Safety and health in the steel industry **Data report 2026**

Shifting attention to preventive indicators is key to avoiding serious workplace incidents.

worldsteel ASSOCIATION

Contents

This report is based on data provided by our members and offers crucial insights into our industry's ongoing commitment to the safety and wellbeing of our workforce.

Throughout this document, all frequency rates are calculated per million hours worked.

For more details on terminology definitions and calculations, please refer to our glossary on worldsteel.org https://worldsteel.org/about-steel/glossary/

The data in this document is provisional and may be updated or supplemented with additional information.

Foreword

Our industry has made remarkable progress over decades through a sustained focus on managing and reducing risk. As a result, it is safer today than it has ever been.

However, the reality is that last year, 74 people did not return home to their families at the end of their shifts.

Our work is not done.

Improvement is becoming harder, in part because the nature of fatal risk itself has changed over time. Fatalities are now concentrated in high-risk, non-routine activities involving a high degree of unpredictability, such as working at height, maintenance, vehicle movement, forklift operations and gas-related work. Importantly, these activities are also frequently carried out by contractors which explains the disproportionate number of contractor fatalities. To tackle this challenge, we need to focus our resources where a significant impact can be made.

The industry needs a shift from traditional activity-based safety approaches to critical risk control, barrier health assurance and potential serious injuries and fatalities (PSIF) thinking, using modern approaches like human and organizational performance (HOP).

This report reflects this shift within the industry with greater emphasis on PSIF, leading indicators and preventive action, alongside continued efforts to improve global alignment and transparency.

Shalini Kumari
Manager, Safety and Health

Across our members, there is now clear alignment that the most effective way to reduce fatalities and life-altering injuries is to prioritise the critical controls that prevent them.

worldsteel's position on lagging indicators

We continue to emphasise that lagging indicators such as lost time injury frequency rate (LTIFR) or total recordable injury frequency rate (TRIFR) should not be part of individual, team or organisation objectives, bonuses, or incentives and they should not be used for comparisons between organisations or local sites. This is because of the following reasons:

- These indicators correlate poorly with the severity of accidents and injuries and do not provide a valid or reliable measure of safety and health controls and initiatives.
- They can foster a negative attitude towards reporting, limiting the organisational ability to learn and improve.
- A smaller organisation's LTIFR or TRIFR is more significantly affected by a single incident but this doesn't necessarily indicate a more dangerous working environment.

Furthermore, although worldsteel has a definition for lost time injury (LTI) and total recordable injury (TRI), companies vary in their definition of what constitutes an LTI and TRI. For this reason, this report has an additional indicator, all injury frequency rate (AIFR), which includes every kind of injury irrespective of severity. However, this is also a lagging indicator, and our focus should be on indicators that monitor and prevent potential serious injuries and fatalities.

Potential serious injuries and fatalities (PSIF)

Serious injuries generally refer to long-term or permanent incapacity, as well as fatalities.

A potential serious injury or fatality is any incident, regardless of actual severity, that has the potential to lead to a life-threatening, life-altering, or fatal injury.

A PSIF precursor is any unmitigated high-risk situation that has potential to result in a serious injury or fatality if not controlled because management controls are absent, ineffective, or not complied with.

The number of individual sites reporting to worldsteel using the PSIF framework has increased in recent years. The figures below only represent the sites reporting PSIFs and combining contractors and employees.

In 2025, 92% of sites made use of a PSIF framework.

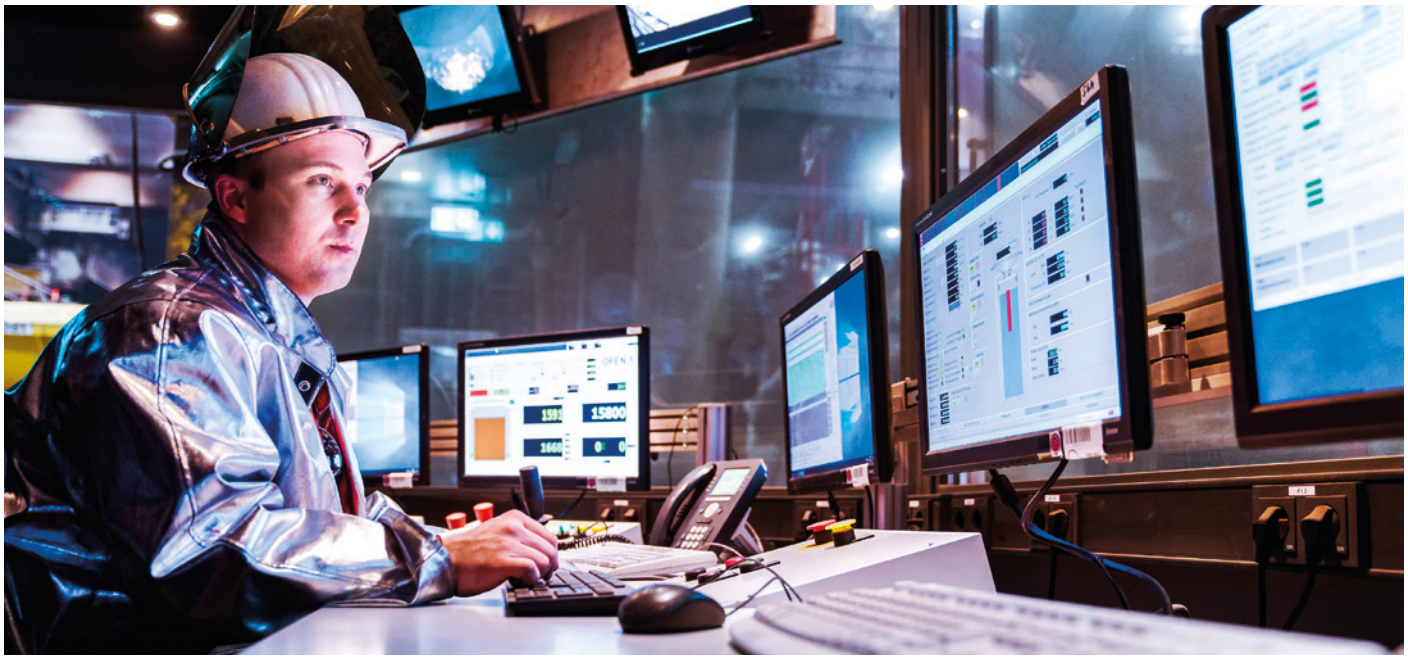
Figure 1: PSIF triangle 2025 for employees and contractors

Fatalities*	Total 50	PSIF	
Lost time injuries	1 957	495	25.29%
All other injuries**	15 362	893	5.81%
Near misses	130 387	2 678	2.05%
Precursors	2 549 646	183 677	7.2%

* In 2025, there were 74 fatalities reported to worldsteel. In order to preserve the ratios within the PSIF section of this report, fatalities reported by organisations that were not able to provide PSIF information have been excluded from this analysis.

** All other injuries includes restricted work cases (RWC), medically treated injuries (MTI) and minor injuries (MI).

Stated injury statistics in this graphic are derived from companies that report PSIF information to worldsteel.



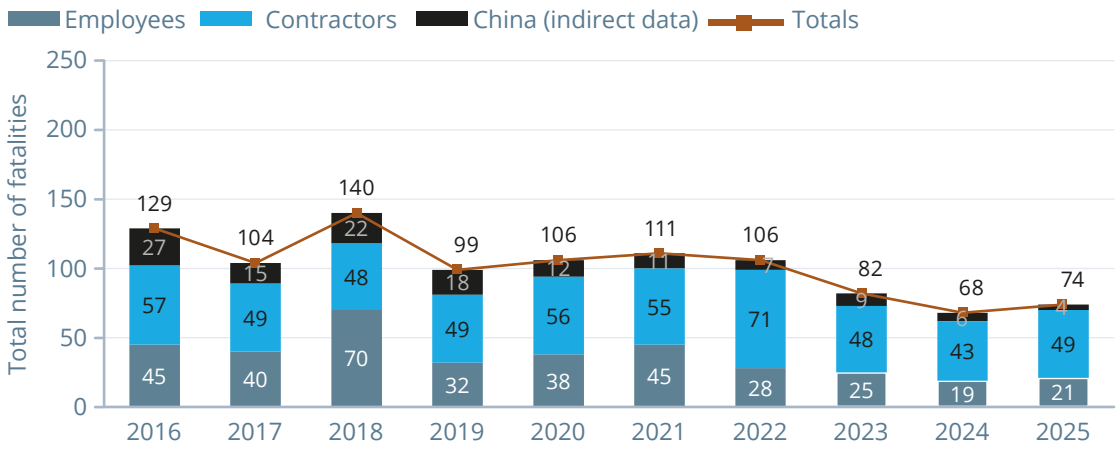
Typically, around 20% of incidents have the potential to become serious injuries or fatalities.

To reduce serious harm, steelmakers should focus on better identifying, managing and reporting near misses and injuries with the potential to cause fatalities and serious injuries.

Fatality analysis

A fatality refers to death from a work-related injury, certified by a medical professional.

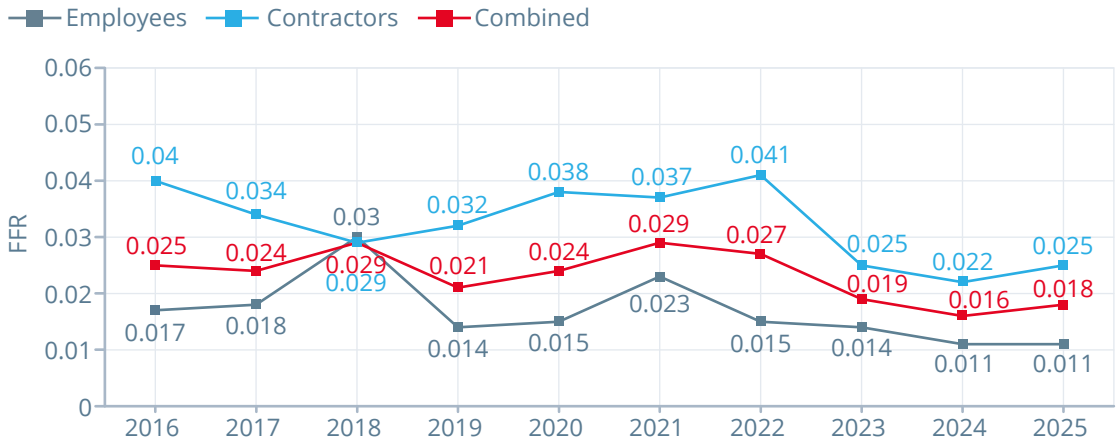
Figure 2: Number of fatalities 2016-2025



** Data received from China via Sinosteel Wuhan Safety & Environmental Protection Research Institute (SEPRI) does not distinguish between employees and contractors. Data received directly from Chinese worldsteel members does and is included in the analysis.*

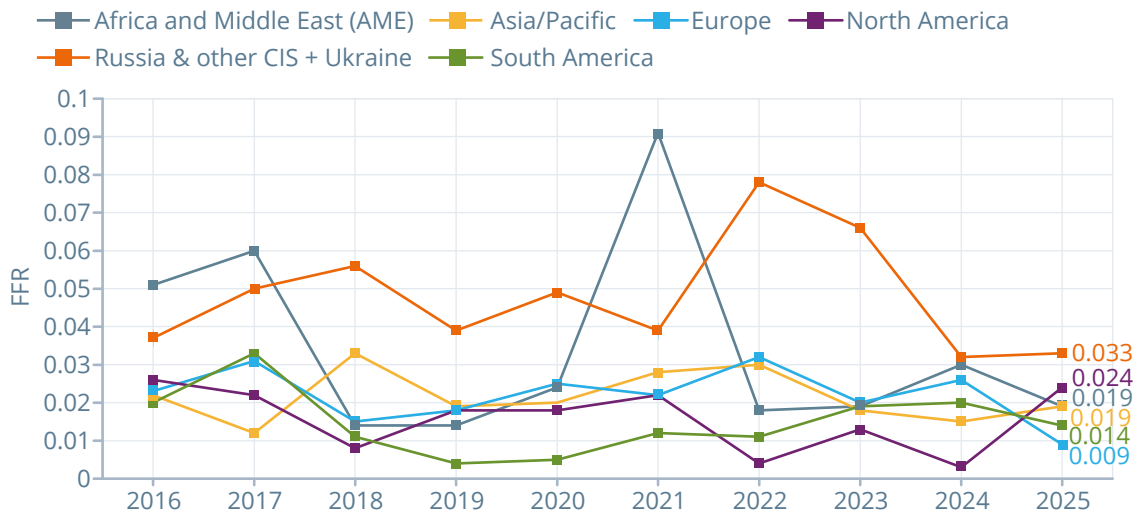
A total of 74 fatalities were reported to worldsteel in 2025, representing an increase of six compared to 2024.

Figure 3: Fatality frequency rate 2016-2025



The fatality frequency rate increased from 0.016 in 2024 to 0.018 in 2025.

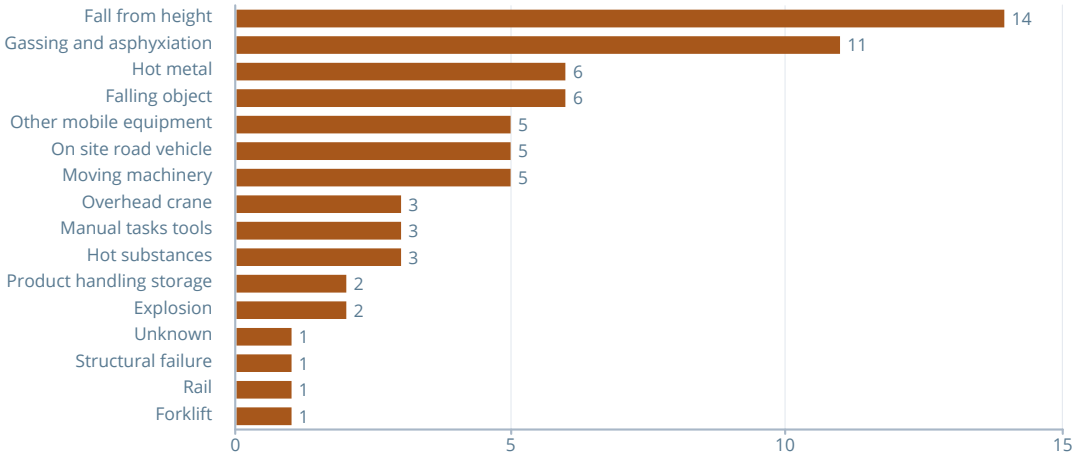
Figure 4: Fatality frequency rate per region 2016-2025



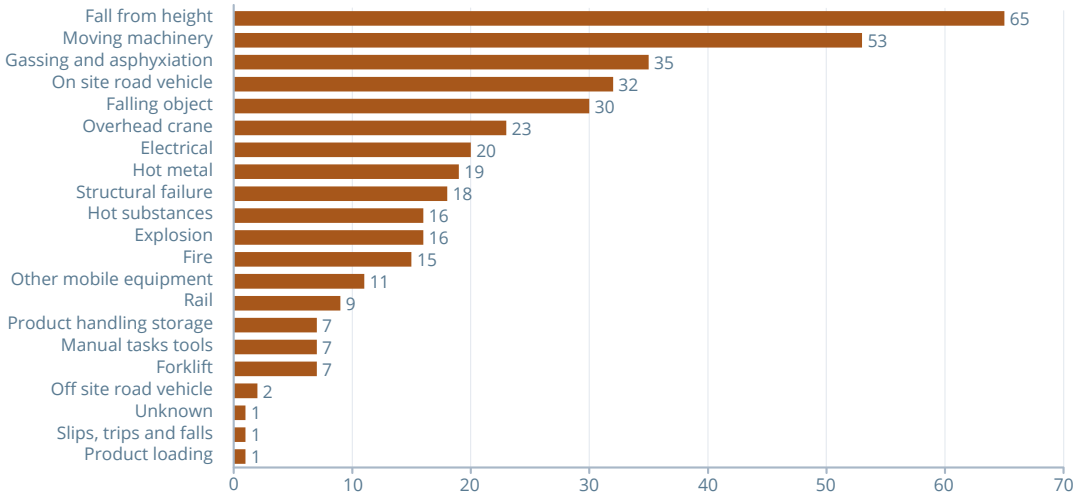
For many regions, the fatality frequency rate has remained relatively stable since 2016.

Figure 5: Causes of fatalities 2016-2025

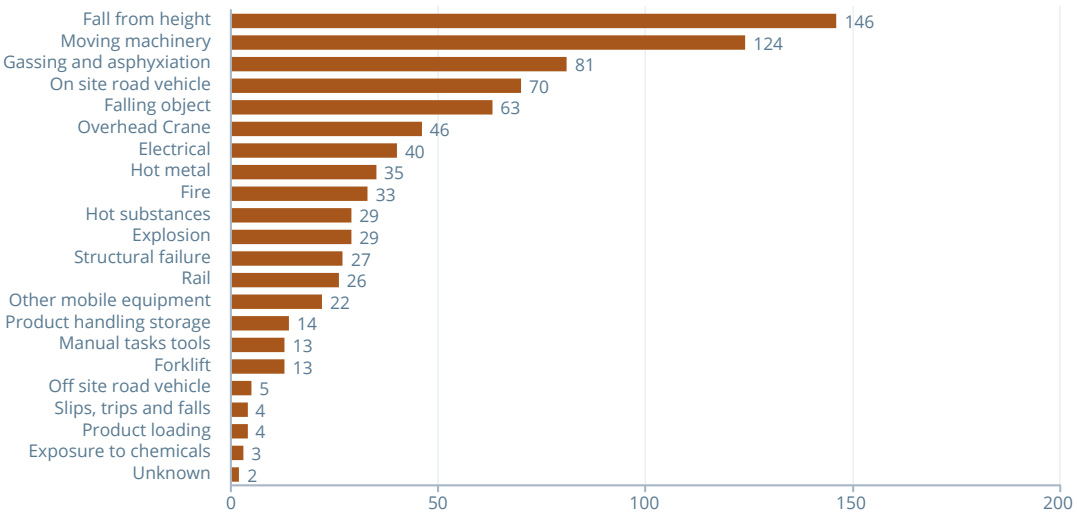
Causes of fatalities 2025



Causes of fatalities last 5 years 2021-2025



Causes of fatalities last 10 years 2016-2025



The top 5 causes of fatalities over the past decade were were falling from height, moving machinery, gassing and asphyxiation, on site road vehicles, and falling objects.These 5 causes are consistent over time.

The following graphs show the distribution of causes split by employees and contractors.

Figure 6: Causes of employee fatalities 2025*

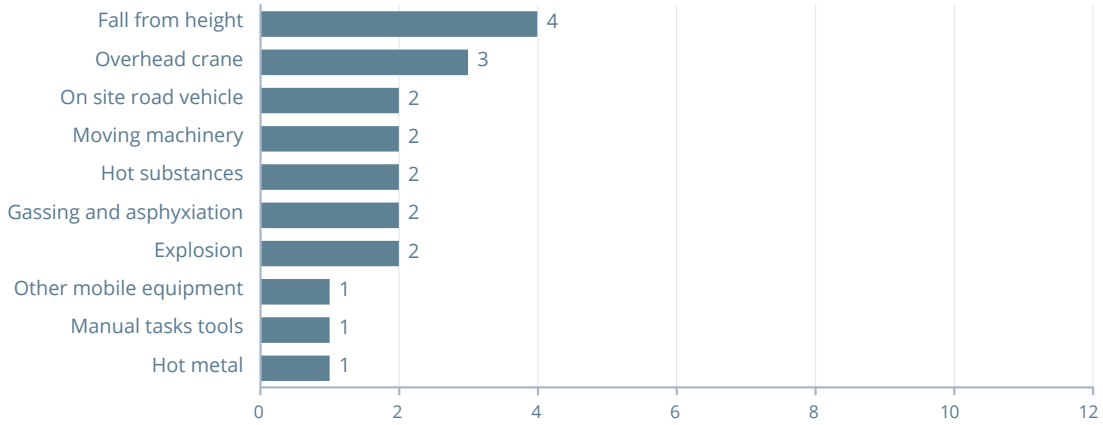
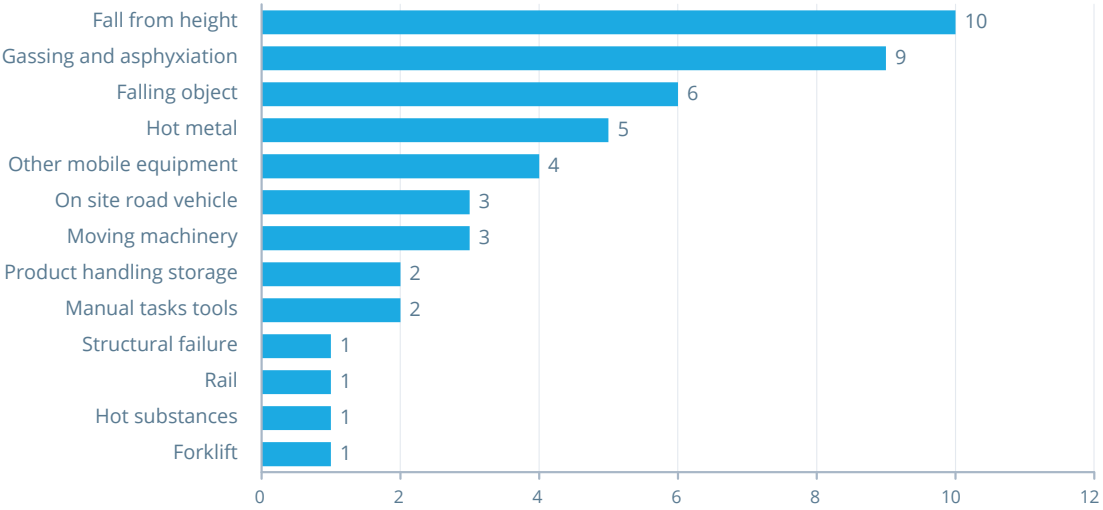


Figure 7: Causes of contractor fatalities 2025*



* Note: Events registered as 'other' or 'Unknown' are not included.

Contractors remain a vulnerable community within the global steel industry. Causes of fatalities for contractors and employees are different, reflecting the different activities and risks faced by each group.

Process safety management (PSM) analysis

Process safety management is a blend of engineering, operations and management skills focused on prevention of, preparedness for, mitigation of, response to, and restoration from catastrophic events, particularly explosions, fires, structural collapse and damaging releases of hazardous substances or energy from a process.

The manufacturing of steel involves processes with intrinsic hazards that need careful management.

The focus of process safety management is not limited to protecting the people within the company but also includes the environment, assets and the surrounding community.

Figure 8: Process safety management maturity assessment results 2025

The process safety management maturity analysis was derived from data provided by 38 organisations, representing 36.2% of worldsteel members.

Increasing maturity in process safety management can be observed. The industry has grown in experience and expertise in process safety management.

However, there are some important areas of improvement for elements 6 (process and equipment knowledge), 15 (measurement and metrics), and 16 (auditing).

Process Safety KPIs are different from Occupational Safety KPIs. A specific set of indicators and guidance are being developed for process safety.

Table 1: Significant process safety events 2025

	Fires	Explosions	Molten metal and water reactions	Gas and liquid releases
Quantity	757	84	68	317

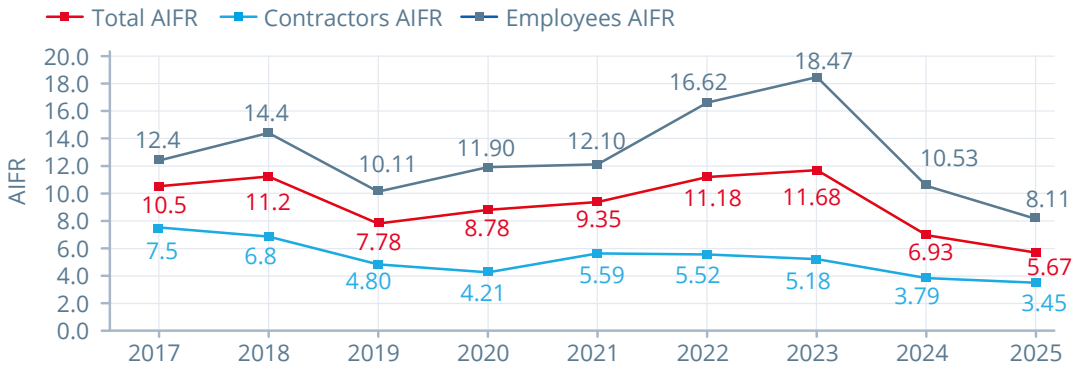
In 2025, worldsteel members reported 106 tier 1 process safety events (PSEs) and 247 tier 2 PSEs.

worldsteel's approach to process safety management is built on the American Petroleum Institute Recommended Practice 754, and identifies 17 key PSM elements.

All injury frequency rate (AIFR) and total recordable injury frequency rate (TRIFR)

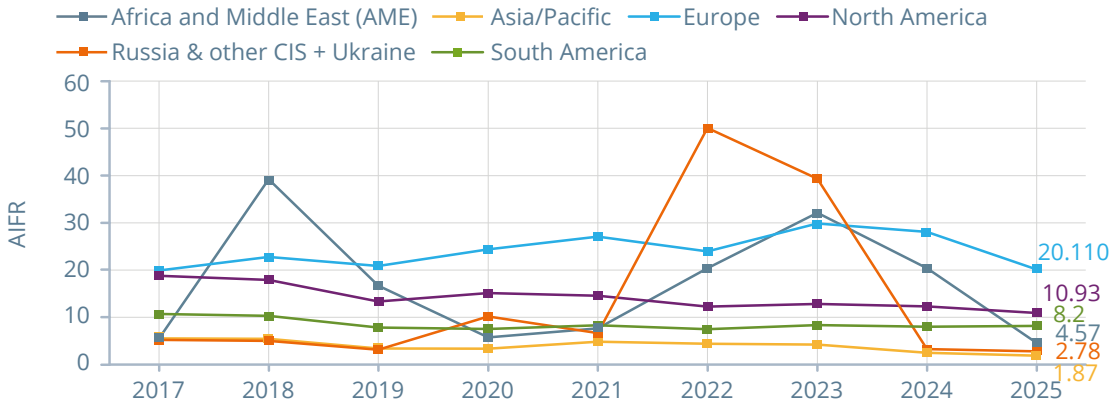
All injuries comprise fatalities, lost time injuries (LTIs), restricted work cases (RWCs), medical treatment injuries (MTIs) and minor injuries (MIs).

Figure 9: All injury frequency rate 2017-2025



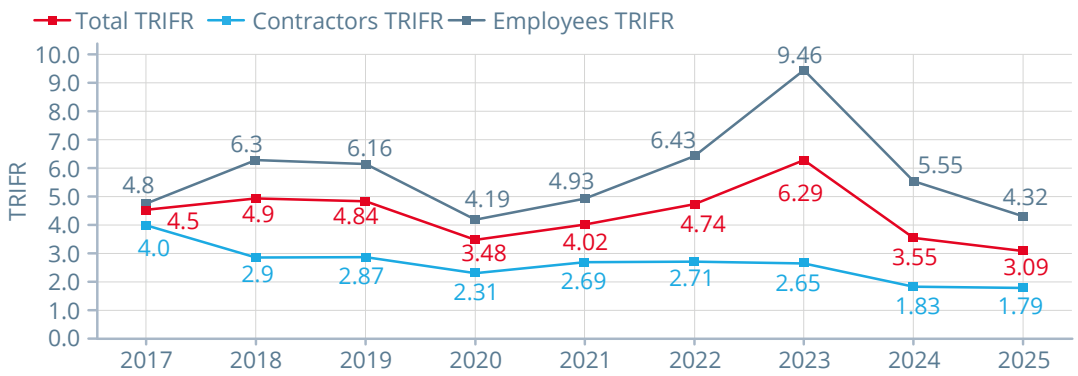
AIFR decreased from 6.93 in 2024 to 5.67 in 2025. Compared with TRIFR, AIFR also includes minor injuries.

Figure 10: All injury frequency rate per region 2017-2025



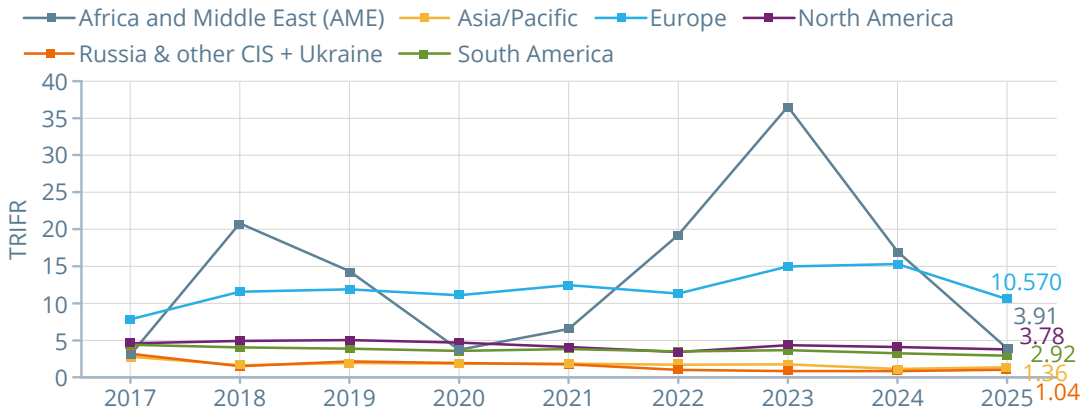
Total recordable injuries comprise fatalities, lost time injuries (LTIs), restricted work cases (RWCs), and medical treatment injuries (MTIs). The frequency rate refers to the total number of injuries per million hours worked.

Figure 11: TRIFR 2017-2025



TRIFR decreased from 3.55 in 2024 to 3.09 in 2025.

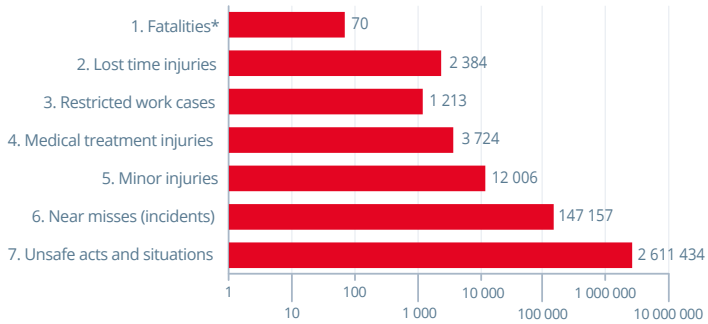
Figure 12: Total recordable injury frequency rate per region 2017-2025



In the data survey, RWCs, MTIs and MIs are recorded separately. Working hours are counted only on sites that have reported at least one RWC or MTI or MI.

Safety pyramids can be used to compare the shape of a company's incident triangle. In case the company triangle is narrower, it could mean that not all incidents are reported, or that fatality prevention requires more attention. It should be noted that the average incident triangle is not necessarily optimal; it should probably be wider. Reducing the number of more minor incidents does not directly reduce the probability of severe incidents, but having those reported allows action to be taken to mitigate risks that might otherwise cause severe incidents.

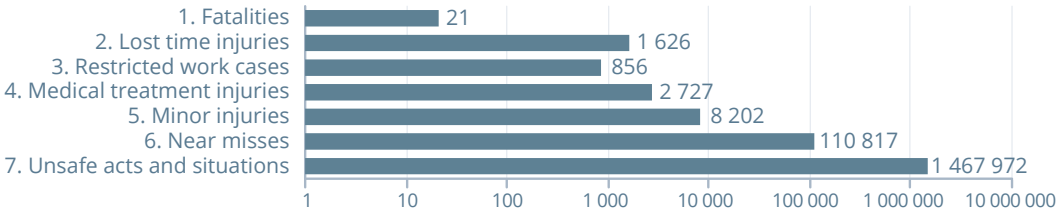
Figure 13: Safety pyramid 2025



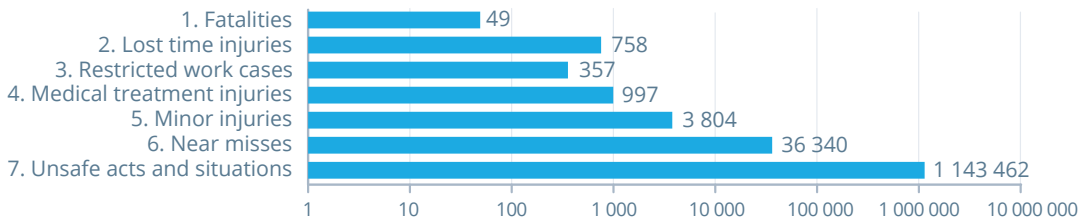
* In 2025, there were 74 fatalities reported to worldsteel. In order to preserve the ratios within the TRIFR section of this report, fatalities reported by organisations that were not able to provide TRIFR information have been excluded from this analysis.

Figure 14: Safety pyramids 2025 for employees and contractors

Employees:



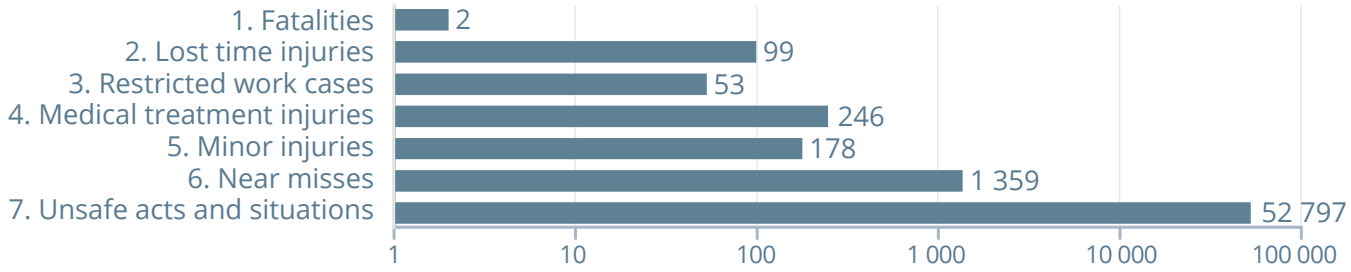
Contractors:



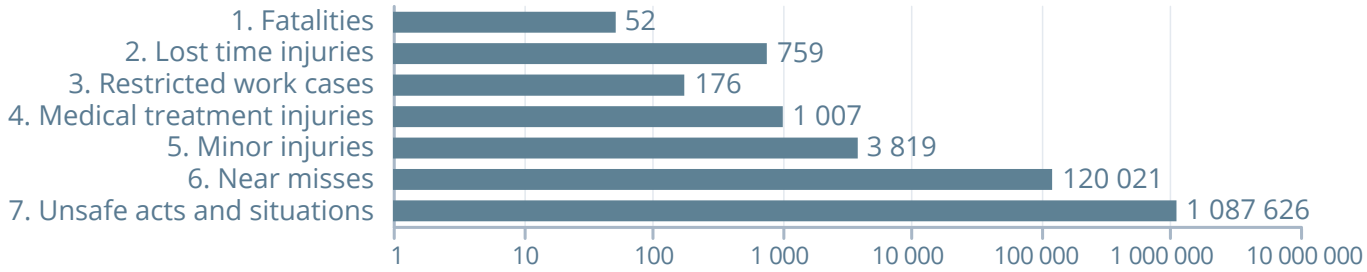
More must be done to improve contractor management systems, to improve reporting, and to better manage and reduce the risks contractors face. This is especially true of PSIF events (see page 4).

Figure 15: Regional safety pyramids

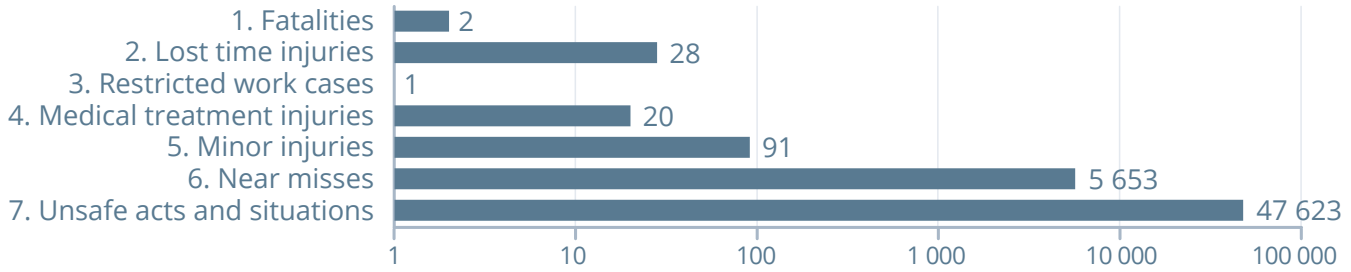
Africa and Middle East (AME)



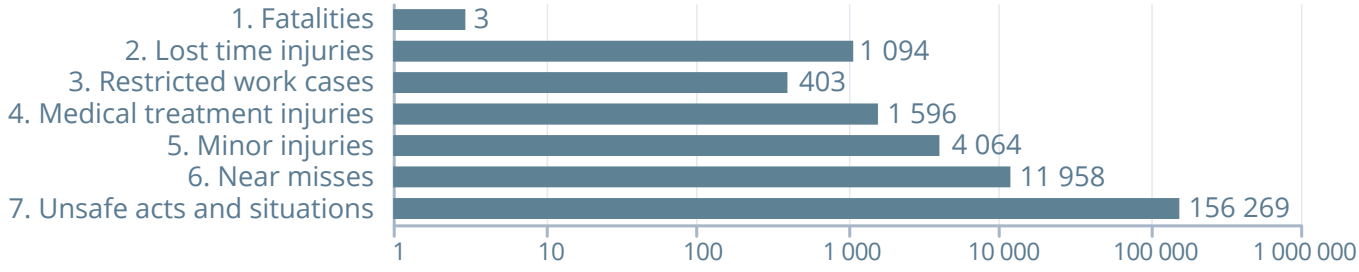
Asia/Pacific



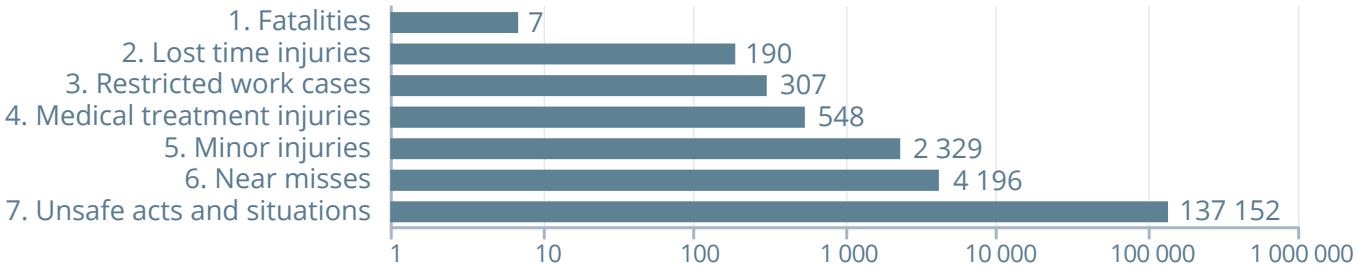
Russia & other CIS + Ukraine



Europe



North America



South America

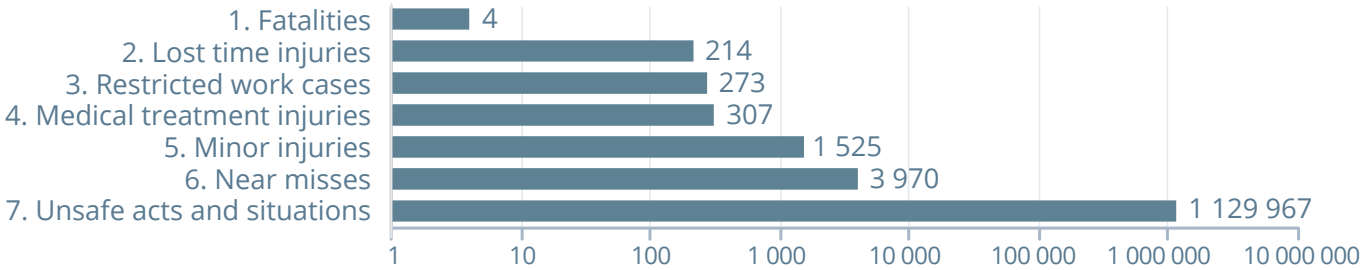


Table 2: Ratio LTIs vs fatalities 2012-2025

Cause	LTIs	Fatalities	Ratio LTIs per 1 fatality
Gassing and asphyxiation	272	155	1.75
Explosion	274	100	2.74
Rail	224	79	2.84
Fire	380	83	4.58
Electrical	508	89	5.71
Fall from height	2228	346	6.44
Structural failure	403	60	6.72
On site road vehicle	994	144	6.90
Overhead crane	1101	111	9.92
Forklift	368	36	10.22
Moving machinery	3344	321	10.42
Hot metal	809	76	10.64
Falling object	2500	185	13.51
Other mobile equipment	996	61	16.33
Hot substances	659	31	21.26
Off site road vehicle	345	14	24.64
Product loading	735	18	40.83
Product handling storage	2163	40	54.08
Exposure to chemicals	229	3	76.33
Manual tasks tools	3811	13	293.15
Slip, trip and fall	4497	6	749.50

A small ratio suggests fewer LTIs per fatality, and while less common these type of incidents represent a higher risk of fatalities.

Many process safety issues fall into this category. It is therefore particularly important to conduct thorough incident investigations and implement preventive measures for incidents with low ratios.

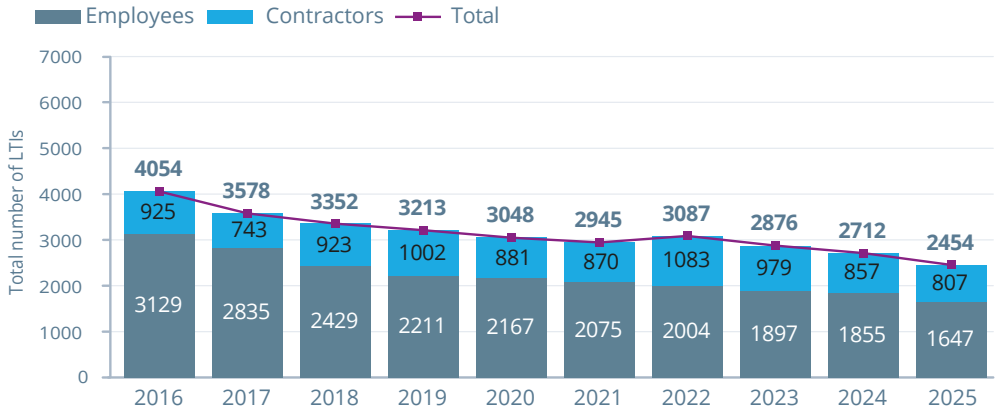
The table shows the ratio between lost time injuries and fatalities by causes. Low ratios mean that per fatality, there are, on average, only a small amount of lost time injuries; a high ratio indicates there are many lost time injuries per fatality. If these were drawn as an incident triangle for each cause, the triangles for the low ratios would be very narrow.

These ratios show that to prevent fatalities, it is more important to undertake comprehensive and robust incident investigations and instigate preventive measures for those incidents with a low ratio. It is precisely these incidents that are most likely to lead to fatalities without effective prevention. These ratios also emphasise the usefulness of categorising potential serious injuries and fatalities among other incidents.

Lost time injury (LTI) analysis

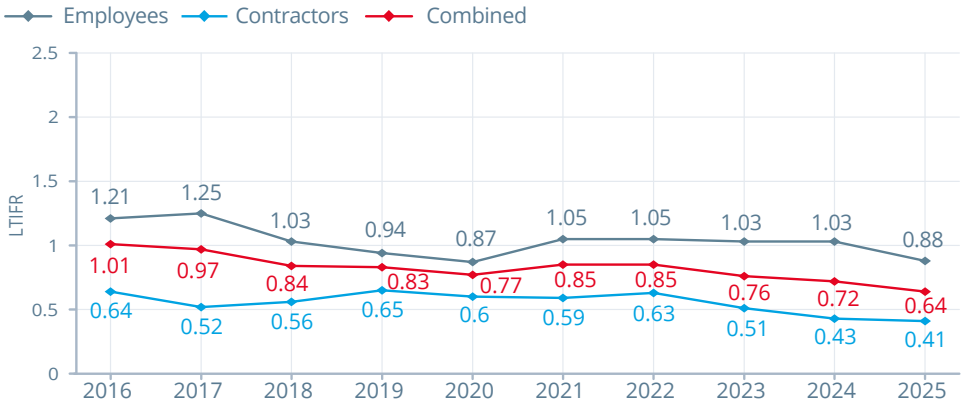
Any work-related injury resulting in the employee or contractor being unable to return to work for their next scheduled work period. Returning to work with work restrictions does not constitute an LTI, no matter how minimal or severe the restrictions, provided it is at the employee's next scheduled shift. However, if an injury deteriorates and time is later lost, a LTI should be recorded. The LTIFR is calculated by combining fatalities and LTIs.

Figure 16: Number of LTIs 2016-2025



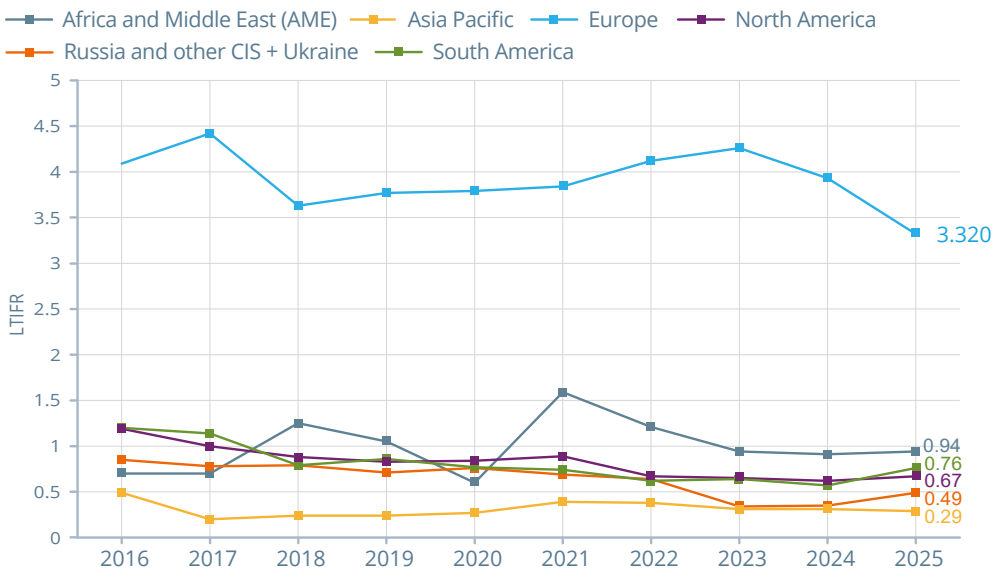
The number of LTIs decreased from 2712 in 2024 to 2454 in 2025.

Figure 17: LTIFR 2016-2025



The LTIFR decreased from 0.72 in 2024 to 0.64 in 2025.

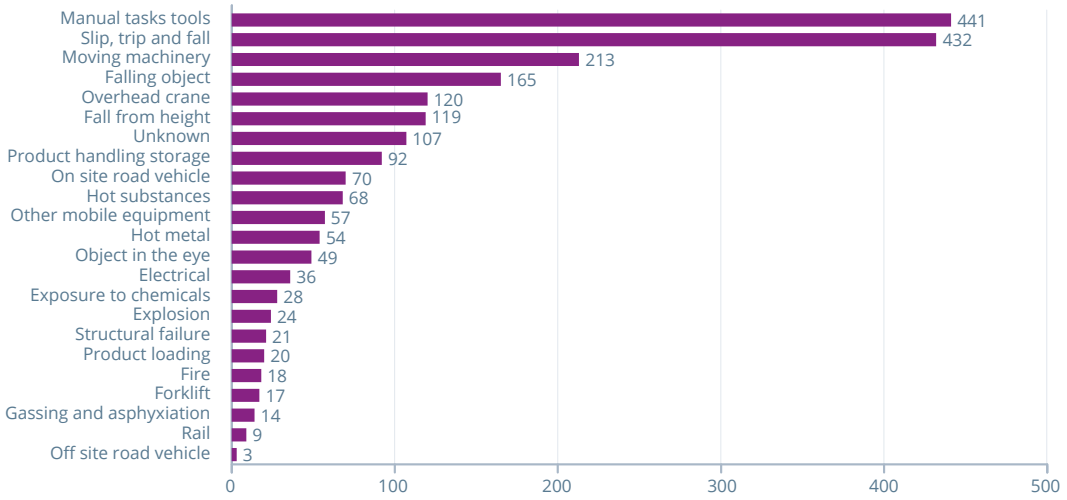
Figure 18: LTIFR per region 2016-2025



Variations across regions are in part attributed to differences in injury definitions and reporting cultures.

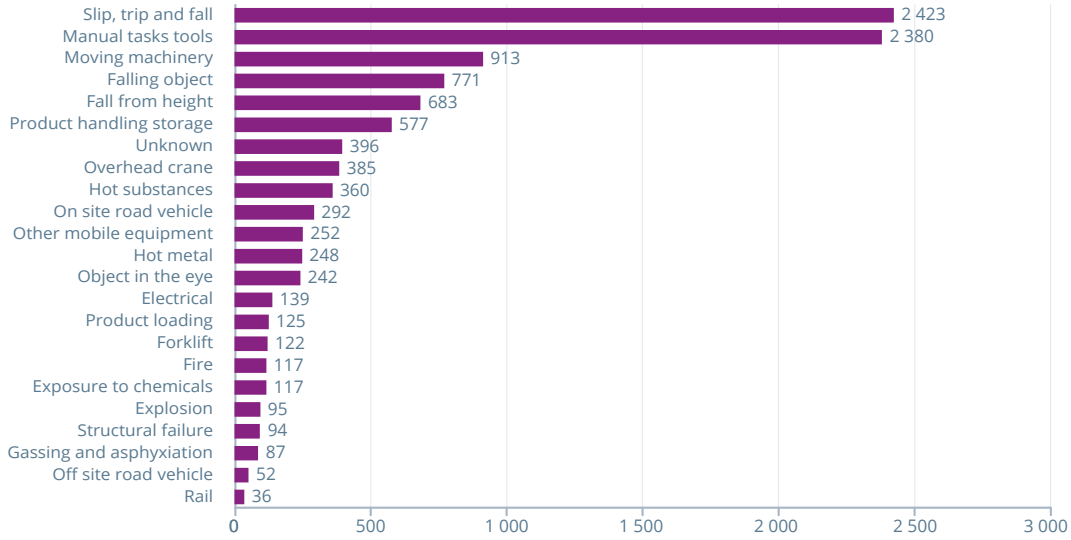
Figure 19: Causes of LTIs 2016-2025 for employees and contractors combined

Causes of LTIs 2025

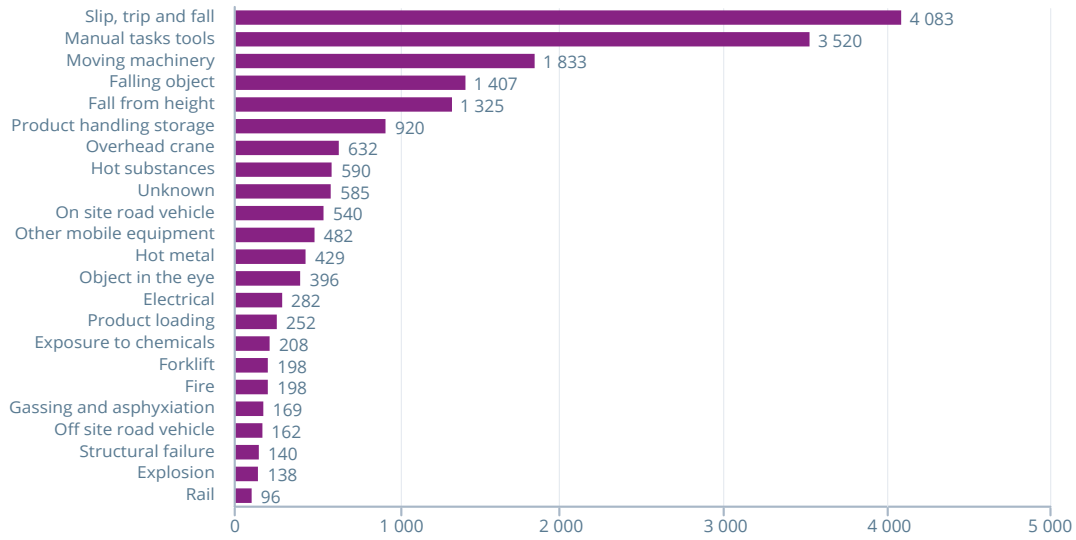


The top five causes of LTIs in 2025 for employees and contractors combined were use of manual tools, slipping, tripping, and falling, moving machinery, falling objects, and overhead cranes.

Causes of LTIs last 5 years (2021-2025)



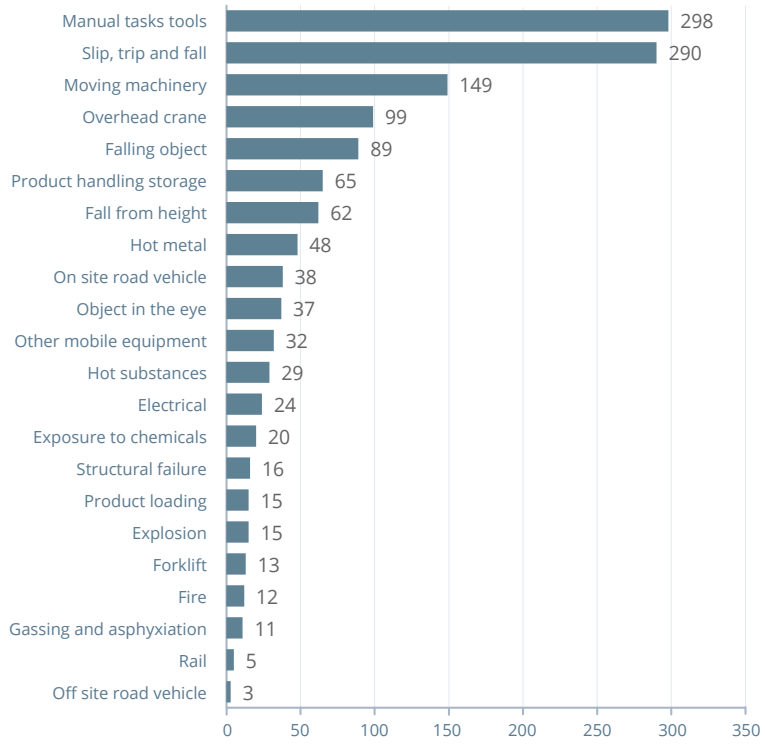
Causes of LTIs last 10 years (2016-2025)



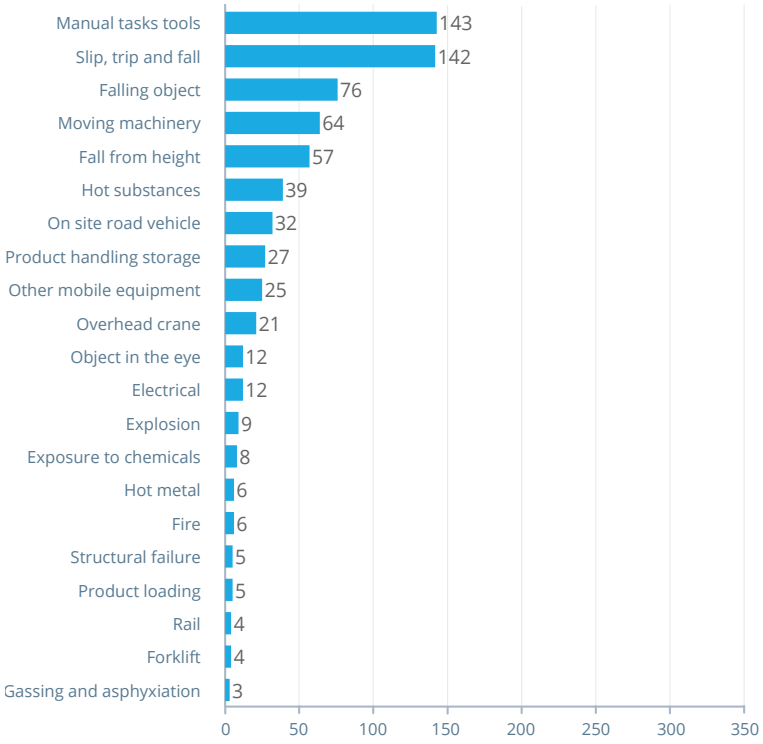
The following graphs show the distribution of causes, separated by employees and contractors.

Figure 20: Causes of LTIs in 2025 for employees and contractors

Causes of LTIs - employees 2025



Causes of LTIs - contractors 2025



Sickness absence

Sickness absence refers to absence from work on the grounds of incapacity to work due to any sickness, work-related or not, and which could qualify for 'disability income'. All other cases of absence, such as pregnancy, childbirth, leave, training and seminars, are not included in the definition of sickness absence.

Sickness absence rate is calculated as the total number of hours of sickness absence per scheduled hours. This indicator is only calculated for employees and is expressed as a percentage.

Table 3: Sickness absence per region 2016 – 2025

% Sickness Absence	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Africa and Middle East (AME)	0.25	0.23	0.29	1.06	0.18	1.01	1.53	2.8	1.19	0.62
Asia/Pacific	0.08	0.08	0.19	0.15	0.05	0.11	0.69	0.74	0.2	0.26
Russia & other CIS + Ukraine	1.26	1.41	0.6	1.38	1.88	1.73	2.33	2.21	1.66	0.75
Europe	2.02	2.26	1.92	3.32	3.89	4.36	6.38	4.95	4.34	4.96
North America	0.14	0.14	0.23	0.22	0.42	0.14	1.31	1.27	3.5	NA
South America	0.53	0.48	0.43	0.75	0.46	0.42	3.03	1.59	1.28	1.08

JSW

Reported occupational sickness levels vary between regions due to differences in industry composition, regulatory standards, and access to healthcare. Cultural attitudes towards reporting workplace-related illnesses and socioeconomic factors also play a role in the disparities. Efforts to improve healthcare access can help promote healthier working environments worldwide.

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