



SAFE-D

STRENGTHENING WORKPLACE SAFETY THROUGH APPLIED
ERGONOMICS IN THE DIGITAL AGE

SAFE-D Need Analysis Report



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Safe D: Strengthening Workplace Safety
Through Applied Ergonomics in The Digital
Age 2023-2-HU01-KA210-ADU-000171333

SAFE-D Need Analysis Report

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1 Introduction

The SAFE-D project, *Strengthening Workplace Safety through Applied Ergonomics in the Digital Age*, was implemented as an Erasmus+ partnership project by organisations from Hungary, Bulgaria and Türkiye. The project addressed a practical challenge that is common in many small and medium-sized enterprises: ergonomic risks are present in everyday work, but they are often managed informally, without systematic analysis, structured learning or continuous workplace improvement.

The project was based on the idea that ergonomics can contribute not only to accident prevention and legal compliance, but also to healthier work, better work organisation, employee participation and sustainable organisational performance. In small enterprises, access to ergonomic expertise, training opportunities and structured improvement methods is often limited. Therefore, SAFE-D focused on developing a practical training and support approach that helps organisations recognise ergonomic problems, understand their causes and implement feasible improvements in real workplace settings.

Training has a central role in the SAFE-D approach. It is not understood as a one-way transfer of theoretical knowledge, but as a guided learning and intervention process. Participants are encouraged to observe work situations, identify risks, discuss problems with employees, define realistic goals, plan improvements, test solutions and reflect on the results. In this sense, the training process supports both competence development and practical workplace change.

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The project results are presented in four complementary documents: the **Need Analysis Report**, the **Curriculum and Intervention Guidebook**, the **Tool Box** and the **Trainers Manual**. Together, these materials provide a training-based framework for applying ergonomics in small and medium-sized enterprises.

1.1 Purpose and Scope of the Need Analysis Report

This report presents the empirical and contextual basis of the SAFE-D project. It summarises the needs analysis conducted in the partner countries and identifies the main ergonomic, organisational and training-related challenges that informed the development of the SAFE-D training and intervention materials.

The report combines desk research, country-level analysis, enterprise visits, questionnaires and qualitative inputs. Its purpose is to explain why a practical, workplace-oriented and SME-sensitive ergonomics training approach was needed, and how the findings supported the development of the Curriculum and Intervention Guidebook, the Tool Box and the Trainers Manual.

1.2 Methodological Approach

The needs analysis was implemented as the first analytical phase of the SAFE-D project. Its purpose was to identify the ergonomic, organisational and training-related needs of small and

medium-sized enterprises in the partner countries and to provide an evidence base for the development of the SAFE-D training and intervention materials.

The analysis combined several complementary sources of information. The project partners reviewed national and sectoral background information, relevant scientific and professional sources, European and international occupational safety and ergonomics materials, and selected standards related to workplace safety, ergonomics and human-centred work design. This desk-based analysis was complemented by enterprise visits, workplace observations, questionnaires and qualitative inputs from stakeholders.

The empirical work focused on small enterprises and the groups connected to workplace safety and adult learning, including employees, managers, adult learners, trainers and organisations involved in occupational safety, ergonomics or workplace education. The aim was not to conduct official inspections, but to understand real workplace conditions, recurring ergonomic problems, training gaps and practical barriers to implementation.

The findings from the different sources were compared and synthesised in order to identify common patterns across Bulgaria, Hungary and Türkiye, while also recognising relevant country-specific characteristics. This multi-source approach helped ensure that the report reflects both formal regulatory and institutional conditions and the practical realities of small enterprises.

1.3 Key Findings

The needs analysis showed that ergonomics and occupational health and safety are supported by established legal, institutional and educational frameworks in all partner countries. However, these frameworks do not automatically lead to systematic ergonomic practice in small enterprises.

The main challenge identified by the project is not the complete absence of knowledge or regulation. Rather, the findings point to an implementation gap. Ergonomic risks are often present in everyday work, but they are not always recognised, prioritised or addressed through structured improvement processes. In many SMEs, ergonomics remains embedded in general occupational safety compliance and is rarely used as a practical tool for improving work organisation, workstation design, task allocation or employee well-being.

The analysis also confirmed that training has an important intervention role. Workers and managers need practical, accessible and workplace-oriented learning materials that help them recognise ergonomic risks, understand their causes and apply feasible improvements. These findings provided the basis for the SAFE-D Curriculum and Intervention Guidebook, the Tool Box and the Trainers Manual.

1.3.1 Overall picture from the country analyses

The analysis of the country reports shows that, in all partner countries, ergonomics and occupational health and safety are supported by established legal and institutional frameworks. Public authorities, inspection bodies, occupational health services, and professional organisations are present and operate within clearly defined responsibilities. Regulations addressing workplace safety and major ergonomic risk factors are in place and largely aligned with European requirements.

At the same time, the findings indicate that these frameworks do not automatically lead to effective ergonomic practice in small enterprises. In everyday work, ergonomics is often treated as a secondary aspect of general occupational safety compliance, rather than as a practical tool for improving work organisation, workplaces, and daily work routines. This gap between formal structures and real practice is a recurring pattern across the partner countries.

1.3.2 Institutional background

In all partner countries, the institutional responsibility for ergonomics is embedded within the broader occupational health and safety system. Governmental bodies define the legal framework and carry out inspections, while occupational health services and professional organisations support implementation at workplace level.

For small enterprises, institutional support is mainly experienced through external services and mandatory procedures. While this system helps ensure compliance with minimum legal requirements, it offers limited support for proactive, workplace-specific ergonomic improvements. Access to applied ergonomics expertise is often restricted, particularly in enterprises with limited financial and organisational resources.

1.3.3 Key public regulations

The partner countries have comprehensive regulations covering workplace safety and ergonomics, including manual handling, display screen work, physical agents, work equipment, and general workplace conditions. These regulations are primarily based on European directives and international standards and provide a solid legal foundation for preventing ergonomic risks.

However, the analysis shows that regulations are usually applied in a formal and document-driven manner. In small enterprises, compliance tends to focus on meeting inspection and documentation requirements, while the practical meaning of ergonomic principles is less visible in everyday work processes and decision-making.

1.3.4 Educational and training capacity

All partner countries have established education and training systems in occupational health and safety, including higher education programmes, professional training, and legally required workplace instruction. These systems ensure that basic occupational safety knowledge is widely available.

In contrast, practical ergonomics training is less clearly defined and less accessible for small enterprises. Ergonomics is often included as a minor element within broader safety or technical training, rather than addressed as a practical competence linked to real work situations. As a result, many workers and managers lack the skills needed to recognise ergonomic risks and apply simple, low-cost improvements in daily practice.

1.3.5 Implications for the needs analysis

The key findings show that the main challenges related to ergonomics in small enterprises are not caused by missing regulations or a lack of formal structures. Instead, they are linked to limited practical knowledge, habits, and everyday work routines. This confirms the need for training approaches that focus on applied ergonomics, real workplace situations, and solutions that are feasible for small enterprises.

These conclusions provide a clear basis for the development of a targeted, practice-oriented ergonomics curriculum and supporting materials within the SAFE-D project.

2 Overview of Ergonomic Standards and Their Practical Relevance

Ergonomic standards provide a structured framework for translating human factors knowledge into practical requirements for the design of work systems, machinery, workplaces, and organisational processes. Rather than prescribing fixed technical solutions, most ergonomic standards define **principles, methods, and evaluation approaches** that support adaptation to human capabilities and limitations. Their overarching aim is to improve safety, health, comfort, and performance, while reducing the risk of work-related injuries and long-term health effects.

At international and European level, ergonomics standards form a **coherent but diverse system**, covering general principles, physical workload, human–machine interaction, environmental conditions, and organisational aspects. In practice, these standards are closely interconnected and often applied together with machinery safety and occupational safety management standards.

General ergonomics principles

General ergonomics principles are defined in standards that establish the conceptual foundations of human-centred design, such as **ISO 26800** and **ISO 6385**. These standards describe ergonomics as a systems-oriented discipline, emphasising the interaction between humans, tasks, tools, environments, and organisations. They promote early integration of ergonomic considerations into design and decision-making processes and highlight the importance of considering physical, cognitive, and organisational factors simultaneously.

These standards are intentionally generic and do not target specific industries. Their role is to provide a common framework that supports consistent application of ergonomics across different contexts, including manufacturing, services, and digital work environments.

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Anthropometry, biomechanics, and physical workload

A major group of ergonomics standards focuses on **anthropometry and biomechanics**, providing methods for assessing physical workload, postures, forces, and movements. Standards such as **ISO 7250** define human body dimensions for design purposes, while others address working postures (**ISO 11226**) and manual handling activities (**ISO 11228-1, ISO 11228-2, ISO 11228-3**).

These standards are particularly relevant for identifying and preventing musculoskeletal risks associated with lifting, carrying, pushing, pulling, repetitive tasks, and prolonged static postures. They offer structured assessment methods and reference values that support ergonomic risk assessment and workplace redesign. For SMEs, where manual work is often prevalent, these standards provide an important methodological basis for improving working conditions without complex technical investments.

Ergonomics in machinery design

Ergonomics plays a critical role in machinery safety, where human interaction with machines must be considered alongside technical protective measures. Ergonomic requirements are embedded in machinery-related standards, most notably in **EN ISO 12100**, which establishes general principles for risk assessment and risk reduction, including risks arising from human–machine interaction.

More specific ergonomics-related machinery standards address the design of controls, displays, and interfaces, such as the **EN 894 series**, which focuses on the ergonomic requirements for the design and layout of control actuators and displays. These standards aim to reduce the likelihood of operating errors, improve usability, and support safe machine operation during normal use, maintenance, and emergency situations.

Rather than prescribing detailed machine designs, these standards emphasise clarity, accessibility, visibility, and logical arrangement, recognising that poor interface design can undermine even technically well-protected machinery.

Human–system interaction and digital ergonomics

With the increasing use of digital systems, ergonomics standards addressing **human–system interaction** have gained importance. The **ISO 9241 series** provides guidance on software ergonomics, usability, and interaction design, covering aspects such as interface layout, information presentation, user control, and accessibility.

These standards support the design of systems that align with human cognitive processes, reduce mental workload, and minimise the risk of errors. Although often associated with complex digital systems, their principles are equally relevant for simpler applications commonly found in SMEs, such as machine control panels, monitoring systems, and administrative software tools.

Ergonomics of the physical work environment

Another important group of standards addresses the **physical work environment**, including thermal conditions, lighting, noise, vibration, and surface temperatures. Examples include standards related to thermal environments (**ISO 7730, ISO 7243**), visual ergonomics and lighting, and exposure to noise and vibration.

These standards provide methods for assessing environmental conditions and evaluating their impact on comfort, performance, and health. They highlight the interaction between environmental factors and task demands and emphasise the need for context-specific assessment rather than uniform limit values.

Ergonomics and management systems

Ergonomic principles are also integrated into **occupational health and safety management systems**, most notably through **ISO 45001** and related documents addressing psychosocial risks and work organisation. In this context, ergonomics supports systematic hazard identification, risk assessment, and continuous improvement processes.

Management system standards do not require direct application of individual ergonomics standards, but they rely on ergonomic thinking to ensure that physical and psychosocial workload factors are recognised and addressed. This approach is particularly relevant for SMEs, where structured management practices can support preventive action even with limited technical resources.

Practical challenges in applying ergonomic standards

Despite their broad scope and potential benefits, ergonomic standards are **not widely used in everyday enterprise practice**, especially among SMEs. Several recurring challenges can be identified:

- standards are often available only in English and use technical language,
- their structure and level of detail can be difficult to interpret without specialist knowledge,
- SMEs tend to prioritise legally mandatory requirements over voluntary standards,
- ergonomics is frequently perceived as an abstract or secondary issue.

As a result, standards are mainly applied by specialists involved in design, certification, or compliance, while their practical value for daily work organisation remains underutilised.

Relevance for the SAFE-D project

The analysis of ergonomic standards highlights a clear gap between **formal standardization** and **practical application**. While comprehensive and scientifically grounded standards exist, they are rarely translated into accessible guidance that SMEs can use directly.

This gap underlines the importance of the SAFE-D approach, which aims to convert standard-based ergonomic knowledge into **practical, understandable, and context-sensitive tools**. By focusing on real workplace situations, enterprise visits, and applied training materials, the project supports SMEs in benefiting from ergonomics standards without requiring direct engagement with complex technical documents.

In this sense, ergonomic standards provide the conceptual and methodological foundation, Across all partner countries, ergonomics standardization is well aligned with international frameworks but remains difficult to apply in everyday enterprise practice. Limited national adaptation, language barriers, and the technical nature of standards restrict their effective use, particularly among SMEs. These shared conditions underline the importance of translating standard-based ergonomics principles into clear, accessible, and practice-oriented guidance, which can bridge the gap between formal standards and real workplace needs — a central objective of the SAFE-D project.

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3 Evidence Base, Supporting Sources and Analytical Outputs

This section summarises the main analytical outputs, supporting sources and preparatory documents that informed the SAFE-D needs analysis.

3.1 O1.6. Enterprise Visiting Reports

The enterprise visiting reports documented workplace observations related to ergonomics, occupational health and safety, workstation design, work environments, employee work habits and potential areas for improvement.

3.2 Guides for Enterprise Observation Visit on Work Health and Safety

The items in this list have been prepared to assist in the explanatory observation of occupational health and safety issues during the visit to five workplaces within the scope of the project. The observer can evaluate the characteristics of the business with his/her own experience and make additional observations on some issues, ask short questions to the business authority, or may not need to ask questions or make

observations on some issues. Please, explain to the owner/manager of the enterprise that this is not an official audit or inspection.

3.3 O1.9 Ergonomic Problems Analysis Report

The ergonomic problems of the project target groups and the challenges faced by enterprises were analysed based on questionnaires, enterprise visit reports and supporting sources. The analysis followed these steps:

- Data analysis and review
- Survey preparation and execution
- Survey results analysis,
- Synthesis and report preparation
- Validation of the results

The ergonomic problems identified during the needs analysis differ in terms of their underlying causes and possible solutions. Some issues, such as outdated machinery or major workplace redesign, primarily require technical investment or regulatory intervention. However, a substantial proportion of identified ergonomic risks are linked to knowledge gaps, habits, and organisational routines.

These include improper manual handling techniques, suboptimal workstation adjustment, ineffective use of existing equipment, poor task organisation, and limited awareness of cumulative workload effects. Such problems are not caused by the absence of rules, but by insufficient applied knowledge and lack of practical guidance.

From an intervention perspective, these issues are well suited to training-based solutions. Targeted adult education can improve risk recognition, support safer work practices, and enable low-cost improvements that are feasible for small enterprises. This confirms that training is a justified and effective core intervention within the SAFE-D project.

O1.10 Training Needs Analysis Report

The training needs analysis used a systematic process to identify the training requirements of workers, managers, adult learners and other target groups involved in the SAFE-D project. It examined the gap between current ergonomic awareness and the practical competences needed to recognise, assess and manage ergonomic risks in small enterprises.

The analysis considered organisational goals, workplace observations, questionnaire results, enterprise visit reports and qualitative feedback from stakeholders. It focused on identifying the knowledge, skills and practical support needed for applying ergonomics in everyday work situations.

The training needs analysis confirmed that future SAFE-D training materials should be practical, workplace-oriented and proportionate to the capacities of SMEs. The results supported the development of the Curriculum and Intervention Guidebook, the Tool Box and the Trainers Manual.

3.4 Results of the Training Needs Analysis

The Training Needs Analysis identified consistent gaps between current practices and desired performance levels in small enterprises. These gaps are primarily related to the recognition, assessment, and practical management of ergonomic risks.

The most relevant training needs identified are as follows:

- Limited ability of workers and managers to recognise ergonomic risk factors in everyday tasks, particularly related to manual handling, working postures, repetitive movements, and human-machine interaction.
- Insufficient practical knowledge of simple ergonomic assessment methods that can be applied without specialised equipment.
- Weak integration of ergonomics into daily work organisation, maintenance activities, and operational decision-making.
- Limited awareness of how digital tools and basic data collection can support ergonomic improvements in small enterprises.

These needs are relevant across target groups, although the emphasis differs. Workers primarily require practical skills and awareness, managers require decision-support knowledge and prioritisation skills, while adult educators and trainers require structured, practice-oriented teaching materials. Unemployed adults benefit from basic ergonomic literacy that supports informed job choices and employability.

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4 Ergonomics & Work Safety Country Report - Bulgaria

4.1 Institutional background

In Bulgaria, occupational health and safety (OHS) is supported by a structured institutional system involving governmental authorities, enforcement bodies, social partners, professional organisations, and legally mandated service providers. Together, these actors contribute to the prevention of workplace accidents, the protection of workers' health, and the promotion of safe and ergonomic working conditions across sectors.

4.1.1 Governmental and Regulatory Bodies

- **Ministry of Labour and Social Policy**

(Министерство на труда и социалната политика – МТСП)

The Ministry of Labour and Social Policy is the central governmental authority responsible for OHS policy development and coordination. It prepares national strategies and legislation, most notably the **Health and Safety at Work Act** (*Закон за здравословни и безопасни условия на труд*), which forms the legal foundation of OHS regulation in Bulgaria. The Ministry also plays a coordinating role in tripartite social dialogue on working conditions.

- **General Labour Inspectorate Executive Agency**

(Изпълнителна агенция „Главна инспекция по труда“ – ИА ГИТ)

The General Labour Inspectorate is the main enforcement authority in the OHS system. It carries out workplace inspections, monitors compliance with labour and safety legislation, investigates

serious accidents, and applies enforcement measures. Its activities strongly influence enterprise-level compliance, particularly in high-risk sectors.

- **National Social Security Institute**

(Национален осигурителен институт – НОИ)

The National Social Security Institute plays a key analytical and administrative role by registering occupational accidents and occupational diseases. It manages compensation mechanisms and produces statistical data that support national risk assessment, policy evaluation, and prevention planning. Although it does not enforce OHS rules, its data are essential for evidence-based decision-making.

- **National Center for Public Health and Analyses**

(Национален център по общественно здраве и анализи – НЦОЗА)

Operating under the Ministry of Health, the National Center for Public Health and Analyses contributes to occupational health through research, monitoring, and methodological guidance. Its work covers occupational diseases and physical risk factors such as noise, vibration, lighting, and microclimate, supporting the health-oriented dimension of workplace safety.

4.1.2 Working Conditions Fund (Фонд „Условия на труд“ – ФУТ)

The Working Conditions Fund is a specialized financial instrument operating under the Ministry of Labour and Social Policy. It plays a unique role in the Bulgarian OHS landscape by providing co-financing for projects specifically aimed at:

- **Improving Physical Working Conditions:** Funding for the reconstruction or modernization of workspaces.
- **Ergonomic Upgrades:** Supporting the implementation of new technologies and equipment designed to reduce physical strain and musculoskeletal risks.
- **Risk Mitigation:** Financing measures to neutralize harmful factors like noise, vibration, and poor air quality.
- **Education and Awareness:** Funding training programs for OHS specialists and members of Working Conditions Committees within enterprises.

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4.1.3 Trade Unions and Employee Protection

- **Confederation of Independent Trade Unions in Bulgaria**

(Конфедерация на независимите синдикати в България – КНСБ)

KNSB is the largest trade union confederation in Bulgaria. It actively advocates for safe and healthy working conditions through collective bargaining, policy dialogue, and worker representation. Its activities are supported by a dedicated research and training structure, the **Institute for Social and Trade Union Research, Education and Training** (*Институт за социални и синдикални изследвания и обучение – ИССИ*).

- **Confederation of Labour “Podkrepa”**

(Конфедерация на труда „Подкрепа“)

Podkrepa is another major national trade union organisation. It represents workers’ interests in

matters related to working conditions, occupational risks, and safety policies, and provides legal and advisory support in cases involving workplace health and safety.

4.1.4 Employer Organizations and Business Support Structures

- **Bulgarian Industrial Association**

(Българска стопанска камара – БСК)

The Bulgarian Industrial Association represents employers from various sectors. It supports enterprises by providing guidance on regulatory compliance, including OHS requirements, and by integrating workplace safety considerations into broader industrial and economic development initiatives.

- **Bulgarian Chamber of Commerce and Industry**

(Българска търговско-промишлена палата – БТПП)

The Bulgarian Chamber of Commerce and Industry supports businesses through training, information services, and consultancy. Its activities include awareness-raising and capacity-building initiatives related to occupational safety, health, and compliance with national and international standards, particularly for small and medium-sized enterprises.

4.1.5 Professional, Ergonomic, and Expert Organizations

- **Bulgarian Occupational Health and Safety Association**

(Българска асоциация по безопасност и здраве при работа – БАБЗР)

This professional association brings together OHS specialists and practitioners. It focuses on training, professional exchange, and the dissemination of good practices in workplace safety and health. Its role is primarily educational and professional rather than regulatory.

- **Bulgarian Ergonomics Society**

(Българско дружество по ергономия)

The Bulgarian Ergonomics Society specifically promotes ergonomics and human-centred design. It addresses the relationship between people and their work environment, with a focus on preventing musculoskeletal disorders, improving usability, and supporting productivity through ergonomic workplace design. Its contribution is particularly relevant in research, education, and expert-level practice.

4.1.6 Institutions Supporting Labour Relations and Workplace Dialogue

- **National Institute for Conciliation and Arbitration**

(Национален институт за помирение и арбитраж – НИПА)

The National Institute for Conciliation and Arbitration supports the resolution of collective labour disputes through conciliation and arbitration procedures. While it is not an OHS authority, it becomes relevant when disputes involve working conditions, workload, or safety-related issues, thus indirectly influencing OHS outcomes.

4.1.7 Occupational Health Services

- **Occupational Health Services**

(Служби по трудова медицина – СТМ)

Occupational Health Services are legally mandated entities that every employer must contract. These services perform workplace risk assessments, including ergonomic risk evaluation, health surveillance of employees, and preventive advisory activities. In practice, they play a central

operational role in translating legal OHS requirements into workplace-level actions, particularly in SMEs.

4.2 Key public regulations

4.2.1 Framework legislation

- **Labour Code of the Republic of Bulgaria**

(Кодекс на труда)

The fundamental law governing labour relations, including general employer and employee duties related to occupational health and safety.

- **Health and Safety at Work Act**

(Закон за здравословни и безопасни условия на труд)

The primary national OHS act, defining general principles, employer obligations, risk prevention, and the institutional framework for occupational health and safety.

4.2.2 Workplace requirements and risk assessment

- **Ordinance No. 7 of 1999 on the minimum requirements for health and safety at workplaces and the use of work equipment**

(Наредба № 7 от 1999 г. за минималните изисквания за здравословни и безопасни условия на труд на работните места и при използване на работното оборудване)

Establishes minimum workplace requirements and rules for the safe use of work equipment.

(This ordinance replaces the need for separate “equipment” and “workplace” decrees in practice.)

- **Ordinance No. RD-07-2 / RD-07-3 on the conditions and procedure for carrying out risk assessment**

(Наредба № РД-07-2 / РД-07-3 за условията и реда за извършване на оценка на риска)

Regulates the methodology and documentation of workplace risk assessments.

- **Ordinance on the minimum requirements for the safety and health of workers during manual handling of loads**

(Наредба за минималните изисквания за здравословни и безопасни условия на труд при ръчно пренасяне на тежести)

Regulates the prevention of musculoskeletal disorders related to lifting, carrying, pushing, and pulling.

Relevance: core ergonomic regulation, especially important for SMEs and physically demanding work.

- **Ordinance on minimum OHS requirements for work with display screen equipment**

(Наредба за минималните изисквания за здравословни и безопасни условия на труд при работа с видеодисплеи)

Covers workstation design, work organisation, breaks, visual strain, and ergonomic layout.

Relevance: key legal basis for office ergonomics and digital work.

- **Ordinance on the protection of workers from risks related to exposure to noise**

(Наредба за защита на работещите от рискове, свързани с експозиция на шум)

- **Ordinance on the protection of workers from risks related to exposure to vibration**
(Наредба за защита на работещите от рискове, свързани с експозиция на вибрации)
- **Ordinance on working time, rest periods, and breaks**
(Наредба за работното време, почивките и отпуските)
While not an OHS act in a narrow sense, it directly affects workload, fatigue, recovery, and psychosocial risk factors.
Relevance: organisational ergonomics and prevention of overload.

4.2.3 Occupational health services and control

- **Ordinance No. 3 on occupational health services**
(Наредба № 3 за службите по трудова медицина)
Defines the organisation, tasks, and responsibilities of occupational health services supporting employers and workers.
- **Ordinance No. 5 on occupational health and safety committees and groups**
(Наредба № 5 за комитетите и групите по условия на труд)
Regulates worker participation and internal consultation mechanisms related to workplace health and safety.
(Note: this is **not** a “periodic inspection” ordinance, which was a misinterpretation in the original list.)

4.2.4 Sector-specific regulations

- **Ordinance No. 2 / No. 4 on minimum OHS requirements for construction and assembly works**
(Наредба № 2 / № 4 за минималните изисквания за здравословни и безопасни условия на труд при строителни и монтажни работи)
Specifies safety and health requirements for construction sites and construction processes.

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4.2.5 Personal protective equipment and hazardous agents

- **Ordinance No. 3 / No. 7 on personal protective equipment (PPE)**
(Наредба за минималните изисквания за използване на лични предпазни средства)
Establishes employer obligations for the selection, provision, and use of PPE.
(The original “Ordinance No. 8” reference was too generic and not robust.)
- **Ordinance on the protection of workers from risks related to exposure to chemical agents at work**
(Наредба за защита на работещите от рискове, свързани с експозиция на химични агенти при работа)
Regulates chemical risk assessment, exposure limits, and preventive measures.

4.2.6 Worker information, training, and participation

- **Ordinance on training and instruction of workers and employees on OHS**
(Наредба за обучението и инструктажа по безопасност и здраве при работа)
Regulates initial, periodic, and extraordinary OHS training and instruction.
Relevance: essential for translating legal and ergonomic requirements into practice.

4.3 Educational and training capacity

In Bulgaria, education and training in occupational health and safety (OHS) and ergonomics is delivered through a combination of higher education programmes, mandatory employer-based instruction required by law, occupational health services (labour medicine services), social partner training activities, and a growing commercial market of short courses. Overall capacity is substantial in compliance-oriented OHS, while ergonomics appears more frequently as an embedded topic rather than a stand-alone qualification route.

4.3.1 Higher education capacity

Bulgaria has identifiable higher education pathways linked to occupational safety engineering and technical safety. A clear example is the **Technical University of Sofia**, which offers a Master's programme titled "**Technical Safety of Work Equipment**", explicitly covering risk analysis and assessment of work equipment, occupational safety management, and compliance with technical legislation and conformity assessment.

Beyond this, OHS-focused master-level education is also visible through programmes marketed internationally (e.g., "Occupational Safety Engineer" master-level track at the Technical University of Gabrovo), indicating an academic capacity for formal OHS qualification routes.

Ergonomics-related research and teaching capacity exists, but it is often connected to broader engineering and design fields. For example, the **Technical University of Varna** has been presented in international cooperation contexts as a centre for research in ergonomics and human factors, including cognitive ergonomics and design-related applications.

4.3.2 Legal obligations for worker OHS instruction and mandatory training

Bulgarian regulation places strong emphasis on **employer-delivered instruction and training**. The conditions and procedures for training and instruction are regulated by **Ordinance No. RD-07-2 (16 December 2009)**, which sets the framework for how training and instruction must be conducted for workers and employees.

In practice, this covers multiple types of instruction (commonly described as initial, workplace/on-the-job, periodic, and extraordinary forms, depending on the work and risk profile), ensuring that training is not a one-off event but a continuous compliance duty.

This legal design creates a stable baseline training demand in enterprises and supports a wide training-provider market, because many employers rely on external support to organise, document, and update OHS instruction.

4.3.3 Training and role of Occupational Health Services

A distinctive feature of the Bulgarian system is the legally embedded role of **Labour Medicine Services** (occupational medicine services). Employers are expected to have an agreement with a labour medicine service as part of their general OHS obligations, alongside risk assessment and preventive measures.

These services contribute not only to health surveillance and exposure control but also to OHS-related training delivery and practical guidance in enterprises. In the market, many occupational medicine providers explicitly offer OHS training packages for employers, managers, and designated persons responsible for briefings and instruction.

4.3.4 Worker participation structures and training (including representatives/committees)

Worker participation is institutionalised through workplace structures (committees/groups on working conditions), and training obligations exist for such roles. EU-OSHA's OSHwiki materials on worker participation in Bulgaria describe that, after initial training, **members must complete a minimum of six hours of training annually**, aimed at updating knowledge and developing competence.

This requirement is important for SAFE-D because it creates a formal channel through which ergonomics and MSD prevention content could be integrated into routine annual updates.

4.3.5 Trade union OSH training and awareness activities

Trade unions in Bulgaria are active not only in advocacy but also in **training and advisory work** related to safe and healthy working conditions. For example, the **Confederation of Independent Trade Unions in Bulgaria (KNSB/CITUB)** explicitly lists OSH training among its activities, including consultations and dissemination of good practices, with training aimed at reducing workplace risks.

This indicates an existing social-partner capacity for delivering or supporting OHS training, which can be relevant for dissemination channels, especially for reaching workers and workplaces with limited internal resources.

4.3.6 Ergonomics-specific capacity and market-based short courses

Ergonomics in Bulgaria is present as a professional and academic field, but it is less standardised as a single national training pathway. A relevant capacity-building actor is the **Bulgarian Association of Ergonomics and Human Factors**, which explicitly states objectives linked to improving specialist training and organising courses and seminars.

In parallel, commercial providers include ergonomics content mainly within "office safety", "workplace ergonomics", or "risk assessment" packages rather than standalone ergonomics certification programmes. This structure aligns with the compliance-driven demand created by employer obligations and periodic instruction requirements.

4.3.7 Practical implications for SAFE-D

In summary, Bulgaria's educational and training capacity is strong in:

- compliance-oriented OHS education and technical safety (including university programmes),
- legally required instruction and periodic training frameworks under Ordinance RD-07-2,
- enterprise-level implementation supported by labour medicine services,
- worker participation training (including annual update expectations),
- and trade union training and awareness activities.

At the same time, ergonomics training is often integrated into broader OHS and design education rather than offered as a dedicated pathway. This creates an opportunity for SAFE-D to provide structured, practical ergonomics modules that can be embedded into existing mandatory training cycles and stakeholder training channels.

4.4 Standardization

In Bulgaria, ergonomics-related standardization follows a similar pattern, with a strong reliance on European and international standards adopted at national level. Independent national ergonomics standards are limited, and ergonomics is typically addressed through occupational safety legislation, machinery safety standards, and broader technical regulations.

Standardization activities related to ergonomics are largely concentrated within occupational safety and health frameworks, where ergonomics is considered part of risk prevention and workplace design. Active national involvement in the development of international ergonomics standards is relatively low, and the application of standards is primarily driven by regulatory compliance rather than proactive workplace improvement.

As in the other partner countries, SMEs face challenges in accessing and applying ergonomics standards due to language barriers, cost, and limited awareness. In practice, ergonomics is often addressed indirectly, through inspections, safety documentation, or externally imposed requirements, rather than through systematic use of standards as design or improvement tools.

In Bulgaria, ergonomics-related standardization activities are coordinated by the Bulgarian Institute for Standardization through Technical Committee TK-59 “Ergonomics”, which provides access to relevant standards and documentation. The committee is currently working on strengthening national capacity, including the approval of language translation experts to support the wider accessibility of ergonomics standards. Academic experts, including representatives from Ruse University, have expressed interest in supporting future initiatives and potential SAFE-D follow-up activities related to ergonomics standardization and knowledge transfer.

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4.5 Evidence Base and Supporting Sources

Since 2000, Bulgarian ergonomics and occupational health and safety (OSH) research has been produced through a combination of (i) **public institutions with national scope**, (ii) **university-based research teams**, and (iii) **professional associations and practice-oriented networks**. The overall picture is an active but distributed research ecosystem, where occupational health (public health and occupational medicine) has stronger institutional anchoring than ergonomics, while ergonomics is increasingly visible through academic networks and professional organisation-building.

A central national-level coordination mechanism is Bulgaria’s participation in the European Agency for Safety and Health at Work (EU-OSHA) through its **national focal point situated in the Ministry of Labour and Social Policy**. Through this structure, Bulgarian experts contribute to European thematic priorities and knowledge dissemination and support national-level adaptation of EU-OSHA campaigns and materials, including topics connected to digitalisation, psychosocial risks, and emerging prevention challenges.

From the public-health and occupational medicine perspective, the **National Center for Public Health and Analyses (NCPHA)** provides a stable institutional base for occupational health knowledge generation and dissemination. NCPHA operates official publication channels that include occupational medicine among their covered topics (for example, the **Bulgarian Journal of Public Health**, which explicitly lists occupational medicine within its scope). This creates a national platform for publishing and communicating occupational health evidence relevant to working conditions, prevention, and risk factors.

Academic publication activity in occupational health and safety is also visible through Bulgarian medical and interdisciplinary journals and conference outputs after 2000. For example, Bulgarian-authored papers on OSH training effectiveness and workplace health topics are present in peer-reviewed journal environments, reflecting ongoing research engagement with workforce knowledge, preventive training, and applied occupational health questions. In parallel, Bulgarian researchers contribute to international occupational health platforms (e.g., congress proceedings and international journal supplements), which supports the international visibility of Bulgarian OSH research in specific thematic areas.

In ergonomics and human factors, Bulgaria's post-2000 development is increasingly supported by professional community structures. The **Bulgarian Association of Ergonomics and Human Factors (BAEHF)** is formally linked to the global ergonomics community through membership in the **International Ergonomics Association (IEA)**. This provides an organisational channel for professional exchange, dissemination, and alignment with international ergonomics priorities and terminology.

University-based capacity forms the second backbone of national research and publication activity. In technical education, OHS-related scientific work is linked to engineering disciplines and safety-oriented programmes. For example, the **Technical University of Sofia** maintains master-level education relevant to technical safety and work equipment safety, which typically supports applied research and publication activity in risk assessment, technical compliance, and prevention solutions connected to machinery and work systems. (Note: this source indicates national programme context; the degree-level example is a known and visible capacity in Bulgaria's technical universities, but programme-level research outputs vary by department and project.)

In ergonomics and human factors, the **Technical University of Varna** is presented in international cooperation contexts as a partner with research capacity in ergonomics and human factors, including cognitive ergonomics and design-linked applications. This indicates a recognisable academic anchor for ergonomics-related research and cooperation.

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A characteristic feature of the Bulgarian research ecosystem is that many OSH and ergonomics topics are **project-driven**, reflecting the practical, compliance-oriented environment of OSH implementation and the importance of applied outputs. This is also consistent with the broader national policy approach, where Bulgaria has periodically adopted national OSH programmes and strategies that include dissemination activities, events, and awareness-raising as part of strengthening OSH capacity.

5 Ergonomics & Work Safety Country Report - Hungary

5.1 Institutional background

In Hungary, the occupational health and safety (OHS) system is characterised by a **centralised regulatory framework**, a **clear separation between enforcement and health supervision**, and a **strong tradition of tripartite social dialogue**. Together, these elements support the prevention of work-related injuries and diseases and promote safer and more ergonomic working environments across sectors.

5.1.1 Governmental and Regulatory Bodies

- **Ministry of National Economy**
(*Nemzetgazdasági Minisztérium – NGM*)

The Ministry of National Economy is the central governmental authority responsible for labour policy, including occupational health and safety. It prepares OHS-related legislation, coordinates

national strategies, and represents Hungary in international and EU-level OHS cooperation. Within the ministry, the occupational safety portfolio is responsible for maintaining and developing the regulatory framework, most notably **Act XCIII of 1993 on Labour Safety** (*Munkavédelmi törvény*), which remains the cornerstone of Hungarian OHS regulation.

- **Occupational Safety and Health Authorities of the Government Offices**

(Fővárosi és Vármegyei Kormányhivatalok Munkavédelmi Hatóságai)

Enforcement of OHS legislation is carried out by the occupational safety authorities operating within the metropolitan and county government offices. These authorities perform workplace inspections, investigate serious and fatal accidents, and ensure compliance with safety, health, and ergonomics-related requirements. The former central labour inspectorate structure has been integrated into this decentralised administrative system, while its core enforcement functions have been retained.

- **National Center for Public Health and Pharmacy**

(Nemzeti Népegészségügyi és Gyógyszerészeti Központ – NNGYK)

The National Center for Public Health and Pharmacy is responsible for the public health dimension of occupational health. Its activities include occupational hygiene, chemical safety, and the assessment of physical risk factors such as noise, vibration, radiation, and microclimate. The institution also plays a role in the professional supervision of occupational health services and in the registration and evaluation of occupational diseases, ensuring a health-based perspective within the OHS system.

5.1.2 Tripartite Social Dialogue and Representation

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- **National Occupational Safety and Health Committee**

(Munkavédelmi Bizottság – MB)

The National Occupational Safety and Health Committee is the most important tripartite forum for OHS in Hungary. It brings together representatives of the government, employers, and employees to discuss strategic issues related to occupational safety and health. The committee reviews draft legislation, supports coordination between stakeholders, and contributes to decisions on the use of financial resources derived from occupational safety fines for prevention, research, and awareness-raising activities.

- **Hungarian Trade Union Confederation**

(Magyar Szakszervezeti Szövetség – MASZSZ)

MASZSZ is one of the largest national trade union confederations. It represents employees' interests in social dialogue and collective bargaining, including issues related to workplace safety, health protection, and ergonomics. The organisation maintains a network of safety representatives and experts who support workers at company and sectoral levels.

- **Democratic Confederation of Free Trade Unions**

(LIGA Szakszervezetek)

LIGA is another major trade union confederation active in the field of occupational safety and health. It provides legal assistance, training, and professional support to its members, with a particular focus on prevention, risk awareness, and the protection of workers' rights in relation to workplace hazards.

5.1.3 Employer and Industrial Organisations

- **Confederation of Hungarian Employers and Industrialists**
(*Munkaadók és Gyáriparosok Országos Szövetsége – MGYOSZ*)
MGYOSZ represents primarily large employers and industrial actors. Within its activities, occupational safety, health, and ergonomics are addressed as integral elements of sustainable industrial development, competitiveness, and corporate responsibility.
- **Hungarian Chamber of Commerce and Industry**
(*Magyar Kereskedelmi és Iparkamara – MKIK*)
The Hungarian Chamber of Commerce and Industry plays an important role in supporting small and medium-sized enterprises. It provides information, guidance, and training related to regulatory compliance, including occupational safety and health requirements, and promotes practical, cost-effective solutions for improving workplace safety and ergonomics.
- **National Federation of Building Contractors**
(*Építési Vállalkozók Országos Szakszövetsége – ÉVOSZ*)
ÉVOSZ is a sector-specific employer organisation representing the construction industry, one of the highest-risk sectors in Hungary. Occupational safety and health are core topics in its activities, including sectoral guidance, training initiatives, and the dissemination of good practices.

5.1.4 Professional and Ergonomic Organisations

- **Hungarian Ergonomics Society**
(*Magyar Ergonómiai Társaság – MET*)
The Hungarian Ergonomics Society is a key professional organisation dedicated to human-centred design and applied ergonomics. Its activities focus on adapting work systems to human capabilities and limitations, with the aim of preventing musculoskeletal disorders, reducing mental workload, and improving overall work performance.
- **Hungarian Chamber of Engineers – Occupational Safety Section**
(*Magyar Mérnöki Kamara – Munkabiztonsági Tagozat*)
This professional body represents certified occupational safety engineers. Its members are involved in technical safety design, complex risk assessments, and expert activities related to machinery safety, workplace design, and compliance with technical regulations.
- **Hungarian Society of Occupational Health Specialists**
(*Magyar Üzemegészségügyi Tudományos Társaság – MÜTT*)
MÜTT focuses on the medical and scientific aspects of occupational health. It supports professional development, research, and knowledge exchange among occupational physicians and contributes to the evidence-based practice of workplace health protection.

5.1.5 Operational Level: Occupational Health Services

- **Occupational Health Services**
(*Foglalkozás-egészségügyi Szolgálatok*)
Occupational health services are legally mandated and must be provided by all employers, either through internal units or external contracts. These services perform health surveillance, workplace hygiene inspections, and advisory activities, including ergonomic assessments at

workstation level. In practice, they represent the most direct interface between the OHS system and everyday workplace conditions, especially in small and medium-sized enterprises.

5.2 Key public regulations

5.2.1 Framework legislation

- **Act I of 2012 on the Labour Code**
(2012. évi I. törvény a munka törvénykönyvéről)
The fundamental law governing labour relations, including general employer and employee duties related to safe and healthy working conditions.
- **Act XCIII of 1993 on Labour Safety**
(1993. évi XCIII. törvény a munkavédelemről)
The primary national OHS act, defining prevention principles, employer obligations, risk assessment requirements, and the enforcement framework.

5.2.2 Workplace requirements and risk assessment

- **Joint Ministerial Decree 3/2002 (II. 8.) on minimum OHS requirements for workplaces**
(3/2002. (II. 8.) SZCSM–EüM együttes rendelet a munkahelyek munkavédelmi követelményeinek minimális szintjéről)
Establishes minimum workplace requirements, including space, ventilation, temperature, lighting, hygiene facilities, and general ergonomic conditions.
Relevance: core regulation for everyday workplace design, especially important for SMEs.
- **Ministerial Decree 25/1998 (XII. 27.) on manual handling minimum requirements**
(25/1998. (XII. 27.) EüM rendelet az elsősorban hátsérülések kockázatával járó kézi tehermozgatás minimális egészségi és biztonsági követelményeiről)
Regulates risk assessment and prevention related to manual handling and musculoskeletal disorders.
Relevance: key ergonomic regulation for physically demanding work.
- **Ministerial Decree 50/1999 (XI. 3.) on minimum OHS requirements for work with display screen equipment**
(50/1999. (XI. 3.) EüM rendelet a képernyő előtti munkavégzés minimális egészségügyi és biztonsági követelményeiről)
Covers workstation design, work organisation, breaks, visual strain, and ergonomic layout.
Relevance: legal basis for office ergonomics and digital work.
- **Ministerial Decree 2/1998 (I. 16.) on safety and health signs used at workplaces**
(2/1998. (I. 16.) MüM rendelet a munkahelyen alkalmazandó biztonsági és egészségvédelmi jelzésekről)
Defines minimum requirements for safety signage and visual communication.
- **Ministerial Decree 10/2016 (IV. 5.) on minimum requirements for work equipment and its use**
(10/2016. (IV. 5.) NGM rendelet a munkaeszközök és használatuk biztonsági és egészségügyi követelményeinek minimális szintjéről)
Regulates the safe use, inspection, and operation of work equipment at enterprise level.

5.2.3 Occupational health services and medical surveillance

- **Ministerial Decree 27/1995 (VII. 25.) on occupational health services**
(27/1995. (VII. 25.) NM rendelet a foglalkozás-egészségügyi szolgálatról)
Defines the organisation, tasks, and service requirements of occupational health services.
- **Ministerial Decree 33/1998 (VI. 24.) on medical fitness examinations and medical opinions**
(33/1998. (VI. 24.) NM rendelet a munkaköri, szakmai, illetve személyi higiénés alkalmasság orvosi vizsgálatáról és véleményezéséről)
Regulates pre-employment, periodic, and extraordinary medical examinations and related documentation.

5.2.4 Sector-specific regulations

- **Joint Ministerial Decree 4/2002 (II. 20.) on minimum OHS requirements at construction sites and during construction processes**
(4/2002. (II. 20.) SZCSM–EüM együttes rendelet az építési munkahelyeken és az építési folyamatok során megvalósítandó minimális egészségvédelmi és biztonsági követelményekről)
Specifies safety and health requirements for construction activities, one of the highest-risk sectors.

5.2.5 Personal protective equipment and hazardous agents

- **Ministerial Decree 65/1999 (XII. 22.) on the minimum requirements for the use of personal protective equipment at work**
(65/1999. (XII. 22.) EüM rendelet a munkavállalók munkahelyen történő egyéni védőeszköz használatának minimális biztonsági és egészségvédelmi követelményeiről)
Establishes employer obligations for PPE selection, provision, training, and use.
- **Ministerial Decree 5/2020 (II. 6.) on protecting workers from exposure to chemical agents**
(5/2020. (II. 6.) ITM rendelet a kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről)
Regulates chemical risk assessment, exposure limits, and preventive measures.
- **Ministerial Decree 26/2000 (IX. 30.) on protection against occupational exposure to carcinogens**
(26/2000. (IX. 30.) EüM rendelet a foglalkozási eredetű rákkeltő anyagok elleni védekezésről és az általuk okozott egészségkárosodások megelőzéséről)
Defines specific control and prevention measures for carcinogenic substances.

5.2.6 Physical agents

- **Ministerial Decree 22/2005 (VI. 24.) on minimum requirements for workers exposed to vibration**
(22/2005. (VI. 24.) EüM rendelet a rezgésexpoziciónak kitett munkavállalókra vonatkozó minimális egészségi és munkabiztonsági követelményekről)
Regulates exposure assessment and prevention for hand–arm and whole-body vibration.
- **Ministerial Decree 66/2005 (XII. 22.) on minimum requirements for workers exposed to noise**
(66/2005. (XII. 22.) EüM rendelet a munkavállalókat érő zajexpozicióra vonatkozó minimális

egészségi és biztonsági követelményekről)

Defines noise exposure limits, measurement, and employer obligations.

5.2.7 Market placement and machinery conformity

- **Ministerial Decree 16/2008 (VIII. 30.) on machinery safety requirements and conformity assessment**

(16/2008. (VIII. 30.) NFGM rendelet a gépek biztonsági követelményeiről és megfelelőségének tanúsításáról)

Regulates machinery safety requirements and conformity assessment, primarily relevant for designers, manufacturers, and market placement.

5.3 Educational and training capacity

Hungary has a well-developed and diverse educational and training portfolio in occupational safety, ergonomics, and human factors, covering higher education, postgraduate training, adult education, and professional development. This multi-level system provides a solid basis for the development and implementation of ergonomics-related training activities targeting small and medium-sized enterprises (SMEs).

At the level of higher education, ergonomics and workplace safety are integrated into several accredited engineering and safety-oriented programmes. Universities offering safety engineering, occupational safety, and related technical degrees typically include ergonomics, human-machine interaction, workplace design, and risk assessment as core or compulsory subjects. In addition to degree programmes, specialised postgraduate courses are available that focus explicitly on ergonomics and human factors, preparing professionals to analyse work systems, design safer workplaces, and address physical and cognitive workload in practice.

Hungary also offers dedicated **specialist training programmes in ergonomics**, delivered as postgraduate or professional further-training courses in Hungarian. These programmes are designed primarily for engineers, safety professionals, occupational health specialists, and managers, and they provide structured knowledge on applied ergonomics, human performance, workplace assessment methods, and preventive approaches. The availability of such programmes in the national language significantly supports access for professionals working in SMEs.

Adult education and lifelong learning play a key role in the Hungarian training system. Accredited adult education providers, universities, and professional organisations offer short courses and modular trainings related to occupational safety, ergonomics, risk assessment, and workplace health promotion. These courses are typically practice-oriented and organised in flexible formats, such as evening, weekend, or blended learning, which makes them accessible for working adults and SME representatives.

In recent years, digital and online learning opportunities have also expanded. Open online courses and university-based digital learning platforms support self-directed learning and provide opportunities to reach a wider audience. Although ergonomics-specific online courses are still limited, the existing digital infrastructure offers clear potential for the dissemination of applied ergonomics knowledge in a flexible and cost-effective way.

Despite the broad availability of training opportunities, several challenges remain. In many SMEs, ergonomics education is still treated as a secondary topic compared to legally mandated occupational safety training. Financial constraints, limited time resources, and a lack of tailored, SME-specific content often reduce participation in more advanced or specialised courses. Furthermore, ergonomics is frequently embedded within broader safety or engineering programmes rather than offered as a stand-alone, practice-focused subject directly addressing the everyday problems of small enterprises.

Overall, Hungary has a strong institutional and educational capacity to support ergonomics and workplace safety training. However, the findings of the needs analysis underline the importance of developing **targeted, applied, and SME-oriented ergonomics training materials**, as well as flexible delivery formats that combine occupational safety, ergonomics, and digital tools. These conditions provide a clear justification for the development of a tailored ergonomics curriculum and guidebook within the SAFE-D project.

5.4 Standardization

In Hungary, ergonomics-related standardization is organised within a single occupational safety and health mirror technical committee that represents the country in several European and international technical committees. This mirror committee serves as the national interface to ergonomics-, machinery-, and occupational safety-related standardization activities and follows developments in multiple international forums.

The committee includes around twenty experts and brings together key stakeholders, including representatives of regulatory authorities, academic institutions, notified bodies, professional associations, and practitioners. Communication within the committee is regular, and it provides an important platform for information exchange. However, its overall activity level remains limited, and Hungary's contribution to the active development of new ergonomics standards is relatively modest.

The current situation is strongly influenced by historical developments. Prior to the 1990s, ergonomics standardization played a much stronger role within the regional standardization system of the time, and several advanced Hungarian ergonomics standards were developed. Following political and economic transition, these standards were largely withdrawn and replaced by European standards. As a result, a significant body of nationally developed ergonomic knowledge lost its formal regulatory status, even though much of its content remains technically relevant.

Today, ergonomics standardization in Hungary primarily means the adoption of European and international standards. Most of these standards are introduced in English, with only a limited number available in full Hungarian translation. This language barrier significantly reduces accessibility, especially for SMEs, and makes practical application difficult outside specialist contexts. In practice, ergonomics standards are most often used in machinery design, conformity assessment, and occupational safety management, while their systematic application at enterprise level remains limited.

5.5 Evidence Base and Supporting Sources

Since 2000, ergonomics and occupational health and safety (OSH) research in Hungary has developed within a structurally changing institutional environment. While scientific output and

international cooperation have continued, the institutional framework of occupational safety research has undergone significant transformation.

Following the reorganisation of the national occupational safety system, the former Labour Research Institute (Munkaügyi Kutatóintézet) was dissolved, and no dedicated state-level occupational safety research institute currently operates in Hungary. At the same time, there is no university where occupational safety is pursued as an independent research field at department or institute level. As a consequence, OSH research activities are typically embedded within broader disciplines such as ergonomics, safety engineering, public health, industrial management, or human factors.

Beyond its public health functions, Hungary participates in the work of the European Agency for Safety and Health at Work (EU-OSHA) through its national focal point, which is operated by the Ministry for National Economy (Nemzetgazdasági Minisztérium – NGM). Within this framework, Hungarian experts from public authorities, research institutions, and professional organisations contribute to European strategic discussions, thematic campaigns, and knowledge dissemination activities. These activities include topics related to digitalisation, psychosocial risks, and emerging ergonomic challenges. The national focal point mechanism ensures a continuous institutional link between domestic occupational safety practice and European-level OSH policy development, supporting the adaptation of EU priorities to the national context.

Despite the absence of a dedicated occupational safety research institute, scientific publication activity has continued through university-based research groups and public health institutions. Occupational and environmental medicine research has been disseminated through national and international journals, including long-standing Hungarian scientific outlets focusing on occupational and environmental health. These publications often address epidemiological trends, workplace exposure assessment, musculoskeletal disorders, and work-related health risks in Hungarian populations.

Ergonomics research has remained particularly visible within university departments focusing on human factors, work system design, usability, and human–machine interaction. After 2000, Hungarian ergonomics research increasingly connected to digital transformation topics, including cognitive load, human–AI interaction, automation, and safety culture in technologically advanced workplaces. These research directions reflect broader European priorities concerning safe digitalisation and the integration of artificial intelligence into work systems.

Research activity in the field is typically project-based and dependent on competitive funding schemes. Earlier targeted research opportunities financed from occupational safety fine allocations were discontinued, resulting in reduced structural support for long-term OSH research programmes. Consequently, many research initiatives are realised within interdisciplinary or innovation-driven projects rather than within a stable, dedicated occupational safety research framework.

International cooperation plays an important role in sustaining research capacity. Hungarian universities participate in European partnerships and collaborative projects addressing ergonomics, digital work environments, and the societal impact of artificial intelligence. Examples include

cooperation frameworks focusing on ergonomic design and projects examining life and work in the AI era. These initiatives contribute to integrating Hungarian research into broader European networks and facilitate knowledge transfer between academia and practice.

A stabilising and increasingly significant element of Hungarian OSH research is doctoral-level work within safety and security sciences. The Doctoral School of Safety Science provides a structured academic environment where occupational safety, ergonomics, risk management, and safety culture are addressed as research topics. In recent years, doctoral defences have taken place explicitly in occupational safety-related areas, strengthening the scientific foundation of the field.

6 Ergonomics & Work Safety Country Report - Türkiye

6.1 Institutional background

Türkiye's occupational health and safety (OHS) system is characterised by a **highly centralised regulatory structure under the labour administration**, complemented by a **specialised ecosystem of technical institutes, professional chambers, and sector-specific employer organisations**. While policy-making and enforcement are concentrated at national level, practical implementation and safety culture development rely heavily on professional, sectoral, and enterprise-based actors.

6.1.1 Governmental and Regulatory Bodies

- **Ministry of Labour and Social Security**

(Çalışma ve Sosyal Güvenlik Bakanlığı – ÇSGB)

The Ministry of Labour and Social Security is the primary governmental authority responsible for occupational health and safety in Türkiye. Following institutional restructuring, it assumed responsibilities previously held by the former Ministry of Family, Labour and Social Services. The Ministry prepares and oversees the implementation of OHS legislation, most notably **Occupational Health and Safety Law No. 6331** (*6331 Sayılı İş Sağlığı ve Güvenliği Kanunu*), which forms the core legal framework for OHS regulation.

- **Directorate General of Occupational Health and Safety**

(İş Sağlığı ve Güvenliği Genel Müdürlüğü – İSGGM)

Operating under the Ministry, İSGGM represents the central policy-making and coordination body of the OHS system. It drafts secondary legislation, develops technical guidelines, and oversees national implementation mechanisms. A key responsibility of the Directorate is the management of **İSG-KATİP**, the national digital platform used for the registration and assignment of occupational safety experts, workplace physicians, and OHS service providers. It also supervises the certification and authorisation of Joint Health and Safety Units (*Ortak Sağlık ve Güvenlik Birimleri – OSGB*).

- **Occupational Health and Safety Research and Development Institute**

(İş Sağlığı ve Güvenliği Araştırma ve Geliştirme Enstitüsü – İSGÜM)

İSGÜM functions as the technical and laboratory arm of the OHS system. It conducts workplace measurements related to physical, chemical, and biological exposures, tests personal protective equipment, and supports applied research activities. Its work provides the scientific and technical basis for enforcement, prevention, and policy development.

- **Social Security Institution**

(Sosyal Güvenlik Kurumu – SGK)

The Social Security Institution plays a critical analytical and administrative role by registering occupational accidents and occupational diseases. It manages insurance and compensation mechanisms and produces comprehensive national statistics, which form the primary data source for monitoring trends and assessing the effectiveness of OHS policies in Türkiye.

- **Vocational Qualifications Authority**

(Mesleki Yeterlilik Kurumu – MYK)

MYK is responsible for defining, accrediting, and certifying vocational qualifications. In the OHS context, it issues **Vocational Qualification Certificates** that are legally mandatory for many high-risk occupations, such as construction, welding, and mining. Through this system, MYK contributes to improving safety competence at workforce level.

6.1.2 Professional Chambers and Scientific Organisations

- **Union of Chambers of Turkish Engineers and Architects**

(Türk Mühendis ve Mimar Odaları Birliği – TMMOB)

TMMOB is a major professional umbrella organisation, with particular relevance through its Chambers of Mechanical, Chemical, and Mining Engineers. These chambers provide technical expertise, professional training, and policy input related to machinery safety, process safety, and high-risk industrial activities.

- **Turkish Medical Association**

(Türk Tabipleri Birliği – TTB)

The Turkish Medical Association represents physicians, including workplace physicians (*İşyeri Hekimi*). It plays an important role in occupational health by focusing on the prevention of occupational diseases, the quality and ethics of health surveillance, and professional standards in occupational medicine.

- **Turkish Ergonomics Association**

(Türk Ergonomi Derneği)

The Turkish Ergonomics Association is the leading academic and professional body dedicated to ergonomics and human-centred design in Türkiye. Its activities focus on physical ergonomics, cognitive ergonomics, and the prevention of musculoskeletal disorders, contributing scientific knowledge and professional awareness to workplace design and risk prevention.

- **Turkish Standards Institute**

(Türk Standartları Enstitüsü – TSE)

TSE is responsible for the development, adoption, and dissemination of national standards, including those related to occupational health and safety. It adopts international standards, such as ISO 45001, and establishes national criteria for safety equipment and conformity assessment.

6.1.3 Social Partners and Employee Representation

- **Confederation of Turkish Employers' Associations**

(Türkiye İşveren Sendikaları Konfederasyonu – TİSK)

TİSK is the main employer confederation at national level. It actively participates in OHS policy discussions and supports employers through guidance and training initiatives. Through

structures such as the **TİSK Academy**, it promotes safety culture development and managerial competence in occupational health and safety.

- **Employee Confederations**

(*TÜRK-İŞ, HAK-İŞ, DİSK*)

Employee representation in Türkiye is organised primarily through three national confederations. **TÜRK-İŞ** is the largest and most influential, **HAK-İŞ** represents a broad range of sectors, while **DİSK** is known for its strong focus on labour rights and critical reporting on workplace accidents and fatalities, including contributions through the **Labourers' Health and Occupational Safety Assembly** (*İSİG Meclisi*).

6.1.4 Sector-Specific Employer Organisations

In Türkiye, several powerful sectoral employer unions play a decisive role in shaping OHS practice and safety culture within high-risk industries. Their influence often exceeds that of general professional organisations, as they combine regulatory awareness, sector-specific expertise, and practical implementation capacity.

- **MESS** (Metal Industries Employers' Association)
MESS is recognised for its advanced safety initiatives, including digital training platforms, simulation-based education, and large-scale safety culture programmes such as *MESS Safe*.
- **KİPLAS** (Chemical, Petroleum, Rubber and Plastics Industries Employers' Association)
KİPLAS places strong emphasis on process safety, chemical risk management, and accident prevention in high-hazard industrial environments.
- **ÇEİS** (Cement Industry Employers' Union)
ÇEİS operates sector-specific OHS programmes and advanced training facilities, including simulation-based learning environments, supporting continuous improvement of safety performance in cement production.

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6.2 Key public regulations

6.2.1 Framework legislation

- **Occupational Health and Safety Law No. 6331**
(*6331 Sayılı İş Sağlığı ve Güvenliği Kanunu*)
The primary national OHS law, establishing general prevention principles, employer and employee obligations, risk assessment requirements, professional roles, and enforcement mechanisms.
- **Labour Law No. 4857**
(*4857 Sayılı İş Kanunu*)
The fundamental labour law governing employment relations, including provisions related to working time, rest periods, and general duties connected to safe and healthy working conditions.

6.2.2 Workplace requirements and risk assessment

- **Regulation on Risk Assessment**
(*İş Sağlığı ve Güvenliği Risk Değerlendirmesi Yönetmeliği*)

Regulates the methodology, documentation, and periodic review of workplace risk assessments.
Relevance: central preventive instrument under Law No. 6331.

- **Regulation on Occupational Health and Safety Services**
(*İş Sağlığı ve Güvenliği Hizmetleri Yönetmeliği*)
Defines the organisation, scope, and conditions of occupational health and safety services, including workplace physicians, occupational safety experts, and authorised service units (OSGBs).
- **Regulation on the Use of Work Equipment**
(*İş Ekipmanlarının Kullanımında Sağlık ve Güvenlik Şartları Yönetmeliği*)
Establishes minimum safety and health requirements for the use, inspection, and maintenance of work equipment.
Relevance: machinery use, technical safety, and ergonomics in operation.

6.2.3 Training, information, and worker participation

- **Regulation on Occupational Health and Safety Training of Employees**
(*Çalışanların İş Sağlığı ve Güvenliği Eğitimlerinin Usul ve Esasları Hakkında Yönetmelik*)
Regulates initial, periodic, and additional OHS training obligations for employees.
Relevance: essential for translating legal and ergonomic requirements into practice.
- **Regulation on Occupational Health and Safety Committees**
(*İş Sağlığı ve Güvenliği Kurulları Hakkında Yönetmelik*)
Establishes the structure and operation of workplace OHS committees in larger enterprises, supporting internal consultation and worker participation.

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6.2.4 Personal protective equipment and safety communication

- **Regulation on the Use of Personal Protective Equipment at Work**
(*Kişisel Koruyucu Donanımların İşyerlerinde Kullanılması Hakkında Yönetmelik*)
Defines employer obligations regarding PPE selection, provision, training, and use.
- **Regulation on Safety and Health Signs**
(*İş Sağlığı ve Güvenliği İşaretleri Yönetmeliği*)
Specifies requirements for safety and health signage, visual warnings, and signals at workplaces.

6.2.5 Hazardous agents and occupational hygiene

- **Regulation on the Protection of Workers from Chemical Agents**
(*Kimyasal Maddelerle Çalışmalarda Sağlık ve Güvenlik Önlemleri Hakkında Yönetmelik*)
Regulates chemical risk assessment, exposure limits, and preventive measures.
- **Regulation on the Protection of Workers from Noise-Related Risks**
(*Çalışanların Gürültü ile İlgili Risklerden Korunmalarına Dair Yönetmelik*)
Defines noise exposure limits, measurement requirements, and employer obligations.
- **Regulation on the Protection of Workers from Vibration-Related Risks**
(*Çalışanların Titreşimle İlgili Risklerden Korunmalarına Dair Yönetmelik*)
Regulates prevention and control of hand–arm and whole-body vibration exposure.

6.2.6 Major hazards and accident prevention

- **Regulation on the Prevention of Major Industrial Accidents and the Mitigation of Their Effects**

(Büyük Endüstriyel Kazaların Önlenmesi ve Etkilerinin Azaltılması Hakkında Yönetmelik)

Implements the SEVESO framework in Türkiye, regulating major accident hazards, safety reports, and emergency planning.

6.3 Educational and training capacity

Türkiye has made notable progress in occupational health and safety (OHS) and ergonomics training over the past decade, supported by a comprehensive legal framework and gradual alignment with European Union directives and International Labour Organization principles. The Occupational Health and Safety Law No. 6331, adopted in 2012, constitutes the central regulatory basis for workplace safety, requiring employers to conduct systematic risk assessments, implement preventive measures, and provide regular training for employees.

OHS education and training are delivered through a mixed system involving public institutions, professional bodies, higher education institutions, and private training providers. The Ministry of Labour and Social Security plays a central coordinating role, while organisations such as the Turkish Standards Institute, universities, and authorised training centres contribute to professional and sector-specific capacity building. The Turkish Employment Agency supports employability-related training initiatives, which may indirectly include OHS elements, particularly for vulnerable groups.

Training programmes in Türkiye can be broadly classified into mandatory worker training, certification-based training for OHS professionals, and industry-specific courses. All employees are required to receive basic OHS training before starting work, followed by periodic refresher training and additional instruction in case of changes in work processes or emerging risks. Occupational safety experts and workplace physicians must obtain formal certification at C, B, or A class levels, reflecting increasing responsibility and competence requirements.

Sector-specific training programmes address the needs of high-risk industries such as construction, manufacturing, mining, and heavy industry, while office-based training increasingly incorporates ergonomic aspects related to display screen work and work organisation. Employers are encouraged to apply international management system and ergonomics standards, such as ISO 45001 for occupational health and safety management and ISO 9241 for human–system interaction, although their practical adoption varies significantly across sectors and enterprise sizes.

Despite these developments, challenges remain in the effective implementation of OHS and ergonomics training. Small and medium-sized enterprises often face limited financial and organisational capacity to prioritise systematic training, while workers in the informal economy and in geographically remote areas have reduced access to structured programmes. Workplace accident rates remain relatively high in certain sectors, particularly construction and heavy industry, reflecting persistent gaps in enforcement, supervision, and safety culture.

Strengthening public awareness, supporting SMEs through targeted incentives, expanding digital and modular training solutions, and improving compliance monitoring are key measures for further development. By embedding ergonomics more consistently into workplace practices and treating risk

assessment as a routine management activity, Türkiye can improve worker well-being, reduce occupational injuries, and enhance overall productivity..

6.4 Standardization

In Türkiye, ergonomics-related standardization is closely linked to occupational safety and health regulation and machinery safety requirements, with a strong emphasis on compliance with international and European standards. National standardization activities focus primarily on the adoption and implementation of internationally recognised standards rather than on the development of country-specific ergonomics standards.

Ergonomics requirements are most commonly encountered through machinery safety standards, workplace safety regulations, and occupational health and safety management system frameworks. While the formal standardization infrastructure exists, ergonomics is generally treated as a supporting element rather than as an independent field of standardization.

Participation in international standardization activities is present but limited, and the practical application of ergonomics standards is uneven across sectors. Larger industrial enterprises and export-oriented companies are more likely to apply standards systematically, while SMEs often rely on minimum legal compliance and informal practices. As in other countries, the technical complexity of standards and the lack of accessible, practice-oriented guidance remain key barriers to wider uptake.

6.5 Evidence Base and Supporting Sources

Since 2000, ergonomics and occupational health and safety (OSH) research in Türkiye has developed within a **strongly institutionalised but practice-oriented framework**, shaped by legislative reforms, professionalisation of OHS roles, and expanding university and sectoral research capacity. Compared to some Central European contexts, Türkiye maintains a **more visible and continuous institutional presence** in occupational safety research, although the balance between applied research and academic publication varies by discipline and sector.

A central reference point for national OSH knowledge production and coordination is the **Ministry of Labour and Social Security**, under which Türkiye participates in European and international OSH dialogue. Türkiye is connected to the **European Agency for Safety and Health at Work (EU-OSHA)** through national coordination mechanisms, enabling Turkish experts to contribute to European campaigns, thematic priorities, and information exchange, particularly in areas such as digitalisation, psychosocial risks, and prevention in high-risk sectors. This connection supports the alignment of national OSH discourse with European policy developments, even though Türkiye is not an EU Member State.

From a scientific and technical perspective, a key institutional actor is the **Occupational Health and Safety Research and Development Institute (İSGÜM)**. İSGÜM functions as a national technical and laboratory-based body, supporting OSH research through workplace exposure measurements, testing of personal protective equipment, and applied studies related to chemical, physical, and biological risk factors. While its primary mission is regulatory and technical support, İSGÜM also contributes to national knowledge generation and provides a practical research backbone for evidence-based prevention.

University-based research constitutes a major pillar of ergonomics and OSH publication activity in Türkiye. Several universities maintain **engineering, medical, and interdisciplinary research groups** working on occupational safety, industrial hygiene, ergonomics, and human factors. Ergonomics research is

particularly visible in departments of industrial engineering, mechanical engineering, and design, where studies address physical ergonomics, work system design, cognitive workload, and human–machine interaction. After 2000, Turkish researchers increasingly published on ergonomics-related topics in both national and international journals, often linking ergonomics to productivity, quality, and safety performance.

Occupational health research is strongly represented within medical faculties and public health departments, focusing on occupational diseases, exposure assessment, and epidemiological trends. These research activities are reflected in national scientific journals and conference proceedings, as well as in international publication platforms, especially in areas such as pneumoconiosis, noise-induced hearing loss, musculoskeletal disorders, and psychosocial risks.

A distinctive feature of the Turkish system is the **strong integration of professional chambers and sectoral organisations into the research–practice continuum**. Organisations such as the **Union of Chambers of Turkish Engineers and Architects (TMMOB)** and the **Turkish Medical Association (TTB)** regularly contribute to expert reports, position papers, and scientific meetings addressing occupational safety, ergonomics, and industrial risk. These outputs often combine scientific analysis with policy critique and practical recommendations, reinforcing the applied character of OSH knowledge production.

Ergonomics as a scientific field has gained additional visibility through the activities of the **Turkish Ergonomics Association**, which supports academic exchange, conference organisation, and dissemination of ergonomics research. This professional platform facilitates cooperation between universities, researchers, and practitioners, and strengthens Türkiye’s integration into the international ergonomics community.

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Research activity in ergonomics and OSH is frequently **project-based**, supported by national research funding schemes, sectoral initiatives, and international cooperation projects. Turkish universities increasingly participate in international research networks and education-oriented projects addressing topics such as ergonomic design, digital transformation of work, and the impact of artificial intelligence on working conditions. These projects often combine engineering, social science, and occupational health perspectives and contribute to the international visibility of Turkish research.

Doctoral education also plays a significant role in sustaining research capacity. PhD programmes in engineering, public health, ergonomics, and occupational safety-related fields provide a structured environment for advanced research, with doctoral dissertations addressing both classical OSH risks and emerging challenges such as automation, platform work, and cognitive ergonomics.

6.6 Cross-country synthesis of needs and constraints

Despite differences in national regulatory frameworks and institutional arrangements, the needs analysis revealed a high degree of convergence across the partner countries. In Bulgaria, Hungary, and Türkiye, ergonomics is formally embedded in occupational health and safety regulation, yet its practical application in small enterprises remains limited.

Across all partner countries, small enterprises tend to prioritise legally mandatory compliance activities, while ergonomics is often perceived as abstract, secondary, or relevant only for larger organisations. The use of ergonomic standards is largely restricted to specialists and external consultants, and their translation into everyday work organisation and task design is weak.

Common constraints identified include limited financial and human resources, lack of in-house ergonomic expertise, and restricted access to practical, context-specific training materials. At the same time, enterprises expressed a clear interest in solutions that are easy to understand, directly applicable, and adaptable to real workplace conditions.

These shared patterns indicate that, although national contexts differ, the underlying training needs of small enterprises are largely comparable. This supports the development of a generic ergonomics curriculum that can be adapted to national contexts without losing relevance.

7 Empirical Analysis

7.1 Introduction to the Empirical Analysis

The empirical analysis conducted within Activity A1 aimed to complement desk research and country-level reviews with evidence collected directly from practice. The focus was placed on small and micro-enterprises, adult learners, employees, employers, and training providers operating in real working environments where ergonomic and occupational safety challenges are often present but not always systematically addressed.

The purpose of the empirical work was to identify practical needs, knowledge gaps, and operational constraints related to ergonomics and occupational health and safety (OSH), with particular attention to the conditions of small enterprises. Rather than assessing formal compliance, the analysis sought to understand everyday work practices, perceptions, and limitations that influence the practical application of ergonomic principles.

The empirical component therefore focused on real workplace conditions and the experiences of employees, employers, trainers, and adult learners across the partner countries. The objective was not to produce statistically representative national datasets, but to generate practice-oriented evidence that helps identify common needs and priorities relevant for the development of SME-adapted ergonomics training solutions within the SAFE-D project.

The results of this empirical analysis provide an important input for the development of the SAFE-D tailored ergonomics curriculum and the related practical training tools. Detailed research instruments, raw data, and country-level documentation are presented in the supporting project materials, while this report provides a synthesized and comparative overview of the main findings.

7.2 Methodological Overview

A mixed-method approach was applied in all partner countries. Data collection combined structured questionnaires, qualitative company visits, and stakeholder input from training providers and adult education institutions.

The empirical data collection followed a **multi-method approach**, combining:

- enterprise site visits and workplace observations,
- structured questionnaires,
- informal interviews and partner-validated observation summaries.

This approach enabled the project to capture both **observable ergonomic risk factors** and **perceived needs, experiences, and expectations** related to occupational safety and ergonomics.

The empirical instruments included:

- questionnaires for employees (Q1),
- questionnaires for employers and SME managers (Q2),
- questionnaires for training managers and adult education providers (Q3),
- questionnaires for adult learners (Q4),
- and structured workplace observation and company visit tools.

Data collection was carried out in Bulgaria, Hungary, and Türkiye within the same project period, ensuring comparability across countries and target groups.

7.2.1 Enterprise site visits

Site visits were conducted in all partner countries. Depending on national implementation choices, enterprise visits were documented using:

- structured company visit guides and workbooks, and/or
- synthesised observation reports based on on-site visits, interviews, and expert reflections.

Across the three partner countries, a total of **17 enterprises** were covered through on-site visits. The visits focused on:

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- working environment characteristics,
- ergonomic risk factors (posture, repetition, static load),
- workplace organisation,
- availability of basic OSH measures,
- access to ergonomics-related guidance and training.

7.2.2 Questionnaires

Structured questionnaires were administered to different target groups:

- employees working in SMEs,
- SME employers and managers,
- trainers and OSH training managers,
- adult learners with workplace experience.

In total, **111 respondents** completed questionnaires across the partner countries. The questionnaires addressed:

- exposure to ergonomic risks,

- previous training experiences,
- self-reported discomfort and health complaints,
- organisational capacity and constraints,
- expectations towards future training solutions.

7.2.3 Interviews and qualitative inputs

During enterprise visits, **informal interviews and discussions** were conducted with employees and managers. These inputs were used to **contextualise and interpret** the quantitative findings and to support the identification of recurring patterns.

7.2.4 Data processing and analysis

Quantitative questionnaire data were analysed using **descriptive statistics** (frequencies and percentages). Qualitative observations and interview inputs were synthesised thematically, focusing on **recurring ergonomic and organisational patterns** rather than individual cases.

The analysis was conducted at country level and subsequently integrated into a **cross-country synthesis**, allowing the identification of shared challenges and training needs.

7.3 Methodological limitations and scope of validity

The needs analysis conducted within Activity A1 was designed as an applied, practice-oriented study focusing on small enterprises and adult education contexts in the partner countries. As such, the methodological approach intentionally prioritised relevance, feasibility, and direct applicability over statistical representativeness.

The empirical components of the study were based on a limited but targeted sample of enterprises, adult learners, managers, and training providers. Enterprise visits and survey participation reflected real workplace conditions in small enterprises, but the results cannot be interpreted as nationally representative in a statistical sense. Instead, they provide qualitative and semi-quantitative insight into recurring patterns, typical constraints, and commonly observed gaps.

Another limitation relates to the diversity of sectors and organisational maturity levels represented in the sample. While this diversity strengthens the identification of cross-cutting issues, it also limits the depth of sector-specific conclusions. The study therefore focuses on transversal ergonomic challenges that are relevant across sectors rather than on highly specialised technical problems.

The analysis of standards and regulatory frameworks relied on publicly available documents and expert knowledge within the partner organisations. Differences in national implementation practices and enforcement intensity may influence local conditions, but these differences do not affect the validity of the identified training needs, which proved largely convergent across countries.

Within these boundaries, the scope of validity of the results is defined as follows: the findings are valid for small enterprises with limited internal ergonomic expertise, for adult learners and trainers involved in occupational safety and ergonomics education, and for the design of practice-oriented training interventions. The results provide a sufficiently robust evidence base for curriculum development and applied training activities under Activity A2.

7.4 Results

7.4.1 Coverage of empirical data

The empirical evidence of Activity A1 is based on:

17 enterprise site visits (Bulgaria, Hungary, Türkiye),

111 questionnaire respondents, including employees, managers, trainers, and adult learners.

This dataset provides a **robust qualitative–quantitative basis** for identifying SME-relevant ergonomics and OSH needs.

The empirical sample is not intended to be statistically representative at national level. The purpose of the empirical work was not generalisation, but the identification of **typical, recurring ergonomic challenges and training needs** in SME contexts.

The strength of the analysis lies in the **triangulation of multiple data sources** (site visits, questionnaires, interviews) and the consistency of patterns observed across different countries and sectors. This approach is appropriate for needs analysis in the context of applied adult education and curriculum development.

7.4.2 Ergonomic risks identified during enterprise visits

Across the visited enterprises, **ergonomic risks were widely present**. The most frequently observed risk factors included:

- non-optimal working postures,
- prolonged static sitting or standing,
- repetitive movements,
- limited adjustability of workstations and tools,
- spatial constraints affecting task variation.

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More than **80% of visited enterprises** exhibited at least one significant ergonomic risk factor, indicating that ergonomic challenges are **systemic rather than exceptional** in SME environments.

7.4.3 Training gaps and access to ergonomics knowledge

Questionnaire results revealed a **substantial lack of formal ergonomics training** among employees:

- **83% of respondents** reported never having received ergonomics-specific training,
- training, where available, was mostly limited to **general occupational safety instruction**.

Knowledge of ergonomic standards and structured self-assessment methods was **low across all target groups**, with awareness largely based on personal experience rather than formal education.

7.4.4 Self-reported discomfort and health complaints

Employees frequently reported **work-related physical discomfort**, particularly:

- lower back pain,
- neck and shoulder pain,

- wrist and hand discomfort,
- eye strain and fatigue.

More than **60% of respondents** reported at least one form of musculoskeletal discomfort, highlighting the **preventive relevance of ergonomics-focused interventions**.

7.4.5 Organisational capacity and SME constraints

From the employer and manager perspective, the implementation of ergonomic improvements is constrained by:

- limited time and financial resources,
- lack of in-house ergonomic expertise,
- perceived complexity of standards and regulations.

In many SMEs, occupational safety responsibilities are assigned informally or outsourced, limiting the integration of ergonomics into everyday decision-making processes.

7.4.6 Identified needs and expectations

Despite these constraints, all target groups expressed **strong interest in practical, applied ergonomics solutions**. Preferred characteristics of future training and support tools include:

- short, modular formats,
- practical examples linked to real work situations,
- visual aids and simple checklists,
- digital or blended learning formats adaptable to SME schedules.

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7.5 Summary of empirical findings

The empirical analysis demonstrates that **ergonomic risks are widespread in SMEs**, while **systematic ergonomics knowledge and training are largely absent**. The identified gaps are not primarily caused by a lack of regulation, but by limited applied knowledge, awareness, and decision-making capacity under resource-constrained conditions.

Across all partner countries, a significant proportion of the observed ergonomic risks were linked to **digital work practices**, particularly prolonged screen-based work, hybrid and remote work arrangements, and increased reliance on digital tools.

During enterprise visits and surveys, employees frequently reported extended periods of sitting, limited posture variation, and increased visual strain associated with computer-based tasks. In office-based and service-oriented SMEs, digital workstations often lacked systematic ergonomic adjustment, despite their central role in everyday work.

These findings indicate that, in the digital era, ergonomic risks increasingly emerge not from heavy physical labour, but from **sedentary, screen-intensive work patterns**, which are often underestimated in small enterprises.

These findings provide a **clear empirical justification** for the development of the SAFE-D curriculum, toolbox, and guidance materials, which will focus on **practical, SME-oriented ergonomics solutions** in the subsequent project activities.

7.5.1 General patterns across partner countries

Across all partner countries, the empirical results reveal that ergonomic risks are widespread in small enterprises but remain largely underestimated and insufficiently managed. Ergonomics is rarely treated as a preventive approach; instead, it is commonly addressed only after health complaints or work-related discomfort appear.

Employees frequently experience musculoskeletal discomfort, fatigue, and strain related to posture, repetitive tasks, and poorly adapted workstations. However, these issues are often normalized and not recognized as occupational risks.

7.5.2 Knowledge and training gaps

A consistent lack of structured ergonomic knowledge was identified among employees and employers alike. Awareness is typically based on personal experience rather than formal training, standards, or systematic risk assessment methods.

Training related to ergonomics is usually limited to general OSH instruction or legal compliance requirements. Task-specific ergonomic guidance, especially adapted to SME environments, is largely missing.

7.5.3 SME-specific constraints

Employers and managers highlighted limited time, financial resources, and internal expertise as key barriers to implementing ergonomic improvements. Existing regulations and standards are often perceived as complex and difficult to translate into everyday practice.

There is a clear demand for simple, practical, and adaptable tools that support decision-making without requiring specialist knowledge.

7.5.4 Expectations towards future solutions

All target groups expressed strong interest in applied, practice-oriented learning formats. Preferred solutions include short modules, visual tools, digital resources, and concrete examples directly linked to real work situations.

These findings confirm the need for a tailored ergonomics curriculum and toolbox that bridges the gap between regulation, standards, and everyday practice in small enterprises.

7.6 Illustrative good practices observed during site visits

7.6.1 Structured machine safety and maintenance combined with operator training (Manufacturing SME – Hungary)

During the site visit at a medium-sized manufacturing enterprise, a **well-documented machine safety and maintenance practice** was observed. Machines were equipped with appropriate protective devices, and maintenance activities were **regularly documented**. New operators received **task-specific introductory training**, and refresher training was provided when equipment or processes changed.

Although the practice primarily targeted machine safety and compliance, it also had a **clear ergonomic relevance** by reducing unsafe postures, unplanned interventions, and physical strain during operation and maintenance tasks.

Why this qualifies as a good practice:

- documented and systematic,
- integrated into everyday operation,
- indirectly supports ergonomic risk reduction.

7.6.2 Informal but effective workstation adjustment in screen-based work
(Digital service SME – Bulgaria)

In a small digital print studio, the site visit documented that **workstations were adjusted informally by employees** to match task requirements. Chairs were height-adjustable, monitors were positioned at eye level, and work surfaces were adapted depending on whether tasks required seated or standing work.

No formal ergonomic assessment was conducted; however, employees were **aware of comfort-related adjustments** and actively modified their workstations during the workday.

Why this qualifies as a good practice:

- real adaptation to screen-based work,
- employee-driven adjustment,
- low-cost and immediately applicable.

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7.6.3 Task rotation and shared responsibility in daily work organisation
(Service-oriented SME – Türkiye, enterprise visit synthesis)

The Turkish enterprise visit reports highlighted cases where **task rotation was part of daily work organisation**, particularly in service-oriented SMEs. Employees alternated between digital administration, customer-related tasks, and light physical activities. This reduced prolonged static postures and repetitive load, even though the practice was **not formally labelled as an ergonomic measure**.

Responsibility for work organisation was shared informally among team members, allowing flexibility in task allocation based on workload and physical condition.

Why this qualifies as a good practice:

- reduces static and repetitive load,
- embedded in real work organisation,
- feasible without additional resources.

7.7 Country-specific Empirical Results

7.7.1 Bulgaria – Empirical observations

In Bulgaria, the empirical results highlight a relatively strong formal OSH framework, but limited practical reach at SME level. Employees often lack access to ergonomics-focused training, while employers tend to rely on minimum compliance approaches.

Ergonomic risks are present across sectors, particularly in manual handling and digital work, but systematic assessment is rare. Training needs are clearly expressed, especially for practical guidance adapted to small enterprises.

7.7.2 Hungary – Empirical observations

In Hungary, the findings indicate fragmented ergonomic knowledge and a lack of institutionalised support for applied ergonomics at enterprise level. Employees report frequent musculoskeletal complaints, while employers often lack clear guidance on how to implement ergonomic improvements.

Ergonomic considerations are most visible in office-based work, yet even here they remain partial and unsystematic. The results underline the importance of accessible tools and training that translate legal requirements into practical solutions.

7.7.3 Türkiye – Empirical observations

In Türkiye, the empirical data show a well-developed regulatory and training framework, but uneven implementation in practice. While awareness of OSH obligations is higher, effective ergonomic application varies significantly across enterprises.

SMEs face challenges related to enforcement, resource allocation, and access to practical training. Respondents emphasized the need for applied ergonomics content linked to sector-specific risks and everyday work organisation.

7.8 Implications for SAFE-D Outputs

The empirical results clearly justify the development of the SAFE-D tailored ergonomics curriculum, toolbox, and guidebook. The findings demonstrate a shared need across partner countries for applied, SME-oriented ergonomics solutions that support prevention, improve working conditions, and strengthen workplace safety culture in the digital age.

7.8.1 Implications for curriculum development

The findings of Activity A1 provide a clear evidence base for the development of a tailored ergonomics curriculum for small enterprises. The curriculum should focus on practical applicability rather than theoretical completeness and should translate standard-based ergonomic principles into everyday workplace practice.

Based on the identified needs, the curriculum should include modular thematic blocks addressing physical ergonomics, human–machine interaction, work organisation, and the use of simple digital tools for observation and assessment. Learning objectives should emphasise risk recognition, practical decision-making, and the ability to implement incremental improvements under resource-constrained conditions.

In several partner countries, particularly in Hungary, participants highlighted that many ergonomic and OSH standards are available primarily in English or in highly technical language. This creates a practical

barrier for SMEs, where decision-makers and employees often lack the time or linguistic background to interpret complex regulatory documents.

The SAFE-D project therefore aims not to replicate existing standards, but to **translate their core principles into accessible, local-language, practice-oriented guidance**, supporting everyday decision-making in small enterprises.

Training content should be grounded in real workplace examples and adaptable to different sectors. The curriculum should support both workers and managers and be suitable for integration into existing adult education and workplace training structures. These requirements form the starting point for Activity A2, which will translate the identified needs into concrete training materials and guidance.

The identified needs directly support the priorities of adult education (ADU), particularly the development of **flexible, learner-centred and practice-oriented training formats**. The results indicate strong potential for adult education providers to integrate applied ergonomics into existing vocational and lifelong learning programmes.

By equipping adult educators with modular content and practical tools, the SAFE-D project contributes to the **long-term sustainability** of training provision beyond the project duration, enabling continuous adaptation to evolving digital and organisational work environments.

7.8.2 European Added Value

The European added value of the SAFE-D project lies in its comparative, cross-country approach to identifying ergonomic and occupational safety needs in small enterprises. By jointly analysing regulatory frameworks, institutional capacities, and real workplace practices in multiple EU and candidate countries, the project moves beyond isolated national perspectives and identifies common structural challenges faced by small enterprises across Europe. This transnational perspective enables the development of harmonised, standard-based, yet practically applicable solutions that are aligned with European occupational safety principles, international standards, and EU policy objectives related to decent work, prevention of work-related health problems, and lifelong learning in adult education.

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7.8.3 Transferability to other EU SMEs

The findings and outputs of the SAFE-D project are designed to be directly transferable to small and medium-sized enterprises across the European Union. The identified ergonomic risks, knowledge gaps, and organisational constraints are not country-specific but reflect typical conditions in SMEs operating under EU occupational safety frameworks. By translating ergonomics standards and scientific knowledge into accessible, practice-oriented training content, the project provides tools that can be adapted to different sectors, languages, and national contexts without requiring significant financial or technical resources. This ensures that the developed curriculum and guidance materials can be effectively reused by SMEs, adult education providers, and occupational safety stakeholders throughout the EU.

8 Overall synthesis

Activity A1 achieved its objective of identifying the ergonomic and occupational health and safety training needs of small enterprises and adult learners in the partner countries. Through a combination of desk research, enterprise visits, surveys, and cross-country synthesis, the activity provided a comprehensive and coherent picture of current challenges, capacities, and expectations.

The analysis demonstrated that, despite differences in national regulations and institutional structures, small enterprises across the partner countries face similar ergonomic challenges. These challenges are characterised by limited resources, low practical use of ergonomic standards, and insufficient translation of formal requirements into everyday work practices. At the same time, enterprises and adult learners expressed a clear demand for practical, understandable, and context-specific guidance.

The Training Needs Analysis confirmed that many ergonomic problems are not primarily caused by a lack of regulation or technical solutions, but by gaps in applied knowledge, awareness, and decision-making skills. This finding provides a strong justification for training-based interventions that focus on practical risk recognition, simple assessment methods, and low-cost improvements suitable for small enterprises.

At project level, Activity A1 established a shared evidence base that supports the development of a generic, modular ergonomics curriculum adaptable to different national and sectoral contexts. The results define clear requirements for training content, learning objectives, and delivery formats, while deliberately avoiding premature specification of teaching materials.

With this synthesis, Activity A1 is formally concluded. The findings serve as the validated foundation for Activity A2, which will translate the identified needs into tailored curriculum elements, training materials, and on-site mentoring activities. No additional needs assessment or data collection is required for the continuation of the project.

With the completion of the needs analysis, Activity A1 has achieved its first objectives. The activity provided a comprehensive, evidence-based overview of ergonomic challenges, training gaps, and practical constraints in small enterprises across the partner countries. The results serve as the validated foundation for the curriculum development and on-site training activities planned under Activity A2. No further data collection is required for the transition to the next project phase.

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