SAFESTART

Heavy Equipment Manufacturing Safety



Heavy machinery manufacturing covers a wide range of sectors, but they share one challenge: people working close to moving equipment, suspended loads and stored energy.

Key Equipment Categories

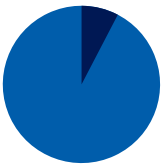
- Power, fluid and motion systems
- Lifting, handling and mobile equipment
- Thermal and industrial-process machinery
- Metal and materials transformation
- Sector-specific processing and automation
- Large transport, aerospace and defence platforms

These sectors employ people across around 93,000 European enterprises. [1]

EU Workforce Dimension [1]

~ 3.9 M people

79,5% working in the Manufacture of Machinery and Equipment (C28)



20,5% working in other Transport Equipment Activities (C30)

(Eurostat NACE codes C28 and C30)

A Workforce Built on Technical Skill

~ 60%

of employees in mechanical and plant engineering sector **are skilled workers.** [2]

This includes fitters, welders, machinists, riggers and technicians who build, test and maintain complex machinery.

17%

of employees in the mechanical engineering sector **are engineers.** [3]

Workplace accidents in EU machinery and transport equipment manufacturing

(Eurostat NACE codes 28, 30 - 2023) [4]

56,735 serious non-fatal accidents

45 fatal accidents

Top five EU countries by number of non-fatal accidents:

22,680	9,839	6,168	5,193	1,731
Germany (39%)	Italy (17%)	Spain (10%)	France (9%)	Poland (3%)

Across this large and varied sector, **nearly 4 million people work close to moving equipment, heavy components and hazardous energy.** When something goes wrong, the consequences can be severe.

The most dangerous moment may not be during production

Maintenance, cleaning, adjustment and fault-finding bring people closer to moving parts, stored energy and unexpected movement.

60%

of machinery accidents occur during maintenance, cleaning or adjustment - and not the obvious production, functioning time. [5]



Maintenance
- Access inside guarded areas

Cleaning
- Hands and tools move closer

Adjustment
- Equipment is tested or repositioned

Jam Clearing
- Pressure builds to restart

Why these Moments are More Risky:

GUARDS OPEN
People enter areas normally kept clear.

HAZARDOUS ENERGY
Machinery or loads may move unexpectedly.

TEAMS INTERACT
Production, maintenance and contractor teams coordinate.

CONDITIONS CHANGE
New problems appear as the work progresses.

Movement, Visibility and Loss of Control

1 in 4 fatal workplace transport accidents in Great Britain occurs during **REVERSING.** [6]

Restricted visibility and blind spots make it easier for someone to enter the vehicle's line of fire unnoticed.



~ 27,1%

of fatal workplace accidents in the EU involved **LOSS OF CONTROL** of machinery, tools, vehicles or handling equipment. [7]

These incidents are rarely caused by machinery alone.
Risk increases when movement, hazardous energy and human factors come together.

Skill reduces risk, but it does not remove exposure.

Skilled workers regularly operate around heavy loads, moving equipment and stored energy.
But experience cannot protect someone once they enter the line of fire.



Machine Manufacturing Accident - UK 2024

An experienced fitter was helping move a three-tonne machine using a forklift.

His hand was beneath the machine when **the forks dropped unexpectedly.**

The local regulator found that the lift had **not been properly planned** or **performed safely.** [8]

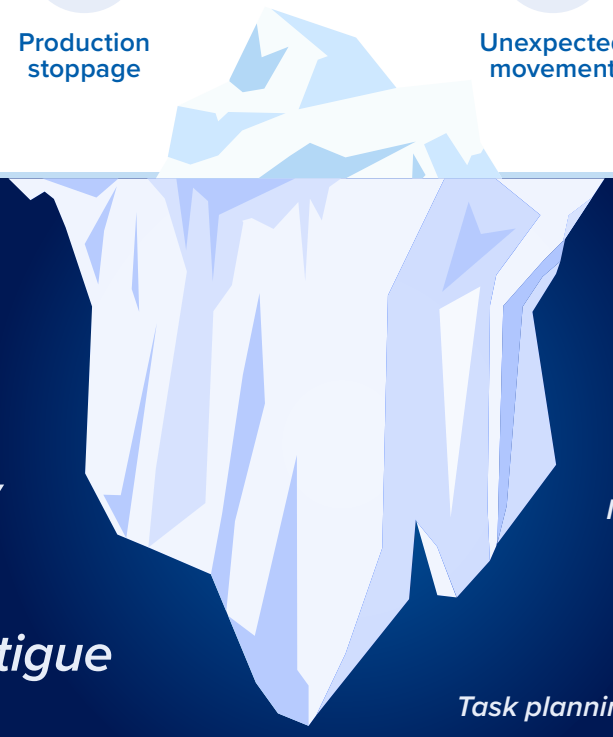
What increased the exposure?

- The lift was not properly planned
- The worker entered the line of fire
- The machine moved unexpectedly

What sits behind an incident?

The visible outcome is often the final result of immediate causes, workplace conditions and human states coming together.

- Worker injury
- Equipment damage
- Production stoppage
- Unexpected movement
- Unsafe positioning
- Line-of-fire exposure



WHAT WE DON'T SEE

(Hidden human conditions)

Changing conditions

Rushing

Complacency

Interruptions

Time pressure

Fatigue

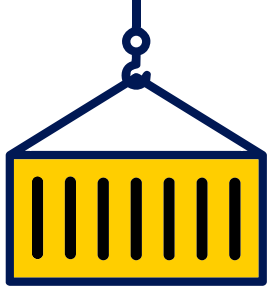
Frustration

Task planning

These underlying conditions **can increase critical errors and exposure to hazardous energy.**

When human factors intersect with heavy equipment and high-energy

Heavy equipment leaves little room for error. A momentary change in attention, judgment, or reaction time can have serious consequences—making human factors a critical part of machinery safety.



States Cause **Errors** And Greater **Exposure** Which Cause **Less Risk** to Become **More Risk**

States		Errors		Exposure	
Rushing	Frustration	Eyes not on task	Mind not on task	Moving machinery	Suspended loads
Fatigue	Complacency	Line of fire	Balance, traction, grip	Stored energy	Vehicule movement



INCREASE THE RISK FOR SERIOUS INJURY

Engineering controls, procedures and training create **ESSENTIAL PROTECTION.**

HUMAN FACTORS SKILLS help people recognise when changing conditions are increasing their exposure.

SafeStart helps workers recognise high-risk states, reduce critical errors and build habits that protect them.

Proven in workplaces worldwide

SafeStart has trained more than 5 million people across 4,000 companies, helping organisations achieve sustained injury reductions of 50% to 80%.



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Schedule a presentation

Sources:

1 - VDMA, Mechanical and Plant Engineering in Figures & Charts – EU machinery and equipment manufacturing employment, 2024.
2 - Eurostat ESAW, NACE Rev. 2 C28 – Manufacture of machinery and equipment n.e.c., 2023.
3 - Eurostat, Accidents at Work – Statistics by Economic Activity, EU, 2023.
4 - Eurostat ESAW, NACE Rev. 2 C28 – Manufacture of machinery and equipment n.e.c., 2023.
5 - L'INRS lance une campagne d'information pour sensibiliser les employeurs et les préventeurs aux risques liés aux machines.
6 - UK Health and Safety Executive (HSE), Workplace transport – Reversing vehicles and avoiding collisions.
7 - Eurostat ESAW, Accidents at Work – Statistics on Causes and Circumstances, EU, 2023.
8 - UK Health and Safety Executive (HSE), Machine manufacturing company fined after employee's fingers crushed during lifting operation, UK, 2026.