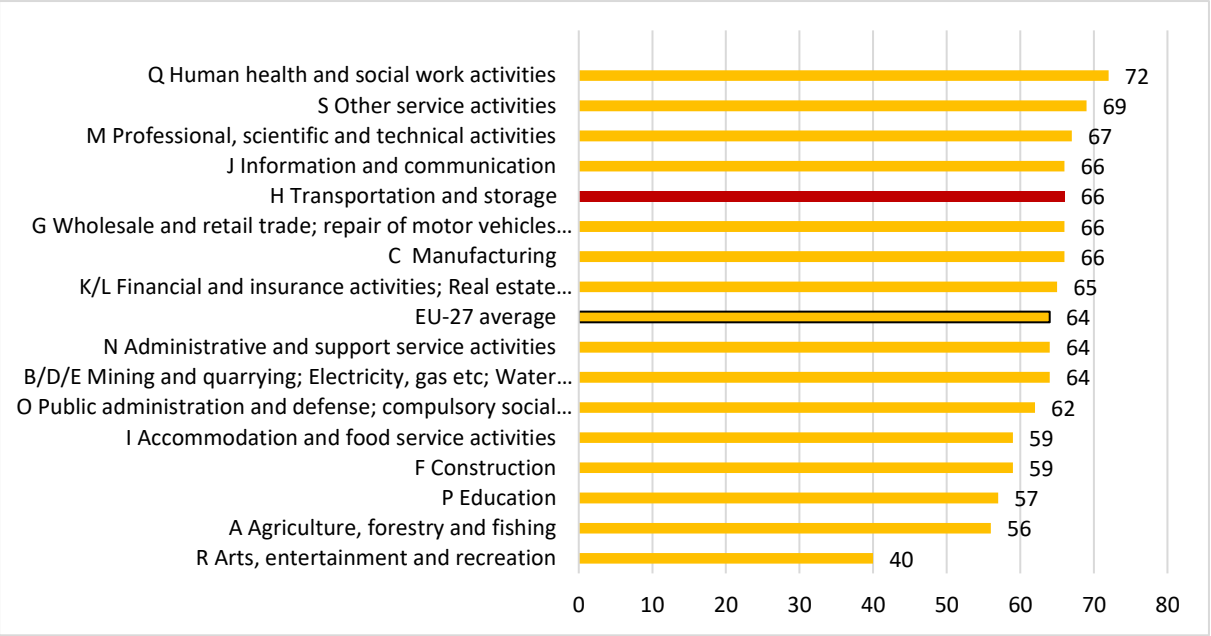
Figure 11 Share of establishments that have a document in place that explains responsibilities or procedures on health and safety, by sector, EU-27, 2019



Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

ESENER 2019 also indicates that 66% of establishments in the transportation and storage sector that employ at least 50 workers have a procedure in place to support employees returning to work after a long-term sickness absence. This is in line with the average across the EU-27 (64%). Most sectors report similar results, apart from arts, entertainment and recreation (40%).

Figure 12 Share of establishments that have a procedure to support employees returning to work after a long-term sickness absence, by sector, EU-27, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

3.3.2 Measures for preventing MSDs

ESENER 2019 survey data provide information in regard to the main types of measures taken by establishments in the transportation and storage sector in the last three years to deal with MSDs. The data show that the most recurrent practice is the provision of equipment to lift and move heavy work, reported by 79% of transportation and storage sector establishments, followed by the provision of ergonomic equipment (70%) and regular breaks for people in uncomfortable positions (67%). In contrast to this, the least widespread measure is the rotation of tasks to reduce repetitive movements (47%). Enterprises in the transportation and storage sectors are mostly aligned with the EU-27 average.

Table 23 Preventive measures for MSDs taken by establishments in the last 3 years, EU-27

Preventive measures for MSDs	Transportation and storage (%)	Total economy (%)
Provision of equipment to help with lifting or moving (*)	79	77
Rotation of tasks to reduce repetitive movements (**)	47	48
Encouraging regular breaks for people in uncomfortable working positions	67	60
Provision of ergonomic equipment	70	67
The possibility for people with health problems to reduce working hours	50	54

Base: All transportation and storage sector establishments in the EU-27
(*) Establishments that indicated presence of lifting or moving people or heavy loads as a risk factor
(**) Establishments that indicated presence of repetitive hand or arm movements as a risk factor
Source: Panteia/IKEI based on ESENER 2019

In addition to these measures, some experts have also proposed measures for some subsectors within the transportation and storage sector that are applied in other sectors such as construction, specifically in relation to airport cargo and baggage handling activities. They propose behaviour-based safety (BBS), which aims to change unsafe behaviour to safe behaviour and to eliminate the possibility of an accident occurring. The BBS approach is centred on workers making each other aware of unsafe behaviour and adhering to the safety measures. The four stages of the process are to identify unsafe behaviour, observe, intervene, and review and monitor. This approach will make sure employees are not reluctant to call attention to unsafe practices. As opposed to this, in a system where employees are punished

immediately, they may become reluctant to report near-miss incidents, which may lead to more OSH risks and injuries (Kania, 2018; Chen & Tian, 2012).

Regarding the differences that can be seen when looking at EU-27 Member States in the types of measures that are taken, there are significant variations. For example, 93% of establishments in Ireland provide equipment to help with lifting or moving, whereas this is only the case for 33% of Polish enterprises. In Cyprus, 80% of establishments rotate tasks to reduce repetitive movements, whereas this is only the case in 24% of enterprises in Luxembourg. Ninety-four per cent of establishments in Luxembourg do however provide ergonomic equipment, whereas this is the case in only 36% of Lithuanian establishments.

From an establishment size perspective, data from ESENER 2019 provide insights into the differences that arise between small and large establishments. Available results show that larger establishments are more likely to report the different risk-related measures. For example, only 38% of micro establishments in the transportation and storage sector that reported the presence of repetitive hand or arm movements report rotating tasks to reduce these movements, compared to 76% of establishments with 250 and more employees.

Table 24 Preventive measures for MSDs taken in the last 3 years in the transportation and storage sector, by establishment size, EU-27, 2019 (%)

Size	Provision of equipment to help with the lifting or moving of heavy loads (*)	Rotation of tasks to reduce repetitive movements (**)	Encouraging regular breaks for people in uncomfortable working positions	Provision of ergonomic equipment	The possibility for people with health problems to reduce working hours
5-9	73	38	65	61	41
10-49	81	49	66	73	54
50-249	91	59	74	87	67
250+	92	76	73	86	73
Total transportation and storage sector	79	47	67	70	50

(*) Only referred to transportation and storage sector establishments reporting the presence of 'lifting or moving heavy loads'
(**) Only referred to transportation and storage sector establishments reporting the presence of 'repetitive hand or arm movements'
Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Establishments across the various sectors covered in the context of this study take a variety of measures to reduce or cope with general OSH risks and hazards, beyond MSDs. The literature review carried out in the context of this study has provided useful insights regarding these various measures.

Box 7 Examples of measures taken to reduce OSH risks

In the context of the warehousing sector, to prevent MSDs effectively it is recommended to:

1. reduce the weight of loads;
2. avoid manually lifting and lowering freight to and from the floor;
3. place freight at an adjusted height that encourages a proper lifting technique; and
4. keep spaces organised and clear to prevent trips and falls as well as improve easy accesses to materials that reduce awkward positions.

Proper PPE, such as the correct footwear, masks and gloves, can also help reduce OSH risks.

Given that land transportation activities account for most work-related accidents in the sector, the literature review has provided examples of preventive measures taken to avoid accidents among drivers in the sector:

1. daily routes generated by an IT system that takes into account working conditions of different loading areas, agreements with clients, literacy levels of drivers and time limitations;
2. the implementation of policies to improve driving safety and reduce accidents such as handbooks for drivers, manager guides and risk assessments that cover seatbelt awareness, mobile phone use, driver fatigue, winter driving and driver vehicle checks;
3. improving safety of vehicles such as including sensors, audible warnings, seatbelt compliance systems, weighing systems, driver fatigue systems and regular maintenance;
4. the creation of dedicated parking bays with areas for unloading; and

lens distribution to eliminate blind spots

Source: Jang & Chen, 2013; Health and Safety Executive, 2007; EU-OSHA, 2011b

In the postal sector, some authors propose a number of solutions to addressing MSDs, including: i) adjusting the height of containers to reduce the anterior trunk flexion; ii) computer screen repositioning and adaptation of the bench's height for barcode reading, in order to reduce the anterior cervical flexion; iii) adjustments of the vehicle interior to reduce the bending and stooped postures identified in the vehicle loading; and iv) encouraging the reduction of body mass through the practice of physical activities and improvement of the quality of the food consumed by postal workers in order to reduce MSDs (Silva et al., 2022). In the road transport sector, some examples in the literature of preventive measures taken to avoid MSDs in drivers are: i) annual check-ups by company physicians and ergonomists where workers and management were educated about MSDs; ii) company-provided training in the form of a course/booklet/video that details the most common scenarios in which transport drivers can sustain MSDs; iii) the ergonomic redesign of vehicles based on an analysis of the tasks that produce MSDs; iv) improvements taking size variations into account such as using computer modelling to determine requirements for a comfortable posture for particular heights/weights; and v) organisational issues such as rest breaks (EU-OSHA, 2011b).

The existing literature also identifies different activities conducted by online platforms to reduce/cope with OSH risks and hazards (EU-OSHA, 2022b). Examples include the offering of insurance policies to compensate for damages suffered by platform workers and liability for damages caused by platform workers (such insurance policies are often to be subscribed to and paid for by the worker), the introduction of strict rules that workers must abide by (wearing mandatory clothing/protective equipment provided by the platform) and the development of ad hoc OSH training activities.

The below example from France indicates one measure used by La Poste postal service to prevent occupational risks.

Box 8 Case study: The HSCT Register of the French La Poste postal service

The HSCT Register is a tool for preventing occupational risks and improving working conditions. The register allows to report any problem that degrades existing OSH and working conditions as well as suggestions related to OSH issues or the recording of a general alert concerning public health issues. It is open to all postal workers, trade unions and staff from external companies working for La Poste (for instance, subcontractors or temporary workers). This HSCT can be consulted on a continuous basis by any member of the Health, Safety and Working Conditions Committee or management representatives, as well as by external labour inspectors. The employer is obliged to respond to the problems reported in this register and to ensure follow-up. This HSCT Register is available both in each La Poste establishment as well as online. In addition to this Register, La Poste has other policies to deal with OSH issues, including a network of internal OSH specialists accessible to workers, an external psychological support service to deal with difficult personal or professional situations, and, finally, a mediation service.

Source: Group La Poste (https://www.sudposteaura.fr/documentation/documentation-reseau/345-le-registre-chsct-numerique-a-la-poste.html)

In the water transport sector, several measures have been identified to counter risks in the sector.

Table 25 Countermeasures for risks and hazards of the water transport sector

Key categories	Elements
Essential aspects of the risk assessment	▪ Avoid working alone, but if you must, maintain good communications with someone responsible for checking your safety and always notify someone else of your intentions and location before you start. Remember to check your radio before leaving the office. ▪ Slips and falls: Wear appropriate anti-static non-slip shoes/boots. Pay particular attention in the vicinity of deck machinery, where lubricants may be spilt or if leaking cargo is identified. ▪ Excessive noise: You should assess the risk, limit exposure or use ear defenders. Prolonged exposure to even moderate noise levels can damage hearing.

Key categories	Elements
Work equipment, work organisation and personal protective equipment	▪ Lighting: If adequate light is not available, e.g. by opening hatches or doorways, a suitable torch or working light may be used. ▪ Machinery: Keep well away from moving machinery and wear high-visibility clothing and a safety helmet. Remember: the operator may have a limited view, particularly in the hold. You must observe any instructions from officers or crew. ▪ Asbestos: Pay particular attention to older vessels or vessels registered in countries with lower standards. Do not disturb any pipe-lagging or insulation. If you consider there may be a risk, leave the area immediately and notify the master. ▪ Cold stores: Always station someone outside the door to call for assistance if you get into difficulty. Check that there is adequate oxygen and that there are no other hazardous gases in the store before you enter. Wear insulation clothing to protect you from the cold. ▪ Limit the time you spend in the cold store to ensure your core body temperature does not drop too low.
Information, communication and training	▪ Training and instruction of seafarers in safe behaviour on board, for example, during the medical refresher course. ▪ Comprehensive information on board to raise awareness on the use of personal protection devices, including onboard programmes in terms of primary and secondary prevention. ▪ Intensified education in the official language on board (usually English).

Source: European Commission, 2012; Oldenburg et al., 2010

3.3.3 Measures for reducing/coping with psychosocial risks

In addition to enterprises taking measures to reduce or cope with ergonomic risks, specific measures need to be taken to address psychosocial risks. ESENER 2019 has also collected information regarding the measures taken by establishments in the transportation and storage sector in the last three years to prevent psychosocial risks. The most frequently reported measure includes allowing employees to take more decisions on how to do their job (63% of responses, below the EU-27 average of 68%), followed by other measures such as the possibility of reorganising their work in order to reduce job demands/work pressure or the provision of confidential counselling for employees (both 43%). The least commonly reported measure by transportation and storage sector establishments is the provision of training on conflict resolution (33%). Compared to establishments from all EU-27 sectors, the shares of establishments that apply the above-mentioned measures are rather like those of the transportation and storage sector, with the only exception of intervention if excessively long or irregular hours are worked (more relevant for the transportation and storage sector). There are strict international, European and national regulations regarding this issue in most subsectors (e.g. limiting pilots' and train drivers' hours per shift, and mandatory resting periods for truck drivers). Adherence to these limits is closely related to safety and prevention of serious accidents. In most other sectors, working hours are limited only by the labour code and overtime can be managed easier. These time constraints directly affect business performance: therefore, most enterprises must keep them high on their agenda and do consider these issues.

Table 26 Measures taken to prevent psychosocial risks in the last 3 years, transportation and storage sector, EU-27, 2019 (%)

	Transportation and storage sector	All sectors
Reorganisation of work in order to reduce job demands/work pressure	43	43
Confidential counselling for employees	43	42
Training on conflict resolution	33	34
Intervention if excessively long or irregular hours are worked	38	29
Allowing employees to take more decisions on how to do their job	63	68

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The ESENER 2019 survey also provides information regarding other formal procedures implemented by establishments with 20 or more employees in the transportation and storage sector to deal with and prevent psychosocial risks. In all cases, the results provided are more or less lower than the average of

all sectors combined (the exception being the presence of an action plan to prevent work-related stress, which is in line with the EU average). Only 43% of transportation and storage sector establishments have a procedure to deal with cases of threats, abuse or assaults by clients and a procedure to deal with cases of bullying or harassments (versus all sectors' averages of 51% and 45%, respectively). Slightly below the average for all sectors, 41% of establishments have an employee survey including questions on work-related stress.

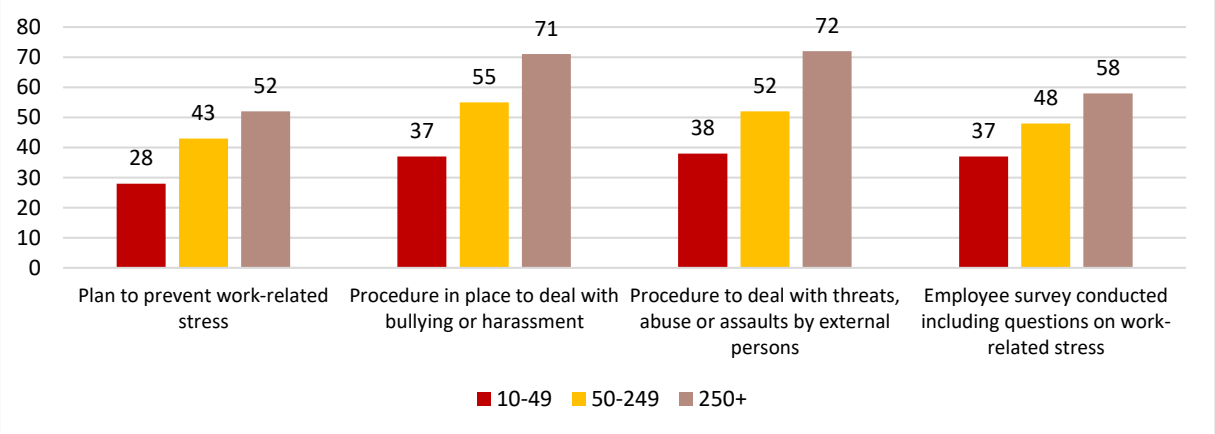
Table 27 Formal procedures taken by establishments to prevent psychosocial risks, transportation and storage sector, EU-27, 2019 (%)

	Transportation and storage sector	All sectors
Presence of an action plan to prevent work-related stress	33	33
Procedure to deal with cases of bullying or harassment	43	45
Procedure to deal with cases of threats, abuse or assaults by clients (*)	43	51
Employee survey including questions on work-related stress	41	44

Base: Transportation and storage sector establishments with 20 or more employees
(*) Establishments that indicated presence of dealing with difficult customers, patients or pupils as a risk factor
Source: Panteia/IKEI based on ESENER 2019

When looking at the impact of enterprise size on the prevalence of formal procedures taken by establishments to prevent psychosocial risks, establishments with 20 or more employees show again a positive establishment size effect whereby larger establishments (250+ employees) are more likely to take such measures. As an example, 37% of transportation and storage sector establishments with 10 to 49 employees have got a procedure in place to deal with possible cases of bullying or harassment, whereas this percentage increases to 71% for large establishments with 250 employees or more.

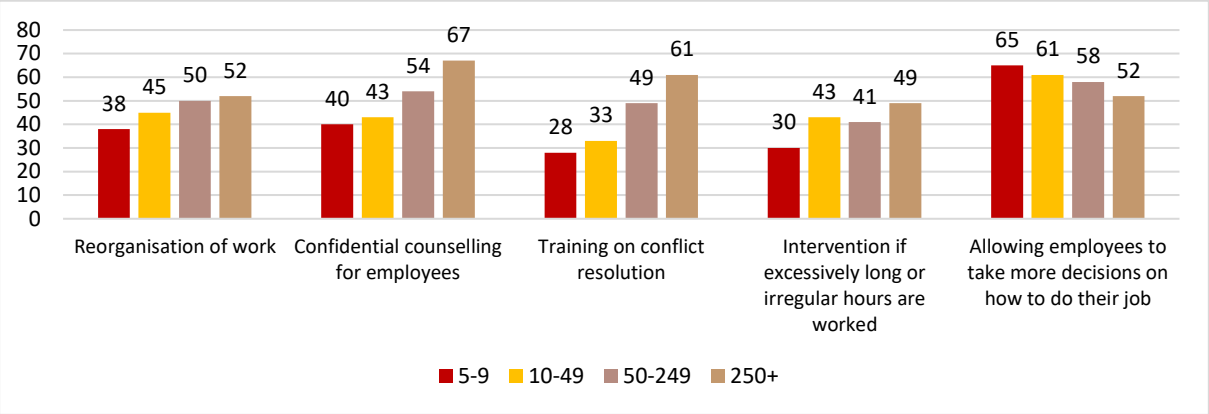
Figure 13 Formal procedures taken by establishments to prevent psychosocial risks, transportation and storage sector, by size of enterprise, EU-27, 2019 (%) (*)



(*) Base: Transportation and storage sector establishments with 20 or more employees / Source: Panteia/IKEI based on ESENER 2019

Most of the measures taken in the three years prior to the survey for dealing with psychosocial risks are more common in larger establishments (for instance, the reorganisation of work, the provision of confidential counselling for employees and the provision of training on conflict resolution). However, the share of establishments that allow employees to take decisions on how to do their job slightly decreases with the establishment size, so 65% of micro establishments allow this possibility in comparison to 52% among the largest establishments. This result could suggest that larger establishments may have more clear and well-defined job-related procedures in comparison to smaller establishments.

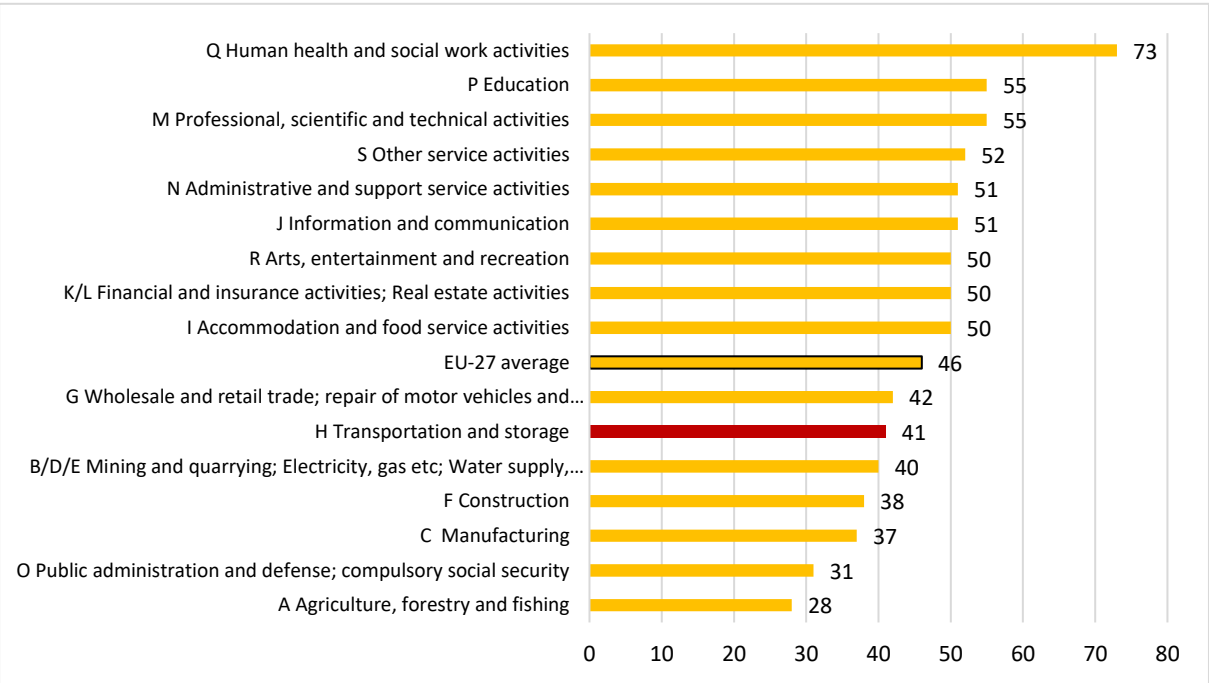
Figure 14 Measures taken in the last 3 years related to dealing with psychosocial risks, transportation and storage sector, by establishment size, EU-27, 2019 (%) (*)



(*) Base: Transportation and storage sector establishments with 20 or more employees / Source: Panteia/IKEI based on ESENER 2019

Enterprises with fewer than 20 employees were also asked whether employees had been involved in identifying possible causes for work-related stress, such as time pressure or difficult clients. Forty-one per cent of enterprises in the transportation and storage sector involved employees, compared to 46% of establishments in the total economy.

Figure 15 Establishments that have involved employees in identifying possible causes for work-related stress, such as time pressure or difficult clients, by sector, EU-27 (%) (*)



(*) Base: Transportation and storage sector establishments with fewer than 20 employees / Source: Panteia/IKEI based on ESENER 2019

The literature review highlights the different types of measures taken across sectors to deal with specific types of risks related to activities or characteristics of employment in the sector. For instance, Table 28 provides an overview of some specific measures taken in the water transport sector:

Table 28 Examples of measures taken to reduce/cope with psychosocial risks in the water transport sector

Key categories	Examples of prevention measures
Work-related stress	▪ Shorten the duration of shipboard stay to reduce long-time separation from family and minimise long working hours. ▪ Medical training courses for ship officers should include prevention messages. ▪ Seafarers should learn how to prevent and manage stress by making use of relaxation techniques.
Isolation	▪ Improvements in to-shore telecommunications (at a reasonable charge, guaranteed privacy of the messages, free access to all ranks). ▪ Promotion of social contacts in the port (shipboard sports events, easily accessible welfare facilities, pastoral care and anonymous seafarer's health counselling). ▪ Much effort must be paid to facilitate seafarers' access to port welfare facilities. ▪ In cases of strong isolation, which tends to increase the risk of suicide, psychological support must be available in seafarers' port welfare facilities.

Source: Oldenburg et al., 2010

In the road transport sector, measures for coping with psychosocial risks can include psychological support and legal advice offered to lorry drivers who were traumatised after serious accidents and telephone hotlines utilising cooperative and interdisciplinary structures (EU-OSHA, 2011b). A further example of prevention measures taken can be found in the case of the air transport sector, which deals with its own unique challenges for employees.

Table 29 Examples of prevention measures for different air transport operations dealing with psychosocial risks

Occupations	Selected psychosocial risks	Examples of prevention measures
Check in staff / Air safety control staff	Stress, aggression and violence	▪ Environmental measures: Providing appropriate lighting, entrances and exits, security hardware. ▪ Organisational/administrative measures: developing programmes, policies and work practices for a safe working environment, avoiding lone working, providing sufficient staff. ▪ Behavioural/interpersonal measures: Providing training for workers to recognise, report and respond to conflict and potential stress and violence in the workplace. Providing psychological support for workers who are victims of violence. Taking reports about workplace violence seriously and acting promptly.
Air traffic controller	Stress	▪ Reduction of working times, arranging work teams and rest pauses in accordance with workload. Reducing shift and night work. ▪ Improving work environment (providing canteens, sleep facilities, nice office design, good lighting, noise insulation). ▪ Health protection and promotion. ▪ Worker participation.

Source: Schmitz-Felten, OSHwiki 2022

Fatigue is one of the most important problems in the transportation and storage sector, with the rail sector being particularly affected according to the literature. In 2011, EU-OSHA published a report in which it recommended a fatigue management programme to be set up by rail companies as a means of reducing the risk of fatigue (which can cause serious accidents). The programme consists of the following action points: a fatigue management policy; limits on hours of work, and provisions for adequate rest breaks; rostering design and management of work patterns; fatigue risk assessments and subsidiary assessments such as specific tasks/decompositions; 'competency-based' education or 'awareness-training' programmes as appropriate; a rail safety worker fatigue reporting mechanism with associated feedback; procedures and measures for assessing/monitoring the fatigue management programme; procedures for reporting, investigating and recording incidents that are attributable wholly or in part to fatigue; and a process for review of the fatigue management programme and its risk treatments/controls (EU-OSHA, 2011b).

To prevent accidents caused by fatigue in the railway sector, trains generally include a Driver's Safety Device, also known as the 'dead man's handle', which prevents accidents in case the driver becomes incapacitated, for example, falls asleep. The device is held in place by the driver, so whenever the driver does become incapacitated, they let go of the handle, and the brakes are activated to stop the train. However, this measure is not suitable for preventing fatigue (EU-OSHA, 2011c; Fan & Smith, 2018).

An example of a good practice identified during the literature review is aimed at supporting air traffic control staff who have been involved in or witnessed a 'critical incident' and may suffer stress or trauma related to this. Critical incidents may be actual aviation accidents or near-miss accidents. Reactions may take the form of inability to remember certain aspects of the incident, flashbacks, irritability, difficulty concentrating, difficulty getting back to work and so on.

Box 9 Example of good practice for preventing post-traumatic stress following critical incidents in air traffic control work (Portugal)

In this initiative, support was brought to staff through Critical Incident Stress Management (CISM). The technique aims to encourage workers to understand what is happening to them during and after critical incidents rather than remain in shock and confusion. It uses peer and specialist support.

After a critical incident, CISM provides one-to-one discussions with affected staff, group debriefing and defusing. The introduction involves an information stage, training two key managers, recruiting sufficient volunteers — CISM team peers — and providing them with training, selecting three health professionals, who need sufficient knowledge and training in both CISM and air traffic services. It also involves always having a service available, providing sessions within 24 hours of the incident, ensuring that the peers can determine when the people they are helping require another type of (professional) help and provision of support as necessary to the peers themselves.

Source: EU-OSHA, 2011c

3.3.4 Evolution in time of the presence of preventive measures to cope with OSH risks

The proportion of establishments that have a document in place that explains responsibilities or procedures on health and safety was slightly higher in 2019 compared with 2014 (91% and 87%, respectively). In 2009, 73% of the establishments surveyed indicated that there was a documented policy, established management system or action plan on health and safety in the establishment. Whilst the exclusion of micro-enterprises with five to 10 employees in ESENER 2009 would lead to the expectation that the share would be higher, as these enterprises usually perform lower, the figures actually got higher in each enterprise size across the period (all sector data).

In the period 2014-2019, the proportion of establishments that have introduced preventive measures aimed at raising awareness about healthy nutrition has increased from 27% to 32% and the proportion with measures aimed at raising awareness on the prevention of addiction, for example, to smoking, alcohol or drugs, has also slightly increased from 43% to 47%. Promotion of back exercises, stretching or other physical exercise during work hours seems to get a little less attention (27% and 28%, respectively).

Table 30 Presence of general health promotion measures to cope with OSH-related risks: Evolution in time 2014-2019, transportation and storage sector, EU-27 (%)

General health promotion measures	ESENER 2014	ESENER 2019
Raising awareness about healthy nutrition	27	32
Raising awareness on the prevention of addiction, e.g. to smoking, alcohol or drugs	43	47
Promotion of sports activities outside working hours	25	32
Promotion of back exercises, stretching or other physical exercise at work	27	28

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

Next to general health promotion measures, measures are taken specifically aimed at reducing ergonomic risks. In all cases, the number of preventive measures has decreased in 2019 when compared to 2014.

Table 31 Presence of preventive measures to cope with OSH-related risks: Evolution in time 2014-2019, transportation and storage sector, EU-27 (%)

	ESENER 2014	ESENER 2019
Provision of equipment to help with the lifting or moving of loads or other physically heavy work	88	79
Rotation of tasks to reduce repetitive movements or physical strain	41	47
Encouraging regular breaks for people in uncomfortable or static postures, including prolonged sitting	74	67
Provision of ergonomic equipment, such as specific chairs or desks	78	70

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

Finally, establishments were asked about measures taken to prevent psychosocial risks. The share of establishments that have taken the various measures presented increased over time. Work has been reorganised to reduce job demands and work pressure (39% and 43%, respectively). In the ESENER 2009 survey, establishments were asked whether they used measures to deal with psychosocial risks in the last three years. At that time, around 44% indicated that one of the measures taken was changes to the way work is organised.

The proportion of establishments that have introduced confidential counselling for employees and intervention in the case of excessively long or irregular hours worked increased from 39% and 33%, respectively, to 44% and 38%. In the ESENER 2009 survey, 41% of establishments indicated that they provide confidential counselling for employees.

Table 32 Presence of preventive measures to cope with psychosocial risks: Evolution in time 2014-2019, transportation and storage sector, EU-27 (%)

	ESENER 2014	ESENER 2019
Reorganisation of work in order to reduce job demands and work pressure	39	43
Confidential counselling for employees	39	44
Intervention if excessively long or irregular hours are worked	33	38

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

In 2014, 31% of the EU establishments in the transportation and storage sector with more than 20 employees on the payroll had an action plan available to prevent work-related stress. Work-related stress is experienced when the demands of the work exceed the employees' ability to cope with or control them. In 2019, this proportion increased slightly to 33%. The proportion of establishments with more than 20 employees on the payroll that have a procedure in place to deal with possible cases of bullying or harassment increased from 2014 to 2019 (37% and 43%, respectively). In 2009, this proportion was 35%.

The proportion of establishments with more than 20 employees on the payroll that report dealing with difficult customers, patients or pupils as a risk factor and that have a procedure to deal with possible cases of threats, abuse or assaults by external persons increased from 39% in 2014 to 43% in 2019.

Looking at the evolution over time, attention to physical ergonomics and the prevention of MSDs decreased in the observation period. Meanwhile, more prevention measures appear to have been focused on lifestyle (eating, substance use, sports), mental health and work–life balance (organisation). The pattern may reflect trends in public awareness. Both the Senior Labour Inspectors' Committee (SLIC) and EU-OSHA had their campaigns on MSDs many years before ESENER 2019: in 2007.[14] On the contrary, the SLIC campaign on psychosocial risks took place in 2012 with a special focus on the transport sector, whereas EU-OSHA's 'Healthy Workplaces Manage Stress' Campaign ran between 2014 and 2015. These actions could have effectively boosted the attention towards psychosocial risks at work, which had started unfolding back around 2000.

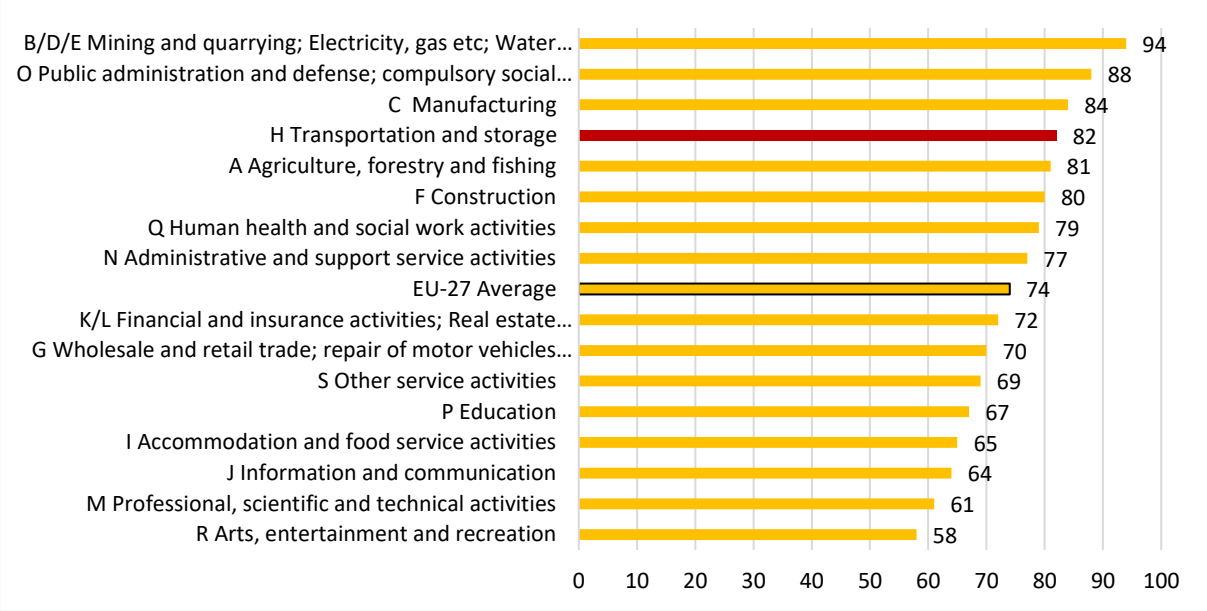
[14] After ESENER 2019, EU-OSHA ran its 2020-2022 'Healthy Workplaces Lighten the Load' Campaign focusing on musculoskeletal disorders (MSDs). SLIC too carried out its campaign on MSDs inspection in 2022.

3.4 Use of health and safety services and access to external sources of OSH information

3.4.1 *Arrangement of regular medical examinations to monitor the health of employees*

ESENER 2019 data provide information regarding the arrangement of regular medical examinations to monitor the health of employees. The data indicate that in 2019, 82% of transportation and storage sector establishments reported regularly arranging this type of medical examination. This percentage is higher than the share of the total EU economy on average (74%).

Figure 16 Share of establishments that arrange regular medical examinations to monitor the health of employees, by economic sector, 2019 (%)

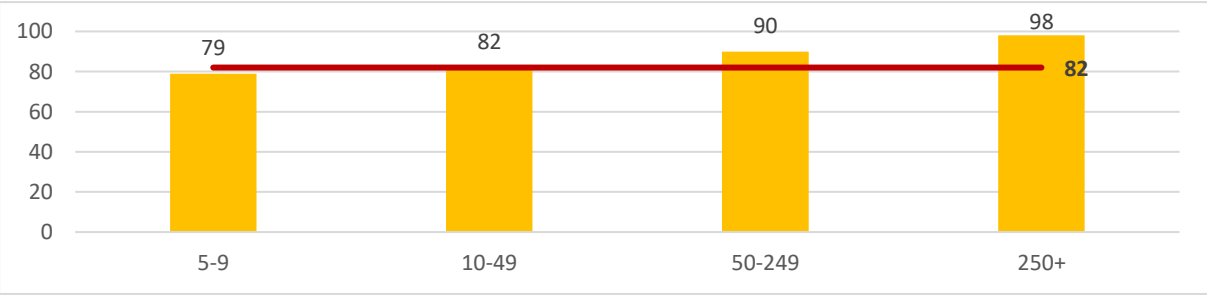


Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

In some sectors, regular medical examinations are a fundamental component of an employee's ability to carry out the job. This is particularly the case in the air transport sector, whereby pilots must renew their flying licence regularly, every six months. An interviewee indicated that pilots must undergo tests, pass the simulator and go through medical exams.

Looking at differences per establishment size, ESENER 2019 data reveal a positive relationship with the size of the enterprise. In this regard, 79% of micro establishments in the transportation and storage sector arrange regular medical examinations for their employees in comparison to 90% and 98% among the medium and largest establishments in the sector.

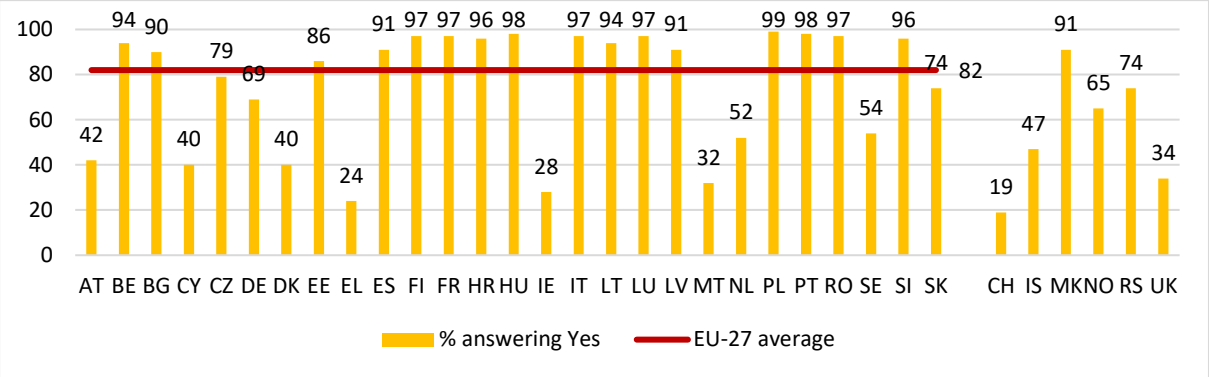
Figure 17 Share of establishments in the transportation and storage sector that arrange regular medical examinations to monitor the health of employees, by establishment size, EU-27, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

When looking at the country level, significant differences can be seen across Member States. For instance, whereas 99% of establishments in Poland and 98% in Hungary and Portugal arrange regular examinations, in other Member States this is significantly lower (such as in Greece and Ireland, with 24% and 28%, respectively). These differences can be explained to a large extent by existing OSH regulations in each country. For instance, in Hungary, employers must provide regular occupational medicine services to their employees, irrespective of establishment size considerations.

Figure 18 Share of establishments in the transportation and storage-sector that arrange regular medical examinations to monitor the health of employees, by country, EU-27, 2019



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

An interviewee indicated that train drivers in the United Kingdom are required to undergo periodic medical assessments to check that they meet the fitness requirements of the job, which are outlined in the Train Driving Licences and Certificates Regulations. Medicals must take place at least every three years up to the age of 55, and thereafter every year. A medical examination and an occupational psychological examination will also take place before appointment to the job as a driver. Drivers may be referred to occupational health at other times if there is believed to be a need. However, it was noted that the quality of occupational health medical appointments and treatment by occupational health practitioners can sometimes be unsatisfactory, with concerns being raised about the reliability of hearing, eyesight and electrocardiogram tests, and inaccuracy or delay in communicating the results of medicals — a serious issue when it is used to judge whether workers are fit for safety-critical work or the wrong information needlessly puts workers in fear of serious medical conditions.

3.4.2 Use of health and safety services

Enterprises in the transportation and storage sector utilise several health and safety services. These cases include (but are not limited to) occupational health doctors, psychologists and accident prevention experts.

Regarding the use of different health and safety services (either in-house or contracted externally), the ESENER 2019 survey results show that 82% of all establishments in the transportation and storage sector use the services of an occupational health physician, 62% of establishments use the services of a generalist on health and safety, and 55% use an expert for accident prevention. In contrast to these figures, 36% of establishments in the sector use the services of an expert dealing with the ergonomic design and set-up of workplaces, and only 20% use the services of a psychologist.

In all cases, the use of these different health and safety services is similar to (or above) the EU-27 average for all establishments. For instance, 76% of all EU-27 establishments use the services of an occupational health physician (in comparison to 82% in the transportation and storage sector), whereas 61% use the services of a generalist on health and safety (62% in the transportation and storage sector).

Table 33 Health and safety services used (in-house or contracted externally) by economic sector, 2019, EU-27) (% establishments)

Used OSH services	Transportation and storage	Total economy
Occupational health doctor	82	76
Psychologist	20	19
Expert dealing with the ergonomic design	36	35
Generalist on health and safety	62	61
Expert for accident prevention	55	52

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Larger establishments report a greater use of different types of health and safety services. For instance, 62% of the largest establishments use the services of an expert dealing with ergonomic design and set-up of workplaces, compared to 30% of micro establishments. Additionally, 97% of the largest establishments count on the services of an occupational health doctor, whereas this share is lower for micro establishments (79%).

Table 34 Health and safety services used (in-house or contracted externally) in the transportation and storage sector, by size class, 2019, EU-27 (% establishments)

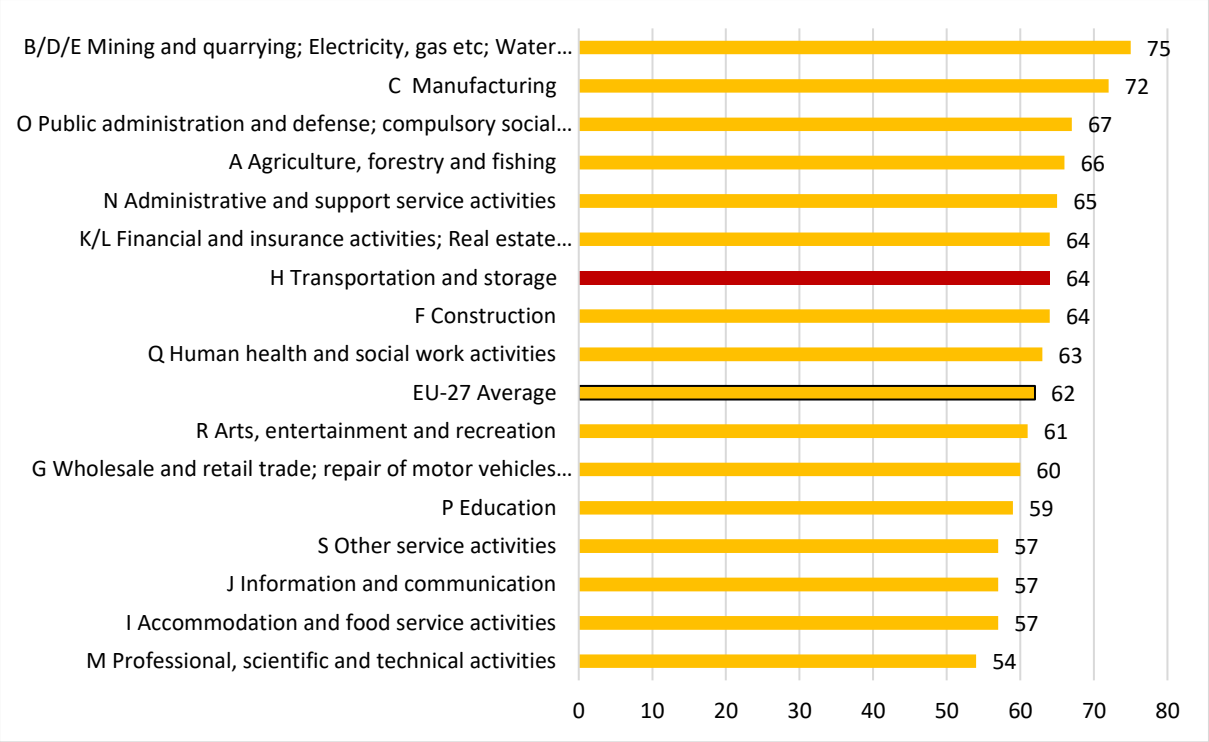
Size	Occupational health doctor	Psychologist	Expert dealing with ergonomic design	Generalist on health and safety
5-9	79	16	30	57
10-49	82	21	36	65
50-249	92	32	54	71
250+	97	49	62	81
Total transportation and storage sector	82	20	36	62

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

For instance, one example of medical services that are offered within one airline group shows that in addition to a range of medical treatments provided to employees, this is also supplemented by various confidential, individual services in the area of psychosocial counselling that aim to support and encourage employees and managers to adopt healthy lifestyles.

Data from ESENER 2019 show that 64% of establishments in the transportation and storage sector used the services of an external provider to support them in their health and safety tasks in the last three years. This percentage is slightly higher than the EU-27 average (62%), but slightly less than in other sectors such as mining and manufacturing (above 70% in both cases). There are also important differences among Member States (for instance, 86% of Italian and Slovakian establishments have used these services in comparison to 16% in Cyprus).

Figure 19 Share of establishments that have used the services of any external provider to support them in their health and safety tasks, by economic sector, 2019 (%)

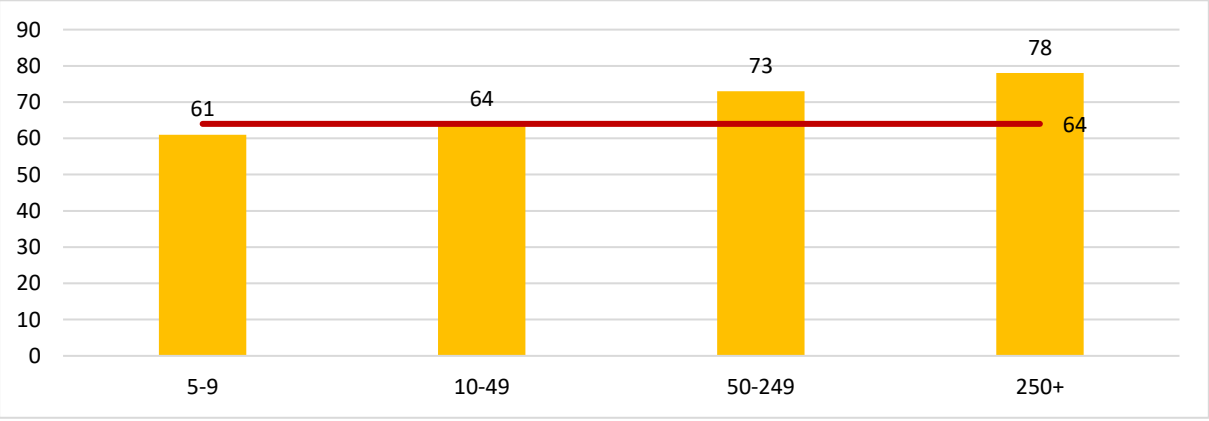


Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Even though large establishments may have a well-established OSH department/expert/internal safety officer, the available data show that large establishments are also more likely to use the services of an external provider to support them in their health and safety tasks. ESENER 2019 data show that over three-quarters (78%) of the large-scale establishments in the transportation and storage sector have used an external provider in the last three years, whereas this percentage is lower among micro establishments (61%).

In many segments of the transportation sector, workers health and safety representatives are not in place or are considered ineffective. This difficulty is related to some objective factors such as the precarious situation of work, the fragmentation — even physical — that prevents travelling staff to meet and have a physical place of aggregation and control, and even socio-demographic factors, such as the strong presence of immigrant workers who do not know the language (Interview).

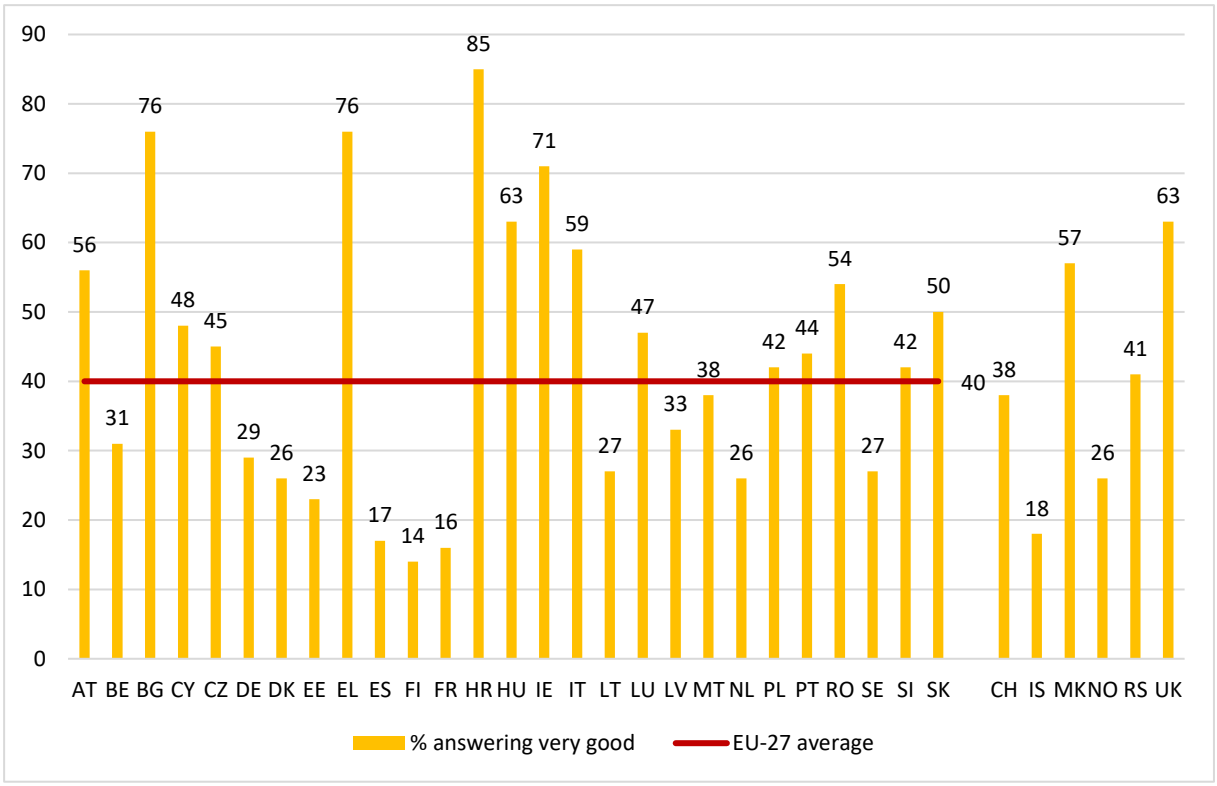
Figure 20 Share of establishments that have used the services of any external provider to support them in their health and safety tasks, by establishment size, transportation and storage sector, EU-27 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The ESENER 2019 survey results show that 87% of establishments in the transportation and storage sector that have used the services of an external provider (64% of establishments in the sector indicated this) rate the services obtained from these external providers as 'very good' or 'quite good' (40% as very good, and 47% as quite good), a result relatively similar to the EU-27 average for all sectors (40% very good and 46% quite good). Significant differences can be seen at the country level though, with 85% of establishments in Croatia rating the health and safety services from external providers as 'very good' compared to only 14% in Finland.

Figure 21 Share of enterprises that rated the health and safety services obtained from external providers as very good, by country, 2019



Base: Transportation and storage sector establishments in the EU-27 reporting the use of health and safety services obtained from external providers / Source: Panteia/IKEI based on ESENER 2019

3.4.3 Use of OSH information from other organisations

An additional consideration regarding OSH management is the use of OSH information from external organisations. The utilisation of information from other organisations to obtain relevant health and safety information can be a convenient low-effort method to collect relevant information for an establishment. As an example, in the air transport sector, several institutions and insurance associations in Europe have established different safety guidelines and training manuals for air transport workers (Schmitz-Felten, OSHwiki 2022):

- The European Commercial Aviation Safety Team provides information about safety management and culture.
- The European Aviation Group for Occupational Safety and Health is an organisation committed to the promulgation of safe workplaces, safe plants and machinery, safe work procedures and safe people working in the aviation industry.
- The Aviation and Aerospace group of the Institution of Occupational Safety and Health published guidelines and a DVD on airside health and safety instructions.

The ESENER 2019 survey data show that establishments in the transportation and storage sector utilise information from different types of organisations to obtain health and safety-related information.

However, there are notable differences regarding the popularity and utilisation of such sources. Sixty-nine per cent of establishments have contracted health and safety experts to provide them with OSH-related information, 50% of establishments in the sector have contracted insurance providers and 41% the labour inspectorate. Only 32% of establishments obtained information from employers' organisations, 30% from official institutes for health and safety at work, and only 19% of establishments from trade unions. The comparison with the EU-27 average for all sectors does not show great differences, where both percentages and order of importance of each type of organisation are rather similar.

Table 35 Share of establishments in the transportation and storage sector that used health and safety information from external organisations, by economic sector, EU-27, 2019

Source of information	Transportation and storage (%)	Total economy (%)
Employers' organisations	32	28
Trade unions	19	18
Contracted health and safety experts	69	64
Insurance providers	50	45
Labour inspectorate	41	37
Official institutes for health and safety at work	30	28

Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

At the sectoral level, the data show that larger establishments are more likely to contract external organisations to obtain OSH information, irrespective of the type of organisation in general, where this pattern seems to be particularly clear for labour inspectorates and official institutes for health and safety at work.

Table 36 Share of establishments in the transportation and storage sector that used health and safety information from external organisations, by size class, EU-27, 2019

Size	Employers' organisations	Trade unions	Contracted health and safety experts	Insurance providers	Labour inspectorate	Official institutes for health and safety at work
5-9	30	15	66	48	34	23
10-49	32	19	69	49	42	31
50-249	38	36	80	63	58	48
250+	50	38	74	62	71	67
Total transportation and storage sector	32	19	69	50	41	30

Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Significant differences can also be seen when looking at Member State level for enterprises that use information from trade unions, with only 4% doing so in Slovakia and 54% doing so in Sweden. Danish enterprises were the most likely to use information provided by insurance providers (89% of enterprises), with Italian enterprises the least likely (17%). Irish enterprises were most likely to use information provided by OSH institutes (62% of enterprises) and Romanian enterprises were the most likely to use information from the labour inspectorate.

Table 37 Share of establishments in the transportation and storage sector that used health and safety information from external organisations, by country, EU-27, 2019 (%)

	Employers' organisations	Trade unions	Contracted health and safety experts	Insurance providers	Labour inspectorate	Official institutes for health and safety at work
AT	45	16	57	36	73	30
BE	56	27	76	66	57	49
BG	20	15	55	48	52	28
CY	11	12	45	43	28	14
CZ	7	4	78	27	26	18
DE	39	23	74	89	35	37
DK	60	35	40	29	58	12
EE	9	4	32	25	72	22
EL	7	4	48	21	20	23
ES	25	24	88	76	31	20
FI	44	24	51	56	58	49
FR	22	16	40	33	41	32
HR	28	11	86	37	63	37
HU	20	11	60	19	26	14
IE	56	20	93	61	81	62
IT	30	15	83	17	14	18
LT	44	19	49	69	76	54
LU	22	16	57	27	44	28
LV	22	6	56	49	67	38
MT	29	11	65	65	57	24
NL	48	16	60	59	31	35
PL	42	32	63	40	51	33
PT	18	9	81	36	38	26
RO	28	13	91	41	89	41
SE	50	54	56	21	70	32
SI	67	6	87	39	30	30
SK	0	2	78	24	34	13
EU Average	32	19	69	50	41	30

Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

3.4.4 Evolution in time of the use of health and safety services and external providers, access to external sources of OSH information

In 2014, 78% of establishments in the transportation and storage sector arranged regular medical examinations for their employees. In 2019, this proportion slightly increased to 82%. This percentage seems to be higher than in 2009, when 73% of the establishments indicated that the health of employees was monitored through regular medical examinations.

Table 38 Type of health and safety services used (in-house or contracted externally): Evolution in time 2014-2019, transportation and storage sector, EU-27 (% establishments)

	ESENER 2014	ESENER 2019
An occupational health doctor	80	82
A psychologist	18	20
An expert dealing with the ergonomic design and set-up of workplaces	38	36
A generalist on health and safety	64	62
An expert for accident prevention	54	55

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

The type of health and safety services (in-house or contracted externally) remained similar from 2014 to 2019. When compared to the situation in 2009, the proportions of almost all types of services used increased, except for an expert for accident prevention. Regarding the type of organisations consulted for OSH information, figures remain consistent when 2014 is compared to 2019, apart from other official institutes for health and safety at work, which are consulted significantly less in 2019 when compared to 2014.

Table 39 Type of organisations consulted for OSH information: Evolution in time 2014-2019, transportation and storage sector, EU-27 (% establishments)

	ESENER 2014	ESENER 2019
Employers' organisations	31	32
Trade unions	18	19
Insurance providers	53	50
The labour inspectorate	45	41
Other official institutes for health and safety at work	43	30

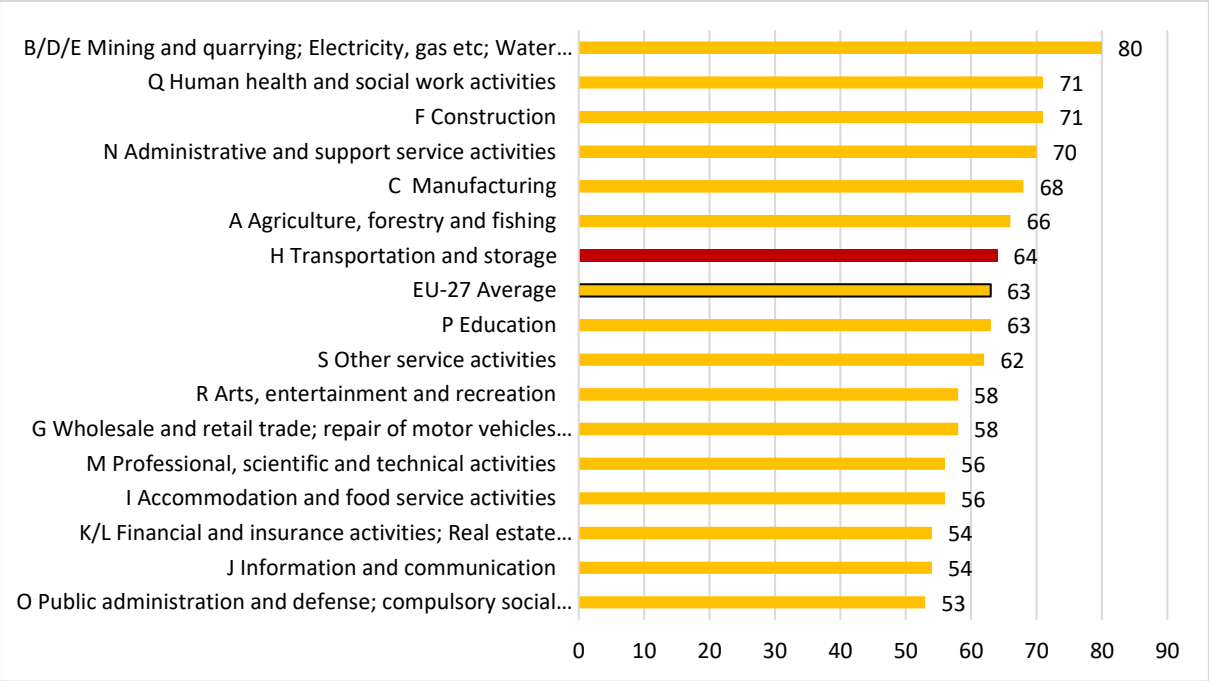
Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

3.5 Discussion on OSH issues at different levels

3.5.1 Management commitment: Discussion on OSH issues by top management

Management commitment is one of the key elements explaining differences in the extent and importance of the existing OSH practices within enterprises. The ESENER 2019 survey provides a proxy indicator of management commitment to OSH issues and this is reflected in the regular discussion of OSH issues at the top level of management. In this sense, the available data show that 64% of transportation and storage sector establishments (only establishments with 20 or more employees) suggest that OSH issues are regularly discussed at the top level of management, where this percentage is slightly higher than the EU-27 average for all sectors (63%).

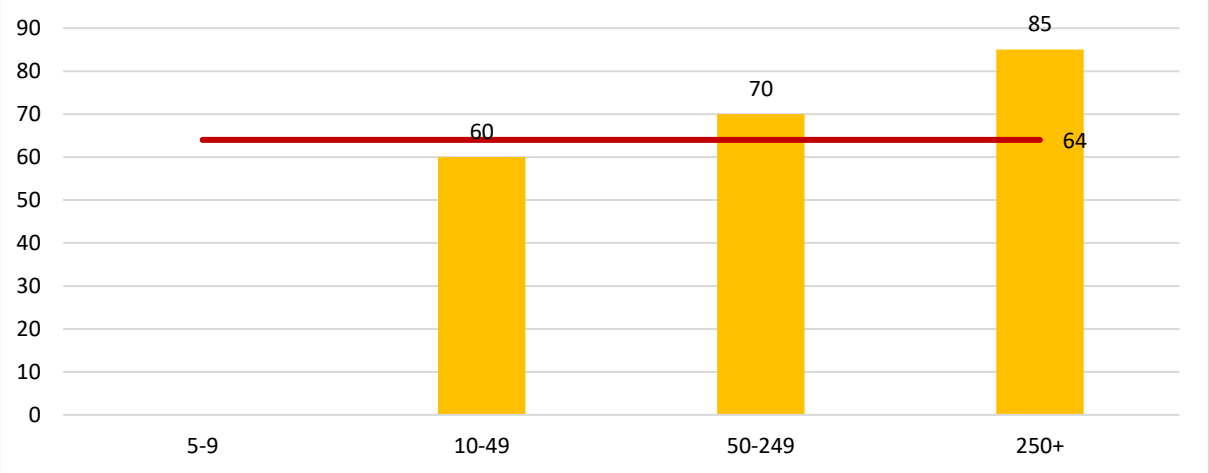
Figure 22 Share of establishments in which health and safety issues are discussed regularly at the top level of management, by sector, EU-27 (%)



Base: Only establishments with 20 or more employees / Source: Panteia/IKEI based on ESENER 2019

Looking at establishment size, there are some notable differences, with health and safety issues being discussed more frequently in larger establishments. Sixty per cent of small establishments (between 20 and 49 employees) report discussions at the top level of management, whereas the shares corresponding to larger establishments are higher (70% and 85% for medium and large establishments, respectively).

Figure 23 Share of establishments in which health and safety issues are discussed regularly at the top level of management, by size class, EU-27, 2019



Base: Only establishments with 20 or more employees / Source: Panteia/IKEI based on ESENER 2019

Further analysis of ESENER 2019 data indicates a positive relation between having regular meetings on health and safety issues at the top level of management and having formal procedures in place to prevent psychosocial risks. Although reversed causality cannot be excluded (installing formal procedures to prevent psychosocial risks may result in more meetings at top management level to discuss health and safety issues), this result shows that commitment of top-level management and team leaders will have a positive effect on the management of psychosocial risks.

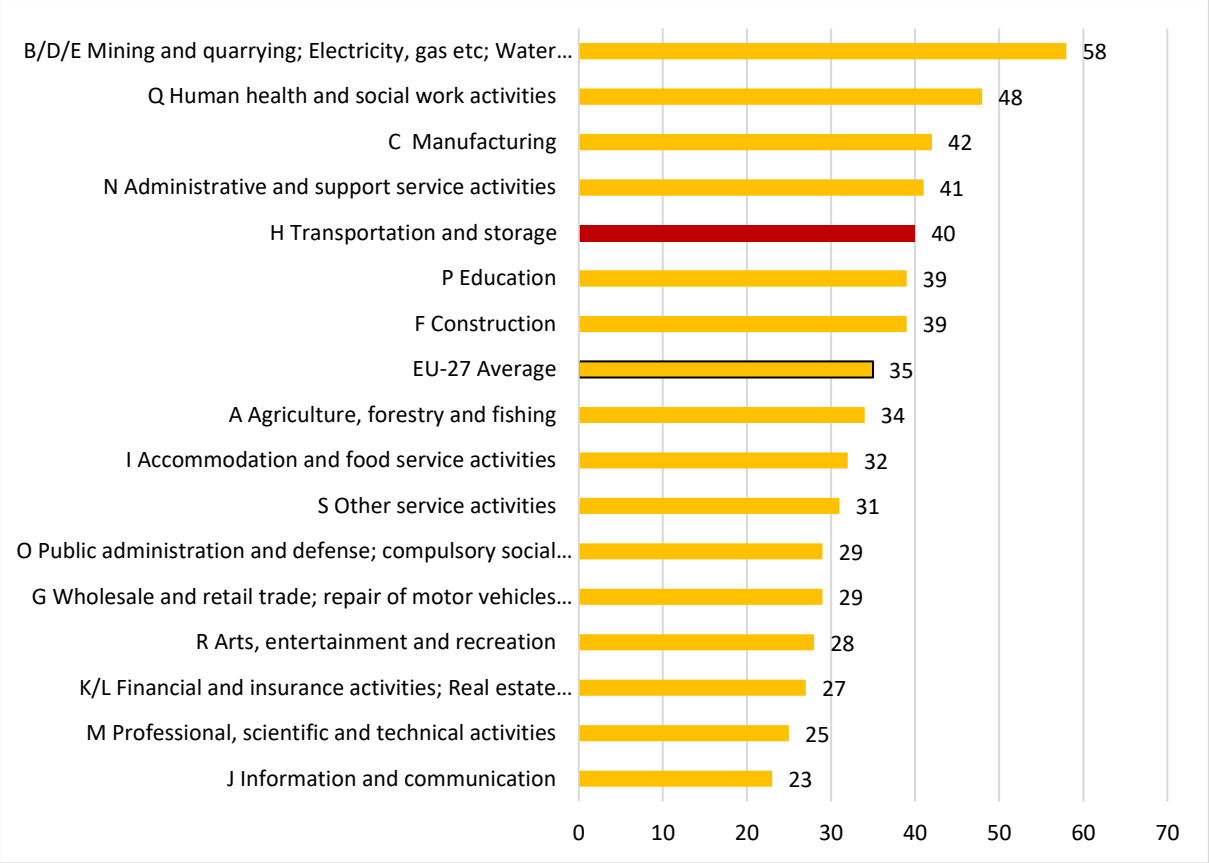
As an example, a study on the postal sector in the United Kingdom highlights the key role that intermediate supervisors play in supporting workplace health and safety issues. In this regard, the study suggests that some of the main factors limiting managers' ability to undertake 'desirable' safety practices include managers' indifference towards safety and quality considerations, lack of training/knowledge of OSH issues, cost/budget limiting considerations and, finally, competing demands from other duties (time/workload factors) (Bentley & Haslam, 2001).

As an example, during a recent investigation at one major European airport it has been noted that although OSH issues have been recognised by top management, these are currently not being acted upon. For some of the baggage companies working out of the airport, management encourages manual bag handling, which can lead to an increased risk of OSH injuries. Management has also introduced a high workload and increased work pressure for employees, which can be attributed to the fact that airline companies face a '300 euro fine per minute' if any delay is incurred. According to a company doctor, it is a business model that creates unsafe OSH measures. Another company doctor states that publications on the situation are seen as 'bad press', but no further action is taken as it is not taken seriously (Holdert & Meindertsma, 2023).

3.5.2 Discussion of OSH in staff or team meetings

The discussion on OSH issues at different levels in the establishment is another aspect related to OSH management. According to the ESENER 2019 survey results, OSH issues are regularly discussed in staff or team meetings in 40% of transportation and storage sector establishments, a percentage higher than the EU-27 average for all sectors (35%).

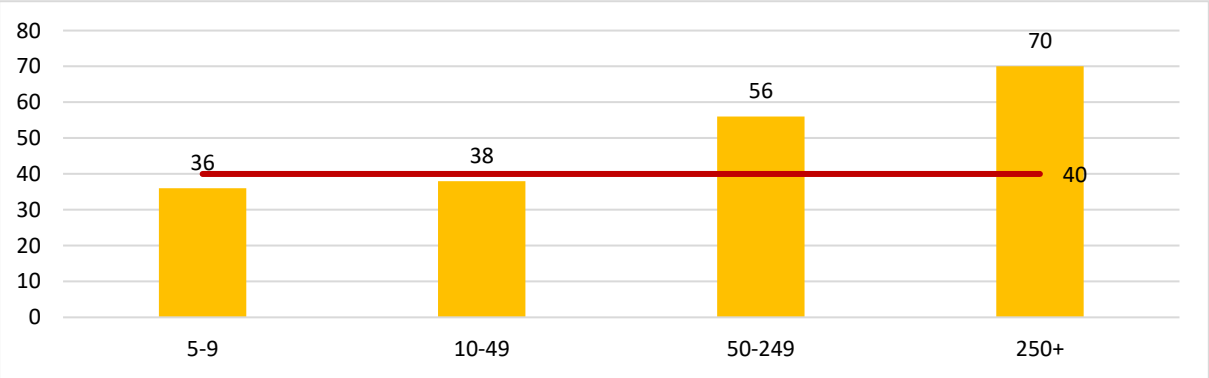
Figure 24 Share of establishments in which health and safety issues are discussed regularly in staff or team meetings, by sector, EU-27, 2019 (%)



Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Meanwhile, differences per establishment size show two distinctive groups of transportation and storage sector establishments. OSH issues are regularly discussed in staff or team meetings in micro and small establishments at 36% and 38%, respectively, whereas 56% of medium-sized establishments and 70% of large establishments do this.

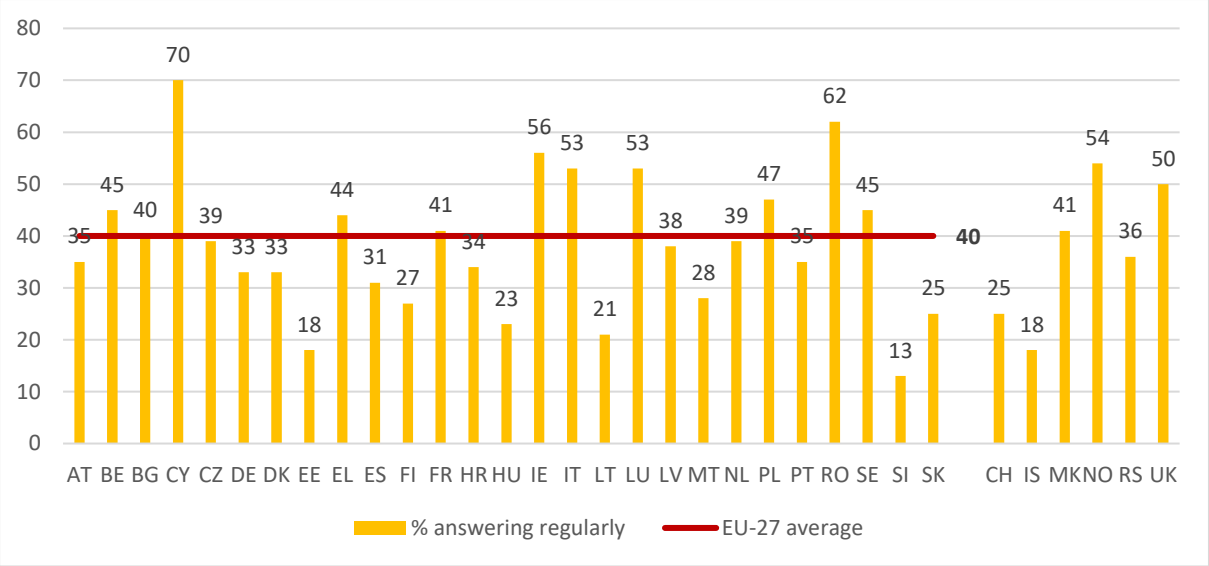
Figure 25 Share of establishments in which health and safety issues are discussed regularly in staff or team meetings, by establishment size, transportation and storage sector, EU-27 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

When looking at the differences between countries, ESENER 2019 shows several differences. Whereas 70% of establishments in Cyprus regularly discuss health and safety issues in staff or team meetings, this is only the case for 13% of establishments in Slovenia.

Figure 26 Share of establishments in which health and safety issues are discussed regularly in staff or team meetings, by country, transportation and storage sector, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

There are, in addition, some tools that have been identified that can help the worker play a proactive role in OSH. One interviewee highlighted the Italian 'Stop Work Authority', which defines that it is the authority of each worker, regardless of position, seniority and role, to stop work when they believe that it is not being carried out safely because it could lead, for themselves or others, to accidents or occupational diseases, and it is specified that no fault or responsibility may be attributed to an employee who, in good faith, signals a risky situation or who stops activities pursuant to the Stop Work Authority, even if such action should later turn out to be unnecessary. Such an empowerment of the worker can bring advances in terms of OSH. Currently, not all business settings are sufficiently mature enough for full and substantial implementation of this principle (Interview).

3.5.3 Evolution in time on the discussion of OSH issues at different levels

In 2019, over half (64%) of establishments with more than 20 employees on the payroll regularly discusses health and safety issues at the top level of management. This is slightly more than in 2014 (62%) and substantially more than in 2009 (32%).

Table 40 Health and safety issues discussion at the top level of management: Evolution in time 2014-2019, transportation and storage sector, establishments with more than 20 employees on the payroll, EU-27 (%)

	ESENER 2014	ESENER 2019
Regularly	62	64
Occasionally	31	28
Practically never	5	7

Base: All establishments with more than 20 employees on the payroll / Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

3.6 Training on health and safety issues

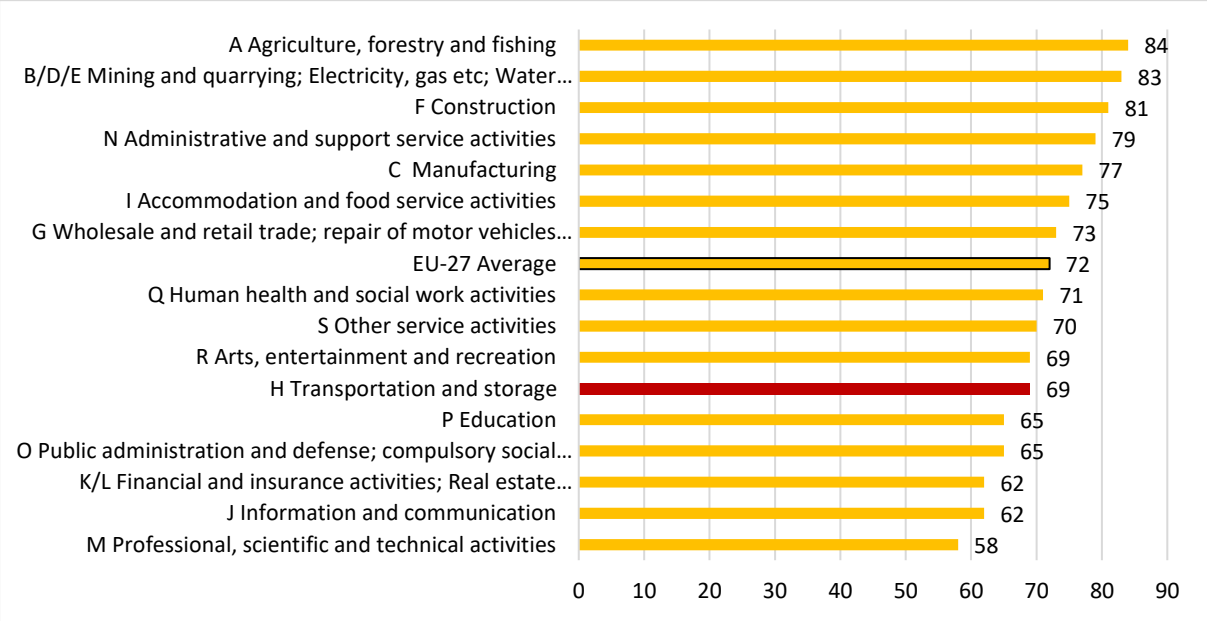
The successful implementation of different OSH management practices often requires the development of training activities to inform/train different layers of the company (managers, OSH company representatives, workers) on how to work safely and without risks to health.

3.6.1 Management training

It is the responsibility of employers to ensure that everyone in the company has relevant information on existing and new OSH risks, measures in place to deal with these risks or instructions to follow any emergency procedures. Some groups of workers have particular training needs, including new recruits (especially if they are young or have no experience), workers changing jobs or taking on extra responsibilities within the company, and migrant workers coming from a third country. Also, managers and OSH representatives need to keep themselves constantly updated with changes and new developments (legislative, operational, etc.) in the OSH field and affecting the daily activities of the company. A recent Eurofound study showed that employers in the transportation and storage sector are more likely to train employees performing cognitive tasks than those performing physical tasks, and that training opportunities are lower if workers perform interactional tasks (Eurofound, 2022).

Concerning the participation in training activities among team leaders and line managers on how to manage health and safety in their teams, the ESENER 2019 data indicate that in 69% of establishments in the transportation and storage sector with 20 or more employees these groups receive this type of training, which is slightly lower that the EU-27 average result (72%), but which is above other sectors such as professional activities, information and communication, and financial activities (58%, 62% and 62%, respectively).

Figure 27 Share of establishments with 20 or more employees in which team leaders and line managers receive any training on how to manage health and safety in their teams, by sector, EU-27, 2019



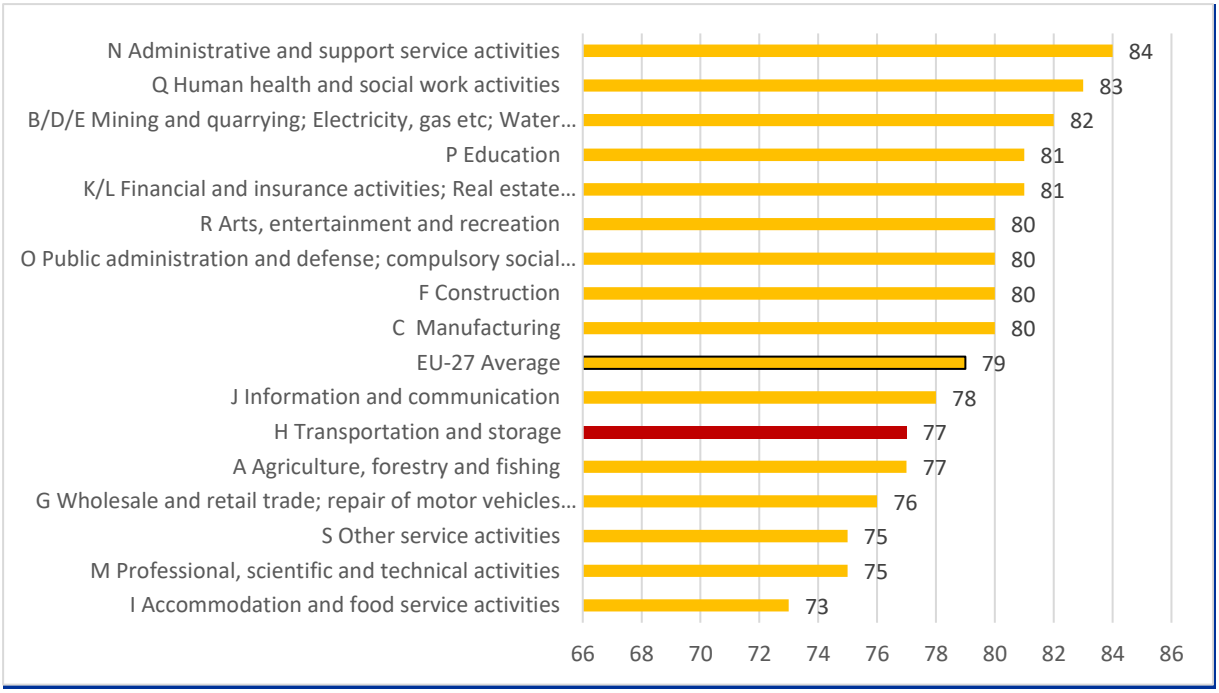
Base: All establishments in the EU-27 with 20 or more employees / Source: Panteia/IKEI based on ESENER 2019

The results show that the participation in training activities among team leaders and line managers on how to manage health and safety in their teams increases depending on the size of the establishment. Whereas 64% of small establishments (20-49 employees) in the transportation and storage sector receive training, this figure is 77% for medium-sized establishments (50-249 employees) and 90% for large establishments (250+ employees).

Data per Member State show considerable differences. Although 100% of Bulgarian and Estonian establishments report that team leaders and line managers receive training on how to manage health and safety in their teams, this percentage goes down to 40% in the case of Romania. Again, it is difficult to provide specific explanations for these country differences.

Seventy-seven per cent of establishments in the transportation and storage sector indicated that health and safety representatives were provided with any training during work time to help them perform their health and safety duties. This is around the same as for the economy as a whole.

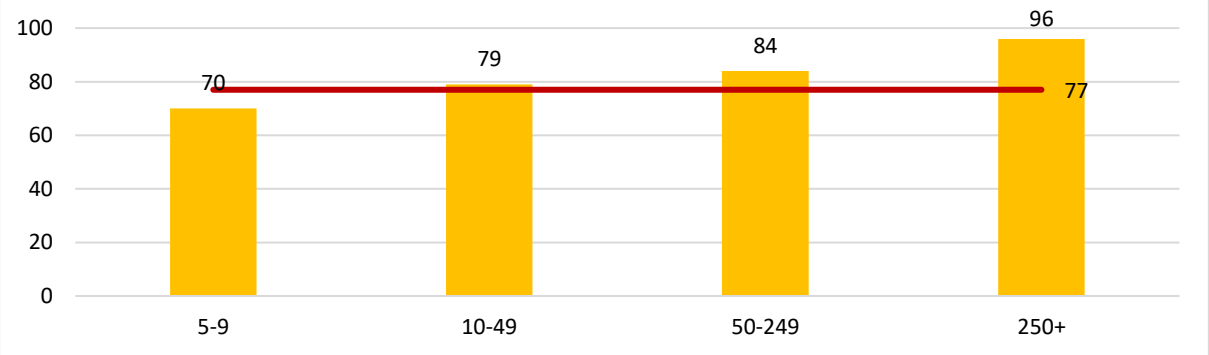
Figure 28 Share of establishments where the health and safety representatives were provided with any training during work time to help them perform their health and safety duties, by sector, EU-27 (%)



Base: Only establishments with health and safety representatives / Source: Panteia/IKEI based on ESENER 2019

When considering the size of the establishment, larger establishments are more likely to provide health and safety representatives with any training during work time to help them perform their health and safety duties (96%), whereas this percentage is 79% in small establishments (with 10-49 employees) and 70% in micro establishments (with 5-9 employees).

Figure 29 Share of establishments where the health and safety representatives were provided with any training during work time to help them perform their health and safety duties, by establishment size, transportation and storage sector, EU-27 (%)



Base: Only transportation and storage sector establishments with health and safety representatives / Source: Panteia/IKEI based on ESENER 2019

Additionally, there are notable differences regarding establishments that provide health and safety representatives with training during work time to help them perform their health and safety duties when looking at the country level. In this regard, there are Member States where more than 90% of establishments report providing this type of training (e.g. Cyprus, Czechia, Estonia and Slovakia), whereas in other Member States this percentage is below 60% (e.g. France, Lithuania and Latvia).

3.6.2 Employee training on OSH issues

The ESENER 2019 survey identifies the main OSH topics on which employees are trained. In this respect, 80% of establishments in the transportation and storage sector report providing employees with training in relation to emergency procedures and how to lift and move heavy loads. Seventy-four per cent of enterprises whose employees are exposed to 'chemical or biological substances' have offered training on the use of dangerous substances to their employees, and 99% of all establishments on proper use and adjustment of their working equipment. By way of contrast, only 35% of transportation and storage sector establishments provide training on psychosocial risks prevention. There are no important differences with the EU-27 average for all sectors, neither in the order nor in the importance of the different issues.

Table 41 OSH topics on which training has been provided to employees (%), transportation and storage sector and all sectors, EU-27, 2019

Training topics	Transportation and storage	Total economy
Proper use and adjustment of their working equipment	69	64
Use of dangerous substances (*)	74	79
How to prevent psychosocial risks	35	34
How to lift and move heavy loads (**)	80	75
Emergency procedures	80	79

Base: All transportation and storage sector establishments in the EU-27
(*) Base: Only transportation and storage sector establishments reporting the presence of 'chemical or biological substances'
(**) Base: Only transportation and storage sector establishments reporting the presence of 'lifting or moving heavy loads'
Source: Panteia/IKEI based on ESENER 2019

For some subsectors within the broader transportation and storage sector, additional training topics need to be taken into consideration, as is the case for bike couriers. Box 10 provides an example of training topics for employees working in this sector.

Box 10 Employee training on OSH issues in bike riders

All light delivery drivers require proper training regarding traffic rules, the use of safety equipment and safe loading of two-wheeled vehicles. In Germany, training for postal delivery drivers and newspaper couriers on two wheels is provided by different accident insurance companies, for example, Unfallkasse Post und Telekom (statutory accident insurance body for the postal and telecoms sectors) and BG Druck- und Papierverarbeitung (statutory accident insurance body for the printing and paper industry).

Many serious and fatal accidents involving cyclists (especially bicycle messengers) are the result of the cyclist being overlooked by vehicle drivers (e.g. falling into the blind spot of truck drivers when they are turning). This shows that it is essential to sensitise not only the light delivery drivers to the risks and hazards of their work but also all other road users. For example, campaigns in the United Kingdom are trying to get across the messages: 'Think road safety!' and 'Tomorrow's roads: safer for everyone'. The Cycles and HGVs working group of the London Cycling Campaign has developed a code of conduct for lorry drivers.

Workers in the food delivery industry require special training on preventive measures and how to handle difficult situations and clients.

Source: EU-OSHA, 2011a

Regarding the differences between enterprise sizes, the share of establishments in the transportation and storage sector that provide training to employees on different OSH issues is higher among larger establishments than among smaller ones, as expected. For instance, training on proper use and adjustment of working equipment is reported to be provided by 64% of micro establishments and 72% of small and medium-sized establishments, whereas these percentages are significantly higher among large establishments (89%).

Table 42 OSH topics on which training has been provided to employees (%), transportation and storage sector, by establishment size, EU-27, 2019

	Proper use and adjustment of their working equipment	Use of dangerous substances (*)	How to prevent psychosocial risks	Emergency procedures	How to lift and move heavy loads (**)
5-9	64	63	35	77	78
10-49	72	77	31	80	79
50-249	72	81	47	90	85
250+	89	96	52	92	93
Total	69	74	35	80	80

Base: All transportation and storage sector establishments in the EU-27

(*) Base: Only transportation and storage sector establishments reporting presence of 'chemical or biological substances'

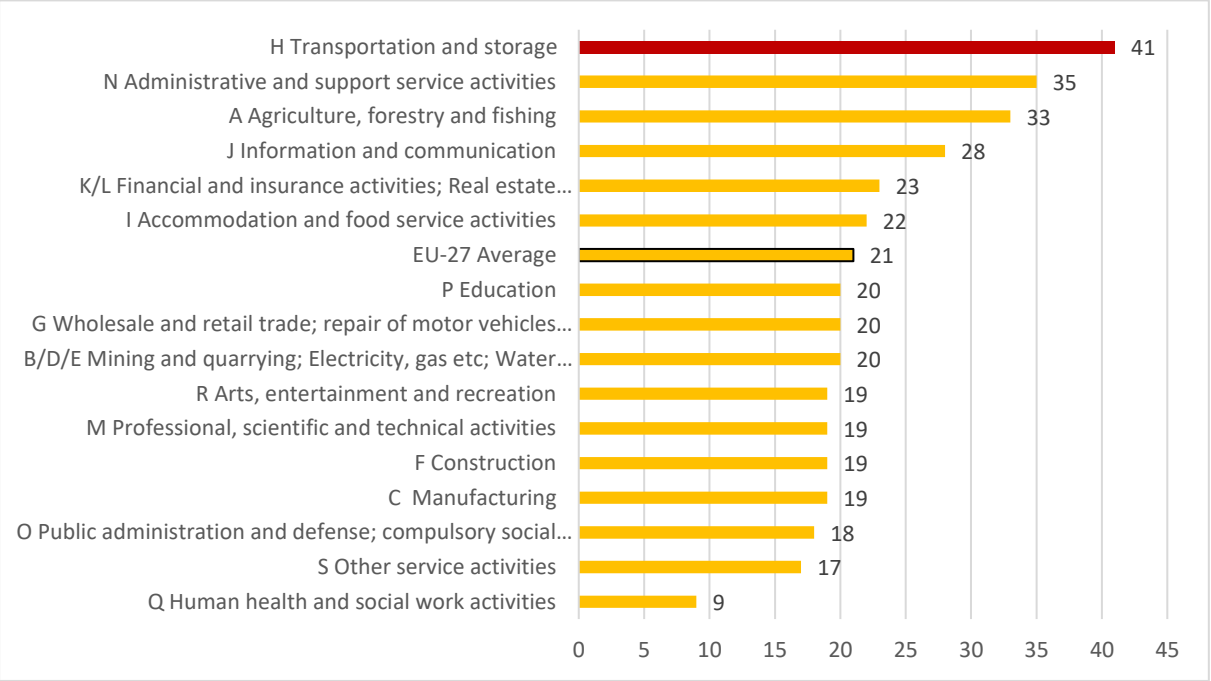
(**) Base: Only transportation and storage sector establishments reporting presence of 'lifting or moving heavy loads'

Source: Panteia/IKEI based on ESENER 2019

The ESENER 2019 data show significant differences at country level. For instance, whilst only 31% of Greek enterprises indicated that they are provided training on the use of dangerous substances, this is the case for 94% of Italian enterprises. Regarding training on the proper use and adjustment of working equipment, only 39% of French enterprises provided this, compared to 88% of Croatian enterprises. Also highlighting differences between Member States, one interview with a representative of the water transport sector indicated that in Belgium port workers must undergo specific training to be able to work in the sector, but this is not the case in the port of Rotterdam. If employees are well trained, it can lead to increased safety for themselves but also for the others on the team.

ESENER 2019 also provides information regarding whether training to employees on OSH topics is provided in other languages. In the transportation and storage sector, 41% of enterprises that provide some kind of OSH training to employees and also employ workers with difficulties understanding the language spoken at the premises provide training to employees in other languages. This is by far the largest percentage across the EU-27, whereby the EU average for all sectors is 21%. Larger enterprises are more likely to employ non-native workers, however these companies have the necessary resources and the willingness to train their workers who have difficulties in understanding.

Figure 30 Whether training to employees on OSH-related topics is provided in other languages, by sector, EU-27 (%)



Base: All establishments in the EU-27 that provide some kind of OSH training to workers and also employ workers with difficulties understanding the language spoken at the premises / Source: Panteia/IKEI based on ESENER 2019

3.6.3 Evolution in time on training on health and safety issues

In this section more information is provided on the extent to which management, health and safety representatives, and employees are trained on health and safety issues. The proportion of establishments with more than 20 persons on the payroll, in which team leaders and line managers receive any training on how to manage health and safety in their teams, has increased slightly from 66% in 2014 to 69% in 2019.

In the same period, the proportion of establishments that provide any training to health and safety representatives (if available) during work time has slightly decreased from 81% to 77%.

The ESENER data from 2014 and 2019 show that the topics employees are trained on did not significantly change over time. However, the proportion of training that was provided in different languages increased significantly from 31% in 2014 to 41% in 2019.

Table 43 Topics of training provided to employees: Evolution in time 2014-2019, transportation and storage sector, EU-27 (% establishments)

	ESENER 2014	ESENER 2019
The proper use and adjustment of their working equipment and furniture	66	69
The use of dangerous substances (*)	74	74
On how to prevent psychosocial risks such as stress or bullying	37	35
On how to lift and move heavy loads or people (**)	83	80
Emergency procedures	82	80

Base: All transportation and storage sector establishments in the EU-27

(*) Base: Only transportation and storage sector establishments reporting presence of 'chemical or biological substances'

(**) Base: Only transportation and storage sector establishments reporting presence of 'lifting or moving heavy loads'

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

4. Main drivers and barriers for OSH management

4.1 Introduction

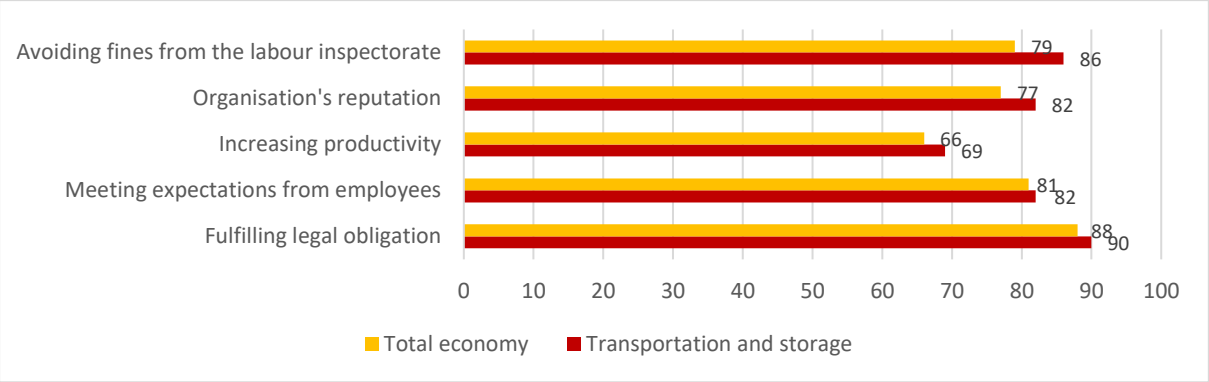
This chapter presents the main drivers and barriers in regard to OSH management practices within the transportation and storage sector. This includes the main reasons that motivate sector enterprises to engage in OSH practices, and the main difficulties that enterprises report in addressing health and safety issues in general as well as in dealing with psychosocial risks in their establishments. Additional elements that are influencing OSH management practices (such as COVID-19 and digitalisation) are also presented in this chapter.

4.2 Drivers for OSH management

4.2.1 Reasons that motivate enterprises to address OSH issues

Enterprises in the transportation and storage sector have a variety of reasons to engage in OSH practices within establishments, including visits by the labour inspectorate. According to ESENER 2019, the main drivers for addressing health and safety in transportation and storage sector establishments are fulfilling legal obligation (90%) and avoiding fines from the labour inspectorate authorities (86%). Other reasons play a significant although lower role, including maintaining the organisation's reputation and meeting the expectation from employees or their representatives (both 82%) and, finally, maintaining or increasing productivity (69%). In all cases, these figures are greater than the average for the total economy.

Figure 31 Main reasons for addressing health and safety in the establishment, transportation and storage sector and all sectors, EU-27, 2019 (% establishments)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

Further in-depth analysis of ESENER 2019 data shows that two reasons for addressing health and safety are positively related with management commitment to OSH (see Annex 2). These are: to meet expectations from employees, and to increase productivity. The other three reasons are not significantly related with the attention for OSH management practices (to fulfil legal obligations, for the organisation's reputation, and to avoid fines from the labour inspectorate).

The literature shows that courier companies follow existing OSH regulations due to different reasons, including economic and managerial efficiency, company reputation and, finally, maximum retention of drivers in a very competitive labour market arena (EU-OSHA, 2022b). According to an interviewee, contrarily to what happens in private transport sector activities, working and OSH-related conditions within the postal and courier sector are mainly regulated at the national level. For instance, European-level legislation does not regulate subcontracting. Some stakeholders have advocated for a European directive and a cross-border parcel delivery regulation dictating some obligations on working conditions.

Traditionally in Europe, existing courts have ruled on several platform work cases (in particular those in the delivery sector and personal transportation), often resulting in contradictory rulings and different conclusions despite similar factual circumstances (CEPS et al., 2020). The European Commission put forward its proposal on new rules for platform work to the Council and the European Parliament, on

9 December 2021, and it is currently being discussed. Against this, some Member States have ruled out specific legislation regulating platform work. In Sweden, the Arbetsmiljöverket (Swedish Work Environment Authority) did oblige delivery riders' platforms (via fines and sanctions) to provide platform workers who work a certain number of hours per week with winter tyres fitted at no expense to the rider (CEPS et al., 2020). Additionally, one of the best examples is given by Spain, which did pass in 2021 the so-called Riders' Law.

Box 11 The Spanish Riders' Law

Platform work has captured public attention in recent years, with an intense discussion around the employment status of platform workers and the existence of abuse situations (for instance, in the form of bogus self-employment among platform workers). The so-called Riders' Law (Royal Decree Law 9/2021, of 11 May 2021, ratified by Law 12/21 of 28 September 2021) is the legislative response to these challenges.

On the one hand, the new law aims to provide a legal presumption of a dependent employment relationship for digital platform workers in the delivery sector. On the other hand, the law establishes a right to algorithmic transparency, forcing every type of platform to inform the employee's legal representatives about the inner functioning of the algorithms 'that may affect working conditions, and access to and maintenance of employment, including profiling'.

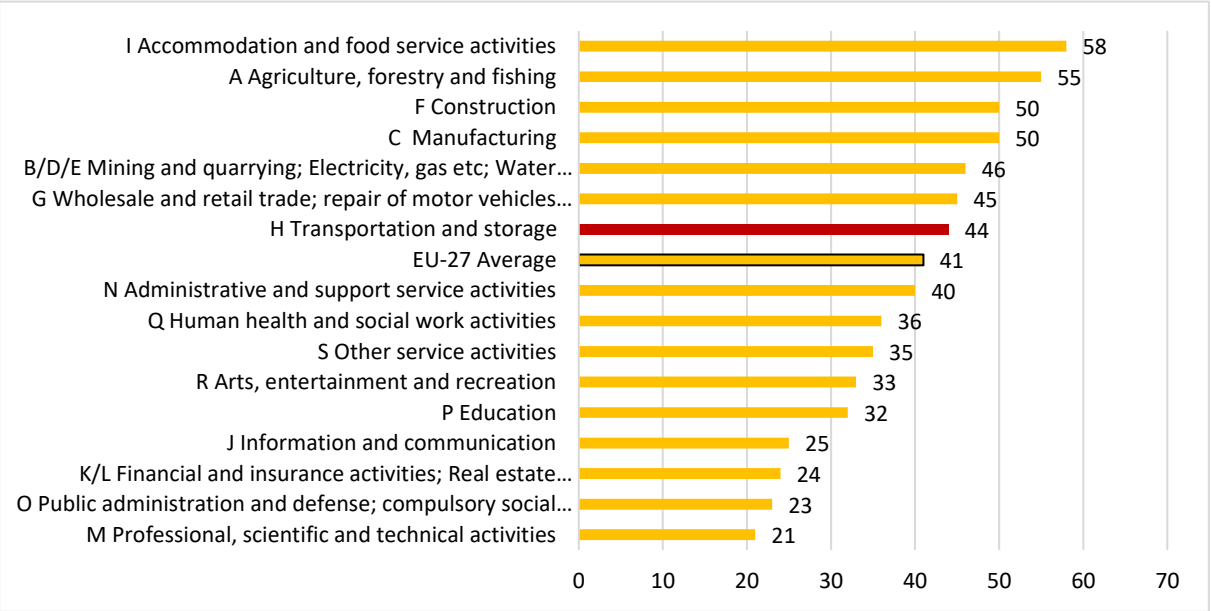
Both issues correspond directly to two of the most relevant underlying causes for OSH challenges related to platform work.

Source: EU-OSHA, 2022c

4.2.2 Visits of labour inspectorates

Labour inspectorates play a key role not only in driving compliance with and fulfilment of existing OSH legislation but also in providing useful advice about how to successfully deal with and improve existing OSH management practices within transportation and storage sector establishments. ESENER 2019 data show that 44% of establishments in the transportation and storage sector report having been visited by the labour inspectorate in the last three years. This is slightly above the EU-27 average of 41%, and significantly more than in some other sectors, such as information and communication (25%), financial and insurance activities (24%), professional, scientific and technical activities (21%), and public administration and defence (23%). However, this figure has decreased since ESENER 2014, whereby 51% of enterprises in the transportation and storage sector reported a visit by the labour inspectorate.

Figure 32 Share of establishments that report having been visited by the labour inspectorate in the last 3 years in order to check health and safety conditions, by economic sector, 2019 (%)



Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

In Spain, the labour inspectorate has taken a very active role in relation to platform work activities, including those related to delivery/courier activities. Thus, the 2018-2020 Labour and Social Security Inspectorate Strategic Plan (Spanish Labour and Social Security Inspectorate, 2018) includes several operational measures directly targeting platform work, including the development of a specific ad hoc campaign to inspect platforms, the provision to inspectorates with the technical means necessary to facilitate the identification of those involved in digital platforms and the provision of training activities in this area. Furthermore, the Central Services of the Spanish Labour and Social Security Inspectorate did develop a guide on the collaborative economy to facilitate the investigations of the inspectors (EU-OSHA, 2022a).

There are also some negative examples that have been identified. For instance, in the preparation of a mass claim against baggage and cargo companies at Amsterdam Airport Schiphol by the labour union FNV, the labour inspectorate has carried out inspections at the site for the first time in 12 years. In their findings, the inspectorate stated that the work is too physically demanding and that the companies operate in violation of the Working Conditions Act. The labour inspectorate has found several shortcomings, where employees must carry most luggage manually, with lifting aids either being not operational, not present or not used. It was also found that the necessary risk assessment measures were not in order. Furthermore, it is required by the inspectorate that the baggage basements be automated within two years, however Schiphol Airport has no intention on renovating the basement at least until 2026 (Holdert & Meindertsma, 2023).

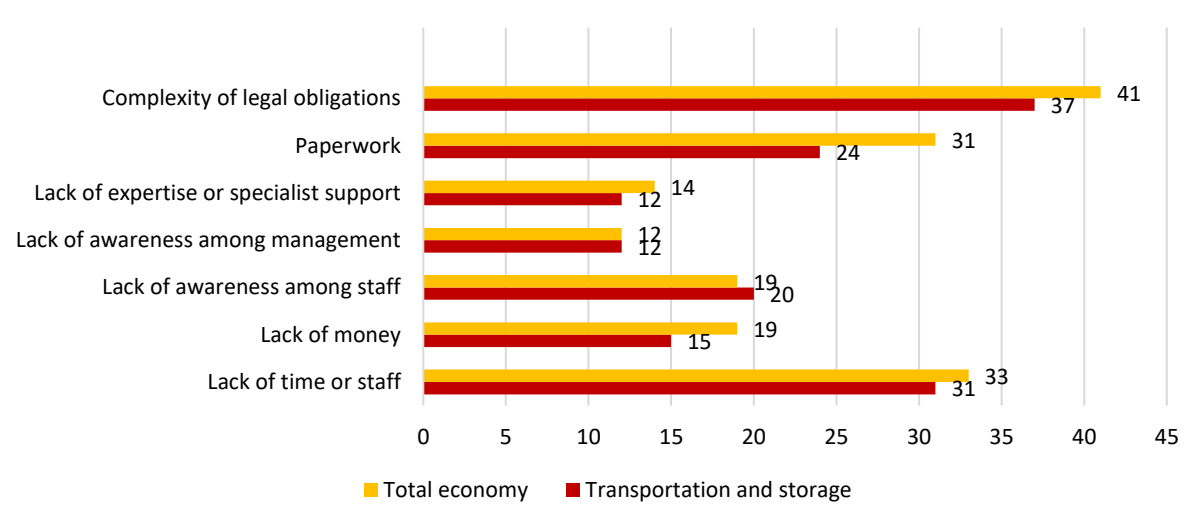
One interviewee indicated that whilst labour inspection is good in theory, in practice it is rarely effective.

4.3 Barriers for OSH management

4.3.1 Difficulties in engaging in OSH management practices

Establishments in the transportation and storage sector are confronted with several difficulties in addressing health and safety issues. In this regard, and according to the results stemming from ESENER 2019, the most important difficulties are the complexity of existing legal obligations (signalled as a major difficulty by 37% of transportation and storage sector establishments), followed by lack of time/staff to deal with these issues and existing paperwork (31% and 24% of establishments, respectively). The lack of awareness among management and the lack of specialist support are the least important reasons (only suggested by 12% of establishments).

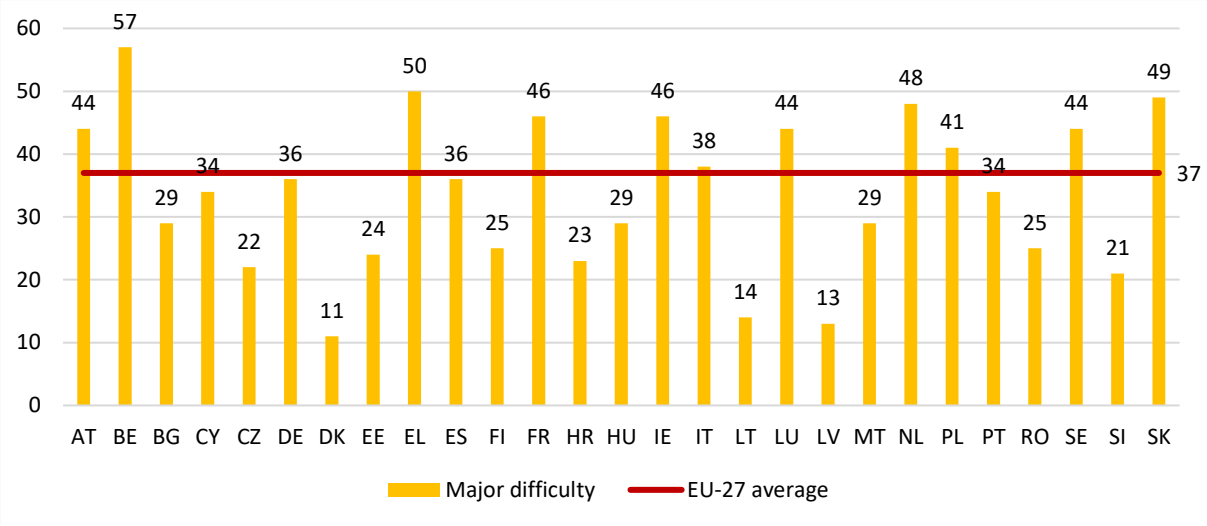
Figure 33 Main difficulties in addressing health and safety in the establishment, transportation and storage sector and all sectors, EU-27, 2019 (% establishments)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

In some Member States, establishments are more likely to report complexity of legal obligations as the main difficulty in addressing health and safety in the establishment. This is particularly the case in Belgium and Greece (57% and 50%, respectively).

Figure 34 Establishments reporting complexity of legal obligations as the main difficulty in addressing health and safety, transportation and storage sector, by country, 2019 (% establishments)



Base: All transportation and storage sector establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

According to one interviewee, many OSH issues in the aviation sector do not apply directly, because much of the work takes place in mobile workplaces (i.e. airplanes), explicitly excluded in the Council Directive 89/391/EEC of 12 June 1989 on the 'introduction of measures to encourage improvements in the safety and health of workers at work'.

As an additional difficulty for engaging in OSH management practices not covered under the ESENER questionnaire, the use of unregulated/uncontrolled subcontracting should be noted, which is evident in the case of the courier sector.

Box 12 The use of unregulated subcontracting as an added difficulty for engaging in OSH management practices

Courier companies usually make use of subcontractors, be it incidentally (sudden surge of activities) or structurally (during certain periods, for certain types of routes or parcels, and so on), where the working and OSH conditions for drivers working for or as a subcontractor may vary significantly to the ones offered by subcontracting companies to employees on the payroll.

In the transportation sector in general, the use of subcontracting and non-standard work arrangements is on the rise, so transport companies are increasingly assimilating operational models involving subcontractors, subcontracting chains, and/or self-employed drivers and riders ('supply chain') as a result of growing demand and increasing competition — both regarding the number of players in the market and on pricing.

Allegedly, this works as follows: e-commerce companies use postal or courier services companies for the delivery of goods bought through their shop. Some of these companies use subcontractors, who in turn also use a subcontractor, who finally delivers the parcel. In many cases, the final subcontractors are hired as self-employed workers, so they themselves are responsible for their own health and safety, although the facts of this labour relation would not support its legal qualification.

Source: EU-OSHA, 2022b

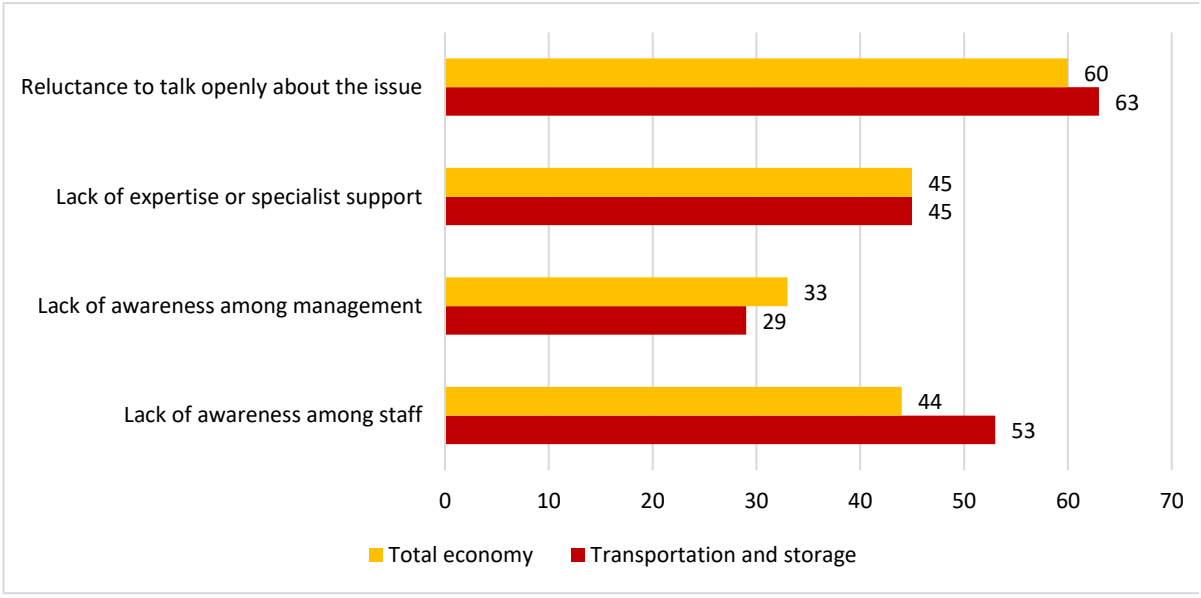
One of the noted difficulties for engaging in OSH management practices identified in the literature review is the lack of reliable and comparable data on the exposure to occupational hazards of the workers (Oldenburg et al., 2010).

4.3.2 Main obstacles to dealing with psychosocial risks

As shown in section 2.3.2, psychosocial risks are frequently reported in the transportation and storage sector. In this regard, the ESENER 2019 survey identifies the main difficulties experienced among those establishments that have identified one or more psychosocial risks and report that psychosocial risks are more difficult to address than other risks.

In this sense, the most relevant difficulties include a reluctance to talk openly about these risks, a lack of awareness among staff as well as the lack of expertise/specialist support (63%, 53% and 45% of the responses, respectively), whereas the lack of awareness among management is only suggested by 29% of responses. In the case of reluctance to talk about issues and lack of awareness among staff, these figures are higher than for the total economy. The difference between the transportation and storage sector and the average in the total economy in regard to reluctance to talk openly about risks is minimal, and it is a common issue that such topics can still be taboo.

Figure 35 Main obstacles to dealing with psychosocial risks in the establishment, transportation and storage sector and all sectors, EU-27, 2019 (% establishments) (*)



(*) Responses only of those establishments that have identified one or more psychosocial risk and report that psychosocial risks are more difficult to address than other risks

Source: Panteia/IKEI based on ESENER 2019

4.4 Additional elements influencing OSH management practices

4.4.1 The impact of the COVID-19 pandemic on OSH management practices

The COVID-19 pandemic that began in early 2020 had a severe impact also on the transportation and storage sector and OSH management in enterprises. Transportation and storage workers were considered key frontline workers throughout the pandemic, making up 10.3% of all essential workers, with those working in passenger, freight, and postal and courier activities particularly affected (European Parliament, 2022a). Transport workers were also among those facing the highest risk of contracting COVID-19 due to their continuation of work. This section explores some of the key impacts in regard to OSH on the sector.

- **Transportation and storage workers considered essential during the pandemic**

Many occupations within the transportation and storage sector were considered essential during the height of the COVID-19 pandemic, which exposed these workers to the effects of the virus. The COVID-19 pandemic affected global trade flows at an unprecedented speed and scale (UNCTAD, 2021). The

COVID-19 outbreak has accelerated the growth of e-commerce activities worldwide due to a combination of public anxiety about infection, mandated lockdowns and widely applied mobility restrictions (UNCTAD, 2021; Koch et al., 2020). In this context, some sectors, such as courier and delivery companies, expanded their activities and were considered as 'essential' in the pandemic (Egozi et al., 2022; Eurofound, 2021). This of course meant that workers in this sector were more likely to be exposed to the virus, particularly given the customer-facing nature of the job.

Road transport services were also considered an essential service as they were responsible for facilitating the supply of essential goods such as food and medical supplies in addition to materials that businesses and consumers were dependent upon (ILO, 2020a). The demand for these essential products and services coupled with the pre-existing labour shortages within the sector had the effect of increasing the workload of road transport workers. To maintain the functioning of essential services, Member States introduced temporary derogations from rules concerning working time and leave, which had an effect on working conditions (Eurofound, 2020; Samek Lodovici et al., 2022).

Some sectors were not considered essential but were affected by the pandemic in different ways. For instance, the airline industry experienced a huge decrease in capacity of roughly 60-80% at major carriers. Many pilots lost their jobs and/or were on extended leave, which presented some new challenges, such as an increased workload for remaining staff (Cahill et al., 2020).

- **Increased exposure to COVID-19 for certain jobs in the sector**

Some workers within the sector were more likely to be exposed to the virus, due to the nature of the job. For instance, pilots and cabin crew members were exposed to a higher risk of COVID-19 contamination, and they had to go into quarantine every time they entered a new place/country, resulting in many risky situations in this sense. Urban transport workers also had high exposure to the risk of infection due to close contact with colleagues and passengers. The pandemic also intensified violence against, harassment of and stigmatisation of frontline essential workers (Samek Lodovici et al., 2022).

Within this context, couriers have been exposed to a higher risk of being exposed to the virus or spreading it to others, given their contact with many people (customers, suppliers and co-workers), including high-risk customers and zones such as hospitals and quarantine facilities. However, it is not clear that all these delivery workers, particularly those in the platform economy, may have had access to adequate PPE (both in terms of quantity and quality) (OECD, 2020; EU-OSHA, 2021). Some authors suggest that many riders and drivers have worked longer hours than before and at a higher speed, resulting in less time for sanitising measures, higher-speed driving or higher stress levels (Egozi et al., 2022; Hadden, 2020). It took a lot of time before enterprises in the passenger transport sector introduced measures, such as providing PPE, to protect drivers from COVID-19 and some never did so personnel had to source this themselves (Interview).

- **Impact of mobility restrictions on workers**

During the first phase of the pandemic in 2020, authorities across Europe implemented several mobility restrictions to avoid the pandemic diffusion. Travel restrictions and containment measures adopted within and at the external border of the EU led to drastic reductions in traffic in all transport modes (European Parliament, 2020). According to the International Road Transport Union (IRU), international coach transport and national passenger transport markets were severely affected, and tourist services halted, and interurban services fell to almost half of normal levels. Additionally, in early March 2020, land-based supply chains, particularly road, had been particularly severely affected by such restrictions and waiting times at certain internal EU borders went beyond 24 hours.

Seafarers were negatively affected due to the strict movement restrictions that were in place during the initial outbreak of the pandemic and kept them at sea for months on end (European Parliament, 2022a). Measures taken by Member States such as containment measures and cross-border closures also worsened working conditions of road transport drivers in addition to the risks resulting from the temporary relaxation of rules on working and rest times (Eurofound, 2020). Living conditions also declined with road transport workers being left without rest facilities (due to closures) and less access to fresh water (ILO, 2020a; Rasnača, 2020).

On 23 March 2020, a communication from the European Commission on 'Upgrading the transport Green Lanes to keep the economy going during the COVID-19 pandemic resurgence' provided practical advice

to Member States on how to promote cooperation across the EU so that all freight reached its destination without any delay. The green lanes are also specifically designed to protect transport workers and include recommendations to afford them safer and more predictable working conditions (European Parliament, 2020).

- **Measures taken to address the effects of the pandemic on workers**

Whilst it was the case that many occupations were able to be done remotely, this was not the case for many jobs in the transportation and storage sector. For instance, to cope with the disruption and continue to link supply chains and enable smooth cargo flows, key stakeholders in the maritime supply chain, of which ports and shipping are key players, adopted a range of response and risk mitigation measures, such as operational adjustments, sanitary protocols and processes, as well as adjustments to working practices and organisational aspects (UNCTAD, 2021).

Courier companies (including transport platforms) have taken measures to protect the health and safety of workers and clients during the pandemic. Examples of actions taken include the provision of guidance, the introduction of contactless delivery, the removal of obligatory signature of delivery, the availability of PPE and follow-up activities to ensure that couriers respect introduced protective measures (EU-OSHA, 2022b).

Due to the nature of the work and the type of premises in warehousing, the potential spread of COVID-19 was widespread and fast. Therefore, several measures were implemented, including social distancing, improved ventilation, redesigning of workspaces and providing proper PPE (University of Illinois, 2021). Some other examples of practices that were developed because of COVID-19 include: i) suspension of on-board ticket sales by road transport staff, and ii) contactless loading/unloading of goods among freight drivers (ETUC, 2021).

Finally, one interviewee also underlined the extension of hybrid work forms because of the COVID-19 pandemic, resulting in a combination of telework and office work practices. Obviously, this affects only those jobs that can be carried out remotely ('office' work, such as finance, human resources, etc.), which represent less than a quarter of postal workers on general terms. Obviously, delivery persons cannot work remotely. These remote work practices pose OSH-related issues concerning interaction with colleagues, communication, management and support, wellbeing and so on.

- **Increase in aggression against transportation and storage sector workers**

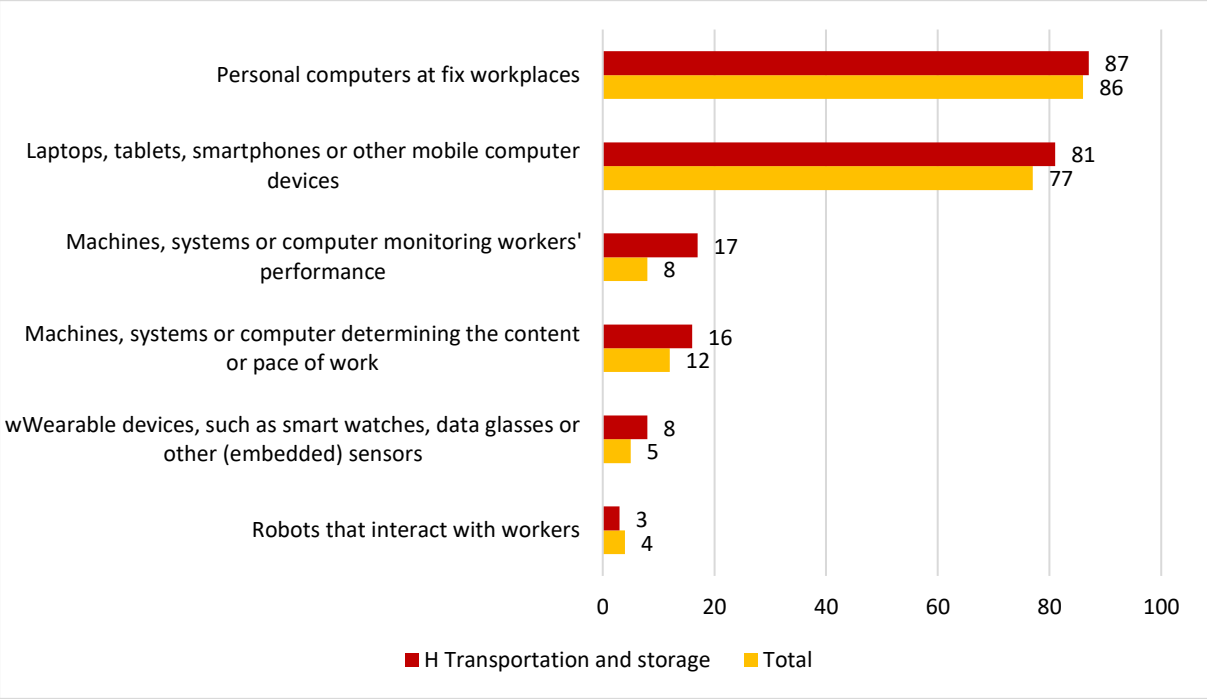
One of the most important risks in some transportation sectors, which has been amplified by the pandemic, was that of assaults on staff, particularly for those who deal with users in direct relationships (frontline). It Italy, assaults on personnel have been reported mostly in rail transport and air transport (Interview). In 2020, the EU Labour Force Survey showed that 5.3% of the employed in the transportation and storage sector perceive the risk of threats and physical violence, and this stressor is in addition to those arising from other tasks, such as dealing with critical situations related to traffic or the condition of their companies' vehicles. Evidence from Eurofound shows that workers in land transport are twice as likely (19%) to report incidents of bullying, harassment and violence, along with verbal abuse and threats, compared to the EU average. A survey carried out in the United Kingdom by The National Union of Rail, Maritime and Transport Workers (RMT) showed that 76% of staff in public-facing roles on London's Underground and Transport for London (TfL) rail networks were subjected to violence at work since the pandemic began, with half of these reporting that it happened multiple times. More than half of staff reported being threatened with physical violence, 28% reported being racially harassed, 14% reported being spat at or targeted with bodily fluids, and 7% had been sexually assaulted (RMT, 2021).

4.4.2 Digitalisation and OSH management practices

Occupations within transport are at one of the highest risks of automation and digitalisation, and 10.5% of employees within the transport sector have a highly flexible form of digital work organisation (Eurofound, 2020). Digitalisation is therefore playing an increasing role in the organisation of work in general and in the transportation and storage sector, with significant impacts on OSH issues.

The ESENER 2019 survey shows that the use of digital technologies for work in the transportation and storage sector is slightly more prevalent when compared to the general situation in other sectors. Eighty-seven per cent and 81% of transportation and storage sector establishments use personal computers at fixed workplaces and mobile computer devices (laptops, tablets, smartphones), respectively, where these figures are slightly above the corresponding percentages for all sectors (86% and 77%, respectively). Other relevant digital technologies such as machines/systems or computer monitoring the content/pace of work/workers' performance, wearable devices (smart watches, data glasses or other (embedded) sensors), and robots that interact with workers are much less extended in the transportation and storage sector (less than 20% in all cases), although they are more frequently reported when compared to other sectors.

Figure 36 Use of digital technologies, transportation and storage sector and all sectors, EU-27, 2019 (% establishments)

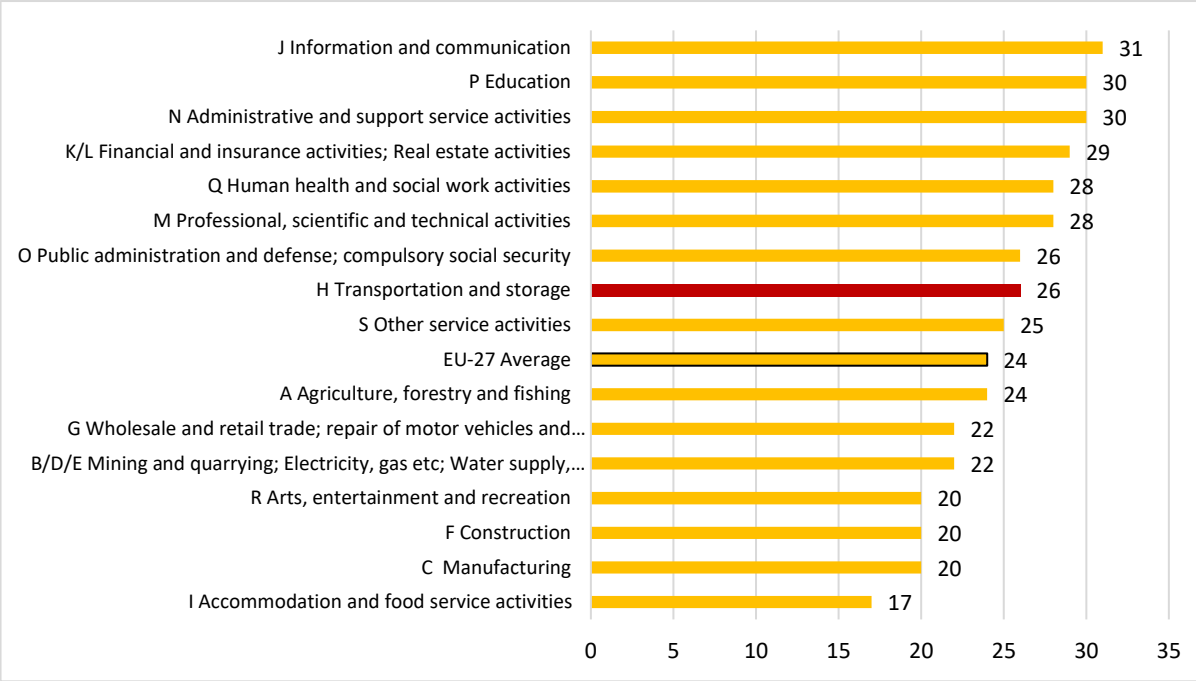


Base: All establishments in the EU-27 / Source: Panteia/IKEI based on ESENER 2019

The use of digital technologies is strongly influenced by the size of the establishments, in the sense that larger sector establishments use these devices more than their smaller counterparts. Focusing on the use of mobile computer devices (laptops, tablets, smartphones) as an example, these devices are present in 73% of establishments with fewer than 10 employees, whereas nearly all establishments with 250 or more employees use them (99% of establishments with 250+ employees).

Around 26% of the EU-27 establishments in the sector have discussed the possible impacts of the use of digitalisation technologies on the health and safety of employees, which is slightly higher than the EU-27 average (24%). These figures are quite low, despite the fact that the transportation and storage sector has substantial exposure to these, swiftly evolving technologies: for example, route planning and logistics are unimaginable without digital applications and most vehicles in public transport are connected to live networks. Automation in driving and warehousing are emerging topics that will highly affect work processes, conditions, and, consequently, safety, demands and exposures at work.

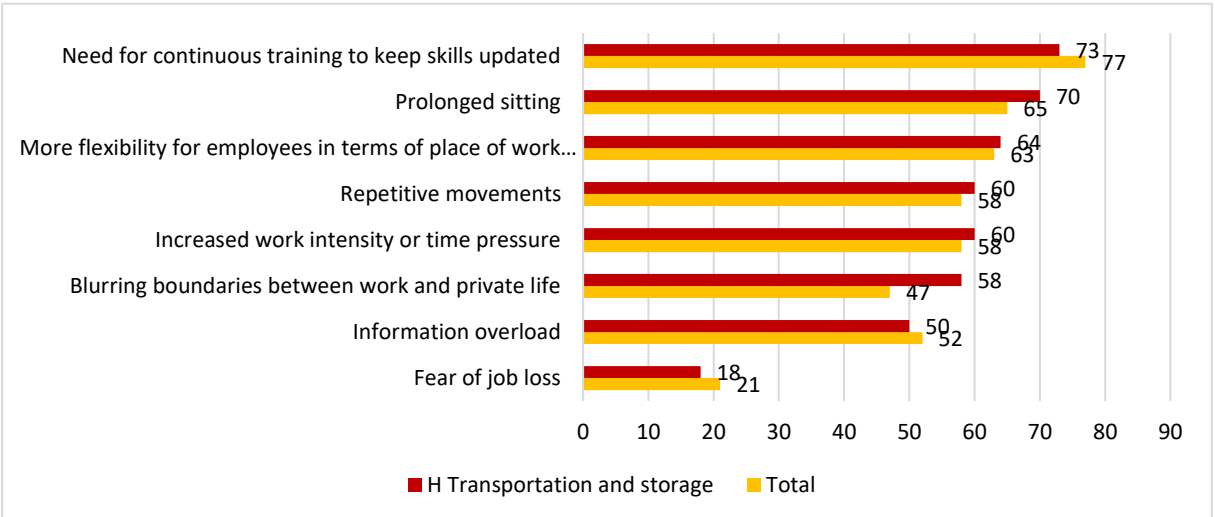
Figure 37 Discussion of the possible impacts of the use of digitalisation technologies on the health and safety of employees, by economic sector, EU-27, 2019 (% establishments)



Base: Responses only of those establishments that have used digital technologies for work, EU-27 / Source: Panteia/IKEI based on ESENER 2019

The most discussed topics related to digitalisation include the need for continuous training to keep skills updated, prolonged sitting and the need for more flexibility for employees in terms of working place and time, the blurring boundaries between work and private life and, finally, increased work intensity/time pressure. In comparison to the topics discussed among all sectors, the transportation and storage sector seems to be particularly interested in topics related to prolonged sitting and blurring boundaries between work and private life.

Figure 38 Impacts discussed in the context of use of digital technologies, transportation and storage sector and all sectors, EU-27, 2019 (%)



Base: Responses only of those establishments that have used digital technologies for work and that have discussed the possible impacts of the use of such technologies on the health and safety of employees / Source: Panteia/IKEI based on ESENER 2019

The literature consulted suggests the introduction of robotics and other digitalised measures can help reduce OSH risks in warehousing jobs. Along with a rise in productivity, digitalisation could help (Matthews, 2019):

- Reduce lifting injuries: Warehouse robots could help assist in lifting or lowering heaving cargo, which can help alleviate injuries. This also prevents the repetitive nature of lowering and lifting, which prevents MSDs.
- Increasing efficiency while maintaining safety: Robots can take over processes that are done by workers. This reduces the workload on the persons, while the robots also have internal mechanisms that keep workers safe when in contact. There are also mechanisms that can be introduced on existing machines, which add to productivity and safety.
- Minimising falls: The robots can perform dangerous tasks that are most likely to lead to accidents, such as replacing workers who perform their work on high platforms. This can reduce OSH-related injuries.
- Managing fatigue: Worker fatigue can cause many injuries at work. Therefore, implementing robots to manage tedious tasks that cause the most fatigue can reduce risks for workers.

Additionally, increased digitalisation can be seen in the postal and courier sector, as explained in Box 13.

Box 13 Digitalisation in the postal and courier sector

The postal and courier sector is consistently using a set of specific digital technologies in the last years as a key tool to gain efficiency and reduce costs. Some of these include the following ones:

- **Automatic sorting and transportation**: The most common digital application in postal and courier work is the automated sorting of letters and parcels, where these work centres are becoming semi-industrial places, compared to previous centres where, 30 years ago, everything was done by hand. Many postal service organisations also apply additional robotics to move objects within warehouses or to load them onto transport vehicles.
- **Tracking and tracing**: Another key digital innovation for postal and courier work is object tracing during delivery via different technologies such as GPS or radio frequency identification (RFID), so the location of letters and parcels can be identified in order to gain a higher level of process control. This enables postal companies to increase efficiency, to prevent object losses and to inform customers about the status of their shipment, as well as for monitoring workers' efficiency and productivity.
- **Handheld devices and navigation**: Digital tracking is not only applied to the transported objects but also to vehicles and postal company workers themselves (in the form of handheld devices that workers need to carry at every step in their work for scanning parcels or collecting customer signatures). Delivery work is controlled by digital navigation software that generates delivery routes and instructs delivery personnel where to go next. In most cases, this comes along with various forms of behaviour monitoring, including enforcing safety regulations (especially for safe driving) but also controlling performance (e.g. work speed).
- **Financial technologies**: Postal service organisations have long provided financial services as one of their major business branches. In this regard, postal companies are increasingly using various forms of digital banking applications, for instance with the replacement of postal banking offices with online banking services.
- **Digital communication**: There is also a trend towards digitalising communication, both internally (for example, to inform workers about their tasks) as well as with customers (ranging from information websites and email or social media contact up to automated communication via chatbots).
- **Labour platforms**: Another key recent techno-organisational development in the postal and courier sector refers to the emergence of the so-called digital labour platforms, which are platforms that distribute work to independent contractors. In this form, the courier is self-employed and depends on a marketing platform for work governed by software algorithms that are used to allocate, monitor and evaluate the work performed and the behaviour and performance of the platform workers, often without employer–employee relations.

Source: Kalbermatter et al., 2021

The current drive towards digitalisation may have consequences on postal and courier workers' health and safety (Kalbermatter et al., 2021). On the one hand, digitalisation may facilitate postal workers' daily tasks, increase transparency in the workplace, and reduce existing risks, for instance, reducing road accidents through digital driving assistance or detecting abnormal situations such as long-time stop during delivery. On the other hand, the literature suggests an increase in stress levels and physically straining work, explained by increased control and surveillance through tracking/monitoring technologies, higher competition among colleagues (leading to a 'less social' working environment) or fear of being sanctioned/fired due to poor performance (Kalbermatter et al., 2021). Also, distraction of interacting with digital surfaces is also perceived as a new form of risk in the workplace (this element is also underlined by an interviewee representing postal companies). Trade unions highlight that increased control and surveillance of postal workers on the job can result in higher stress levels, an increased psychological burden and, thus, higher sickness absence, which should be considered by operators (Copenhagen Economics, 2022).

According to the interviewee, it is important that the introduction of these new technologies is extensively discussed between unions and employers, with an active participation as well of the company's OSH unit.

In the road transport sector, the introduction of electronic applications such as remote planning, monitoring systems and mobile communication has impacted the workload. The increasing use of technology has better equipped drivers to navigate abnormal circumstances, however, they need to know how to work with these technological systems. There is therefore a need for sufficient education and training in this regard (EU-OSHA, 2011b).

4.4.3 Other emerging factors influencing OSH management practices

In addition to the previous elements, other emerging technical, economic, social and organisational factors are influencing OSH management practices within the sector.

- **Liberalisation and structural reform in the transport sector in Europe**

Liberalisation and structural reform over the past decades in the transport sector in Europe is one of the factors that have contributed to the current employment situation in the transport sector. The introduction of competition in transport sectors that were historically state-owned was conceived as a way to provide better and more efficient transport within the EU internal market and pushed for lowering prices of transport services (Heinrich Böll Stiftung, 2021). This however has led to downward pressure on workers' wages and working conditions, such as through a rise in non-standard, precarious forms of employment such as bogus self-employment, where workers are asked by their employers to register as independent subcontractors despite being fully dependent on the employer, and zero-hour contracts, where the employer is not obliged to provide minimum working hours.

As an example, the liberalisation of the EU air services market since the adoption of the Third Aviation Package in 1992 has contributed to a significant growth of the aviation sector. Thus, there has been strong growth in air travel, with the number of daily flights more than doubling (from less than 10,000 in 1992 to around 23,000 in 2016) and a much greater number of routes offered (from under 2,700 in 1992 to more than 7,400 in 2016). The increase in air traffic has led to an increase in employment (Schmitz-Felten, OSHwiki 2022).

However, the intensification of competition and the pressure to reduce costs have led to the emergence of new business models, such as the emergence of low-cost carriers[15] and the availability of a wider choice of air services and lower fares, where passengers are expected to directly manage more aspects of the booking process (online check-in, seat selection, etc.) and pay for every 'extra' acquired. This move has also raised concerns among aircrew (pilots and cabin crew) that these developments may lead to a deterioration of their employment and working conditions, including heavier working time schedules and higher workload, development of atypical employment arrangements, re-negotiations of

[15] However, business models have had the tendency to converge, therefore the distinction has become blurred over time and many air carriers operate hybrid models that cannot be classified as pure low fare versus network.

existing collective agreements and other practices such as so-called pay-to-fly schemes.[16] This has also had implications for the national authorities that are responsible for implementing and enforcing the relevant social legislation and has raised concerns among some air carriers associated with the knock-on impacts on the level playing field in the sector (DG MOVE, 2019).

In Sweden, for example, measures have been taken in relation to the postal sector (through a national collective agreement) to ensure all operators are bound by the same rules and ensuring decent working conditions.

Box 14 The sectoral collective agreement in Sweden

Contrarily to existing practices in other EU Member States, all workers in the Swedish postal sector (both the universal service provider (USP) as well as alternative operators) are subject to the same national collective agreement, de facto preventing companies from basing their competitiveness on lower labour terms and poorer working and OSH conditions. This collective agreement was extended to new market entrants five years after the liberalisation of the postal market already in 1993. Not complying with the collective agreement also represented a risk for alternative operators from a reputational point of view.

Source: Syndex & Uni Global, 2018

- **Increasing presence of long-term subcontracting/outsourcing practices**

The increasing presence of long-term subcontracting/outsourcing practices has the potential to have an impact on OSH in the sector. The road transport sector has been considered by the European Labour Authority (ELA) as highly susceptible to undeclared work, with complex subcontracting chains often being a gateway for violation of regulations protecting labour rights and fair competition in the transport sector (ELA, 2022a). A report by the ELA noted that violations can be found both in transport operations involving heavy commercial vehicles and light commercial vehicles as well as in long-distance haulage and last-mile delivery, with small and medium-sized subcontractors (or even subcontracted bogus firms or letterbox companies abroad) being used as intermediaries to circumvent employer obligations (ELA, 2022a). The existence of long subcontracting chains can therefore contribute to the prevalence of under-declared and undeclared work and make it difficult to ensure compliance.

An increasingly problematic activity in regard to enforcement is the last-mile delivery of parcels, which typically involves long supply chains involving principal contractors (often postal services, large online retailers or third-party logistics providers) working with a chain of subcontractors including temporary work agencies, transport service providers operating as subcontractors and sub-subcontractors as well as those at the bottom of the chain such as self-employed drivers or atypically employed couriers. This situation can lead to circumvention of labour laws and an increase in undeclared work. Complex chains can help to disguise the driver's formal employer and it becomes difficult to assess, both for authorities and workers, what rules and entitlements apply to them (ELA, 2022a).

In the air transport sector, due to the liberalisation of ground handling services (Directive 96/67/EC) sub-contracting is now common at most airports: airlines outsource ground handling and maintenance, while ground handlers outsource aircraft cleaning. Subcontracting may have major consequences for OSH. These subcontracted companies operate simultaneously on site, with different conditions for work organisation and time pressure, as determined by the user company (Schmitz-Felten, OSHwiki 2022).

- **Digital platform work and OSH-related risks**

Digital platform work is defined as all paid labour provided through, on or mediated by a digital labour platform, where digital labour platforms serve as online marketplaces matching the demand and supply of labour. Platform work is characterised by two main characteristics, namely: i) the use of algorithmic management to allocate, monitor and evaluate the work performed and the behaviour and performance of the platform workers; and ii) a prevalence of non-standard working arrangements, in the sense that

[16] The pay-to-fly scheme is an aviation industry practice whereby a professional pilot operates an aircraft on revenue-earning commercial operation by paying for it. Typical customers include, but are not limited to, 'low timers' (inexperienced pilots) and low-hour-type rated pilots who pay to work to build hours and improve their odds at finding employment as airline pilots (taken from Wikipedia).

parcel delivery workers are employed as self-employed freelancers and are rarely hired by the platform as employees (EU-OSHA, 2022b).

From an OSH management perspective, the nature, organisation and conditions of digital platform work worsen and complicate OSH risk prevention and management practices (EU-OSHA, 2017; Bérastégui, 2021). This is evident in the courier sector. In this sense, the main differences between traditional courier companies and digital labour platforms refer to prevention of work-related accidents and diseases as well as compliance with and enforcement of applicable OSH rules and regulations. Indeed, the fact that platform-based couriers primarily hire (bogus) self-employed workers with whom they do not sign an employment agreement implies that existing employers' OSH obligations (conduct a risk assessment and draw up an action plan, regular medical check-ups of employees, presence of insurance systems for occupational accidents and diseases, maintenance and insurance of the delivery vehicles, etc.) are only not valid for those workers with whom the company has no employment contract. By way of contrast, self-employed workers who are in a service provision relationship are solely responsible for their own OSH, with no participation of the employer and a deterioration of labour standards (Egozi et al., 2022; Malenfer & Héry, 2021). In this way, platforms shift costs, risks and responsibilities onto platform workers (EU-OSHA, 2022b).

Also, digital platform work presents additional challenges to the working and OSH conditions of delivery workers. Examples include (Bérastégui, 2021; Christie & Ward, 2019; Dablanc et al., 2021; EU-OSHA, 2017, 2022b; Gregory, 2021):

- Difficulties to understand how algorithms structure workers' personal work allocation or the larger organisation of work, as well as lack of control over own work (for instance, in terms of working times, work location, task duration/distribution or risk profiles of the delivery zones to which they are assigned). Some authors suggest that in the absence of this information, workers do informally turn to one another to fill in gaps in their understanding or to ask for support.
- Increased exposure to risks and higher work intensity, through a system of task-based remuneration that prompts workers to go as fast as possible, often in disregard of safety or weather or traffic considerations (traffic jams, poor weather, accidents, etc.).
- Volatile income, in the sense that parcel delivery workers using online platforms may not know whether they will be assigned tasks and how many tasks, where prices are set by the platform.
- Increased pressure to maintain high ratings within the system, which may become a major source of stress and higher workload, increases the emotional demands of the work (for instance, accepting and not reporting abusive client behaviour out of fear of receiving a negative review), and puts individual workers in direct competition with each other.
- Unpredictability of working schedule or long working hours experienced by delivery platform workers, which can result in work–life conflicts.
- Platform workers are typically expected to bring their own tools and equipment (including vehicles and petrol, insurance, protective clothing overall such as reflective vests or helmets, etc.). Non-compensation by platforms of such work-related costs is also a risk when workers economise in the domains of vehicle maintenance, for example neglecting to repair lights or brakes, or of protective clothing (such as purchase or replacement of a suitable helmet) to save money.
- Platform workers with limited experience or training in this work or who do not hold the required licences are at a higher risk of having a work-related accident. Not all platforms verify this.
- Individual relationship with the platform, offering no framework for collective discussion on OSH/working conditions issues and limited social interaction between platform workers.

According to one researcher, platforms are developed with customer satisfaction as their only criterion, without considering the preservation of workers' health (Malenfer & Héry, 2021).

Some authors also suggest that even though some practices (such as the use of algorithmic management or customer ratings) are more prevalent to the platform economy, such practices are becoming more common in traditional companies as soon as technology allows for them (for instance, customer rating systems via email or client support, and so on, are common among traditional courier companies too) (EU-OSHA, 2022b).

- **Technological developments**

The world is experiencing advances in a wide range of technologies, including the emergence of smart transport systems that are connected, integrated and data-driven. New technologies such as contactless payment systems on public transport systems, use of smart containers and electronic documentation for logistics, and temperature-checking infrared cameras on buses have been utilised. These technologies were accelerated during the COVID-19 pandemic, where they quickly shifted from a convenience to a necessity to protect workers and citizens alike. Additionally, autonomous vehicle technology is being piloted across the world. However, a movement towards widespread autonomous vehicle adoption is uncertain and contingent on several factors: legal, policy and public acceptance, infrastructure support and the achievement of technological milestones. However, although challenges exist, progress is being made. For instance, in early 2015, the Netherlands announced it would become a testing ground for self-driving vehicles, and in July 2016, the bus lane between Schiphol Airport and Haarlem saw the first operational test run by a self-driving bus outside a closed test course. Self-driving vehicles must be approved by the Road Transport Agency. Both the partial and full implementation of autonomous vehicle technology will have an impact on employment and working conditions of transportation workers, whereby not only will jobs disappear in certain sectors, there will also be a shift of jobs between different sectors.

- **Legislative developments and enforcement**

In July 2020, the Mobility Package[17] was adopted by the European Parliament, introducing new rules applicable to the road transport sector from March 2022. These were intended to improve the working conditions of lorry drivers and reduce the risk of unfair competition in the road transport sector. The regulatory aspects concern the posting of drivers, working time, and rules regarding road haulage and cabotage. The main changes introduced by the package that affect employment characteristics in the road transport sector are the application of the minimum wage of the Member State where the transport service is carried out (with some exceptions), the introduction of rules concerning rest times between cabotage operations and the relaxation of rules concerning weekly rest periods.

However, whilst legislation can be enacted at EU level, there is an issue with the enforcement of the laws, with a general lack of compliance with OSH issues in some cases. One interviewee noted that it is often the case that the chance for smaller companies to be inspected, caught in violation and fined is higher than for bigger companies. The chance of being inspected on German streets is less than 1% (which can also be said for the whole of Europe). There are 50,000 km of roads in Germany and only a few places where inspections are carried out, so the chance of being caught is very small. It is therefore easy for companies to avoid inspection. Large companies are more able to pay fines because they can draw from a greater source of income, which they may have earned by not complying with rules.

Enforcement also depends on the size class of vehicles. There are also logistics trucks that weigh less than 3.5 tonnes and do not have a registration such as small vans. Officially, they should be keeping a record of what they have done but there are no inspections of this. These drivers can travel long distances (up to 14,000 km) in one time and are not obliged to take weekly rests or breaks. Ninety per cent of this is logistic emergency freight. Driving such long distances in one time is bad for safety and health. Minibuses available via online platforms can also drive long distances without any restrictions (passenger transport). An interviewee revealed that the problem of compliance with rules can be seen through one example whereby Belgian authorities monitoring one location on a bank holiday Monday issued fines amounting to €170,000 for non-compliance.

- **Green transition in the transportation and storage sector**

Whilst the transportation and storage sector is critical to European businesses and global supply chains, transport is not without costs to society through greenhouse gas and pollutant emissions. Because of the resources it consumes and the pollution it causes, transport also contributes to environmental degradation and to health problems. Transport emissions account for around 25% of the EU's total greenhouse gas emissions, and these emissions have increased over recent years (European Commission, 2021). It is the goal of the EU to be the first climate-neutral continent by 2050, which will

[17] See: https://transport.ec.europa.eu/transport-modes/road/mobility-package-i_en

involve ambitious changes in transport. The European Commission has adopted a set of proposals to make the EU's climate, energy, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

Advancing green and healthy transport will have implications for employment throughout the economy and in the transport sector itself. The reduction of environmental pollution as a result of green technologies may also improve the quality of the work environment, with certain measures such as encapsulation, automatisation and substitution of hazardous materials, and would also improve the environmental performance of enterprises. Many green production strategies can generate a dual public health and occupational health benefit for workers, as at present many workers suffer a double burden of exposure to pollutants, both in the workplace and at home. Transition to renewable energy production may also reduce occupational respiratory diseases and cancers related to urban air pollution-related cardiopulmonary disease (cardiovascular diseases, bronchial obstruction, asthma and other respiratory conditions) (WHO, 2018).

Some green technologies may generate new or increased exposures to air pollution hazards. Other occupational hazards and risks associated with 'green technologies' are often similar to those in conventional industries. Known measures can be employed to reduce such risks. These include design and protective gear against falls from height, local exhaust encapsulation and exhaust ventilation for protection from excessive exposure to toxic chemicals and indoor particulates, ergonomic devices (e.g. for lifting and carrying), training of workers and improved employment terms. Bus and train drivers and public transport managers will have to be equipped with the skills to use new technologies such as satellite navigation, RFID and dual-mode systems, which are likely to be deployed as part of the further development of public transport (ILO, 2020b).

One interviewee revealed that whilst new EU regulations have helped the transition to greener processes in the shipping sector, training is still required every few years in this regard. However, due to the European Green Deal, it is not yet clear which alternative fuel will be used, causing a lack of preparedness in the sector, in both a technical dimension and in that training the old, current and future generation to be able to work with these alternative ways on a technical aspect will be challenging in such a short space of time. It will not be that easy to implement and, moreover, all current fleets must also be converted.

- **Labour shortages in the transportation and storage sector**

There have been important labour shortages in the transportation and storage sector. For instance, in the road transport sector, there has been a shortage of qualified labour supply across the EU due to an increase in demand of skills and specialisations combined with declining work attractiveness, an ageing driver population and poor work environments (TRT, 2017). There have also been shortages in the aftermath of the COVID-19 pandemic. The shortage of available labour directly impacts cargo flows and thus the fluidity of the supply chains. For instance, a shortage in long-haul truck drivers has created capacity shortages among trucking carriers, making it difficult for shippers to move inventory from ports to distribution centres promptly, and understaffed warehouses and distribution centres cannot operate at full capacity, creating delays that result in material or inventory shortages for manufacturers and retailers. A rise in e-commerce sales volumes can make it difficult for understaffed centres to keep pace with order fulfilment volumes (Hellenic Shipping News, 2023). Whilst the impact of the supply chain backlog and driver shortage is having a large effect on consumers, the labour shortage, particularly with truck drivers and warehouse personnel, coupled with the increase in the demand for e-commerce, could have implications on OSH. The amount of time required to acquire necessary qualifications increases the number of risks for both the driver and people sharing the road (STI Interlocks, 2021).

The aviation sector has also been heavily impacted by labour shortages, which was highly evident in the summer of 2022 when air travel was supposed to return to normal after a two-year pandemic. Due to the pandemic in 2020, it is estimated that up to 45% of the air transport sector workforce was lost, where a large part of the workforce left the sector and never came back. Similar losses were also seen

in this sector in 2021, whereas other sectors such as land transport, warehousing and support activities, and the postal sector noted an increase following the resumption of activities. The air transport sector has experienced more and more difficulties in hiring, often related to low salary levels (around 75-80% of workers earn a salary close to the minimum salary). When activity returned following the pandemic, it was very difficult to bring all these people back to the sector, with important negative consequences on the functioning of some airports (e.g. the case of Amsterdam Airport Schiphol).

Box 15 Amsterdam Airport Schiphol's problems related to labour shortages in 2022

Staff shortages, which have hammered the entire aviation sector in the wake of the pandemic, have been especially problematic at Amsterdam Airport Schiphol. The challenge became painfully obvious starting on 23 April 2022 — the first day of spring holidays in the Netherlands — when KLM ground crew went on strike, causing enormous disruption. Staff shortages-related problems continued during the summer period.

As a result of these acute staff shortages, airlines were forced to cut their passenger capacity by almost 20% to avoid delays and cancellations. For instance, KLM announced that between 10 and 20 daily flights to European destinations would be cancelled until 28 August 2022. In addition, sales for both KLM and its regional subsidiary Cityhopper would be severely limited to leave space open for customers whose flights were cancelled. Passengers whose flights were cancelled would be notified and automatically rebooked on another flight. On the cargo side, KLM announced no more loading of parcels on KLM Cityhopper aircraft to reduce the workload of ground staff. Loose cargo would also no longer be allowed to be shipped in the hold for intercontinental flights, so this cargo would be palletised and delivered to the apron in containers.

Icelandair responded to the problems at Amsterdam Airport Schiphol by sending its own handling staff to the Netherlands to assist in loading aircraft. In this sense, the company decided to send its own personnel to try to cover the problems with baggage.

Trade unions suggested that to counteract the situation there was a need for more established worker schedules, less outsourcing of airport operations and, of course, better worker wages. In a press release issued on 30 September 2022, the airport said it is actively working to improve its employment conditions, including better wages, more consistent worker schedules and recruiting more staff.

Sources: CNN (https://edition.cnn.com/travel/article/amsterdam-schiphol-airport-chaos/index.html#:~:text=At%20Amsterdam's%20Schiphol%20Airport%2C%20labor,%2D%2D%20if%20not%20the%20world) and Aviacionline (https://www.aviacionline.com/2022/07/amsterdam-schiphol-airport-appears-to-be-on-the-verge-of-collapse/)

Labour shortages are also a problem for warehouse workers, which also place strain on the existing workers. In some cases, to solve this problem, warehouses have offered an increased salary to fill the positions (Coulton, 2021). However, this is not the case for all workers who fall under warehouse and supporting transportation activities, as the lack of pay is one of the reasons for the strikes at airports across Europe and internationally (Brett, 2023; Holdert & Meindertsma, 2023). While the labour shortage grows, the demand for products through e-commerce rises. The rise in demand through e-commerce also adds to the strain of work. The literature suggests that where there are better OSH management practices in place, warehouses tend to retain more staff (Forbes, 2021).

- **Demographic development**

Although the EU is undeniably facing great challenges in all sectors based on an ageing population, the transportation and storage sector is particularly affected. An ageing of the workforce results in fewer expected personnel and a reluctance to follow technological developments. There are more older workers in the sector when compared to the EU-27 average, and the necessity to replace retiring workers creates significant workforce development challenges (Pomoni et al., 2019). Changing conditions and developments in the transport sector in terms of infrastructure, vehicles and the use of technology mean that older workers need to be able to adapt to these new conditions, which causes challenges related to their health. Employers expect older workers will work the same as younger or middle-aged people, but due to behavioural changes as age increases and health conditions, some jobs increase the risk of reduced travel safety or less effective work. Women workers are also highly underrepresented throughout the transportation and storage sector (see section 2.2). Linked to the previous point, the transportation and storage sector is suffering from notable labour shortages as a consequence of an ageing of the working population, with many vacancies unfilled in the EU (ELA, 2022b).

5. Worker participation in OSH management practices

5.1 Introduction

Chapter 5 looks at the various elements related to the participation of transportation and storage workers in OSH management practices in the sector. The chapter describes the existing formal forms of employee participation in OSH management practices, followed by an analysis of the employees' involvement in OSH issues, including discussions between employee (representatives) and the management on OSH issues or employees' involvement in the design and implementation of OSH measures. The chapter also provides information on the recent time evolution of these workers' participation practices.

5.2 Extent and forms of employee participation in OSH management practices

The active participation of workers in OSH management practices is fundamental in sustaining these practices and ensuring their effectiveness. A report by Eurofound that analysed the data collected from the 2017 European Working Conditions Survey (EWCS) found that the absence of any form of representation and voice is more common in the transport sector, which also records the highest shares of more vulnerable workers (Eurofound, 2017). The levels of representation differ per subsector and per Member State.

According to ESENER 2019, the transportation and storage sector has a presence of formal forms of employee participation[18] in comparison to other sectors and the EU-27 average. In regard to 'General employee representation' forms,[19] only 25% of the transportation and storage sector establishments report the presence of a worker's council, and 18% that of a trade union. In contrast to these figures, the presence of 'Health and safety representation' forms[20] is higher, as 61% of transportation and storage sector establishments report the presence of a health and safety representative.

Table 44 Forms of employee representation in the transportation and storage sector, compared to the total economy, EU-27, 2019 (%)

Forms of employee representation	Transportation and storage	Total economy
Works council (*)	25	24
Trade union representation (**)	19	18
Health and safety committee (***)	25	22
Health and safety representative	61	57

Base: All establishments in the EU-27
(*) This form of employee representation does not exist in Cyprus, North Macedonia and Sweden. The answer to this question has been set to 'no' for all establishments from these countries
(**) This form of employee representation does not exist in Austria, Germany and Luxembourg. The answer to this question has been set to 'no' for all establishments from these countries
(***) This form of employee representation does not exist in North Macedonia and Slovenia. The answer to this question has been set to 'no' for all establishments from these countries
Source: Panteia/IKEI based on ESENER 2019

When looking at size class, employees in larger establishments are more likely to have some form of representation. There are significant differences between micro establishments (5-9 employees) and large establishments (250+ employees) and the levels of representation in regard to works councils and

[18] The ESENER 2019 questionnaire identifies four main forms of employee representation available in European establishments (Q350), namely 'works council', 'trade union representation', 'health and safety committee', and 'health and safety representative'. These forms of representation are not available in all Member States. In Germany and Austria, for example, the employee representation at the workplace level is generally with works councils while in other countries (e.g. Cyprus) it is with so called shopfloor trade union representations. To solve this problem, two forms of representation have been distinguished, namely, the so-called General employee representation (including both works council or trade union representation, whether the answer is yes to at least one of the two questions Q350_1 and Q350_2) and the so-called Health and safety representation (including both health and safety committee and representative, whether the answer is yes to at least one of the two questions Q350_3 and Q350_4).
[19] Comprising 'works council' and 'trade union representation'.
[20] Comprising 'health and safety committee' and 'health and safety representative'.

health and safety committees. This reflects that national legislations may set that above a certain number of employees, workers' representatives must be appointed for OSH consultation within the enterprise. Employees of micro establishments in the sector are also highly unlikely to have trade union representation (only 7%). This is the situation in every sector.

Table 45 Forms of employee representation in the transportation and storage sector, by enterprise size, EU-27, 2019 (%)

Size of establishments	Works council (*)	Trade union representation (**)	Health and safety committee (***)	Health and safety representative
5-9	12	7	13	51
10-49	28	15	25	64
50-249	57	40	59	82
250+	73	49	81	81
Total	25	15	24	61

Base: All transportation and storage sector establishments in the EU-27

(*) This form of employee representation does not exist in Cyprus, North Macedonia and Sweden. The answer to this question has been set to 'no' for all establishments from these countries

(**) This form of employee representation does not exist in Austria, Germany and Luxembourg. The answer to this question has been set to 'no' for all establishments from these countries

(***) This form of employee representation does not exist in North Macedonia and Slovenia. The answer to this question has been set to 'no' for all establishments from these countries

Source: Panteia/IKEI based on ESENER 2019

In 2019, 30% of the establishments in the sector had a general type of employee representation. This proportion was slightly lower than in 2014 (33%). In 2009, the share was higher (33%), so therefore similar to the current situation. In 2019, 64% of the establishments in the sector in the EU-27 had a specific health and safety representation. This proportion is similar when compared to 2014 (62%). In 2009, the share was lower (53%).

One interviewee noted that in relation to works councils, these can be effective in ensuring good working conditions for employees. However, this is highly dependent on national law. For instance, in Germany and the Netherlands, legislation concerning works councils is strong. However, this is not always the case in other countries. Works councils cannot work efficiently when not supported by the law. Since 2009, the EU has been discussing improvements to the legislation regarding European works councils but still no changes have been made at this stage.

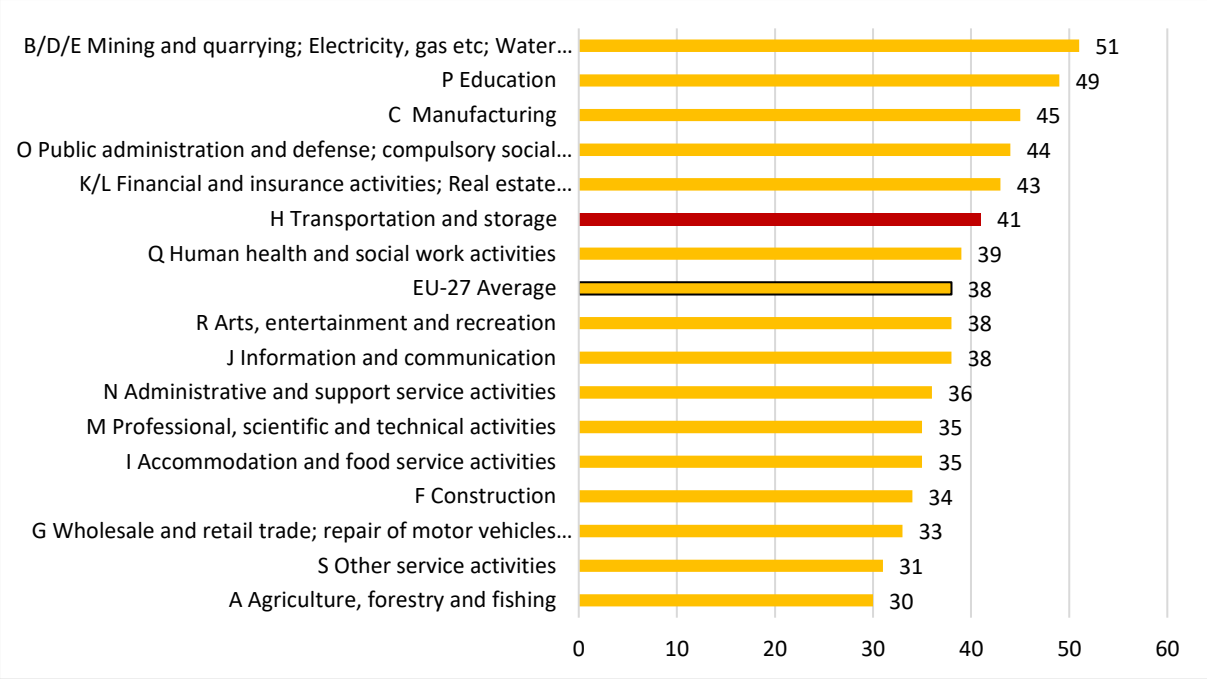
Platform workers in the transportation and storage sector have organised themselves with the aim to improve their collective voice and working conditions, among other goals.[21] Examples include setting up the Finnish 'Justice4Couriers' website[22] (created by the couriers of food delivery platforms Foodora and Wolt to share their work experiences, raise awareness and campaign to improve their working conditions) and the Dutch FNV Riders Union (founded on the initiative of the Deliveroo riders after the decision of Deliveroo in February 2018 to replace all its employed meal delivery riders with (bogus) self-employed riders). In February 2021, the 3F trade union, active in protecting food delivery riders in Denmark, reached a nationwide collective agreement with the Danish Chamber of Commerce for food delivery riders. Finally, the first Spanish collective agreement for platform workers, which came into effect in January 2022, was signed between the trade union confederations CCOO and UGT and the delivery platform Just Eat, following the establishment of the Spanish Riders' Law (already explained in section 4.2.1).

In regard to how health and safety representatives are elected within enterprises, 41% of enterprises in the transportation and storage sector indicate that they are elected by the employees, which is slightly higher than the EU-27 average of 38% for all sectors. Fifty per cent of enterprises indicate that representatives are selected by the employer.

[21] For an extensive collection of examples, please refer to Eurofound's Platform economy repository (available at: https://www.eurofound.europa.eu/data/platform-economy) as well as EU-OSHA's work on platform workers, such as: https://osha.europa.eu/en/publications/protecting-workers-online-platform-economy-overview-regulatory-and-policy-developments

[22] See: https://www.justice4couriers.fi/

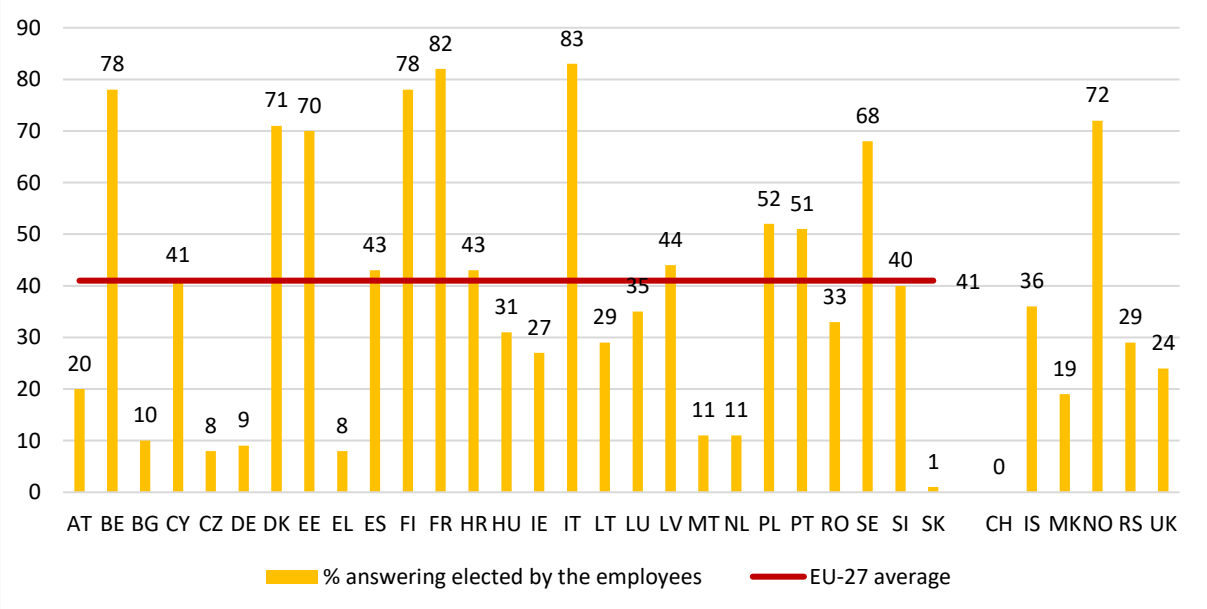
Figure 39 Health and safety representatives elected by the employees, by economic sector, 2019, EU-27



Base: All establishments in the EU-27 that report the presence of a health and safety representative / Source: Panteia/IKEI based on ESENER 2019

When looking at the results at the country level, there is a wide range of variation between Member States. For instance, in Slovakia, 1% of representatives are elected by employees, whereas this is the case for 83% of representatives in Italy. This is very much a reflection of the national legislation and OSH systems.

Figure 40 Health and safety representatives elected by the employees, by Member State, EU-27 (%)



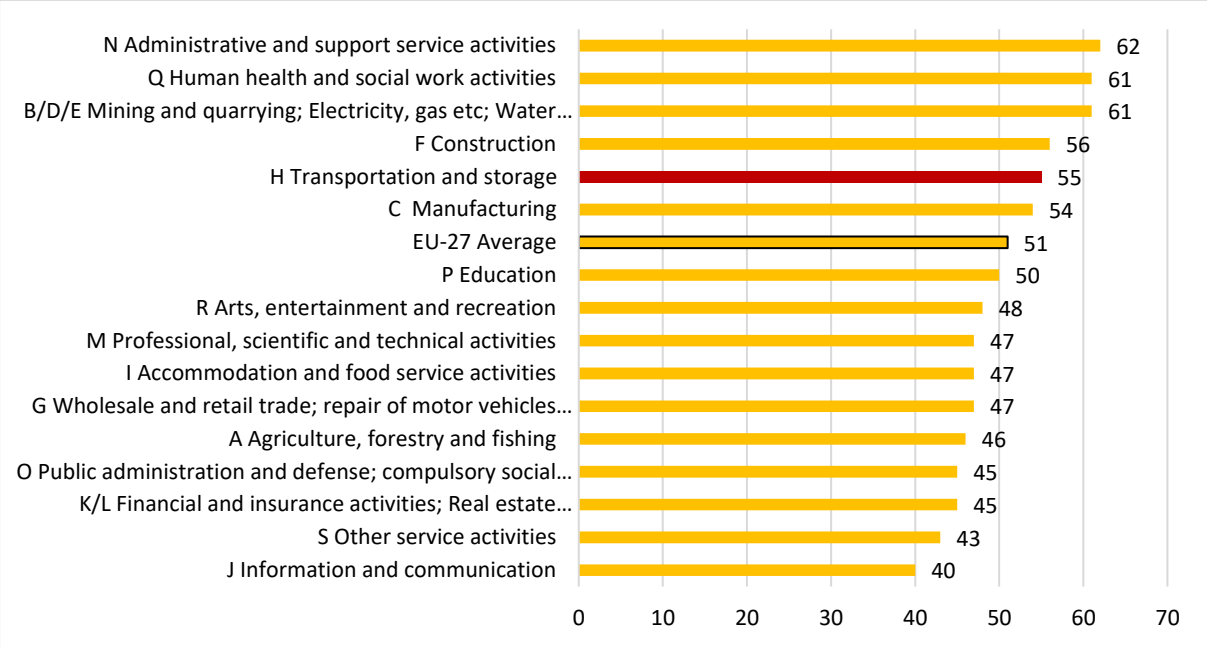
Base: All transportation and storage sector establishments in the EU-27 that report the presence of a health and safety representative / Source: Panteia/IKEI based on ESENER 2019

5.3 Discussion of OSH between employee representatives and the management

5.3.1 Discussion between employee representatives and management

According to the available ESENER 2019 data, 55% of the transportation and storage sector establishments that report having formal employee representation structures are characterised by regular discussions on OSH issues between employee representatives and the management. This percentage is higher than the EU-27 average (51%).

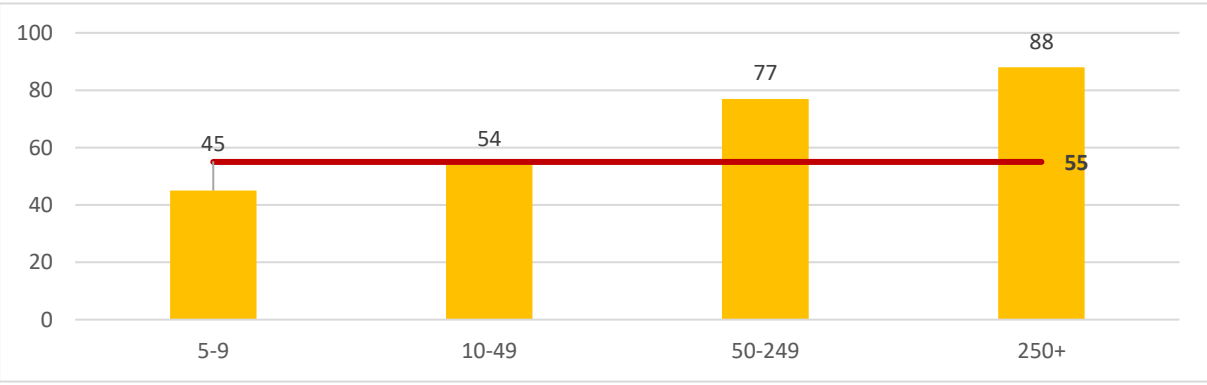
Figure 41 Share of establishments where health and safety issues are regularly discussed between employee representatives and the management, by economic sector, 2019 (%)



Base: All establishments in the EU-27 reporting the presence of at least one form of employee representation / Source: Panteia/IKEI based on ESENER 2019

The data also show significant differences by size class and countries in the presence of regular OSH-related discussions between employee representatives and the management. Although 45% of establishments with five to nine employees have regular discussions regarding health and safety between employee representatives and the management, this is the case for 77% of establishments with 50-249 employees and 88% of establishments with 250+ employees.

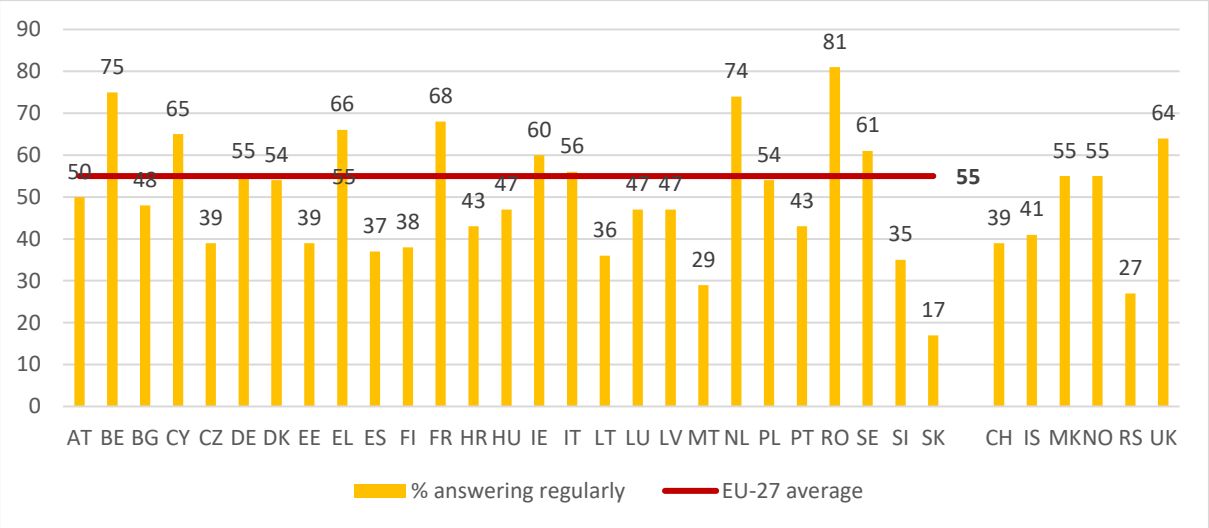
Figure 42 Share of establishments where health and safety issues are regularly discussed between employee representatives and the management, by size class, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 reporting the presence of at least one form of employee representation / Source: Panteia/IKEI based on ESENER 2019

At the country level, whereas Romania shows the highest percentage of establishments where health and safety issues are regularly discussed between employee representatives and the management (81%), this is only the case for 17% of enterprises in Slovakia and 29% in Malta. Again, there is a wide array of reasons behind these differences among Member States, including different collective bargaining practices and cultures as well as different legislation requirements.

Figure 43 Share of establishments where health and safety issues are regularly discussed between employee representatives and the management, by country, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 reporting the presence of at least one form of employee representation / Source: Panteia/IKEI based on ESENER 2019

In 2019, around half (55%) of establishments with a formal form of employee participation regularly hold discussions on health and safety issues between representatives and the management. This is less than in 2014 (58%).

Table 46 Health and safety issues discussion between employee representatives and the management: Evolution in time 2014-2019, transportation and storage sector, establishments with a formal form of employee participation, EU-27 (%)

	ESENER 2014	ESENER 2019
Regularly	58	55
Occasionally / Only when issues arise	34	33
Practically never	2	9

Source: Panteia/IKEI based on ESENER 2019 and ESENER 2014

According to data from ESENER 2019, controversies related to health and safety arise often in 5% of transportation and storage sector establishments where health and safety issues are discussed between employee representatives and management at least occasionally This is in line with the EU-27 average for the total economy.

Table 47 Enterprises indicating that controversies exist relating to health and safety (%), transportation and storage sector compared to the total economy, EU-27, 2019

How often do controversies related to health and safety arise?	Transportation and storage (%)	Total economy (%)
Often	5	5
Sometimes	31	28
Practically never	63	66

Base: All establishments in the EU-27 that indicate discussion of health and safety issues between employee representatives and management takes place occasionally or regularly / Source: Panteia/IKEI based on ESENER 2019

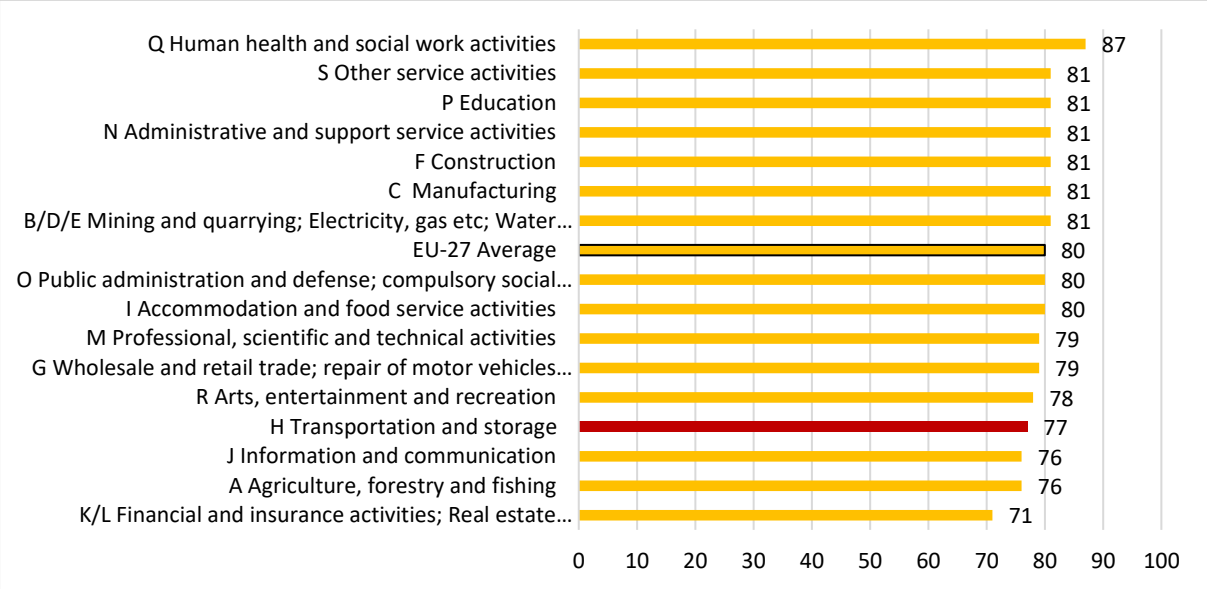
Controversies related to health and safety are more likely to occur often in larger establishments, as these are reported in 28% of large establishments (250+ employees), compared to an average of 5%

for all size classes. Several differences can be seen at the Member State level, with some Member States (such as Austria, Finland, Lithuania, Latvia, Slovenia and Slovakia) reporting 0%, whereas in Greek establishments, controversies arise often in 24% of enterprises.

5.3.2 Employee involvement in the design and implementation of OSH measures

The ESENER 2019 survey provides information on the involvement of transportation and storage sector employees in the design and implementation of different OSH measures following risk assessments. Transportation and storage sector establishments in the EU are slightly less likely to be involved in the implementation of OSH measures when compared to other sectors (77%, compared to the EU-27 average of 80%). This percentage is similar to the EU-27 average but lower than in the human health and social work activities sector.

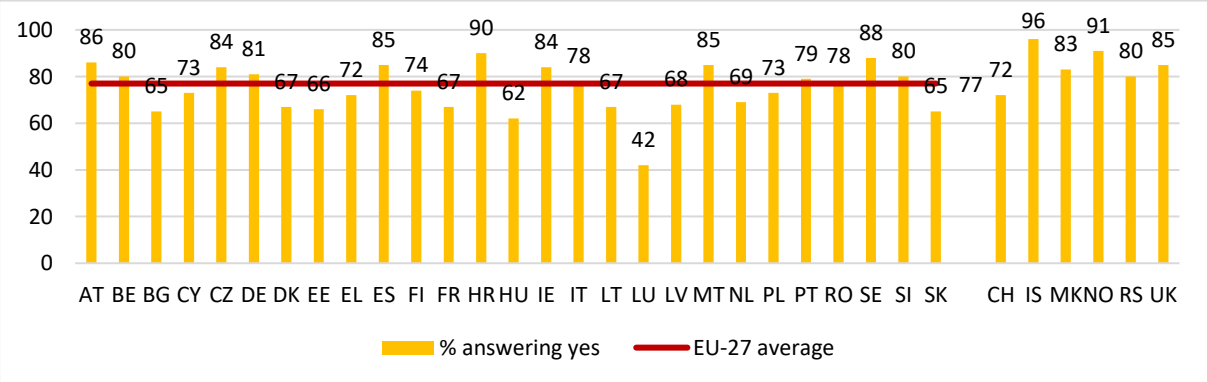
Figure 44 Share of establishments where employees are usually involved in the design and implementation of measures following a risk assessment, by economic sector, 2019 (%)



Base: All establishments in the EU-27 that regularly carry out workplace risk assessments / Source: Panteia/IKEI based on ESENER 2019

At the country level, some differences can be noted. For instance, 90% of Croatian establishments involve employees in the implementation of OSH measures following a risk assessment, whereas this is the case in only 42% of establishments in Luxembourg. No significant differences could be determined between size classes.

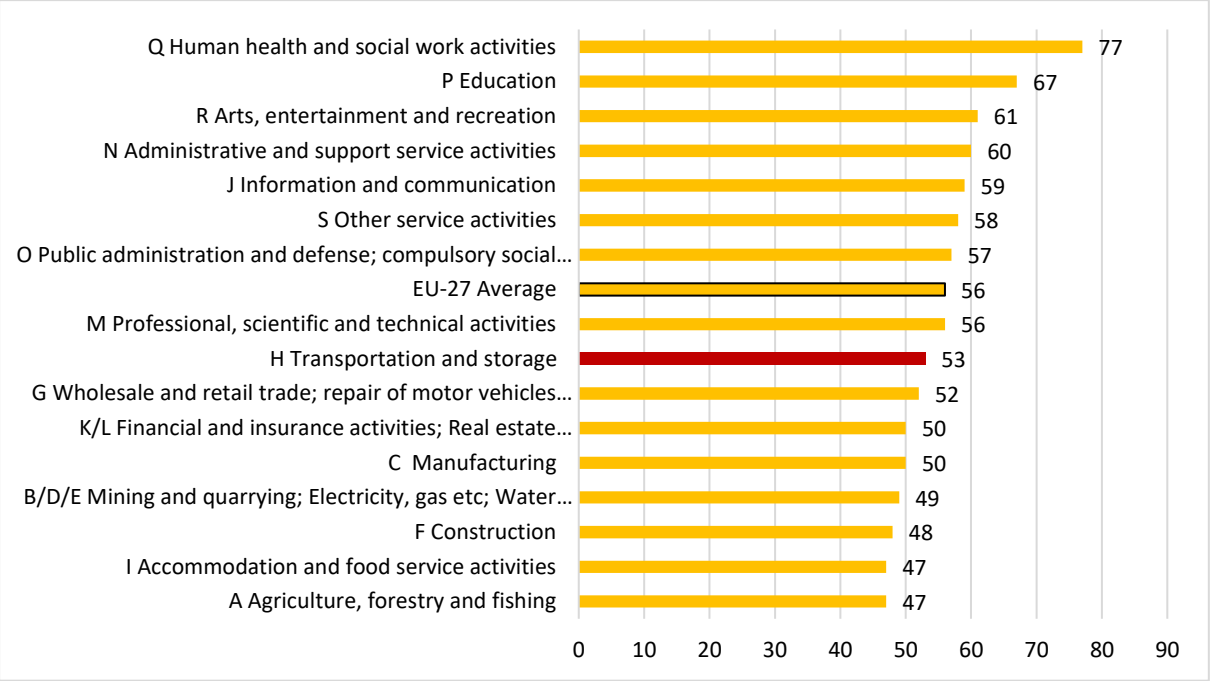
Figure 45 Share of establishments where employees are usually involved in the design and implementation of measures following a risk assessment, by country, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 that regularly carry out workplace risk assessments / Source: Panteia/IKEI based on ESENER 2019

ESENER 2019 survey data also show that around 53% of transportation and storage sector establishments that have introduced measures to prevent psychosocial risks have given a role to their employees in the design and set-up of these measures. This percentage is slightly lower than the EU-27 average (56%), and significantly below the human health and social work activities sector (77%), although higher than in other sectors such as agriculture (47%), construction (48%) and mining (49%). Again, no significant establishment size differences can be distinguished.

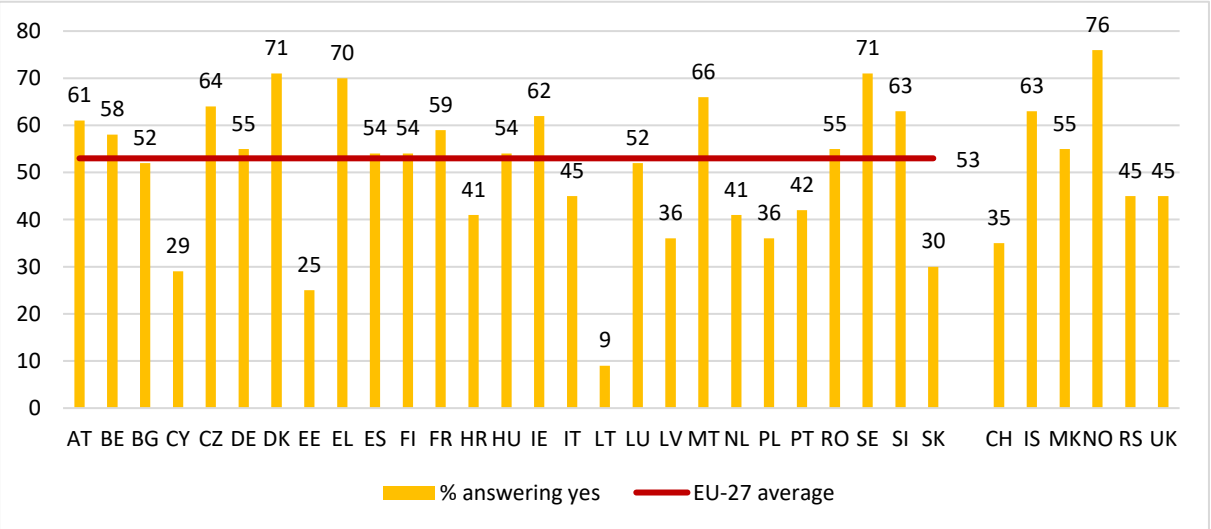
Figure 46 Share of establishments where employees have a role in the design and set-up of measures to address psychosocial risks, by sector, 2019 (%)



Base: All establishments in the EU-27 that have implemented at least one measure to prevent psychosocial risks / Source: Panteia/IKEI based on ESENER 2019

Significant variations can be found when looking at the country level. For instance, whereas 71% of establishments in Germany and Sweden involve employees in the design and set-up of measures to address psychosocial risks, this figure is only 9% in Lithuania.

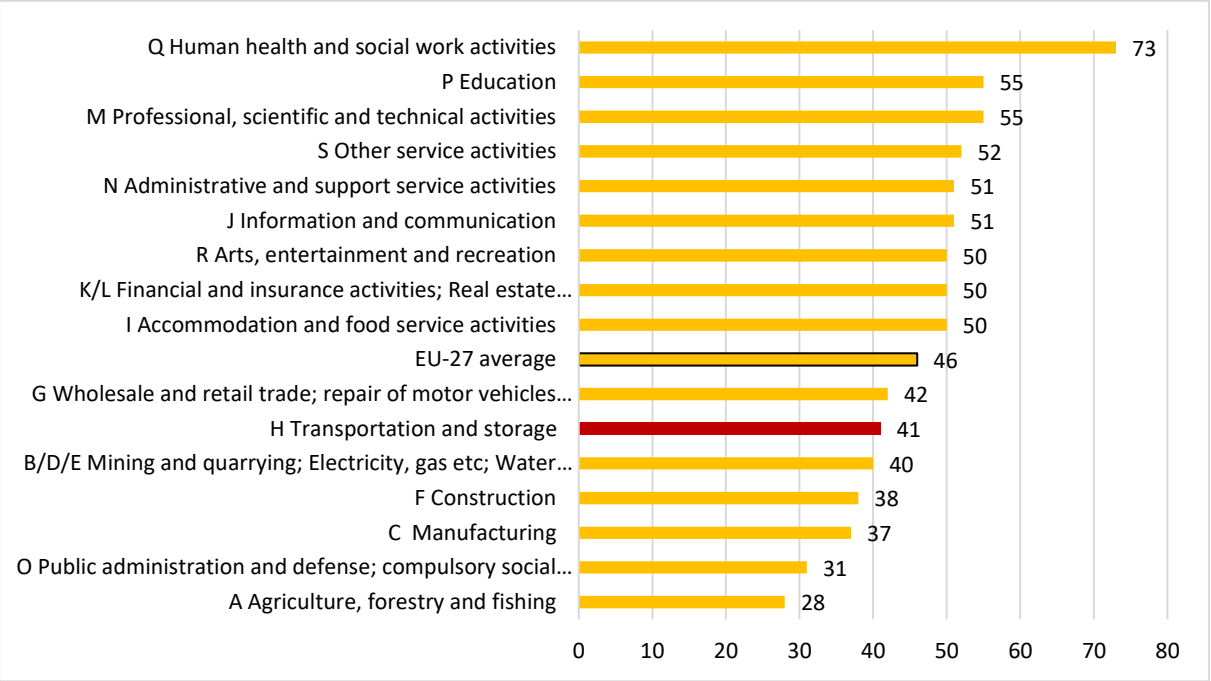
Figure 47 Share of establishments where employees have a role in the design and set-up of measures to address psychosocial risks, by country, 2019 (%)



Base: All transportation and storage sector establishments in the EU-27 that have implemented at least one measure to prevent psychosocial risks / Source: Panteia/IKEI based on ESENER 2019

According to data from ESENER 2019, 41% of establishments in the transportation and storage sector report involving their employees in identifying possible causes for work-related stress, such as time pressure or difficult clients. This is less than the average for the total economy in the EU-27 (46%), but more than in some other sectors, such as agriculture, forestry and fishing (28%).

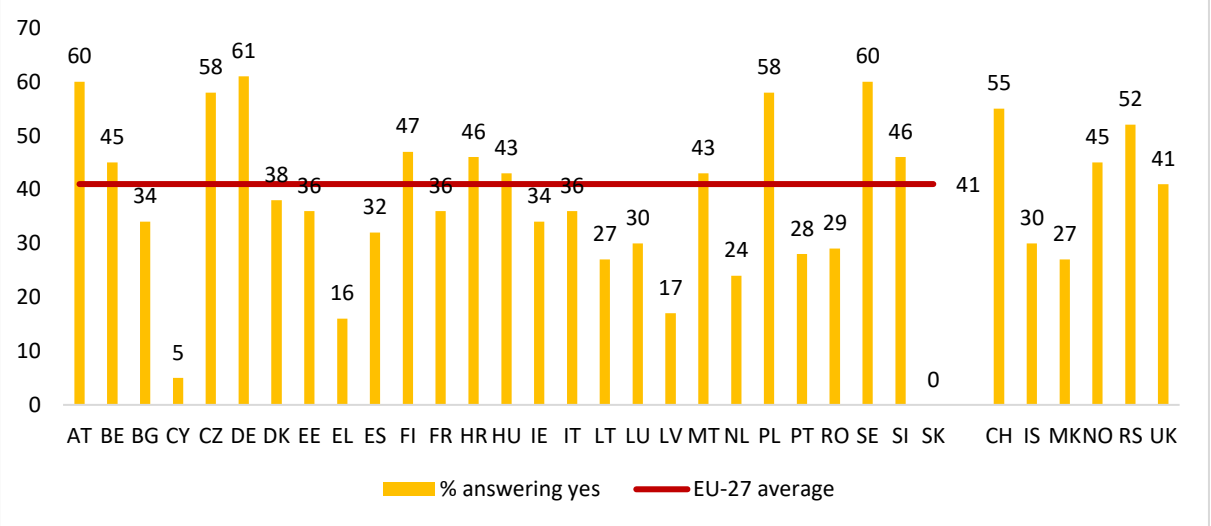
Figure 48 % of enterprises in the transportation and storage sector where employees have been involved in identifying possible causes for work-related stress, by sector, 2019



Base: All establishments in the EU-27 with fewer than 20 employees / Source: Panteia/IKEI based on ESENER 2019

Enterprises in Germany are most likely to involve their employees in identifying possible causes for work-related stress. Employees of enterprises in Austria and Sweden are also likely to be involved in identifying possible causes for work-related stress (60%). On the other hand, enterprises in Slovakia (0%) and Cyprus (5%) are the least likely to involve employees.

Figure 49 % of enterprises in the transportation and storage sector where employees have been involved in identifying possible causes for work-related stress, by country



Base: All transportation and storage sector establishments in the EU-27 with fewer than 20 employees / Source: Panteia/IKEI based on ESENER 2019

6. Conclusions and policy pointers

6.1 Main conclusions from the research

- **Characterisation of the transportation and storage sector and employment**

The transportation and storage sector plays an important role within the EU economy, covering a wide range of different industries jobs and tasks, which means there is a variety of OSH implications. The sector was composed of over 1.28 million enterprises in the EU-27 in 2020, where 99.71% of those were SMEs. The large number of SMEs influences the main OSH features in the sector.

In 2021, almost 10.5 million persons were employed in the sector (NACE H) in the EU, representing around 5.3% of the total number employed. More than half of the employees are employed in land transport and pipelines, followed by warehousing and support activities for transportation.

There has been an ongoing trend in regard to labour shortages in the sector (which also has been exacerbated by the recent COVID-19 pandemic), which has had a number of effects on OSH. The sector is highly male dominated (only 22% of workers in the sector are women, compared to 46% among the total EU-27 employed workforce) and the sector can be characterised by its ageing workforce, which also provides significant challenges in regard to OSH.

- **Main OSH risks and health outcomes in the transportation and storage sector**

Whilst the various subsectors within the broader transportation and storage sector are all subject to different occupational risks, workers are particularly exposed to prolonged sitting, repetitive hand or arm movements, risk of accidents with machines, and lifting or moving heavy loads. These risks result in high accident rates, MSDs, stress and fatigue. Besides these risks, the sector also reports exposure to violence, and many workers have unusual working times and repetitive and monotonous work.

Transportation and storage sector workers are also confronted with several psychosocial risks, such as having to deal with difficult customers, time pressure and the presence of long/irregular working hours. However, less than one-fifth of establishments in the sector suggest that psychosocial risks are more difficult to address than other risks.

The transportation and storage sector can be considered a relatively dangerous sector, with the third highest number of non-fatal accidents in the EU. The reporting of fatal accidents was also higher than for the rest of the economy. However, the rate of fatal accidents shows a decreasing trend due to better figures in land transport. This may be linked to European initiatives in road safety and advances in vehicle technology. Having in mind the exposures mentioned above, the most common health outcomes in the sector refer to MSDs, dislocations, sprains and strains, concussions and internal injuries as well as other conditions such as cardiovascular disease and diabetes. Mental health-related issues linked to fatigue, work-related stress and isolation are also relatively present.

- **Presence and characterisation of risk assessments**

Transportation and storage sector establishments are more likely to regularly carry out workplace risk assessments when compared to establishments in other sectors, with larger establishments being far more likely when compared to small ones, and there also being significant variations among Member States. Risk assessments are often contracted to external providers, with the most evaluated topic being safety of machines. Given the fact that many workers in the sector work away from a fixed workplace, risk assessments in the transportation and storage sector are more likely to cover workplaces outside the premises of the establishment when compared to the total economy.

The literature review has shown the importance of risk assessment practices, as well as the existing legal obligations and then the limitations of some of these assessment practices, such as the absence of assessments of certain occupational hazards and the weak connection between the usage of PPE and the outcomes of risk assessments. The most common reason given for not conducting risk assessments is that risks are already known.

The number of establishments in the transportation and storage sector that have carried out a workplace risk assessment has remained steady over time, and the topics assessed have generally remained similar. Organisational aspects, such as work schedules, are increasingly covered in risk assessments

over time, as are the safety of machines and work postures and physical working demands. Attention to the health and safety conditions of the workplace at home in the sector has increased over time.

- **Presence of preventive measures to deal with OSH risks**

Transportation and storage sector establishments take a number of measures to deal with OSH risks, such as the provision of equipment to help with lifting or moving, and the provision of ergonomic equipment, which reflects the types of activities that take place within the sector. Given the prevalence of psychosocial risks in the sector, preventive measures are also taken in this regard, particularly in relation to allowing employees to take more decisions on how to do their job. However, establishments are less likely to have formal procedures to deal with and prevent psychosocial risks, although this has increased over time, as was the case in all other sectors. It is hard to explain why enterprises in the sector underperform in having a procedure to deal with external violence, which can happen in most jobs within the sector, and particularly with those that are customer-facing.

On evident trend is that when compared to 2014, more establishments are raising awareness about healthy nutrition and taking measures aimed at raising awareness on the prevention of addiction, for example, to smoking, alcohol or drugs. The proportion of establishments that have introduced confidential counselling for employees, and intervention in case of excessively long or irregular hours worked, increased in this period also.

- **Use of health and safety services**

Transportation and storage sector establishments are more likely to regularly arrange medical examinations when compared to the total EU average, and in most subsectors (such as in the air transport sector in the case of pilots), regular medical examinations are a fundamental component of an employee's ability to carry out the job. This is linked to safety-critical systems within these subsectors.

There is a positive relationship with the size of the enterprise, and significant differences can be seen across Member States in regard to regularly arranging examinations. Regarding health and safety services (either in-house or contracted externally), the use of these different services is similar to (or above) the EU-27 average for all establishments, although larger establishments make greater use of these services. Even though large establishments may have a well-established OSH department/expert/internal safety officer, they are also more likely to use services of an external provider to support them in their health and safety tasks. These may be in relation to special tasks that OSH generalists cannot execute. Looking at the evolution in time, the type of health and safety services used (in-house or contracted externally) remained similar from 2014 to 2019.

A majority of establishments in the sector have contracted health and safety experts to provide them with OSH information, and half of establishments in the sector have contracted insurance providers. Around a third of establishments obtained information from employers' organisations. The comparison with the EU-27 average for all sectors does not show great differences. Larger establishments are more likely to contract external organisations to obtain OSH information, irrespective of the type of organisation in general, where this pattern seems to be particularly clear for labour inspectorates and official institutes for health and safety at work. This finding points to the direction that micro and small enterprises may be less aware of OSH issues. Over time, figures remained consistent between 2014 and 2019, apart from official institutes for health and safety at work, which were consulted significantly less in 2019 when compared to 2014.

- **Discussion of OSH issues at different levels**

Establishments in the transportation and storage sector are slightly more likely than those in other sectors to regularly discuss OSH issues at the top level of management and within staff or team meetings. Such discussions on OSH are more frequently reported among larger establishments, which would reinforce the impression that micro and small enterprises are less aware of OSH. There are notable differences between countries, whereby in some Member States discussions are common, and in others this is less of the case.

Health and safety issues were being discussed more at the top level of management when compared to 2014, although less training was being provided then to health and safety representatives. The topics in which employees were trained did not significantly change over time.

- **Training on health and safety issues**

Building on training, in over two-thirds of establishments in the transportation and storage sector with 20 or more employees, team leaders and line managers receive training on how to manage health and safety in their teams, which is slightly lower that the EU-27 average. The most common topics for training are in relation to emergency procedures and how to lift and move heavy loads, whereas only around a third of sectoral establishments provide training on psychosocial risks prevention.

Training appears to be provided more often to employees performing cognitive tasks than those performing physical tasks, and training opportunities are lower if workers perform interactional tasks. Workers on the move may be difficult to reach with trainings. The share of establishments in the transportation and storage sector that provide training to employees on different OSH issues is higher among larger establishments than among smaller ones. Where workers have difficulties in understanding the language spoken at the premises, 41% of training to employees is provided in other languages, which is by far the largest percentage across the EU-27, whereby the EU average for all sectors is 21%.

- **Main drivers of and barriers to OSH management in the transportation and storage sector**

The main drivers for addressing health and safety in transportation and storage sector establishments are fulfilling legal obligation and avoiding fines from the labour inspectorate authorities, which are still the leading drivers in the entire economy as well. More establishments in the sector have been visited by the labour inspectorate in the last three years when compared to the EU-27 average and significantly more than in some other sectors. One interviewee indicated that whilst labour inspection is good in theory (as for those limited establishments that receive these visits, they can be very effective), in practice it rarely takes place due to lack of available inspectors (a low number of inspectors is an issue for every sector and in most Member States).

The most important difficulties in engaging in OSH management practices in the sector are the complexity of existing legal obligations (which varies significantly across Member States) followed by lack of time/staff to deal with these issues and existing paperwork. An additional difficulty for engaging in OSH management practices not covered under the ESENER questionnaire is the use of unregulated/uncontrolled subcontracting. Additionally, there is a lack of reliable and comparable data on the exposure to occupational hazards of the workers, which causes difficulties in tailoring OSH measures and practices towards workers. Additional elements influencing OSH management practices include the impact of the COVID-19 pandemic, the digitalisation of activities, the increasing presence of long-term subcontracting/outsourcing practices, the increasing presence of platform workers, the increasing presence of green practices, several improvements related to technical and organisational changes, and increasing difficulties in finding suitable personnel, which has been exacerbated by the COVID-19 pandemic.

- **Worker participation in OSH management practices**

Transportation and storage sector establishments are likely to have health and safety representation within the enterprise. Similarly to other activity sectors, this is more often the case as workplace size grows, in reflection of national legislation for worker representation.

However, just over half of transportation and storage sector establishments that have formal employee representation structures conduct regular discussions on OSH issues between employee representatives and the management, which is still higher than the EU-27 average. Transportation and storage workers in the EU-27 are slightly less likely to be involved in the implementation of OSH-related measures when compared to other sectors. In line with this, employees in the sector are also less likely to have been involved in identifying possible causes for work-related stress, such as time pressure or difficult clients, when compared to employees in the total economy.

6.2 Policy pointers

- **Policy pointers related to the characteristics of the transportation and storage sector and employment**
- The analysis confirms that specific actions should be tailored towards SMEs. Generally, SMEs are less likely to report OSH risks (including psychosocial risks) but are also less inclined to make use of OSH services or introduce activities to deal with these risks, including carrying out risk assessments (probably derived from their limited financial and human in-house resources). The analyses confirm the importance of introducing ad hoc measures (awareness-raising activities, ad hoc training, specialised technical assistance services, etc.) and tailored communication strategies to improve the existing knowledge and expertise among SMEs on OSH issues and their importance.
- In order to face demographic challenges and labour shortages affecting the transportation and storage sector, there should be consideration for new policies regarding youth unemployment and mobility, education and lifelong learning, gender diversity, immigration and retirement. It is highly important in particular that measures are taken to attract young people and women to some of these activities within the sector. It should be considered that this will have an impact on OSH management given the different risks these groups are faced with.
- Long-term subcontracting/outsourcing practices are becoming more common in certain subsectors, with these subcontracted companies often offering worse conditions for work organisation and time pressure, which can have negative effects for workers. Measures must be taken to ensure that workers have adequate OSH protection in the case of long-term subcontracting/outsourcing practices.
- Certain subsectors within the transportation and storage sector are particularly affected by digital platform work. This type of work carries its own occupational risks and challenges OSH risk prevention and management practices, often shifting costs, risks and responsibilities onto platform workers. Existing discussions regarding the EU Directive on Platform work could be used as a forum to discuss its impact on OSH. Additionally, more data regarding the working conditions and OSH risks of platform workers would be helpful (possibly in conjunction with the EU Observatory on the Online Platform Economy).

- **Policy pointers related to OSH risks and health outcomes in the transportation and storage sector**
- The transportation and storage sector contains a number of subsectors covering a wide variety of activities, which leads to different occupational risks and health outcomes. It is therefore crucial that specific actions are taken to reduce or mitigate the risks that are particular to certain subsectors. Some examples are presented below.
    - Prolonged sitting is a large risk for workers in some subsectors in the transportation and storage sector (such as those working in road transport), which can lead to serious health conditions such as obesity, cardiovascular disease, sleep disorders and diabetes. These factors are exacerbated in several subsectors by an unhealthy lifestyle and having little to no exercise, made worse by working long and irregular hours. Therefore, measures should be taken to ensure suitable rest times for workers affected by this, as well as suitable infrastructure available to provide better living conditions for transportation and storage sector workers, such as safe rest areas in the case of truck drivers.
    - Many workers, such as those working in warehousing and baggage handling, are at risk of MSDs. They spend long hours on their feet working in awkward body postures and lifting heavy loads, which can lead to various ergonomic hazards, resulting in injuries. Measures should be taken to ensure adequate support for workers, in the form of supporting equipment and new technologies (such as robots) to minimise the risks for workers.

- More attention should be addressed to the psychosocial risks for workers in the sector, as the study has shown that there are a number of issues that are specific to certain subsectors. For example:
    - Activities in the transportation and storage sector often have intense time pressure, which poses significant risks from an OSH perspective, including fatigue, increased chance of accidents and work-related stress. Measures need to be taken to reduce the pressure on workers in this regard.
    - Workers in the transportation and storage sector often work in an isolated and lonely manner, away from home for long periods of time. This can influence the mental health of workers. Therefore, enterprises in the sector (particularly in those sectors that are vulnerable in this regard) should take measures to ensure that this is addressed.
- The transportation and storage sector can be considered a dangerous sector for workers, with a high risk of accidents and health outcomes (when compared to other sectors). Therefore, sufficient access to relevant safety equipment, PPE and monitoring tools should be available to reduce OSH risks for workers and to ensure they are able to carry out their jobs in a safe manner.
- Diversity characteristics should be considered in the context of OSH policies to ensure that risks affecting certain groups are mitigated and addressed.

- **Policy pointers related to OSH management**

- It is important that enterprises ensure that risk assessments become a real instrument to both identify existing work-related risk factors that have the potential to cause harm to the workforce in general (and to specific vulnerable groups in particular) and also to prioritise remedial actions to eliminate or control these risks.
- The transportation and storage sector can often be characterised by work that takes place away from fixed premises. It is therefore the responsibility of employers in the transportation and storage sector to ensure that everyone in the company (including part-time and temporary workers as well as those not working in a fixed place) has relevant information on OSH risks and the measures in place to deal with these risks or instructions to follow any emergency procedures.
- Some groups of workers have particular training needs, including new recruits (especially if they are young and/or have no experience), workers changing jobs or taking on extra responsibilities within the company, and migrant workers. The needs of various types of workers should be considered in the development of training in the sector.
- Managers and OSH representatives must keep themselves constantly updated with changes and new developments (legislative, operational, etc.) in the OSH field and affecting the daily activities of the company. There should be measures taken to encourage training of managers, health and safety representatives, and employees on OSH, particularly given that this is considered one of the most dangerous sectors across the total economy in terms of potential risks. More awareness of psychosocial risks by managers is needed.
- The green transition that is taking place in the context of the transportation and storage sector will result in new OSH risks for workers in the sector. In order to avoid a lack of preparedness for the resulting shift in technologies, employees, enterprises and labour inspectorates must have access to relevant training to be able to work safely with and understand new technologies and their impacts on OSH.

- **Policy pointers on the use of health and safety services**

- Labour inspectorates can play a key role, not only in driving compliance and fulfilment of existing OSH legislation (legislation is perceived as sufficient but it is poorly implemented in many cases) but also in providing useful information and advice on how to successfully deal with and improve existing OSH management practices.

- Linked to the aforementioned point, a stronger system of enforcement is suggested. Actions of labour inspectorates to ensure effective and regular checks of this (mobile) workplace will have benefits for the working conditions of workers. Given the large share of small enterprises and the characteristics of the sector, next to visits, more information should become available to employers and also to employees.
- Measures must be taken to ensure that workers' safety representatives remain accessible to workers in the sector. This is particularly the case for workers in precarious situations and those not working in a fixed physical place.

- **Policy pointers on worker participation in OSH management practices**
- It is important to ensure that employees participate in the management of OSH within establishments, whereby employees should be involved in the design and implementation of different OSH measures. In particular, the transportation and storage sector should take more measures to ensure employees are involved in the identification of possible causes for work-related stress, for example, in relation to time pressure (given the risk profile in the sector).
- It is also relevant that trade unions, works councils and employers' organisations (continue to) support the implementation of good OSH management practices and encourage establishments and employees to prioritise OSH.

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Annex 1: Regression analysis on commitment to OSH management as determinant of the management of psychosocial risks

Which research question is answered with this analysis?

The objective of this analysis is to determine how commitment to OSH management is linked with the management of psychosocial risks.

The management of psychosocial risks is captured by questions Q300 to Q304 in the ESENER 2019 survey. Together, these questions cover nine different plans, procedures and measures that an establishment can apply. Based on the answers to these questions, we have examined to which extent the usage of these 'psychosocial risk management instruments' is related to the commitment of top-level and team leaders to OSH management. More specifically, we have tested the hypothesis that commitment of top-level and team leaders will have a positive effect on the management of psychosocial risks.

Which data were used?

This analysis is based on data from all establishments from the transportation and storage sector from EU-27 Member States that participated in the ESENER 2019 survey. From this subsample, 12 observations were removed because of their reply to question Q113 on the position of the respondent:

- One of the answer categories to this question is 'external health and safety consultant'. Only six respondents from the subsample provided this answer. This is too low to determine any relationship between this answer category and the management of psychosocial risks. We have therefore decided to remove these two observations from the sample.
- Thirteen of the respondents from the subsample provided no answer. Since this question is one of the main dependent variables of this analysis, we decided to also remove these 13 observations from the subsample.

The resulting subsample includes 1,712 observations.

Which dependent variables have been examined?

The ESENER 2019 survey includes questions on nine different plans, procedures and measures that establishments can apply. Some of these questions refer to the presence of different procedures or action plans, while other questions are concerned with actual measures. We have therefore constructed two different indicators, on the number of procedures and measures taken by establishments:

- Questions Q300-Q302 are concerned with the presence of three different procedures/action plans. The answers to these questions have been used to compute an indicator for the presence of formal procedures. A higher score may be interpreted as an indicator for a more formalised, advanced and/or proactive management of psychosocial risks. This indicator is only defined for establishments with at least 20 employees. The (weighted) average score for this indicator is 1.2, with a minimum of 0 and a maximum of 3. For the analysis we aggregated this information to a binary variable indicating whether or not at least one of these procedures/action plans is present (PSR_procedures).[23]
- Questions Q303-Q304 are concerned with the application of five different measures to prevent psychosocial risk (Q304) and whether employees have been involved in identifying possible causes for work-related stress (through a survey or otherwise). The answers to these questions

[23] Reducing an ordinal variable with four answer categories to a binary variable makes it possible to use a logistic regression to examine the relation with other variables.

have been used to compute an indicator for the application of relevant measures. This indicator (PSR_measures) is defined for all establishments in the ESENER 2019 survey. The (weighted) average score for this indicator is 2.6, with a minimum of 0 and a maximum of 6.

While these two indicators are positively related with each other (Spearman's correlation = 0.404, with a significance level of 0.000), the correlation coefficient is so small that it indicates that these two indicators should be viewed as indicators for two different aspects (or dimensions) of the management of psychosocial risks. Therefore, to answer this research question we have conducted separate (regression) analyses on both dependent variables.

Which explanatory variables were included?

The main explanatory variables are the commitment of top-level (Q162) and team leaders (Q163) to OSH management practices and the position of the respondent in the establishment (including whether health and safety is the main task of the respondent). The first two of these questions have only been asked to establishments with at least 20 employees. For the first dependent variable (PSR_procedures) this is not a problem, since this variable is also only available for establishments with at least 20 employees. For the second dependent variable (PSR_measures) this presents a dilemma:

- Include these explanatory variables, at the cost of excluding all establishments with up to 20 employees (which account for the large majority of all establishments)?
- Or make sure that the analyses include establishments from all size classes, even if this means excluding the two questions that contain the most specific information on the commitment of OSH management?

Since the research question is about the relation between commitment to OSH management and the management of psychosocial risks, we have opted for the first solution (i.e. include the information from questions Q162 and Q163). We also performed analyses in line with the second solution (i.e. exclude the information from questions Q162 and Q163) but do not present the results of these analyses.

In addition to these explanatory variables, we also included the following potentially explanatory variables (based on the conceptual framework discussed in section 1.3):

- Several characteristics of OSH management that may be related to the management of psychosocial risks:
  - Whether the establishment has carried out a workplace risk assessment (Q250).
  - Whether the establishment has taken different measures to prevent MSDs (encouraging regular breaks for people in uncomfortable working positions, provision of ergonomic equipment, the possibility for people with health problems to reduce working hours).
- Variables describing the amount and/or nature of worker participation:
  - Whether employees are involved in the implementation of measures based on the workplace risk assessment (Q258).
  - Different types of employee representation. The survey includes four different types of employee representation (variables Q350_1 to Q350_4). The first three of these have however not been presented to establishments in all participating countries, because in some countries these specific types of employee representation do not occur (this topic is further discussed in both the technical report and quality report of ESENER 2019[24]). To solve this problem (i.e. to arrive at a variable that is defined for establishments from all participating countries), the answers to the questions concerning the four different types of employee representation are aggregated to the following two variables:[25]

[24] See: https://visualisation.osha.europa.eu/esener/en/about-tool
[25] The same procedure is also applied in both the technical report and quality report of ESENER 2019.

  - Employee representation: general. This variable indicates whether a works council and/or trade union representation is present in the establishment.
  - Employee representation: health and safety. This variable indicates whether a health and safety committee and/or health and safety representative is present in the establishment.

  These two variables can be constructed for establishments from all 33 countries participating in ESENER 2019.
- Different types of risks (including psychosocial risks).
- Variables describing workforce characteristics (the share of older employees,[26] whether employees work from home and/or anywhere else outside the premises of the establishment).
- Control variables:
  - Country dummies (the default country is Ireland).
  - Establishment size class dummies (the default is the largest size class, with 250 or more employees).
  - Whether the establishment is part of an enterprise with more than one establishment.
  - Founding year of the establishment (before 1990; 1990 to 2015; after 2015. The middle category is the default category).

Which estimation techniques have been used?

As mentioned before, we have examined two different dependent variables to answer this research question. These dependent variables require different regression techniques:

- PSR_procedures is a variable with only four answer categories. We have constructed a dummy variable whether establishments have applied at least one of the three procedures and used logistic regression to establish to which extent PSR_procedures can be explained by the various explanatory variables.
- PSR_measures is a variable with seven different answer categories. Although this is an ordinal variable, it is not uncommon to use the Ordinary Least Squares (OLS) regression technique to examine (dependent) variables with seven answer categories. We have followed this convention and used OLS to examine to which extent PSR_measures can be explained by the various explanatory variables.

Which models were estimated in the logistic regression explaining the presence of OSH procedures/action plans?

The more explanatory variables that are included in the model, the less observations are available for the regression analyses (most questions have been answered by most establishments, but only a few questions have been answered by all establishments). This may result in a selection bias. For this reason, we used a preliminary regression to determine which of the explanatory variables were significantly related to the dependent variable (the presence of OSH procedures/action plans) and which were not. We then re-estimated the regression model with the explanatory variables entering the model in four consecutive steps. These four steps can also be interpreted as four different (nested) models:

- Model 1 includes only the main explanatory variables:
  - To which extent health and safety issues are discussed at the top level of management (never, occasionally or regularly).
  - Whether team leaders and line managers receive any training on how to manage health and safety in their teams (no; some of them; all of them).
  - The position of the respondent in the establishment (the default category is ‘Owner of a firm, managing director or site manager’, and the other categories are ‘Manager

[26] Four different categories can be distinguished: 0%; between 0% and 25%; between 25% and 50%; and more than 50%. The first category (0%) is the default category in the analyses.

without specific OSH tasks', 'Manager with specific OSH tasks', 'OSH specialist without managerial function', 'Employee representative in charge of OSH' and 'Another employee in charge of the subject') and whether health and safety are the respondent's main task.
    - Whether workplace risk assessment is carried out regularly.
    - Whether the establishment has taken different measures to prevent MSDs (the possibility for people with health problems to reduce working hours).
- Model 2 adds other explanatory variables that are significantly related to the dependent variable, such as different types of risk (prolonged sitting, accidents with machines, accidents with vehicles in the course of work).
- Model 3 adds several significant control variables: age distribution of employees, age of the establishment, single establishment, country dummies.
- Model 4 adds all non-significant explanatory variables.

We have applied these four steps for each of the two dependent variables separately.

We have selected model 3 as the final model. This model is used to answer the research questions in the main text. Model 3 is based on almost the same number of observations as model 2, but we favour model 3 over model 2 because it includes some relevant (significant) control variables. Model 1 misses some relevant explanatory variables, and model 4 does not increase the explained variance significantly (as compared to model 3).

Results of the analysis on PSR_procedures

The regression results in Table 48 indicate a positive relation between having regular meetings on health and safety issues at the top level of management and having formal procedures in place to prevent psychosocial risks. Although reversed causality cannot be excluded (installing formal procedures to prevent psychosocial risks may result in more meetings at top management level to discuss health and safety issues), this result is in line with our hypothesis that commitment of top-level and team leaders will have a positive effect on the management of psychosocial risks. Model 3 also indicates that the likelihood of having formal procedures in place to prevent psychosocial risks increases if all team leaders and line managers were to receive training on how to manage health and safety.

Turning to the position of the respondent (who is supposed to be the person in the establishment who knows best about OSH), the results suggest that this may also be relevant. If the person in the establishment who knows best about OSH is a manager without specific OSH tasks (rather than the owner or general manager), the establishment is more likely to have formal procedures in place to prevent psychosocial risks. Establishments are also more likely to have formal procedures in place to prevent psychosocial risks, if the following conditions are met:

- Workplace risk assessments are carried out regularly.
- Establishments recognise prolonged sitting as a risk factor.
- Preventive measures for MSDs are taken, by giving people with health problems the possibility to reduce working hours.
- Establishments are part of a multi-establishment organisation.

In contrast, establishments are less likely to have formal procedures in place to prevent psychosocial risks, if:

- Establishments recognise accidents with machines or with vehicles in the course of work as a risk factor. Possibly, establishments that recognise these risks focus their attention on preventing these physical risks, at the cost of attention on preventing psychosocial risks.

Even if these factors are considered, we still find significant differences based on the founding year and share of employees aged 55 or older. Country and establishment size class are however not related to the likelihood of having formal procedures in place to prevent psychosocial risks. This likelihood is also not related to many of the distinguished health risks for employees (including psychosocial risks) or to the presence of employee representation (general, or specific on health and safety issues).

Table 48 Logistic regressions on whether formal procedures to prevent psychosocial risks are in place (PSR_procedures)

Variable	Model 1:			Model 2:			Model 3:			Model 4:		
	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.
Health and safety issues discussed at the top level of management	**	2	0.008	*	2	0.012	*	2	0.014	*	2	0.024
occasionally	0.400	1	0.500	0.663	1	0.308	0.600	1	0.568	-1.874	1	0.278
regularly	1.214 *	1	0.039	1.407 *	1	0.029	2.066 *	1	0.047	0.801	1	0.616
Team leaders and line managers receive training on how to manage health and safety in their teams.		2	0.555		2	0.477	*	2	0.048		2	0.158
some of them	0.946	1	0.297	0.992	1	0.302	0.987	1	0.454	1.115	1	0.535
all of them	0.163	1	0.607	0.285	1	0.392	1.489 *	1	0.014	1.642	1	0.057
Position of the person who knows best about OSH												
Manager without specific OSH tasks	0.459	1	0.195	0.368	1	0.323	1.971 **	1	0.005	1.311	1	0.159
Manager with specific OSH tasks	0.092	1	0.852	0.011	1	0.983	-0.251	1	0.772	-2.573	1	0.066
OSH specialist without managerial function	1.113	1	0.344	1.177	1	0.318	3.413	1	0.059	2.580	1	0.276
Employee representative in charge of OSH	0.123	1	0.810	0.202	1	0.698	0.558	1	0.611	0.289	1	0.864
Another employee in charge of the subject	-0.401	1	0.258	-0.391	1	0.291	0.042	1	0.950	-1.582	1	0.142
Health and safety is respondent's main task	0.930	1	0.116	1.172	1	0.052	1.048	1	0.334	-0.626	1	0.662
Do you regularly carry out workplace risk assessments?	0.920 *	1	0.017	1.190 **	1	0.004	2.929 **	1	0.000	4.607 **	1	0.001
Preventive measures for MSDs												
The possibility for people with health problems to reduce working hours	0.728 **	1	0.007	0.700 *	1	0.012	1.846 **	1	0.001	2.391 **	1	0.001
Additional explanatory variables												
Types of risk:												
Prolonged sitting				0.510	1	0.201	1.843 **	1	0.010	3.482 **	1	0.010
Risk of accidents with machines				-0.735 *	1	0.014	-1.385 *	1	0.016	-1.216	1	0.130
Risk of accidents with vehicles in the course of work				-1.156 *	1	0.027	-3.069 **	1	0.001	-4.185 **	1	0.005

Variable	Model 1:			Model 2:			Model 3:			Model 4:		
	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.
Control variables												
Founding year of establishment:												
before 1990							-1.369 *	1	0.016	-2.259 **	1	0.007
after 2015							-8.520 **	1	0.003	-12.808 **	1	0.001
Share of employees aged 55+:												
< 25%							-2.093 *	1	0.024	-4.349 **	1	0.004
25% - 50%							-0.091	1	0.927	-2.145	1	0.145
> 50%							1.732	1	0.224	0.470	1	0.827
Establishment is single organisation							-2.847 **	1	0.000	-4.717 **	1	0.000
Country								26	0.147		26	0.454
Insignificant control variables												
Health and safety representation										0.619	1	0.462
General employee representation										0.805	1	0.361
Establishment is subsidiary site										-0.433	1	0.761
Employees work anywhere else outside the premises of the establishment (incl. from home)										0.021	1	0.977
Establishment size class:											4	0.111
…20-49 empl.										-4.744 **	1	0.009
…50-99 empl.										-5.554 **	1	0.008
…100-149 empl.										-3.054	1	0.111
…150-249 empl.										-2.285	1	0.398
Workplace risk assessment carried out regularly, employees involved in measures taken										-1.005	1	0.302
Types of risk:										-0.127	1	0.876
Lifting or moving people or heavy loads										-1.256	1	0.189
Repetitive hand or arm movements										0.253	1	0.725
Tiring or painful positions										-0.221	1	0.760
Loud noise										0.104	1	0.882
Heat, cold or draught										0.607	1	0.423
Chemical or biological substances										-0.290	1	0.713
Increased risk of slips, trips and falls										-0.127	1	0.876

Variable	Model 1:			Model 2:			Model 3:			Model 4:		
	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.	B	df.	Sign.
Psychosocial risks:												
Time pressure										-0.812	1	0.329
Poor communication or cooperation										-1.107	1	0.141
Job insecurity										-1.304	1	0.252
Long or irregular working hours										0.307	1	0.692
Preventive measures for MSDs:												
Encouraging regular breaks for people in uncomfortable working positions										0.953	1	0.217
Provision of ergonomic equipment										1.416	1	0.088
Number of valid observations	314			312			260			247		
Nagelkerke R^2	0.206			0.260			0.697			0.763		

The default country is Ireland; the default establishment size class is 250+ employees; the default share of employees aged 55+ is 0%; the default founding year of the establishment is 1990 to 2015.

Significant at: ** p<0.01; * p<0.05. All explanatory variables are dummy variables (0=no, 1=yes).

Source: Panteia based on ESENER 2019

Which models were estimated in the OLS regression explaining the number of OSH measures applied?

Just as is the case for the logistic regression models discussed previously, we used a preliminary regression to determine which of the explanatory variables were significantly related to the dependent variable (the number of OSH measures applied) and which were not. We then re-estimated the regression model with the explanatory variables entering the model in four consecutive steps. These four steps can also be interpreted as four different (nested) models:

- Model 1 includes only the main explanatory variables:
  - To which extent health and safety issues are discussed at the top level of management.
  - Whether team leaders and line managers receive any training on how to manage health and safety in their teams.
  - The position of the respondent in the establishment (the default category is 'Owner of a firm, managing director or site manager', and the other categories are 'Manager without specific OSH tasks', 'Manager with specific OSH tasks', 'OSH specialist without managerial function', 'Employee representative in charge of OSH' and 'Another employee in charge of the subject') and whether health and safety is the respondent's main task.
  - Whether workplace risk assessments are carried out regularly.
  - Whether the establishment has taken different measures to prevent MSDs (encouraging regular breaks for people in uncomfortable working positions, the possibility for people with health problems to reduce working hours).
- Model 2 adds other explanatory variables that are significantly related to the dependent variable, which in this case is limited to employee representation (the presence of health and safety representation).
- Model 3 adds several significant control variables: age of the establishment, whether the establishment is a subsidiary site, and country dummies.
- Model 4 adds all non-significant explanatory variables.[27]

We have applied these four steps for each of the two dependent variables separately. Also here, we have selected model 3 as the final model, for the same reasons as in the case of the logistic regressions.

Results of the analysis on PSR_measures

The results of the OLS regression on PSR_measures are presented in Table 49. Although these results show similarities with the results of the regression on PSR_procedures, there are also several differences.

First of all, the attention of establishments to the prevention of psychosocial risks (as indicated by the number of measures taken by the establishment) is positively related to the amount of training that team leaders and line managers receive on how to manage health and safety. Increasing the amount of training may therefore increase the number of measures establishments take to prevent psychosocial risks. There is however no support for the hypothesis that having regular discussions on health and safety at top management level increases the attention of establishments on the prevention of psychosocial risks. Also, there are no indications that the position of the person who knows best about OSH matters.

Besides training of team leaders and line managers, only a few other variables are found to be significantly related to the attention to the prevention of psychosocial risks (in model 3):

- Establishments where workplace risk assessments are carried out regularly pay more attention to the prevention of psychosocial risks.

[27] Two of the variables that are added to model 4 are significant at a 5% significance level (time pressure and poor communication or cooperation). However, if these two variables are added to model 3, they become insignificant. In addition, the joint hypothesis that the variables that are added to model 4 increase the variance explained by the model is rejected at a 5% significance level (model 4 does not explain a significantly higher share of variance than model 3). For these reasons, we do not include these two variables in model 3.

- Establishments that take measures to prevent MSDs also pay more attention to the prevention of psychosocial risks. This is true for two of the three MSD measures included in the model (encouraging regular breaks for people in uncomfortable working positions, allowing people with health problems to reduce working hours).
- Establishments with a health and safety representative pay more attention to the prevention of psychosocial risks.
- The attention to the prevention of psychosocial risks also varies with country and founding year and tends to be higher for establishments that are a subsidiary site from a larger organisation.

Similar to the regression on PSR_procedures, we find that once these factors are taken into account, the size class of the establishment is not related to the attention on the prevention of psychosocial risks. This attention is also not related to any of the distinguished health risks for employees, including psychosocial risks. The lack of a relation with establishment size may be partially explained by the fact that these analyses are restricted to establishments with at least 20 employees (since the questions on discussion of health and safety issues and training at top management level are only asked to these establishments).

Table 49 OLS regressions on indicator on measures to prevent psychosocial risks (PSR_measures)

Variable	Model 1:		Model 2:		Model 3:		Model 4:	
	B	Sign.	B	Sign.	B	Sign.	B	Sign.
(Constant)	0.756 *	0.011	0.497	0.099	1.638 **	0.009	2.642 **	0.002
Health and safety issues regularly discussed at top management level	0.585 *	0.036	0.459	0.096	0.363	0.178	0.225	0.423
Team leaders and line managers receive training on how to manage health and safety	0.481 *	0.010	0.402 *	0.031	0.571 **	0.003	0.557 **	0.006
Position of the person who knows best about OSH								
Manager without specific OSH tasks	0.262	0.197	0.291	0.148	0.298	0.145	0.188	0.400
Manager with specific OSH tasks	0.054	0.851	0.028	0.921	-0.025	0.934	-0.210	0.519
OSH specialist without managerial function	-0.501	0.414	-0.420	0.487	-0.469	0.407	-0.871	0.170
Employee representative in charge of OSH	-0.064	0.816	-0.121	0.656	-0.249	0.383	-0.493	0.107
Another employee in charge of the subject	-0.520 *	0.013	-0.441 *	0.032	-0.148	0.496	-0.318	0.190
Health and safety is respondent's main task	0.000	1.000	-0.094	0.725	-0.189	0.511	-0.322	0.311
Workplace risk assessments carried out regularly	0.383	0.100	0.234	0.314	0.449 *	0.049	0.204	0.501
Preventive measures for MSDs								
Encouraging regular breaks for people in uncomfortable working positions	0.760 **	0.000	0.656 **	0.000	0.772 **	0.000	0.837 **	0.000
Possibility for people with health problems to reduce working hours	0.841 **	0.000	0.837 **	0.000	0.591 **	0.000	0.483 **	0.006
Additional explanatory variables								
Health and safety representation			0.789 **	0.000	0.442 *	0.027	0.290	0.170
Control variables								
Founding year of establishment								
before 1990					-0.299	0.079	-0.412 *	0.028
after 2015					-1.264 *	0.030	-1.092	0.089
Establishment is subsidiary site					0.862 **	0.000	0.636 *	0.022
Country dummies					yes **		yes **	
Insignificant explanatory variables								
Share of employees aged 55+:								
< 25%							0.105	0.727
25% - 50%							-0.186	0.572
> 50%							-0.146	0.722
Establishment size class								
…20-49 empl.							-0.214	0.471
…50-99 empl.							-0.222	0.489
…100-149 empl.							0.232	0.498

Variable	Model 1:		Model 2:		Model 3:		Model 4:	
	B	Sign.	B	Sign.	B	Sign.	B	Sign.
…150-249 empl.							-0.542	0.209
Do any employees work anywhere else outside the premises of the establishment (incl. from home)?							0.049	0.770
Establishment is a single organisation							-0.223	0.298
Workplace risk assessment carried out regularly, employees involved in measures taken							0.381	0.118
General employee representation							0.183	0.356
Types of risk								
Lifting or moving people or heavy loads							-0.026	0.893
Repetitive hand or arm movements							0.012	0.950
Prolonged sitting							-0.049	0.841
Tiring or painful positions							-0.210	0.257
Loud noise							-0.048	0.811
Heat, cold or draught							0.082	0.648
Risk of accidents with machines							-0.261	0.177
Risk of accidents with vehicles in the course of work							-0.158	0.510
Chemical or biological substances							0.339	0.076
Increased risk of slips, trips and falls							-0.005	0.976
Psychosocial risks								
Time pressure							-0.387 *	0.035
Poor communication or cooperation							0.406 *	0.046
Job insecurity							-0.233	0.349
Difficult customers							0.297	0.095
Long or irregular working hours							-0.186	0.301
Preventive measures for MSDs: provision of ergonomic equipment							-0.212	0.305
Number of valid observations	495		492		415		385	
Adjusted R^2	0.168		0.195		0.355		0.373	

The default country is Ireland; the default establishment size class is 250+ employees; the default share of employees aged 55+ is 0%; the default founding year of the establishment is 1990 to 2015.
Significant at: ** p<0.01; * p<0.05. All explanatory variables are dummy variables (0=no, 1=yes), except for 'Health and safety issues regularly discussed at top management level' and 'Team leaders and line managers receive training on how to manage health and safety' (both are ordinal variables on a three-point scale).
Source: Panteia based on ESENER 2019

Annex 2: Regression analysis on drivers and barriers of OSH management practices

Which research question is answered with this analysis?

The objective of this analysis is to determine the main drivers and barriers that influence OSH management practices, based on the data obtained through the ESENER 2019 survey.

Which data were used?

This analysis is based on data from all establishments from the transportation and storage sector from EU-27 Member States that participated in the ESENER 2019 survey. This subsample includes 1,731 observations.

Which dependent variable was examined?

The ESENER 2019 survey includes questions that cover many different OSH management practices. By counting the number of OSH management practices that are applied by establishments, we have constructed an indicator that represents the attention establishments have on OSH management practices.[28]

Not all questions regarding OSH management practices can be used to construct such an indicator:

- Some questions are concerned with the nature of OSH management practices or how they are carried out, and not whether they are carried out (for instance, question Q251 whether workplace risk assessments are conducted by internal staff or external service providers).
- Some questions have only been asked to establishments with at least 20 employees (for example, question Q162 whether health and safety issues are discussed at the top level of management). These establishments form a minority of all establishments from the transportation and storage sector.
- Some questions have only been asked to establishments where specific risks were identified (for example, question Q202_1 has only been answered by establishments that identified lifting or moving people or heavy loads as a risk factor). These establishments form a minority of all establishments from the transportation and storage sector.

The ESENER 2019 dataset includes 38 variables that are concerned with the application of different OSH management processes by establishments that can be used to construct an indicator that represents the attention establishments have on OSH management practices (see Table 50 Variables from the ESENER 2019 dataset used to construct the indicator OSH-MPI, representing the attention establishments have on OSH management practices). These variables have been recoded into dummy variables coded as 0 (no) or 1 (yes). This makes the parameters in the regression analysis easier to interpret.

The OSH management practices indicator (OSH-MPI) is calculated as the average of these variables, calculated over all valid answers. This means that if an establishment has not answered all of the 38 questions (which applies to the majority of establishments), OSH-MPI is based on the answers of the subset of questions that have been answered (otherwise, the regression analysis would be restricted to the subset of enterprises that answered all of the 38 questions, in which case the results would not be representative for the whole sector anymore). To control for the fact that the average score on OSH-MPI may be different for establishments that did not answer some of the 38 questions, we took the following two actions:

[28] The same dependent variable has also been used in the recent study on evidence from the European Survey of Enterprises on New and Emerging Risks (ESENER) on the accommodation and food and beverage service activities sector (https://osha.europa.eu/en/publications/accommodation-and-food-service-activities-evidence-european-survey-enterprises-new-and-emerging-risks-esener).

- Establishments that answered less than 30 of the 38 questions are excluded from the estimation procedure. This is only a small group of establishments (less than 2%).
- The regression model includes two dummy variables that indicate whether establishments did not answer some of the questions (validcount_dummy_35, indicating if 35 to 37 questions have been answered; and validcount_dummy_30, indicating if 30 to 35 questions have been answered).

Table 50 Variables from the ESENER 2019 dataset used to construct the indicator OSH-MPI, representing the attention establishments have on OSH management practices

Variables		
Q150	Q202_3	Q303all
Q151_1	Q202_4	Q304_1
Q151_2	Q202_5	Q304_2
Q151_3	Q250	Q304_3
Q151_4	Q252_1	Q304_4
Q151_5	Q252_3	Q304_5
Q152	Q252_4	Q355_1
Q155	Q252_5	Q355_3
Q157_1	Q252_6	Q355_5
Q157_2		Q357
Q157_3		Q358_1
Q157_4		Q358_2
Q158		Q358_3
		Q358_4
		Q358_5
		Q358_6

Source: IKEI/Panteia based on ESENER 2019

The resulting indicator has a (weighted) average score of 0.54, ranging from 0.04 to 1.00. The (weighted) average score is clearly related to establishment size, ranging from 0.50 for establishments with 5-9 employees to 0.73 for establishments with 250 or more employees. Likewise, minimum values between 0.04 and 0.08 only occur for a few establishments in the smallest size class. For establishments with at least 100 employees, the minimum score for OSH-MPI is 0.26.

Which explanatory variables were included?

The main explanatory variables are based on questions about different reasons for addressing health and safety (Q262), main difficulties in addressing health and safety (Q263), and main obstacles in dealing with psychosocial risks (Q308). The answers to questions Q262 and Q263 are given on a three-point scale (not a reason/difficulty; minor reason/difficulty; major reason/difficulty). To deal with the ordinal nature of these variables, we included two dummy variables for each question about a specific reason or difficulty: one dummy indicating whether the relevant reason or difficulty was at least a minor reason/difficulty, and one dummy indicating whether the relevant reason or difficulty was a major reason/difficulty.

In addition to these, we also included the following potentially explanatory variables (based on the conceptual framework discussed in Chapter 1.3):

- Variables describing workforce characteristics (the share of older employees,[29] whether employees work from home and/or anywhere else outside the premises of the establishment).
- Different types of employee representation. The survey includes four different types of employee representation (variables Q350_1 to Q350_4). The first three of these have however not been presented to establishments in all participating countries, because in some countries these

[29] Four different categories can be distinguished: 0%; between 0% and 25%; between 25% and 50%; and more than 50%. The first category (0%) is the default category in the analyses.

specific types of employee representation do not occur (this topic is further discussed in both the technical report and quality report of ESENER 2019). To solve this problem (i.e. to arrive at a variable that is defined for establishments from all participating countries), the answers to the questions concerning the four different types of employee representation are aggregated to the following two variables.[30]

- Employee representation: general. This variable indicates whether a works council and/or trade union representation is present in the establishment.
- Employee representation: health safety. This variable indicates whether a health and safety committee and/or health and safety representative is present in the establishment.

These two variables can be constructed for establishments from all 33 countries participating in ESENER 2019.

- Digitalisation. The survey includes three questions on health hazards related to digitalisation (Q310 to Q312). The first question asks whether six different digital technologies are in use. The second question asks whether possible impacts of such technologies on health and safety of employees have been discussed, and if this is the case the third question is used to establish which specific possible impacts have been discussed. These questions have been used to construct several explanatory variables:
  - Six dummy variables, indicating whether any of six different digital technologies are in use within the establishment (personal computers at fixed workplaces; laptops, tablets, smartphones or other mobile computer devices; robots that interact with workers; machines, systems or computer monitoring workers' performance or determining the content or pace of work; wearable devices, such as smart watches, data glasses or other (embedded) sensors).
  - Eight dummy variables, indicating whether any of eight different possible impacts have been discussed in the establishment[31] (increased work intensity or time pressure; information overload; prolonged sitting; repetitive movements; need for continuous training to keep skills updated; more flexibility for employees in terms of place of work and working time; blurring boundaries between work and private life; fear of job loss).
- Control variables:
  - Country dummies (the default country is Ireland).
  - Establishment size class dummies (the default is the largest size class, with 250 or more employees).
  - Whether the establishment is part of an enterprise with more than one establishment.
  - Founding year of the establishment (before 1990; 1990 to 2015; after 2015. The middle category is the default category).

Which models were estimated?

As mentioned in Annex 1, a selection bias may occur if too many explanatory variables are included in the model (if this reduces the number of valid observations too much). For this reason, we used a preliminary regression to determine which of the explanatory variables were significantly related to the dependent variable, and which were not. We then re-estimated the regression model with the explanatory variables entering the model in four consecutive steps. These four steps can also be interpreted as four different (nested) models:

- Model 1: this model includes the two dummy variables indicating whether establishments did not answer some of the questions, the main drivers and barriers for OSH, and whether psychosocial risks are more or less difficult to address than other risks.

[30] The same procedure is also applied in both the technical report and quality report of ESENER 2019.
[31] If none of the six different technologies are used in the establishment, or if the possible impacts of the use of such technologies have not been discussed, these dummy variables are recoded as 0 (meaning that this specific impact has not been discussed in the establishment).

- Model 2 adds other significant explanatory variables to model 1.
- Model 3 adds control variables to model 2.
- Model 4 adds the non-significant explanatory variables to model 3.

With each step, the number of observations on which the results are based decreases. For this study, we select model 3 as the final model. This model is used to answer the research question in the main text, for the following reasons:

- Model 1 misses some relevant (significant) explanatory variables that are introduced in model 2. We therefore favour model 2 over model 1.
- Model 3 is based on almost the same number of observations as model 2. Because it includes some relevant control variables, we favour model 3 over model 2.
- Model 4 does not increase the explained variance as compared to model 3 while it reduces the number of valid observations by approximately 230. We therefore favour model 3 over model 4.

Which estimation technique was used?

The model was estimated using OLS.

Results

The estimation results are presented in Table 51 OLS regressions on OSH management practices indicator.

The results show that two reasons for addressing health and safety are positively related with the attention on OSH management practices. These are: to meet expectations from employees, and to increase productivity. The other three reasons are not significantly related with the attention on OSH management practices (to fulfil legal obligations; for the organisation's reputation; and to avoid fines).

Likewise, two difficulties that establishments report in addressing health and safety are negatively related with the attention on OSH management practices. These are: a lack of awareness among management, and a lack of expertise or specialist support. In contrast, the complexity of legal obligations is positively related with the attention on OSH management practices. A possible explanation for this relationship is that establishments with less attention on OSH management practices are also less likely to have to deal with the legal obligations that are involved in implementing those OSH management practices. In other words, this might be a case of reversed causality, where more attention on OSH management practices results in having to deal with more different legal obligations, thus increasing the overall complexity. Finally, four of the seven included difficulties are not significantly related with the attention on OSH management practices: a lack of time or staff; lack of money; a lack of awareness among staff; and paperwork.

Different types of risks are also associated with attention on OSH management practices. Significant relations have been found for two different types of risk (lifting or moving people or heavy loads; repetitive hand or arm movements). For eight other types of risk, no significant relation with attention on OSH management practices has been found.

Turning to aspects of psychosocial risks, the analysis finds no support for any relationship between psychosocial risks and the attention on OSH management practices. The results of model 3 show that the attention on OSH management practices is not dependent on whether establishments believe that psychosocial risks are easier to address than other risks, more difficult or whether there is no big difference. In addition, the results of model 4 show that the attention on OSH management practices is not significantly related to any of the five included aspects of psychosocial risks.

The strongest relations with attention on OSH management practices are found for the presence of employee representation, in particular the presence of a health and safety committee and/or a health and safety representative (this variable has the highest parameter estimate of all the examined explanatory variables, except for the establishment size class control variables).

Next, the estimation results suggest that the attention on OSH management practices is positively related to several aspects of digitalisation. First of all, the attention on OSH management practices tends to be higher among establishments that use either personal computers at fixed workplaces and/or

mobile devices (laptops, tablets, smartphones, etc.). It is important to realise that almost three-quarters of all establishments in the transportation and storage sector in the EU-27 use both types of digital technologies. The minority of establishments that use only one (or even none[32]) of these technologies tend to pay less attention to OSH management practices than the other establishments (controlling for all other variables included in the regression models). For the other digital technologies included in the questionnaire (robots that interact with workers; machines, systems or computer monitoring workers' performance or determining the content or pace of work; wearable devices, such as smart watches, data glasses or other (embedded) sensors), no significant relation with the attention on OSH management practices has been found. Furthermore, the results suggest that discussing possible impacts of digital technologies on health and safety of employees may have a positive effect on the attention to OSH management practices. This is in particular the case for discussions of possible impacts on information overload, on the need for continuous training to keep skills updated, and on the flexibility for employees in terms of place of work and working time.

Turning to the control variables, even if we take the effects of all significant explanatory variables into account, we find that establishments with 50 employees or more tend to pay more attention to OSH management practices than smaller establishments. Similarly, establishments that are part of an organisation with several other establishments pay more attention to OSH management practices than establishments that are not part of an organisation with several other establishments. Country differences also occur.

We must be careful with any conclusions regarding the causality of the identified relations, since reversed causality may occur. This applies for example to the significant relation between the two types of employee representation (general, or specific for health and safety) and the attention on OSH management practices. Here, causality may run both ways. Having a health and safety committee may stimulate establishments to increase their attention to OSH management practices; at the same time, establishments that want to apply more OSH management practices may decide to install a health and safety committee as part of this process.

Also, we cannot rule out the possibility that a significant parameter estimate in the regression model is due to a more specific relation between, for example, an identified risk and one or two specific OSH practices associated with that risk.

[32] Less than 5% of all establishments in the transportation and storage sector in the EU-27 do not use personal computers at fixed workplaces or mobile devices.

Table 51 OLS regressions on OSH management practices indicator

Variable	Model 1		Model 2		Model 3		Model 4	
	B	Sign.	B	Sign.	B	Sign.	B	Sign.
Constant	0.326 **	0.000	0.148 **	0.000	0.312 **	0.000	0.302 **	0.000
validcount_dummy_35	0.016	0.264	-0.002	0.853	-0.003	0.814	-0.011	0.386
validcount_dummy_30	0.037	0.196	0.020	0.428	0.014	0.544	0.005	0.864
Reasons to address health and safety:								
…to fulfil legal obligations	0.026	0.489	0.037	0,244	0.026	0.373	0.021	0.537
…to fulfil legal obligations (major reason)	0.056 *	0.012	0.032	0,092	0.016	0.350	0.009	0.666
…to meet expectations from employees	0.045	0.168	0.007	0,795	0.008	0.745	0.034	0.231
…to meet expectations from employees (major reason)	0.056 **	0.001	0.047 **	0,001	0.056 **	0.000	0.047 **	0.002
…to increase productivity	0.065 **	0.005	0.046 *	0,015	0.034 *	0.049	0.038	0.065
…to increase productivity (major reason)	-0.008	0.613	-0.002	0,893	0.010	0.374	0.003	0.817
…for the organisation's reputation	-0.016	0.592	-0.022	0,383	-0.004	0.852	0.000	1.000
…for the organisation's reputation (major reason)	0.017	0.352	0.008	0,585	0.012	0.393	0.025	0.140
…to avoid fines	0.023	0.437	0.027	0,276	0.009	0.705	0.004	0.888
…to avoid fines (major reason)	-0.028	0.117	0.000	0,994	0.011	0.430	0.014	0.374
Difficulties in addressing health and safety:								
…lack of time or staff	0.035 *	0.020	0.015	0.213	0.011	0.325	0.019	0.161
…lack of time or staff (major difficulty)	-0.034 *	0.019	-0.019	0.118	-0.021	0.065	-0.015	0.240
…lack of money	0.013	0.332	-0.005	0.670	-0.001	0.961	0.002	0.873
…lack of money (major difficulty)	0.001	0.961	0.005	0.730	0.006	0.645	0.002	0.889
…lack of awareness among staff	0.023	0.129	0.012	0.353	-0.001	0.944	-0.004	0.751
…lack of awareness among staff (major difficulty)	0.017	0.273	0.007	0.611	-0.003	0.816	-0.005	0.711
…lack of awareness among management	-0.027	0.097	-0.026	0.050	-0.029 *	0.018	-0.029 *	0.040
…lack of awareness among management (major difficulty)	0.030	0.149	0.011	0.531	0.006	0.723	0.003	0.888
…lack of expertise or specialist support	-0.051 **	0.001	-0.043 **	0.000	-0.027 *	0.018	-0.025	0.055
…lack of expertise or specialist support (major difficulty)	-0.024	0.238	-0.007	0.693	-0.008	0.591	-0.012	0.516
…paperwork	0.018	0.239	0.004	0.781	-0.001	0.966	-0.014	0.293
…paperwork (major difficulty)	-0.026	0.104	-0.005	0.730	0.002	0.871	0.017	0.235
…complexity of legal obligations	0.011	0.462	0.028 *	0.031	0.025 *	0.037	0.033 *	0.016
…complexity of legal obligations (major difficulty)	-0.011	0.450	-0.012	0.314	0.001	0.936	0.003	0.816
Psychosocial risks:								
…are easier to address than other risks	0.000	0.996	-0.005	0.747	0.003	0.821	-0.009	0.537
…are more difficult to address than other risks	0.087 **	0.000	0.040 **	0.000	0.019	0.074	0.022	0.091

Variable	Model 1		Model 2		Model 3		Model 4	
	B	Sign.	B	Sign.	B	Sign.	B	Sign.
Additional explanatory variables								
Types of risk:								
…lifting or moving people or heavy loads			0.038 **	0.000	0.032 **	0.001	0.032 **	0.007
…repetitive hand or arm movements			0.057 **	0.000	0.049 **	0.000	0.040 **	0.000
Employee representation:								
…general (works council and/or trade union representation)			0.085 **	0.000	0.043 **	0.000	0.024	0.074
…health and safety (H&S committee and/or H&S representative)			0.091 **	0.000	0.086 **	0.000	0.080 **	0.000
Health hazards related to digitalisation:								
…digital technologies in use: personal computers at fixed workplaces			0.040 **	0.006	0.038 **	0.006	0.036 *	0.022
…digital technologies in use: laptops, tablets, smartphones or other mobile computer devices			0.040 *	0.010	0.028	0.057	0.029	0.080
…impact on information overload has been discussed			0.046 **	0.004	0.047 **	0.002	0.034	0.072
…impact on need for continuous training to keep skills updated has been discussed			0.067 **	0.000	0.059 **	0.000	0.052 *	0.013
…impact on more flexibility for employees in terms of place of work and working time has been discussed			0.043 **	0.010	0.039 *	0.012	0.038	0.057
Control variables								
Establishment is single organisation					-0.044 **	0.000	-0.032 *	0.028
Establishment size class:								
…5-9 empl.					-0.089 **	0.000	-0.101 **	0.000
…10-19 empl.					-0.085 **	0.000	-0.093 **	0.000
…20-49 empl.					-0.064 **	0.000	-0.086 **	0.000
Country dummies					yes		yes	
Insignificant explanatory variables								
Employees work anywhere else outside the premises of the establishment (incl. from home)							-0.016	0.151
Establishment is subsidiary site							0.035	0.083
Size class: 50-99 empl.							-0.033	0.188
Size class: 100-149 empl.							-0.013	0.647
Size class: 150-249 empl.							-0.015	0.652
Founding year of establishment: before 1990							-0.001	0.965
Founding year of establishment: after 2015							-0.046	0.171
Share employees aged 55+: 1-25%							-0.001	0.952
Share employees aged 55+: 25-50%							-0.032	0.065
Share employees aged 55+: 50% or more							0.012	0.582

Variable	Model 1		Model 2		Model 3		Model 4		
	B	Sign.	B	Sign.	B	Sign.	B		Sign.
Types of risk:									
…Prolonged sitting							0.028	*	0.049
…Tiring or painful positions							-0.004		0.747
…Loud noise							0.021		0.100
…Heat, cold or draught							0.019		0.092
…Risk of accidents with machines							0.003		0.817
…Risk of accidents with vehicles in the course of work							-0.002		0.873
…Chemical or biological substances							0.002		0.881
…Increased risk of slips, trips and falls							0.007		0.523
…Psychosocial risks: Time pressure							0.003		0.775
…Psychosocial risks: Poor communication or cooperation							-0.002		0.858
…Psychosocial risks: Job insecurity							0.015		0.332
…Psychosocial risks: Difficult customers							0.018		0.091
…Psychosocial risks: Long or irregular working hours							-0.022	*	0.049
Health hazards related to digitalisation:									
…digital technologies in use: robots that interact with workers							0.020		0.458
…digital technologies in use: machines, systems or computer determining content or pace of work							0.000		0.983
…digital technologies in use: machines, systems or computer monitoring workers' performance							0.009		0.454
…digital technologies in use: wearable devices, such as smart watches, data glasses or other (embedded) sensors							-0.004		0.807
…impact on increased work intensity or time pressure has been discussed							-0.016		0.407
…impact on prolonged sitting has been discussed							-0.001		0.946
…impact on repetitive movements has been discussed							-0.002		0.919
…impact on blurring boundaries between work and private life has been discussed							0.027		0.164
…impact on fear of job loss has been discussed							0.034		0.163
Number of valid observations	1,166		1,133		1,133		904		
Adjusted R^2	0.118		0.410		0.511		0.484		

Significant at: ** p<0.01; * p<0.05. All explanatory variables are dummy variables (0=no, 1=yes).

The default country is Ireland; the default establishment size class is 250+ employees; the default share of employees aged 55+ is 55%; the default founding year of the establishment is 1990 to 2015.

Source: Panteia based on ESENER 2019

Annex 3: Identifying a typology: cluster analysis on attention for OSH management practices

Which research question is answered with this analysis?

The objective of this analysis is to identify a typology of establishments from the transportation and storage sector in their approach to managing OSH at the workplace.

There is no guarantee that a meaningful typology can be found. The first research question is therefore whether it is possible to determine a meaningful typology. If that is the case, the subsequent question is how the different establishment types that are identified can be characterised.

Which data were used?

This analysis is based on data from all establishments from the transportation and storage sector from EU-27 Member States that participated in the ESENER 2019 survey. This subsample includes 1,731 observations.

Which variables were examined?

The ESENER 2019 dataset includes questions that cover many different OSH management practices. As discussed in Annex 2, we used 38 of these variables to construct an indicator that represents the attention establishments have on OSH management practices. Our analysis to identify a typology on attention to OSH management practices is based on the same set of 38 variables. In some analyses, we added the OSH-MPI to this set of variables, to see if this would lead to another (and possibly more meaningful) typology (see Annex 2 for more details on this indicator).

Which clustering technique was used?

Different cluster methodologies are available:

- Hierarchical cluster: this method generates a series of models with cluster solutions ranging from one cluster (all cases in one cluster) to 1,240 clusters[33] (where each case is an individual cluster). In case of large datasets, this methodology requires a considerable amount of time. Hierarchical cluster analysis can handle nominal, ordinal and scale data; however, it is not recommended to mix different levels of measurement.
- K-means cluster: for this method the number of clusters has to be defined in advance (and preferably also an estimate of the average scores per cluster for each variable), after which the procedure quickly classifies all variables. This method is often combined with hierarchical cluster analysis: a hierarchical cluster analysis is performed to determine the number of clusters (and the average scores per cluster for each variable), after which K-means clustering can be applied to determine the final cluster solution.
- Two-step cluster analysis: this method identifies groupings by running pre-clustering first and then running hierarchical methods — in this respect, it can be seen as a combination of the previous two approaches. Two-step clustering can handle scale and ordinal data in the same model, and it has the option to automatically select the optimal number of clusters.
- Latent class analysis (LCA): this method does not assign each observation to a specific class or cluster, but determines the probability for an observation to belong to different classes or clusters. Similar to the above three methodologies, LCA results in a solution that distinguishes mutually exclusive and exhaustive clusters or latent classes. And similar to a two-step cluster

[33] This is the number of establishments that provided a valid response to each of the 38 OSH management practices considered.

analysis, it can deal with ordinal variables (and also with nominal variables). What sets it apart is that the exact class membership is unknown for each observation. Instead, each LCA solution involves a set of inclusion probabilities (how likely it is that each observation will be in any of the latent classes).

The available indicators for the different OSH management practices are a combination of a scale variable (OSH-MPI), an ordinal variable (Q357) and dichotomous (dummy) variables (all other variables). Hierarchical cluster analysis is not a suitable method for this combination of variables (which also applies to K-means clustering, if only because it requires a hierarchical cluster analysis first to determine an initial cluster solution). This leaves two-step cluster analysis and LCA as two feasible clustering techniques. We have chosen to apply a two-step cluster analysis rather than an LCA, partly because a two-step cluster analysis results in a typology where every establishment can be assigned to a specific type or cluster (which makes it easier to characterise the resulting types in terms of variables not used in the cluster analysis, such as country or establishment size class).

Running a two-step cluster analysis

The outcomes of a two-step cluster analysis may be influenced by the way in which the data are ordered. To increase the quality of the outcomes, the observations in the dataset have therefore been ordered randomly before applying the two-step cluster algorithm.

To identify possible clusters, the cluster analysis was performed on unweighted data. The cluster analysis was restricted to establishments that provided a valid response to each of the 38 OSH management practices considered, which resulted in a sample of 1,240 establishments.

The number of clusters distinguished was based on the following three available indicators:

- Silhouette measure of cohesion and separation.
- An information criterion (IC), which is either the Bayesian information criterion (BIC) or the Akaike information criterion (AIC). Both have been used to check if the number of clusters depends on the choice for a specific IC (which has not been the case).
- The distance measure (since most of the variables involved are either ordinal or dichotomous, the only valid distance measure is the log likelihood).

The silhouette measure of cohesion and separation can be used as an indicator for the goodness of fit of the chosen solution. This indicator ranges from -1 to +1. Positive values indicate that the average distance between cases in a cluster is smaller than the average distance to cases in other clusters, and are thus desirable. According to Finch et al. (2015), there is no common understanding of how to interpret the values for this measure. Rather than using criteria based on theoretical arguments, criteria on when a silhouette is considered to be good enough are based on the experience of researchers in their own particular field. Finch et al. (2015) indicate 0.2 as a generally accepted criterion, meaning that if the silhouette measure is < 0.2, the quality of the average silhouette measure across the whole sample is considered poor; a silhouette measure between 0.2 and 0.5 indicates a fair solution and a silhouette measure exceeding 0.5 is a good solution. Van den Berge et al. (2017) are a bit more conservative and suggest a lower threshold of 0.25 for the silhouette measure. This is consistent with the two-step cluster algorithm in SPSS (the software that we have used for these analyses), which interprets a silhouette measure of 0.2 as a poor solution. The silhouette measure may increase with the number of clusters that are distinguished, so this measure cannot be used on its own to determine the optimal number of clusters.

The two-step procedure offers the possibility to automatically detect the optimal number of clusters. This is based on two criteria:

- an IC; and
- the distance measure.

The cluster procedure determines the value of the chosen IC for each potential number of clusters. Smaller values of the IC indicate better models, so, if a solution exists where the minimum value of the IC is reached for a limited number of clusters, this will be the optimal solution. However, there are clustering problems in which the IC will continue to decrease as the number of clusters increases, but where the improvement in the cluster solution (as measured by the change in the IC) is not worth the

increased complexity of the cluster model (as measured by the number of clusters). In such situations, the changes in IC and changes in the distance measure are evaluated to determine the 'best' cluster solution.

To determine the number of clusters of OSH management practices, the following procedure was applied:

1. Automatically select the optimal numbers of clusters, based on the IC and distance measure.
2. Determine the silhouette measure for this solution.
    - If this is 0.25 or higher (fair solution), consider this the final cluster solution.
    - If it is 0.20 or lower (a poor solution), consider the values for the IC.
        - If the IC continues to decrease if the number of clusters increases, then determine whether or not the silhouette measure increases (to levels > 0.20) if the number of clusters is manually increased. If this occurs for a reasonable number of clusters (say, no more than 12), consider this the final cluster solution. Otherwise, the conclusion should be that it is not possible to determine a meaningful clustering.
        - If the IC reaches a minimum value for this solution, conclude that it is not possible to come up with an acceptable clustering of the respondents.

Results: no meaningful cluster solution was found for all risks combined

This procedure did not find a meaningful cluster solution for the group of 38 variables on different OSH management practices.

When the two-step cluster procedure was set to automatically determine the optimal number of clusters, a two-cluster solution resulted. The silhouette measure for this solution was 0.2, which meant that the average distance between cases in a cluster was only slightly smaller than the average distance to cases in other clusters. Following Van den Berge et al. (2017), this is considered to be a poor solution. Manually increasing the number of clusters did not result in an increase of the silhouette measure.

To test whether this result depended on the ordering of the data, we performed the whole procedure of randomly ordering the data and performing a cluster analysis five times. Each analysis resulted in a silhouette measure of 0.2. We then added the OSH-MPI variable to see if this would result in a solution with a higher silhouette measure. This was however not the case.

The conclusion is therefore that it is not possible to come up with a meaningful clustering of EU-27 establishments from the transportation and storage sector regarding this set of OSH management practices.

The European Agency for Safety and Health at Work (EU-OSHA) contributes to making Europe a safer, healthier and more productive place to work. The Agency researches, develops, and distributes reliable, balanced, and impartial safety and health information and organises pan-European awareness raising campaigns. Set up by the European Union in 1994 and based in Bilbao, Spain, the Agency brings together representatives from the European Commission, Member State governments, employers' and workers' organisations, as well as leading experts in each of the EU Member States and beyond.

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