

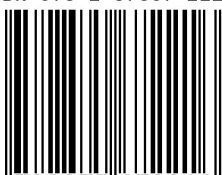
Report

Report no 12/26

European downstream oil industry safety performance

Statistical summary of reported incidents -
2025

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European downstream oil industry safety performance

Statistical summary of reported incidents - 2025

This report was prepared by J. Dekeyser and C. Davidson (Anything Hosted) at the request of Concawe Safety Management Group (SMG).

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CONTENTS		Page
EXECUTIVE SUMMARY		6
1.	INTRODUCTION TO 2025 REPORT	8
2.	2025 PERSONAL SAFETY PERFORMANCE RESULTS	11
2.1.	2025 FATALITIES	11
2.2.	2025 LWI	12
2.3.	PERFORMANCE TRENDS IN THE LAST 10 YEARS - 2015 TO 2025	23
3.	PROCESS SAFETY	32
4.	COMPARISON WITH OTHER SECTORS	40
5.	REFERENCES	41
APPENDIX 1 EUROPEAN OIL INDUSTRY STATISTICS DEFINITIONS AND GUIDING NOTES		44
CONCAWE CATEGORIZATION OF CAUSES FOR FATALITIES AND LWIS		47
APPENDIX 2 HISTORICAL DATA 1993 TO 2025		49
APPENDIX 3 LWI 2025 - CAUSAL FACTORS		55
APPENDIX 4 PROCESS SAFETY EVENTS 2025		56
APPENDIX 5 CONCAWE MEMBER COMPANIES THAT SUBMITTED DATA		59

EXECUTIVE SUMMARY

For 2025, information was received from 40 Concawe Member Companies and two Joint Ventures (comprised of Member Companies) reported separately, together accounting for greater than 94 % of the available refining capacity in the EU-27, UK, Norway and Switzerland. The purpose of collecting this data is to provide Member Companies with a benchmark against which to compare their performance, so that they can determine the efficacy of their safety management systems, identify shortcomings, and take corrective actions. Data also serve to demonstrate that the responsible management of safety in the downstream oil industry results in a low level of accidents despite the hazards intrinsic to its operations.

The aggregated 2025 results for Manufacturing, Marketing and the combined downstream oil industry are shown in the table below.

All reporting companies									
Sector	Manufacturing			Marketing			Both Sectors		
Workforce	OS	CT	AW	OS	CT	AW	OS	CT	AW
Hours worked Mh	108	173	282	133	176	309	242	349	591
Fatalities	0	2	2	1	1	2	1	3	4
FAR - FA/100Mh	0.00	1.15	0.71	0.75	0.57	0.65	0.41	0.86	0.68
LWI	157	240	397	142	137	279	299	377	676
Lost time through LWI - Days	5,906	9,905	15,811	3,754	4,496	8,250	9,660	14,401	24,061
LWIF - LWI/Mh	1.45	1.38	1.41	1.06	0.78	0.90	1.24	1.08	1.14
LWIS - Lost days/LWI	40.73	47.62	44.79	31.28	36.26	33.81	36.45	43.38	40.30
AI	323	419	742	197	176	373	520	595	1,115
AIF - AI/Mh	2.98	2.42	2.63	1.48	1.00	1.21	2.15	1.70	1.89
Distance travelled - million km	27	46	73	224	448	672	251	494	745
RA	25	15	40	57	45	102	82	60	142
RAR	0.82	0.32	0.51	0.25	0.08	0.14	0.31	0.11	0.18
T-1 PSE			50			5			55
T-2 PSE			96			13			109
T-1 PSER PSI/Mh reported			0.18			0.02			0.10
T-2 PSER PSI/Mh reported			0.34			0.05			0.20
Total PSER PSI/Mh reported			0.52			0.07			0.30

OS: Own staff; CT: Contractors; AW: All workers

*Total hours recorded in millions, rounded to whole number (rates below use data before rounding for hours associated with those companies/sectors reporting incidents)

** LWIS is calculated for those LWI where number of lost days are reported

*** RAR is calculated only when both Road accidents and Distance travelled are reported

There were four fatalities reported for 2025, by the industry, two Manufacturing contractors, one Marketing own staff and one Marketing contractor. One Manufacturing contractor as fatality injured caught in, under or between (safe mechanical lifting). Another Manufacturing contractor died following a fall from height during a demonstration. One Marketing employee died because of entrapment between equipment. One Marketing contractor died from a hydrocarbon explosion. The number of annual fatalities in 2025 is the third lowest in the last ten years and represents the lowest figure in the last five years. Even though the actual trend is good, the target of zero fatalities has still not been reached and needs a lot of effort to be accomplished.

In addition to fatalities Lost Workday Injuries (LWI) are also studied to identify further opportunities for continuous safety performance improvement. A total of 676 LWI were reported in 2025 (572 in the previous year) with a 2025 LWIF of 1.14, compared with 0.98 in 2024. As in previous years, a relatively small number of categories contribute to most LWI reported. In order of frequency (highest first) slips & trips (same height), falls from height, struck by, cut, puncture or scrape, and caught in under or between together account for 76% of all LWI reported in 2025 across Manufacturing and Marketing.

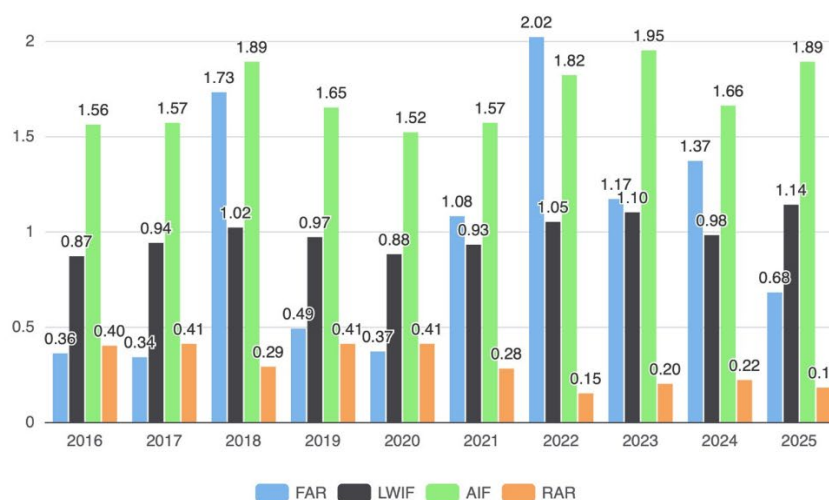
For 2025, 42 companies, including JV's between Concawe Members, submitted Process Safety Event (PSE) data for the Manufacturing operations and 23 submitted Marketing PSE data. The combined number of Tier 1 and 2 process safety events across Manufacturing and Marketing in 2025 (164) is 24% lower than in 2024 (204). Tier 1 Manufacturing process safety events (50 in 2025) decreased by 12% compared with 2024 (56) and Tier 2 Manufacturing process safety events (96 in 2025) are 33 less than in 2024 (128). The number of Marketing Tier 1 events in 2025 (5) is 80% lower than in 2024 (9) and Marketing Tier 2 events increased 15% to 13 from 11 events in 2024. No fatalities and 10 out of 676 LWI (1%) in 2024 were related to Tier 1 process safety events, this is lower than in 2023 (63% fatalities and 3% LWI).

Note that 2021, 2022, 2023 and 2024 data in this report have been revised based on new member company information received in the 2025 data collection. This report considers the following revision in revised data:

- an increase in the originally reported km driven for employees from 176 million in Concawe 2022 report [28] to 177 million and for contractors 417 million to 532 million in this report
- an increase in the originally reported km driven for employees from 820 million in Concawe 2023 report [29] to 915 million in this report.
- a decrease in the originally reported km driven for Marketing staff from 271 million in Concawe 2024 report [30] to 268 million in this report.
- an increase in the originally reported km driven for Marketing contractors from 499 million in Concawe 2024 report [30] to 586 million in this report.
- an increase in the originally reported km driven for Manufacturing staff from 27 million in Concawe 2025 report [31] to 31 million and Manufacturing contractors from 40 million to 47 million in this report.
- an increase in the originally reported km driven for Marketing staff from 236 million in Concawe 2025 report [31] to 257 million and Manufacturing contractors from 394 million to 501 million in this report.

This report therefore provides the most accurate and up to date details of 2021, 2022, 2023 and 2024 data.

All sectors performance from 2016 to 2025



1. INTRODUCTION TO 2025 REPORT

The collection and analysis of incident data is widely recognised by the downstream oil refining industry as an essential element of an effective safety management system. Concawe started compiling statistical data for the European downstream oil industry in 1993 and this is the thirty-first report on this topic (see references of past reports in the reference list [1-31]). This report covers data collected for 2025 as well as a full historical perspective from 1993. It also includes comparative figures from other industry sectors where available.

For 2025, information was received from all forty Concawe Member Companies and 2 Joint Ventures comprised of Member Companies when information has not been submitted by the Member Company partners. These submissions in 2025 represent more than 94% of the European Refining capacity. From the outset, most Concawe Member Companies have participated so that the report has always represented a large portion of the industry and by 1995 the report represented ~93% of European refining capacity (somewhat less for distribution and retail). Over the years, the level of representation has fluctuated in line with the structural changes and mergers occurring in the industry. In the last ten years, the average representation was around 97% of the European refining capacity.

The term “downstream” represents all activities of the industry from receipt of crude oil to products sales, through refining, distribution, and retail. Not all companies operate in both the Manufacturing and Marketing areas and not all companies are able to supply all the requested data. All those who do, collect data separately for “Manufacturing” (i.e., refining) and “Marketing” (i.e., distribution (transport), retail and “head office” staff) and this split has been applied in the report. The data is also split between company and contractor staff as contractor statistics are normally fully integrated into the companies’ safety monitoring systems. Some companies do not record road accidents separately from other incidents. All companies record own staff injuries against the Manufacturing and/or Marketing categories, but this is not always the case for lost days. Contractor data is in general, less complete than company staff data. Where data are not available directly, Members are requested to present the best estimate possible.

The purpose of collecting this data is twofold

- To provide Member Companies with a benchmark against which to compare their performance, so that they can determine the efficacy of their safety management systems, identify shortcomings, and take corrective actions
- To demonstrate that the responsible management of safety in the downstream oil industry results in a low level of accidents despite the hazards intrinsic to its operations.

Several safety key performance indicators have been adopted by most oil companies operating in Europe as well as by other industries. Although there are differences in the way Member Companies collect base data these common indicators allow for an objective comparison at the industry level. The differences in precise definitions used and in local interpretation of metrics means that direct comparison of data from individual companies could lead to erroneous conclusions. For this reason, Concawe does not report individual company data but rather aggregates the data at the membership level.

In 2009, Concawe began to compile Process Safety Performance Indicator (PSPI) data. These describe the number of Process Safety Events (PSE) expressed as unintended Loss of Primary Containment (LOPC). The 2025 Manufacturing PSE data represent 41 out of 42 of the Manufacturing companies and 94 % of European refining capacity.

In 2013, the Concawe membership agreed to adopt 16 incident categories to describe both fatalities and Lost Workday Injury (LWI) to learn more from the actual incidents. These categories allow for better benchmarking and alignment with other industry organisations, particularly the IOGP that

represents the upstream sector of the oil and gas industry. The Concawe categorization of fatalities and LWI are further explained in Appendix 1.

In 2014, Concawe decided to commence collecting additional information in relation to the nature of Marketing retail operations. Companies have been asked to indicate if they have no retail activity and to describe their retail operations as either Company Owned Company Operated (COCO), Company Owned Dealer Operated (CODO), Dealer Owned Company Operated (DOCO) or Dealer Owned Dealer Operated (DODO). Concawe would like to improve the report in the data coverage for retail and transport contractors.

As from 2018, additional information was gathered regarding the causal factors of Lost Workday Injuries. This information is in line with the requirements of API RP 754 (2016) [31]. This data is presented in table format in Appendix 3. Over time this will allow assessment of the main factors contributing to Lost Workday Injuries from which approaches to address incident prevention can be developed.

In 2019, the possibility to link reported Tier 1 Process Safety Events with Lost Workday Injuries was provided with the intention to build an understanding of the types of Process Safety Events and their causal factors that lead to direct injury.

In 2021, the opportunity to record the number of RWIs and/or MTCs linked to each Tier 2 Event was provided.

Since 2022, it has been possible to record for each LWI and fatality, the type of permit to work (PTW) issued at the time of the incident and for each LWI, the number of days absent from work. This information may help Member Companies build a strong management system in conjunction with their PTW procedure.

In 2023, Concawe introduced mandatory reporting of more detailed Tier 1 process safety event information to enable focus on Tier 1 events in five categories: Fire with damage greater than or equal to \$100,000 of direct cost; Explosion with damage greater than or equal to \$100,000 of direct cost; An officially declared community evacuation or community shelter-in-place, (including precautionary); Engineered pressure relief that results in one or more of four consequences (rainout, discharge to a potentially unsafe location, on on-site shelter-in-place or on-site non- precautionary evacuation and/or public measures (including precautionary)) and Upset Emission from a Permitted or Regulated Source that results in one or more of the same four consequences.

A new set of causal factors with revised definitions was introduced in 2023 (see Appendix 1) in an attempt to understand more about the causes of incidents. The causal factor "human factors" has been widely reported, but this rarely informs the root cause of the incident and it is possible that Member Companies have different definitions of human factors. Causal factors are still described in alignment with API RP 754 (2021) [32] and multiple factors may be recorded per LWI.

In 2024, Concawe introduced a number of modifications to enhance learning from the data collected. These included the ability to report >180 days absence from work, the alignment of PSE Tier 1 and Tier 2 consequence reporting with API RP 754, the modification of permit to work definitions and the link of fatal incidents to the IOGP Life Saving Rules [33] involved.

In 2025, Concawe SMG discussed the rationale for collecting Permanent Impairment (PI) data, the need for clear definitions, and the challenges of categorizing incidents, including the handling of cases with delayed PI determination and the relationship between PI, lost work injuries, and restricted work injuries. It was decided to include the PI data in the 2025 survey.

Table 1 summarises the number of submissions and illustrates some key aspects of the data supplied by the companies.

Table 1 Number of companies submitting data for 2025

No Of Companies	Manufacturing			Marketing		
	Own Staff	Contractors	All Workers	Own Staff	Contractors	All Workers
Submission	42	40		23	21	
Including						
Lost Days	36	35		19	16	
All Injuries	36	36		12	16	
Road Accidents	37	35		17	15	
Distance Travelled	28	26		14	12	
Process Safety			41			19
Retail Operations						
No Retail						4
COCO						14
CODO						14
DOCO						9
DODO						9

Several Companies do not report their road accidents and related exposure hours separately. These incidents are included in their overall statistics in cases where relevant criteria (LWI, AI) are met.

2. 2025 PERSONAL SAFETY PERFORMANCE RESULTS

The aggregated 2025 results for Manufacturing, Marketing and the combined downstream industry are shown in Table 2.

Table 2 Aggregated 2025 results for all reporting companies

All reporting companies									
Sector	Manufacturing			Marketing			Both Sectors		
Workforce	OS	CT	AW	OS	CT	AW	OS	CT	AW
Hours worked Mh	108	173	282	133	176	309	242	349	591
Fatalities	0	2	2	1	1	2	1	3	4
FAR - FA/100Mh	0.00	1.15	0.71	0.75	0.57	0.65	0.41	0.86	0.68
LWI	157	240	397	142	137	279	299	377	676
Lost time through LWI - Days	5,906	9,905	15,811	3,754	4,496	8,250	9,660	14,401	24,061
LWIF - LWI/Mh	1.45	1.38	1.41	1.06	0.78	0.90	1.24	1.08	1.14
LWIS - Lost days/LWI	40.73	47.62	44.79	31.28	36.26	33.81	36.45	43.38	40.30
AI	323	419	742	197	176	373	520	595	1,115
AIF - AI/Mh	2.98	2.42	2.63	1.48	1.00	1.21	2.15	1.70	1.89
Distance travelled - million km	27	46	73	224	448	672	251	494	745
RA	25	15	40	57	45	102	82	60	142
RAR	0.82	0.32	0.51	0.25	0.08	0.14	0.31	0.11	0.18

OS: Own staff; CT: Contractors; AW: All workers

*Total hours recorded in millions, rounded to whole number (rates below use data before rounding for hours associated with those companies/sectors reporting incidents)

** LWIS is calculated for those LWI where number of lost days are reported

*** RAR is calculated only when both Road accidents and Distance travelled are reported

For the first reporting of PI in 2025, 4 cases were reported. In the following years with more data, we will be able to observe some trend in the PI data

2.1. 2025 FATALITIES

There were four fatalities reported for 2025:

- One Manufacturing contractor was killed as a result being caught in, under or between two heat exchangers.
- One Manufacturing contractor was killed as a result falling from height during an emergency rescue demonstration.
- One Marketing staff was killed as a result being caught in, under or between the bumpers of a stationary train.
- One Marketing contractor was killed because of explosion or burns from a hydrocarbon explosion.

The number of fatalities in 2025 is lower than that recorded in 2024 (eight), a decrease of four fatalities. Continued efforts are essential to achieve the target of zero fatalities in our industry, in particular a focus on explosion or burns, falls from height and caught in, under or between incidents.

2.2. 2025 LWI

In 2025, there were a total of 676 Lost Workday Injuries (LWI), with 59% of these in Manufacturing and 41% in Marketing. The proportion of Manufacturing LWI recorded for staff and contractors is 40 and 60% (157 and 240 LWI, respectively). In Marketing, the proportion of LWI recorded for staff and contractors is 51 and 49% (142 and 137 LWI, respectively).

There was an increase in Lost Workday Injury Frequency (LWIF) compared with 2024. The LWIF went from 0.98 LWI/Mh in 2024 to 1.14 LWI/Mh in 2025 across all workers. The number of LWI increased by 104 from 572 in 2024 to 676 in 2025. The All-Injury Frequency (AIF) also increased from 1.67 AI/Mh in 2024 to 1.89 AI/Mh in 2025 across all workers.

As in recent years, Manufacturing staff in 2025 is the sector with the highest LWIF (1.45 in 2025 and 1.35 in 2024) and Marketing contractors have the lowest recorded LWIF of all sectors in 2025 at 0.78 (0.70 in 2024).

For comparison purposes, the LTIF (frequency of LWI + Fatalities) has been calculated for each category of workers, compared with the LWIF and presented in Table 3 below.

The small difference between the two reported measures is related to the relatively small number of fatalities (four) compared with the number of LWI (676). The effective investigation of all incidents (near miss, minor and major) to obtain a full understanding of their root causes is therefore essential for the creation of a supportive safety culture and the fostering of the right organisational behaviours necessary to achieve zero incidents or accidents in operations.

Table 3 Comparison of LWIF and LTIF in 2025

	LWIF	LTIF
All Workers	1.14	1.15
Manufacturing Staff	1.45	1.45
Manufacturing Contractors	1.38	1.40
Manufacturing All	1.41	1.42
Marketing Staff	1	1.07
Marketing Contractors	0.78	0.79
Marketing All	0.90	0.91

Table 4 indicates a relatively small number of categories contribute to most LWI reported. In order of overall frequency across all sectors (highest first):

- slips & trips (same height) 32.4% of LWI reported
- cut, puncture and scrape 12.0%
- falls from height 8.7%
- caught in, under or between 8.7%
- overexertion, strain 7.8%
- struck by 7.2%

Together these incident categories account for over 76% of all LWI reported in 2025 across Manufacturing and Marketing.

Other frequently reported incident categories in Manufacturing include:

- Explosion or burns 7.1%
- Exposure, noise, chemical, biological, vibration 5.0%

Concentrating on the most frequently reported incident categories offers the opportunity to address prevention of LWI across both sectors.

The largest differences between Manufacturing and Marketing in the proportions of LWI reported by incident category are in explosion or burns (7.1% of Manufacturing LWI, compared with 3.9% of Marketing LWI), caught in, under or between (10.3% of Manufacturing and 6.5% of Marketing LWI) and slips and trips (36.6% of Marketing and 29.5% of Manufacturing LWI).

As a proportion of LWI reported, Manufacturing contractors reported more caught in, under or between type LWI than own staff (14.6% of all Manufacturing contractor LWI compared with 3.8% of LWI for Manufacturing own staff), while slips and trips were more prevalent as LWI in Manufacturing staff (36.3% of all Manufacturing own staff LWI compared with 25.0% of all Manufacturing contractor LWI). Falls from height type LWI were reported more for Manufacturing contractors (10.0% of LWI) than for Manufacturing staff (5.7% of LWI).

In Marketing, the largest differences in the proportions of LWI reported between staff and contractors were in the incident categories of falls from height (7.7% of staff LWI and 10.9% of contractor LWI), slips and trips (37.3% of staff LWI and 35.8% of contractor LWI) and struck by (7.7% of staff LWI and 4.4% of contractor LWI).

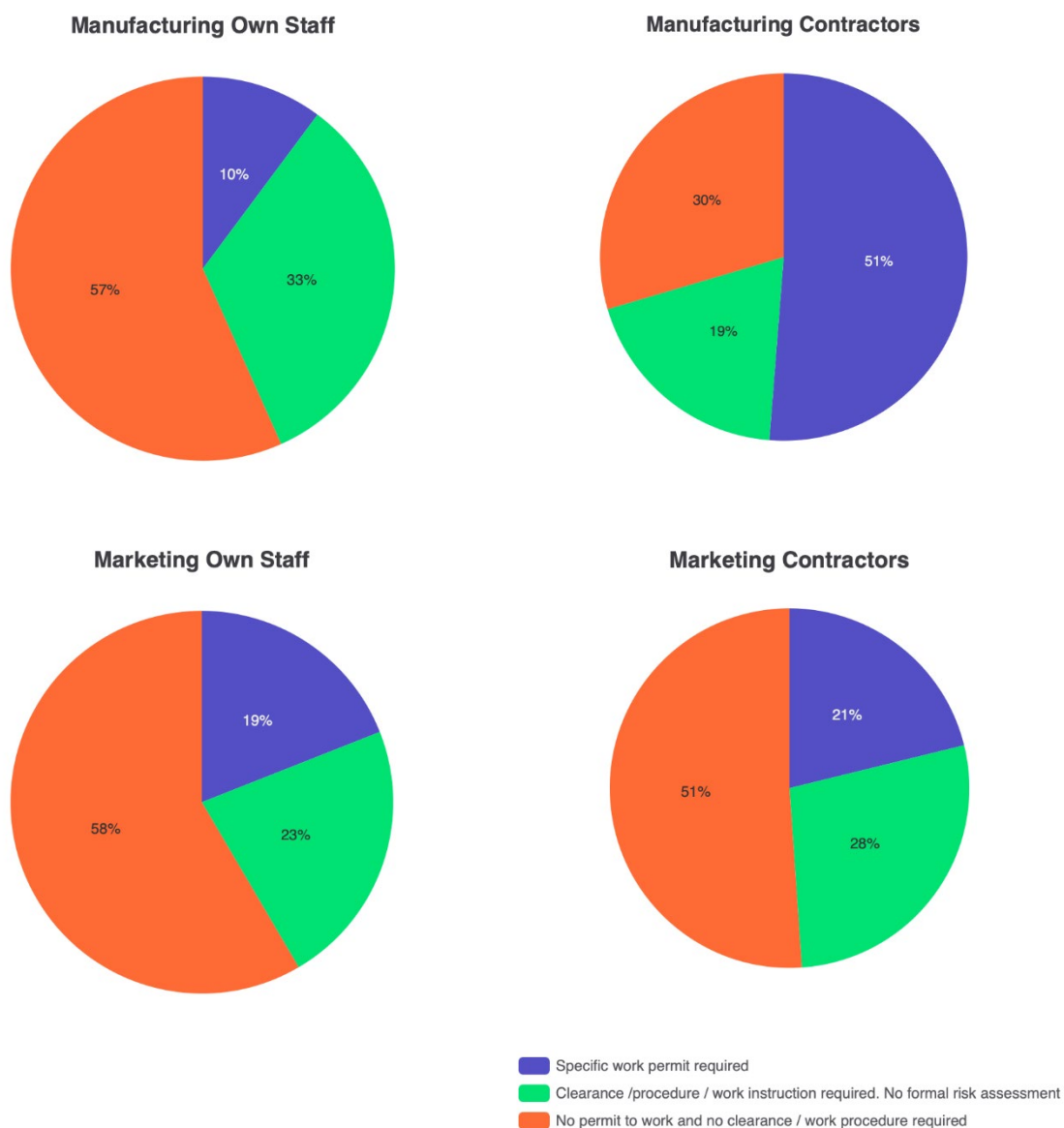
Table 4 LWI by Incident Category in 2025

Category		MF & MK Combined		Manufacturing (MF)						Marketing (MF)					
		All	%	OS	%	CT	%	AW	%	OS	%	CT	%	AW	%
Road Accident	Road Accident	21	3.1	4	2.5	4	1.7	8	2.0	6	4.2	7	5.1	13	4.7
Height/Falls	Falls from height	59	8.7	9	5.7	24	10.0	33	8.3	11	7.7	15	10.9	26	9.3
	Staff hit by falling objects	14	2.1	1	0.6	8	3.3	9	2.3	2	1.4	3	2.2	5	1.8
	Slips & trips (same height)	219	32.4	57	36.3	60	25.0	117	29.5	53	37.3	49	35.8	102	36.6
Burn/ Electrical	Explosion or burns	39	5.8	16	10.2	12	5.0	28	7.1	7	4.9	4	2.9	11	3.9
	Exposure electrical	10	1.5	2	1.3	2	0.8	4	1.0	3	2.1	3	2.2	6	2.2
Confined Space	Confined Space	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other Causes	Assault or violent act	6	0.9	1	0.6	0	0.0	1	0.3	2	1.4	3	2.2	5	1.8
	Water related, drowning	1	0.1	0	0.0	1	0.4	1	0.3	0	0.0	0	0.0	0	0.0
	Cut, puncture, scrape	81	12.0	12	7.6	31	12.9	43	10.8	19	13.4	19	13.9	38	13.6
	Struck by	49	7.2	12	7.6	20	8.3	32	8.1	11	7.7	6	4.4	17	6.1
	Exposure, noise, chemical, biological, vibration	26	3.8	7	4.5	13	5.4	20	5.0	3	2.1	3	2.2	6	2.2
	Caught in, under or between	59	8.7	6	3.8	35	14.6	41	10.3	5	3.5	13	9.5	18	6.5
	Overexertion, strain	53	7.8	18	11.5	14	5.8	32	8.1	14	9.9	7	5.1	21	7.5
	Pressure release	11	1.6	5	3.2	3	1.3	8	2.0	2	1.4	1	0.7	3	1.1

OS: Own staff; CT: Contractors; AW: All workers MF: Manufacturing; MK: Marketing

Since 2021, Concawe collected information to link the event leading to the LWI to the type of Permit to Work (PTW) required to execute the task, if any. The assignment of type of PTW (Specific work permit required; Clearance/procedure/work instruction required and No PTW and no clearance / work procedure required) for each of the sectors is set out in Figure 1A, below.

Figure 1A *Type of Permit to work for LWI recorded by sector*

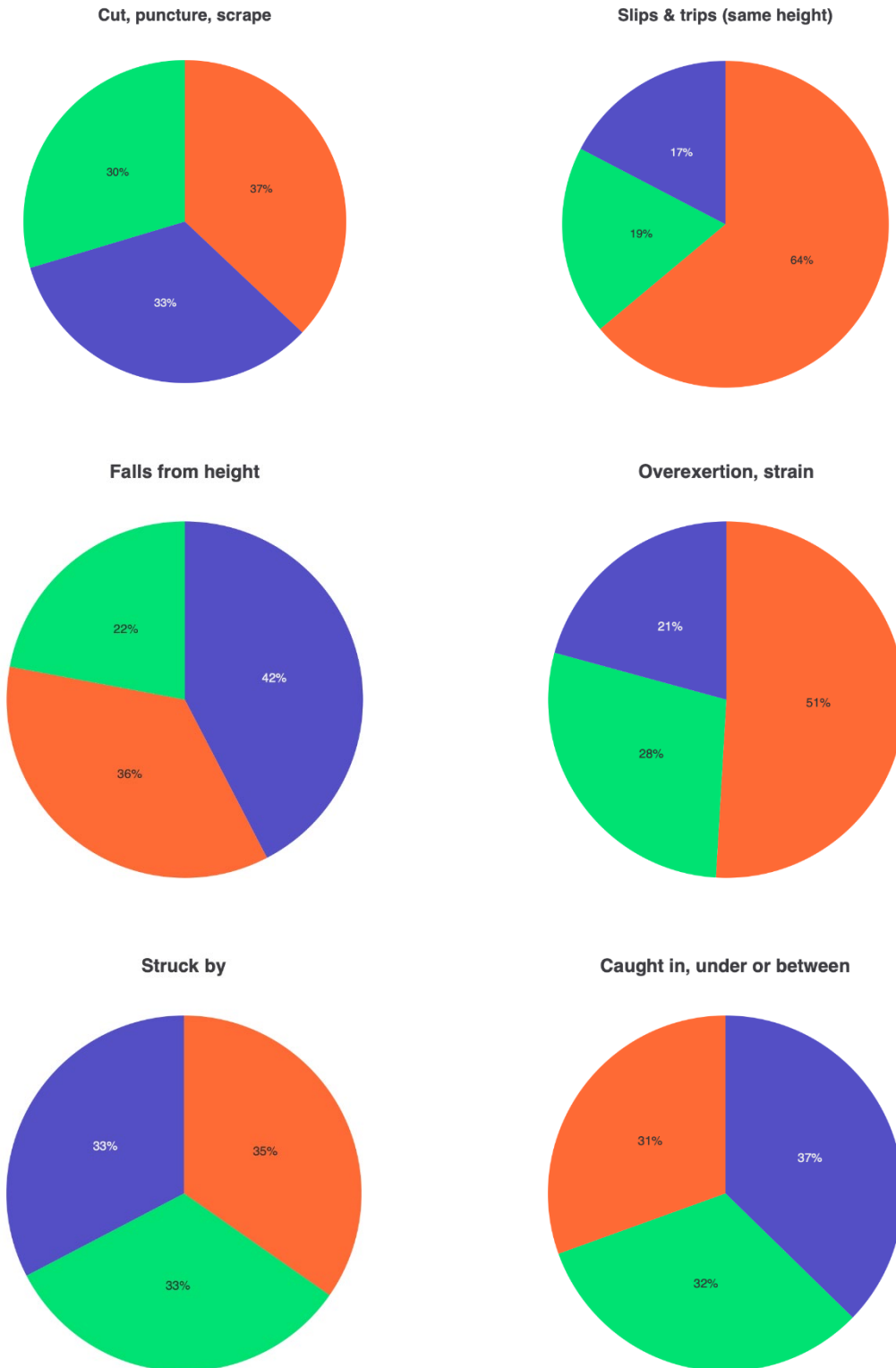


In all sectors, most LWI occur during work that does not require a specific work permit. For Manufacturing staff, 57% of LWI occur in work that does not require a specific permit or clearance/procedure/work instruction. For Manufacturing contractors, 51% of LWI are associated with work that does not require a specific permit. In Marketing, 58% of staff LWI and 51% of contractor LWI are associated with work that does not require a specific work permit or clearance/procedure/work instruction.

The specification of a work permit required at the time of a LWI varies across the sectors between the highest of 51% for Manufacturing contractors and lowest of 10% for Manufacturing staff. The proportion of LWI associated with work that requires a specific work permit has increased in Manufacturing contractors year on year from 48% of sector LWI in 2024 to 51% in 2025. The proportion of Marketing own staff LWI associated with work requiring a specific permit increased from 7% in 2024 to 19% in 2025, while the proportion associated with work not requiring a specific permit decreased from 65% in 2024 to 58% in 2025.

The proportion of the types of PTW specified varies between the sectors. A specific PTW was more likely to be in place at the time of events leading to LWI for Manufacturing contractors (51% of sector LWI) than for Manufacturing staff (10% of sector LWI). The proportion of all Manufacturing contractor LWI in 2025 while working under a specific PTW is higher than in 2024 (48%). As in 2024, Manufacturing staff reported the largest proportion of no PTW/no clearance/work procedure required (57%). Of the sectors reported in 2025, Manufacturing contractors had the smallest proportion of no PTW/no clearance/work procedure required (30%).

Figure 1B Type of PTW at LWI event for most frequently reported Incident Categories



The mean absence per LWI in 2025 was 38 days for Manufacturing staff, 44 days for Manufacturing contractors, 30 days for Marketing staff and 36 days for Marketing contractors, see Figure 1C. Compared with 2024, the mean number of days absent per LWI increased in all sectors: by 3 days (9%) for Manufacturing staff, by 3 days (7%) for Manufacturing contractors, by 1 day (3%) for Marketing staff and by 3 days (9%) for Marketing contractors.

Figure 1C Mean number of days absent from work per LWI by sector (MF = Manufacturing; MK = Marketing; OS = Own Staff; CT = Contractors)

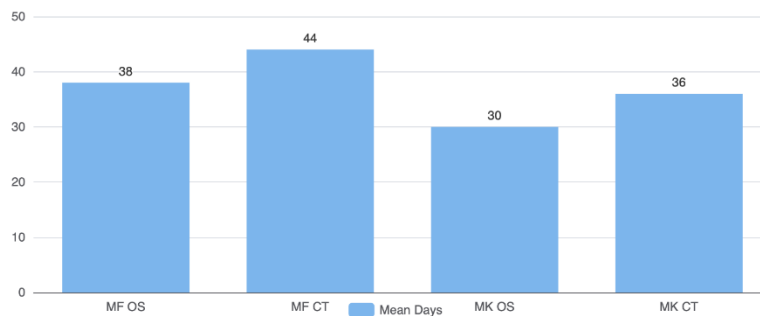
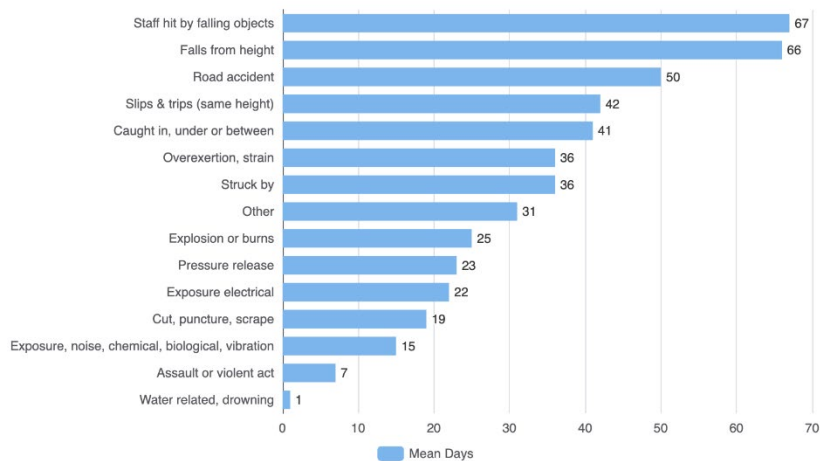


Figure 1D Mean number of days absent from work per LWI by incident category



The mean number of days absence per LWI by incident category is set out in Figure 1D. Staff hit by falling objects categorised LWI have the highest mean number of days absence per LWI (67 days), increasing by 34 days from 2024 (33 days), followed by falls from height (66 days, compared with 55 days in 2024), road accident (50 days, compared with 29 days in 2024), slips and trips (42 days, compared with 39 days in 2024) and caught in, under or between (41 days, compared with 42 days in 2024). The largest year-on-year increase in mean days absence per LWI was reported for road accident incidents, increasing by 21 days (72%), while water related, drowning incidents decreased from 26 days in 2024 to 1 day in 2025.

Figure 1E

Days of Absence in function of number of LWI's

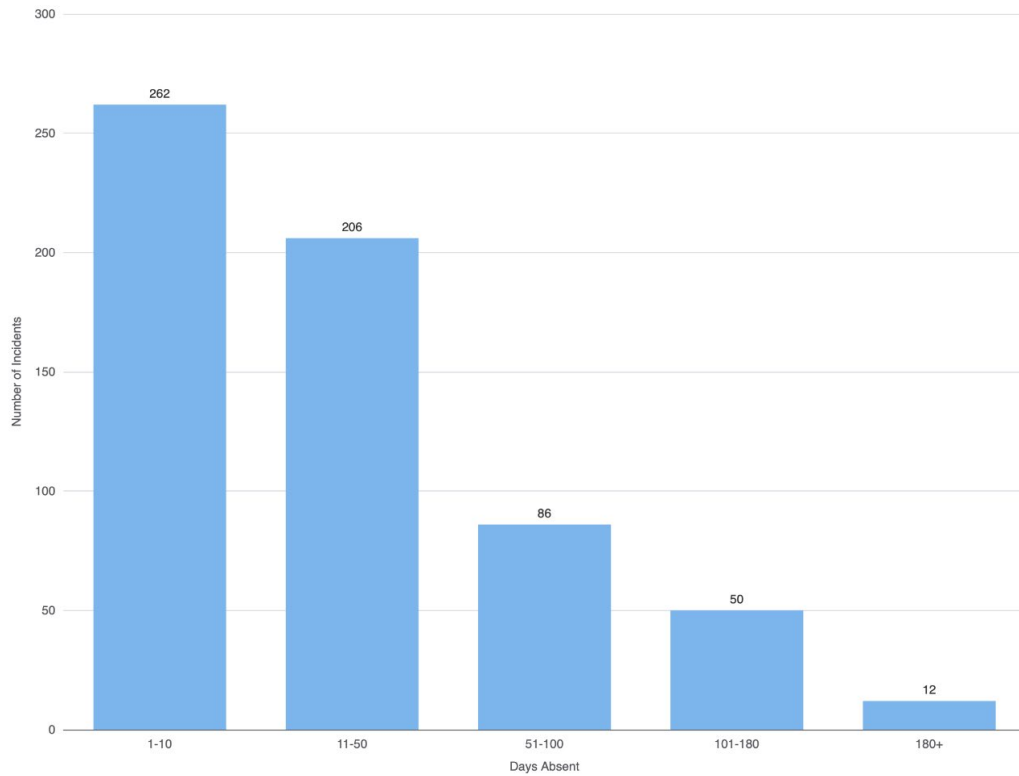


Figure 1F

Days of absence in function of number of LWI's for Manufacturing and Marketing Staff and Contractor personnel

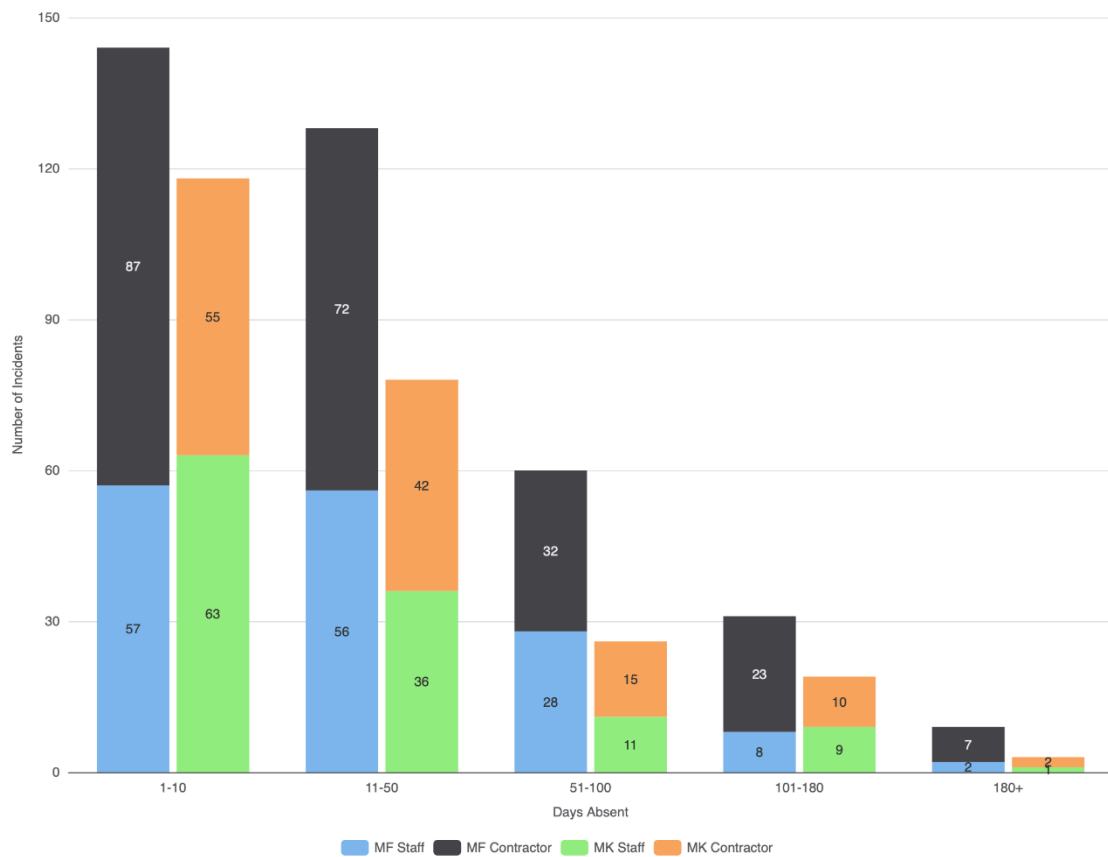
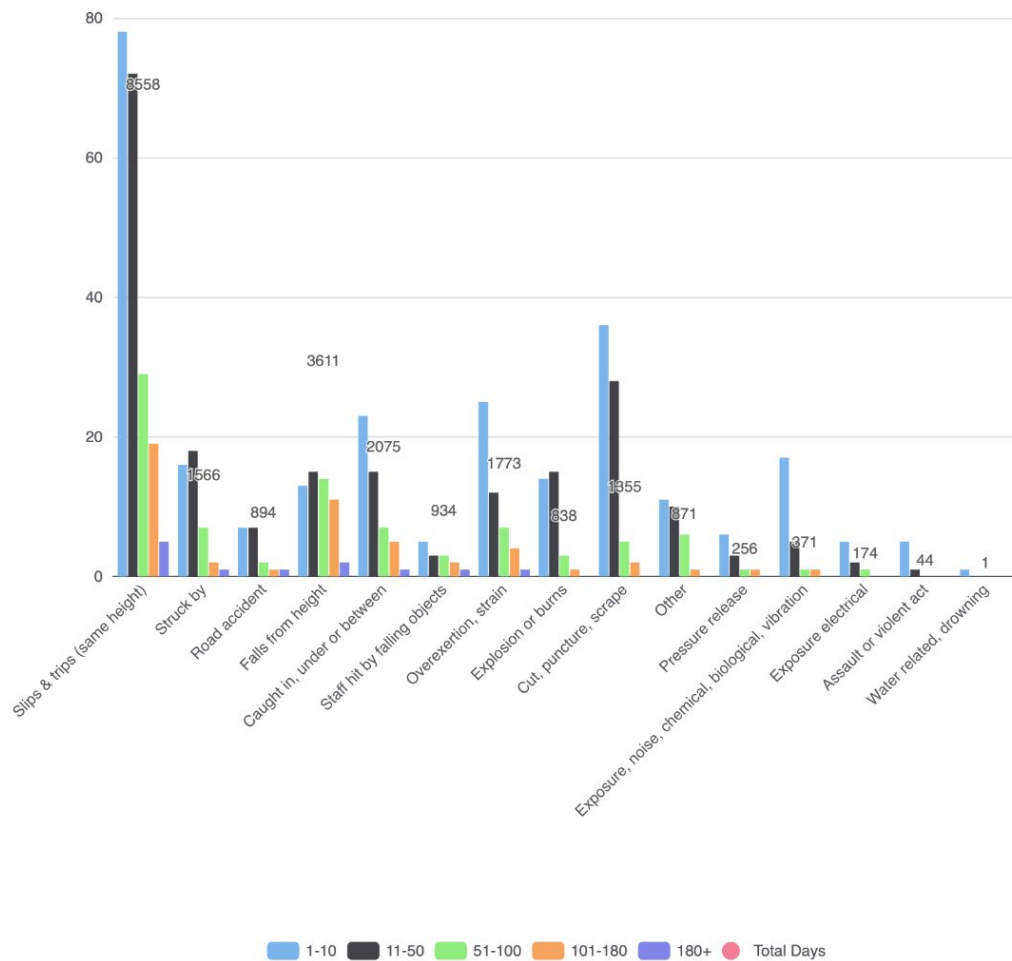


Figure 1G

Distribution of number of days absent from work per LWI by Incident Category (days absence grouped 1-10 days, 11-50 day, 51-100 days, 101-180 days and 180+ days per LWI). Values above bars indicate total number of days absence reported for all incidents in each incident category



Concawe collected causal factors where available for each LWI, see Figure 1F and Appendix 3.

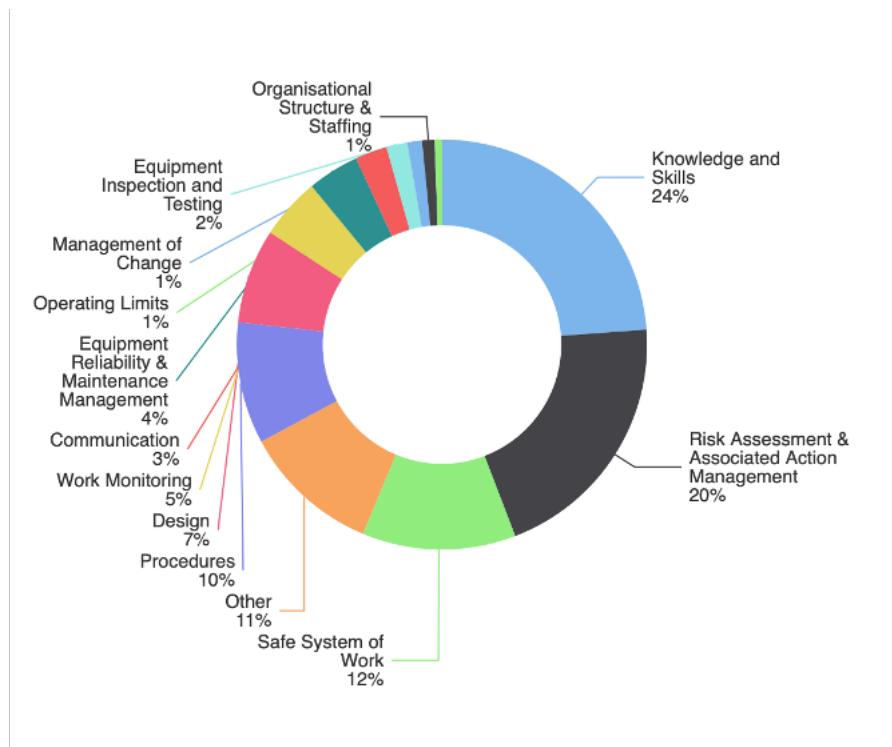
The most reported causal factors across all LWI in 2025 were knowledge and skills (246 incidents), risk assessment and associated action management (210 incidents), safe system of work (125 incidents), other (112 incidents) and procedures (99 incidents). Design accounted for 77 incidents.

Compared with 2024, knowledge and skills increased by 92 incidents from 154 to 246 incidents (+60%), while risk assessment and associated action management increased by 50 incidents from 160 to 210 incidents (+31%). Safe system of work increased by 47 incidents from 78 to 125 incidents (+60%), procedures increased by 30 incidents from 69 to 99 incidents (+43%) and design increased by 22 incidents from 55 to 77 incidents (+40%).

Other causal factors decreased from 201 incidents in 2024 to 112 incidents in 2025 (-89 incidents, -44%). Operating limits also decreased from 11 incidents to 6 incidents (-45%). Equipment inspection and testing remained unchanged at 17 incidents.

Work monitoring increased from 25 incidents in 2024 to 50 incidents in 2025 (+100%). Equipment reliability and maintenance management increased from 20 incidents to 42 incidents (+110%), communication increased from 22 incidents to 26 incidents (+18%), management of change increased from 7 incidents to 12 incidents (+71%) and organisational structure and staffing increased from 5 incidents to 10 incidents (+100%).

Figure 1H Causal factors recorded for all LWI in 2025



Tables 5A and B show the LWI frequency statistics broken down into quartiles. This demonstrates a wide range of variability in performance between the top performing members (Quartile 1 - Q1) and the bottom performing members (Quartile 4 - Q4).

Table 5A 2025 LWIF quartile distribution ranges and average values for each quartile range

LWIF	Quartiles																			
	Manufacturing				Marketing				Total Own Staff				Total Contractors				Total Downstream			
	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's
Q1	0.00	0.72	0.20	11 (27%)	0.00	0.00	0.00	5 (25%)	0.00	0.45	0.11	11 (27%)	0.00	0.26	0.03	10 (25%)	0.00	0.56	0.23	11 (27%)
Q2	0.93	1.31	1.07	11 (27%)	0.19	0.39	0.28	5 (25%)	0.45	1.21	0.90	11 (27%)	0.33	1.12	0.74	10 (25%)	0.65	1.27	1.04	11 (27%)
Q3	1.33	2.94	2.19	11 (27%)	0.77	1.41	0.99	5 (25%)	1.38	2.63	1.87	11 (27%)	1.13	2.76	1.67	10 (25%)	1.30	2.86	1.83	11 (27%)
Q4	3.17	11.65	5.74	8 (20%)	1.42	6.99	2.65	5 (25%)	2.74	14.67	5.01	8 (20%)	2.90	11.55	6.82	10 (25%)	2.94	11.65	5.65	8 (20%)

Table 5B 2025 LWIF quartile distribution by staff type: ranges and average values for each quartile range

LWIF	Quartiles															
	Manufacturing Staff				Manufacturing Contractors				Marketing Staff				Marketing Contractors			
	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's
Q1	0.00	0.45	0.06	11 (27%)	0.00	0.30	0.03	10 (25%)	0.00	0.00	0.00	5 (25%)	0.00	0.39	0.13	5 (29%)
Q2	0.45	1.46	0.92	11 (27%)	0.33	1.16	0.79	10 (25%)	0.00	0.00	0.00	5 (25%)	0.45	0.74	0.60	5 (29%)
Q3	1.56	2.74	2.01	11 (27%)	1.16	2.76	1.87	10 (25%)	0.14	0.99	0.60	5 (25%)	0.92	2.03	1.36	5 (29%)
Q4	3.07	14.67	5.11	8 (20%)	3.61	11.55	6.93	10 (25%)	1.48	6.99	3.21	5 (25%)	2.44	4.81	3.62	2 (12%)

The quartile distribution ranges and average values for each quartile for the 2025 All Injury Frequency (AIF) are shown in Tables 6A and 6B. The average performance indicator figures for the industry conceal a wide range of individual values between reporting companies.

Table 6A 2025 AIF quartile distribution by sector: ranges and average values for each quartile range

AIF	Quartiles																			
	Manufacturing				Marketing				Total Own Staff				Total Contractors				Total Downstream			
	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's
Q1	0.00	1.36	0.73	11 (27%)	0.00	0.20	0.08	5 (25%)	0.00	1.05	0.39	11 (27%)	0.00	1.16	0.52	10 (25%)	0.00	1.19	0.70	11 (27%)
Q2	1.56	2.75	2.08	11 (27%)	0.31	0.91	0.62	5 (25%)	1.26	2.53	1.82	11 (27%)	1.34	2.39	1.85	10 (25%)	1.37	2.45	1.81	11 (27%)
Q3	2.84	7.69	4.43	11 (27%)	1.12	1.88	1.46	5 (25%)	2.63	6.15	3.81	11 (27%)	2.76	6.62	3.80	10 (25%)	2.72	7.69	4.25	11 (27%)
Q4	7.70	22.38	13.34	8 (20%)	1.96	22.06	7.44	5 (25%)	7.55	31.00	14.31	8 (20%)	9.08	22.09	12.91	10 (25%)	7.70	22.38	13.43	8 (20%)

Table 6B 2025 AIF quartile distribution by staff type: ranges and average values for each quartile range

AIF	Quartiles															
	Manufacturing Staff				Manufacturing Contractors				Marketing Staff				Marketing Contractors			
	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's	Low	High	Avg	Co's
Q1	0.00	0.97	0.38	11 (27%)	0.00	1.36	0.44	10 (25%)	0.00	0.00	0.00	5 (25%)	0.00	0.58	0.38	5 (29%)
Q2	1.24	2.48	1.85	11 (27%)	1.79	2.76	2.18	10 (25%)	0.00	0.14	0.03	5 (25%)	0.65	1.43	1.03	5 (29%)
Q3	2.61	5.09	3.84	11 (27%)	2.81	6.62	4.21	10 (25%)	0.39	1.16	0.87	5 (25%)	1.58	4.00	2.39	5 (29%)
Q4	6.15	31.00	14.29	8 (20%)	9.08	22.09	12.68	10 (25%)	1.62	8.70	4.38	5 (25%)	4.81	69.54	37.17	2 (12%)

2.3. PERFORMANCE TRENDS IN THE LAST 10 YEARS - 2015 TO 2025

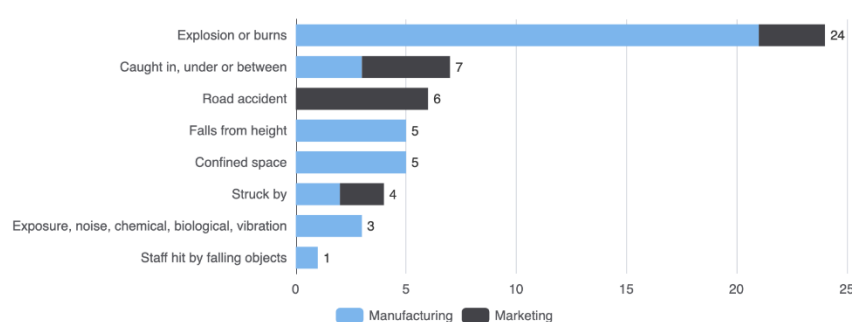
Performance indicators are particularly useful for identifying trends and patterns when considered over time. The historical trends for the European downstream oil industry over the past ten years are summarised in this section. Ten years has been chosen as a period reasonably representative of actual operating conditions and practices in place within the industry. For a full historical perspective, back to 1993, additional data tables are provided in Appendix 2.

Table 7 Fatalities by sector 2015-2025

Fatalities over 10 years by sector (own staff + contractors)			
Year	Manufacturing	Marketing	Total
2016	2	0	2
2017	1	1	2
2018	7	3	10
2019	3	0	3
2020	1	1	2
2021	5	1	6
2022	6	5	11
2023	6	1	7
2024	7	1	8
2025	2	2	4
Total	40	15	55

The total number of fatalities recorded in Figure 2 for the 2016-2025 period decreased to 55 compared to 58 for the 2015-2024 period, a reduction of three fatalities (5.2%). Explosion or burns remained the highest cause of fatalities with 24 fatalities in total, decreasing by three compared to the previous reporting period. Road accident fatalities decreased by two to six, while caught in, under or between fatalities increased by two to seven. Falls from height fatalities increased by one to five, confined space fatalities remained unchanged at five and exposure, noise, chemical, biological, vibration fatalities remained unchanged at three. Struck by fatalities decreased by one to four and staff hit by falling objects fatalities remained unchanged at one. Continuous focus on understanding causal factors and putting in place clearly defined preventative actions and mitigative are required to achieve and sustain our objective of zero fatalities in both Manufacturing and Marketing.

Figure 2 Number of fatalities by category 2016-2025



In the last ten years there have been 55 fatalities, of which 24 explosion or burns type fatalities, six road accident fatalities, seven fatalities for the incident category caught in, under or between, five confined space fatalities and five falls from height. Together, these five incident categories account for 85% of the fatalities experienced in the industry since 2016.

Until 2013, Concawe compiled fatality data against broad categories that could change year to year. Expanding this to 16 distinct categories provided for greater transparency of cause and better benchmarking but risked losing information on longer-term trends. However, by revisiting pre-2013 data, a reasonably consistent pattern can be seen.

Explosion or burns and road accidents are the most prevalent fatal incident categories recorded in the period 2016-2025. Explosion or burns fatalities decreased by three cases from 27 in 2015-2024 to 24 in 2016-2025, while road accident fatalities decreased by two cases from eight to six over the same period. Caught in, under or between fatalities increased by two cases from five to seven fatalities compared to the previous reporting period.

The 2016-2025 reported fatalities in each of the sectors (Appendix Tables A2-2 to A2-5), indicate the higher prevalence of Contractor fatalities in Manufacturing and Marketing activities. Manufacturing recorded 40 fatalities compared to 15 in Marketing over the reporting period.

LWI category data has been available since 2013; a summary is shown in Table A2-6 (Appendix 2) and in Figure 3.

Figure 3: Percentage of LWI by incident category in Manufacturing and Marketing in 2025 compared with period 2016-2024

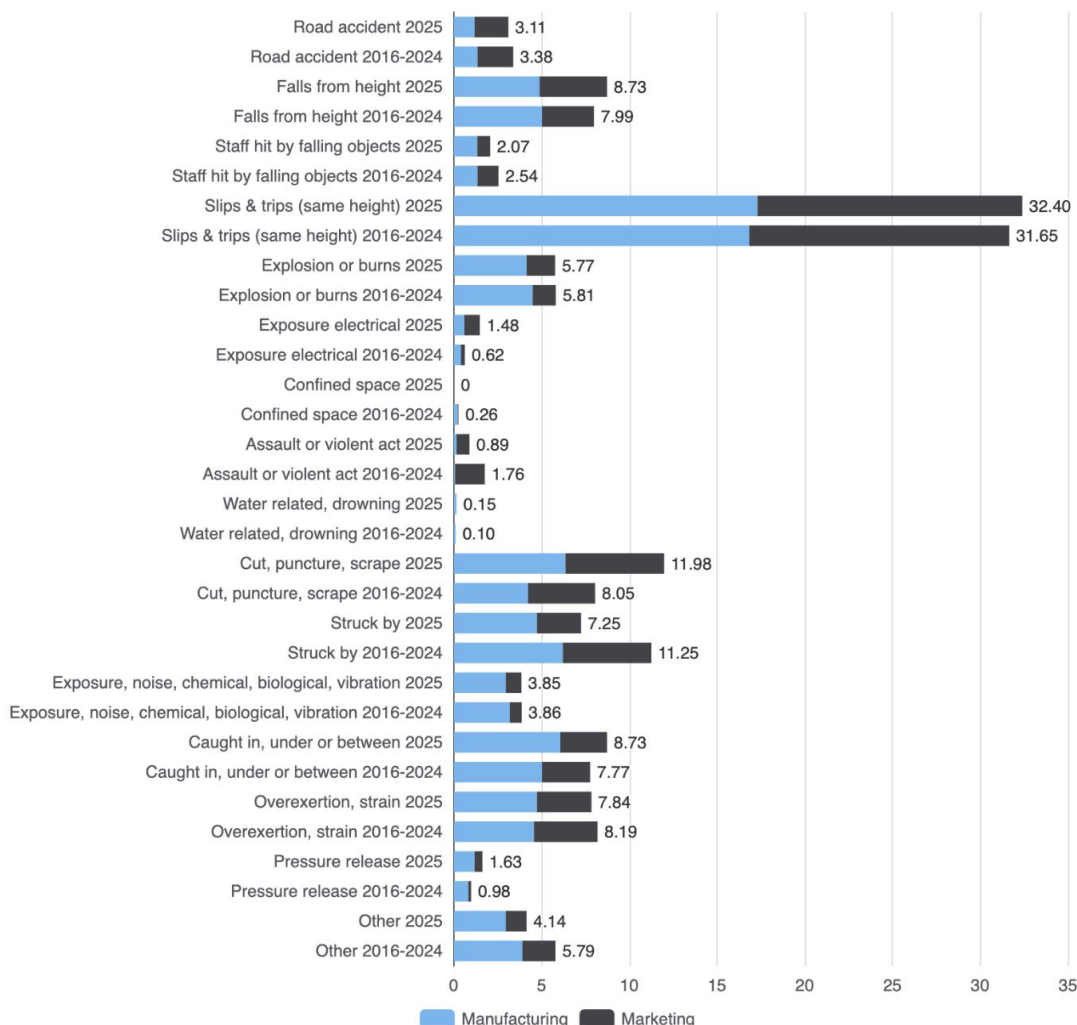


Figure 4A

LWI and Fatalities 2016-2025 by Incident Category

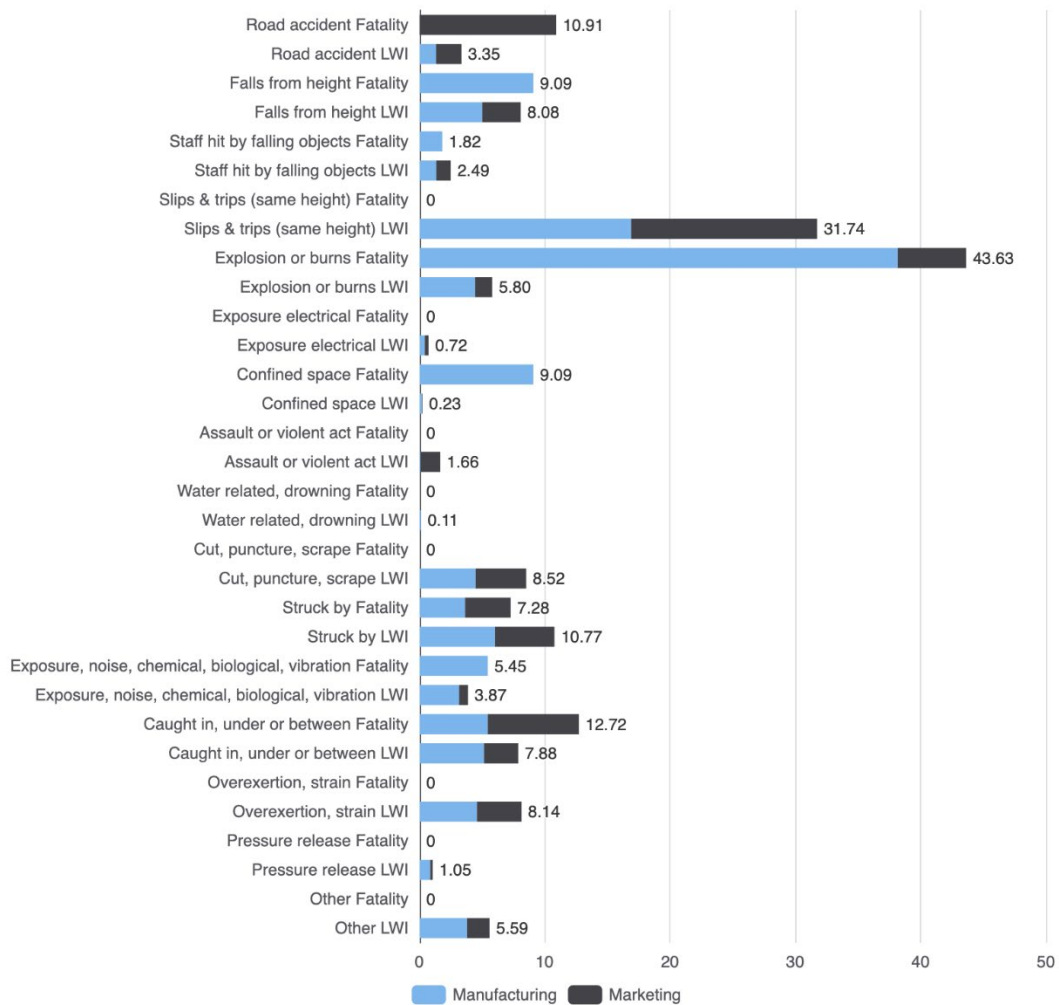


Figure 4B

LWI and Fatalities 2016-2025 by Common Incident Category

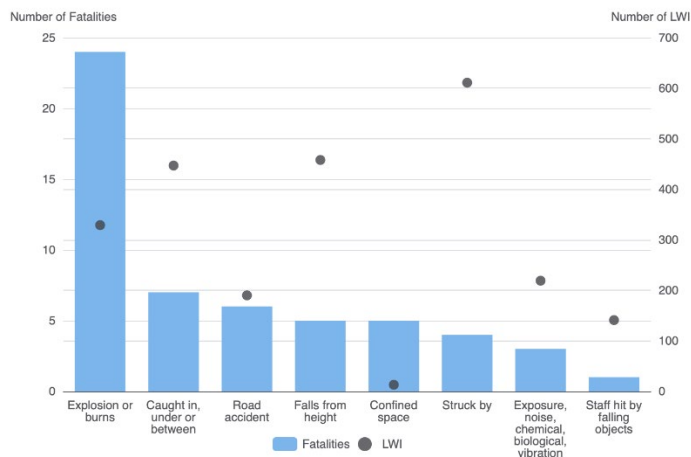


Figure 5A shows the historical evolution of the main personal safety performance indicators over the past ten years across all workers. The Fatal Accident Rate (FAR) across all sectors is 0.68 in 2025 compared with 1.37 in 2024 and 1.17 recorded in 2023. The LWIF of 1.14 and the AIF of 1.89 in 2025 both show an increase compared with 2024 when the LWIF was 0.98 and the AIF was 1.66. The Road Accident Rate (RAR) in 2025 is 0.18 showing a decrease compared with 2024 (0.22) and approaching the lowest recorded level of 0.15 in 2022. Figures 5B and 5C show the same data split for Manufacturing and Marketing, respectively.

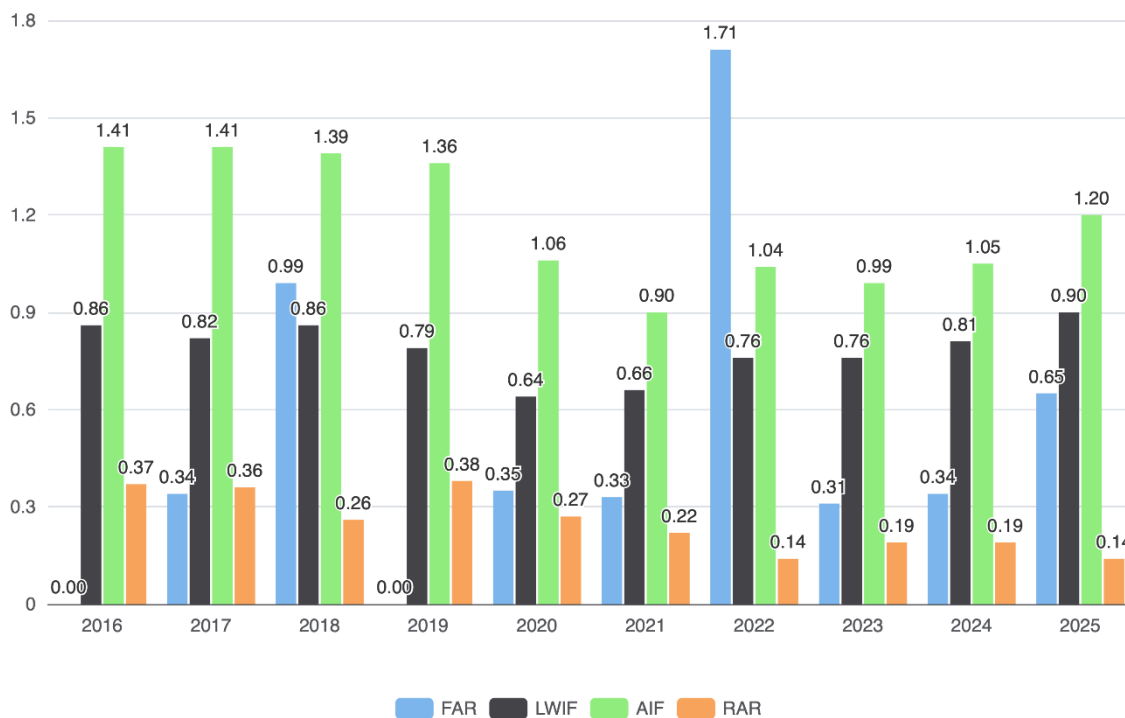
Figure 5A Performance indicators over the last ten years for the European downstream oil industry



Figure 5B Performance indicators over the last ten years for Manufacturing



Figure 5C Performance indicators over the last ten years for Marketing



Figures 6A and 6B show the Fatal Accident Rate FAR for own staff versus contractors for Manufacturing (6A) and Marketing (6B). While FAR are in general higher in Manufacturing than in the Marketing, both sectors display a high degree of variability over the last ten years. Manufacturing contractor FAR decreased from 3.95 in 2024 to 1.15 in 2025, a reduction of 2.80 or 71%, while Manufacturing own staff FAR remained at 0.00 in 2025 following a decrease from 3.77 in 2023 to 0.00 in 2024. In Marketing, own staff FAR increased from 0.00 in 2024 to 0.75 in 2025, while contractor FAR decreased slightly from 0.60 to 0.57. Further effort is required to reduce staff and contractor fatalities to zero.

Figure 6A Manufacturing Fatal Accident Rate (number of fatalities per 100 million hours worked) in the last ten years

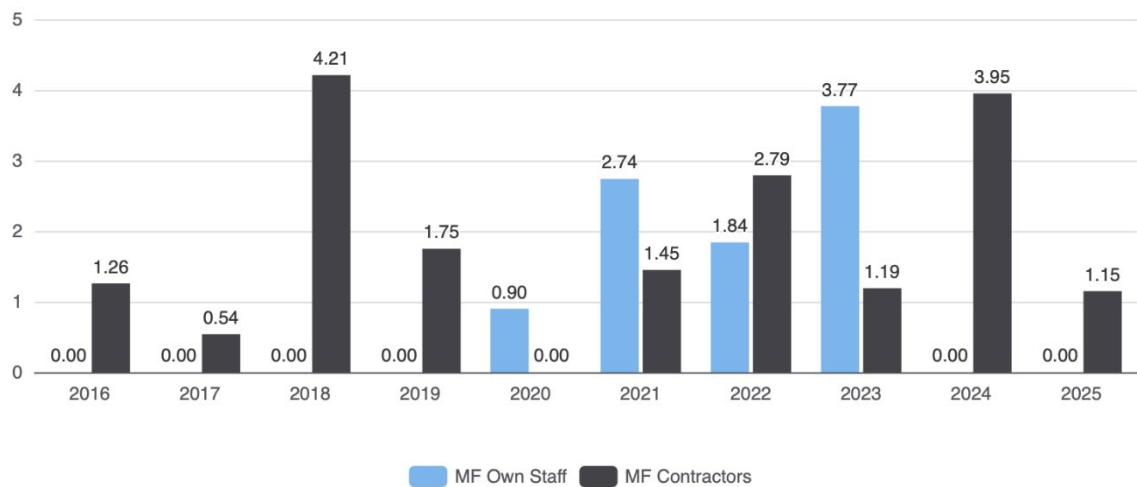


Figure 6B Marketing Fatal Accident Rate (number of fatalities per 100 million hours worked) in the last 10 years

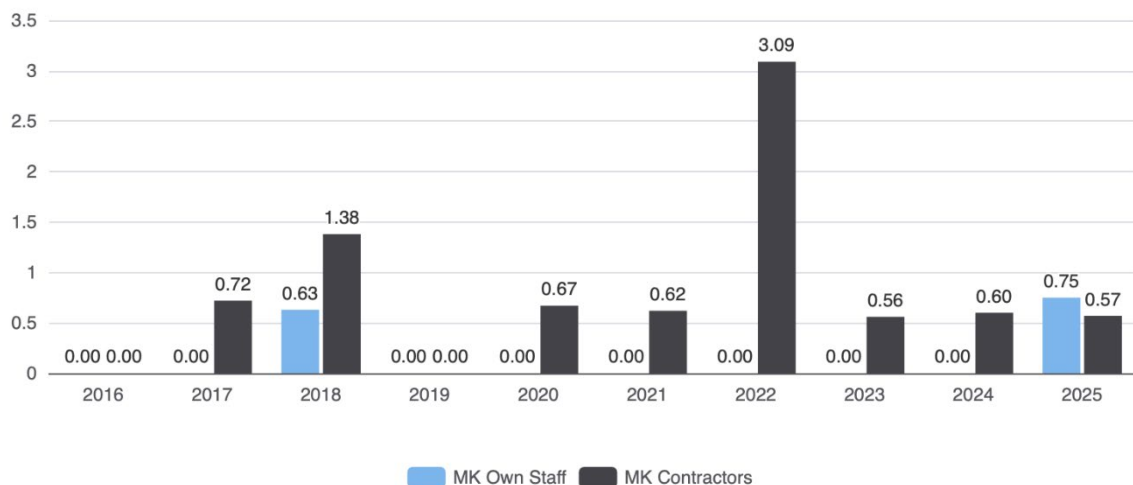
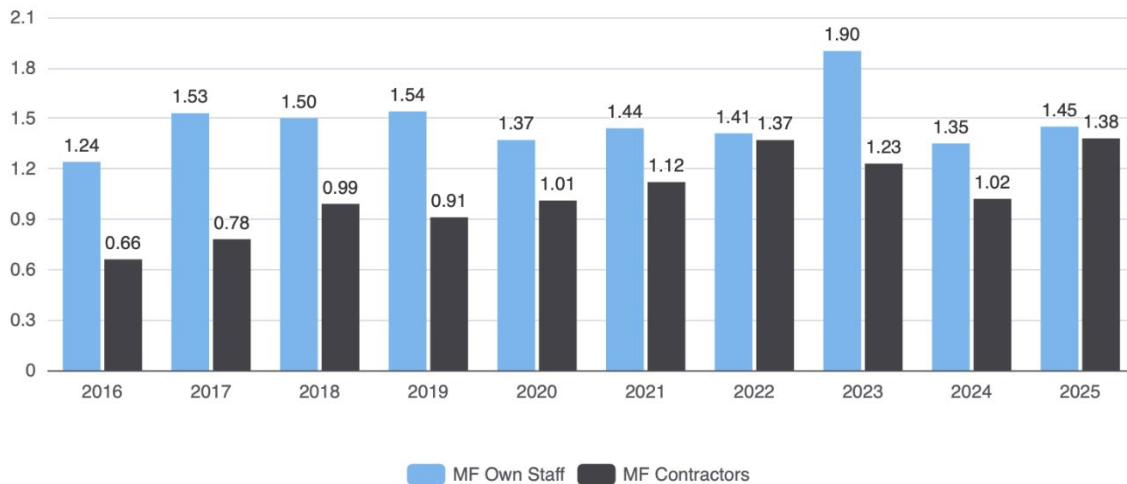


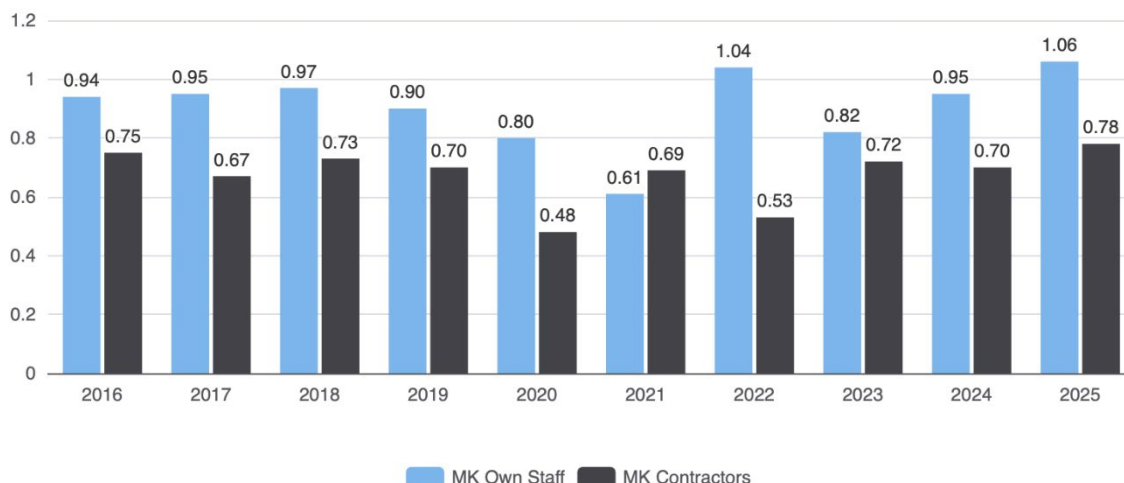
Figure 7A shows Manufacturing LWIF in 2025 to be higher than in 2024 for both own staff and contractors (1.45 and 1.38). The 2025 performance is much worse as in 2016 when these figures were 1.24 and 0.66 respectively.

Figure 7A Manufacturing LWIF in the last ten years



In 2025, Marketing own staff had an LWIF of 1.06 an increase since 2024 (0.95), and slightly above the range recorded in the last ten years (LWIF range 0.61 to 1.04). Marketing contractors LWIF increased from 0.70 in 2024 to 0.78 in 2025, also above the range recorded in the past ten years (range 0.48 to 0.75; see Figure 7B and Appendix 2 Table A2-4).

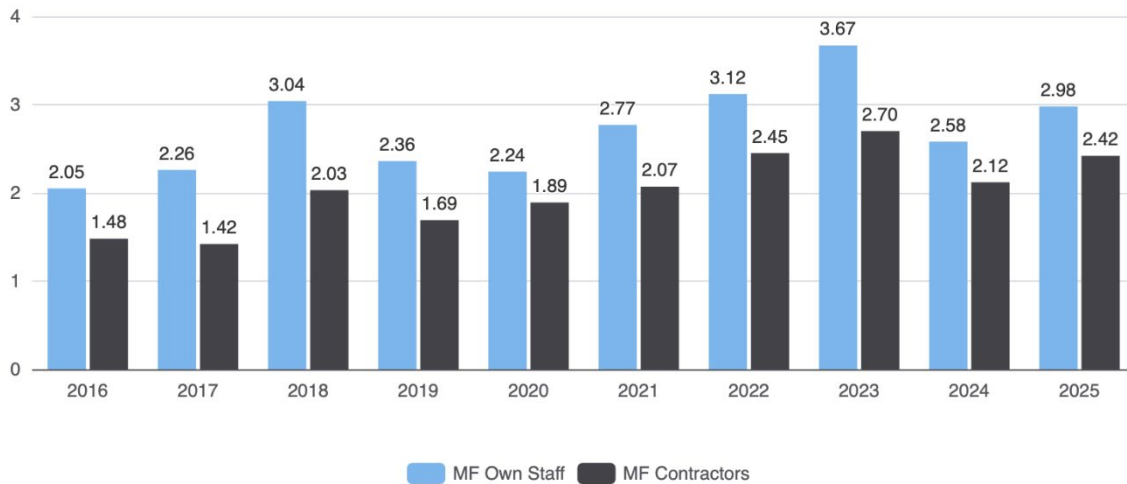
Figure 7B Marketing LWIF in the last ten years



Historical figures (see Appendix 2) suggest that AIF peaked around 1995-97 but this was considered at the time likely the result of improved reporting standards. The downward trend in recorded Manufacturing AIF since 2010 ended in 2016 for staff and in 2017 for contractors. Since then, own staff and contractor AIF in Manufacturing steadily increased to 3.67 (the highest in the last ten years) and 2.70 (the highest in the last ten years), respectively in 2023 (Figure 8A). 2024 saw a welcome end to this upward trend with Manufacturing AIF recorded at 2.58 for own staff and 2.12 for contractors.

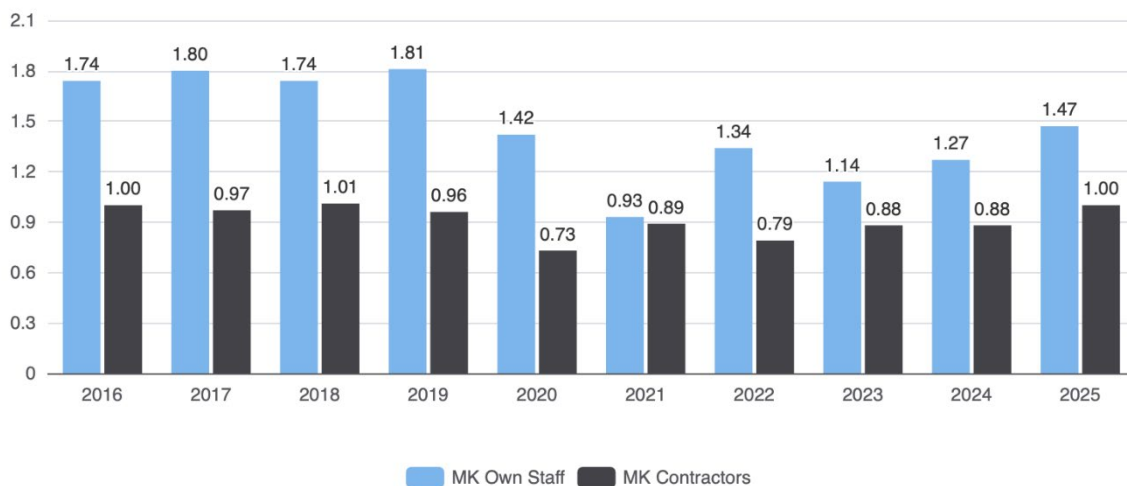
In 2025, Manufacturing AIF increased again to 2.98 for own staff and 2.42 for contractors, representing increases of 0.40 (15.5%) and 0.30 (14.2%), respectively, compared with 2024.

Figure 8A Manufacturing All Injury Frequency (sum of fatalities, LWI, RWI, MTC per million hours worked) in the last ten years



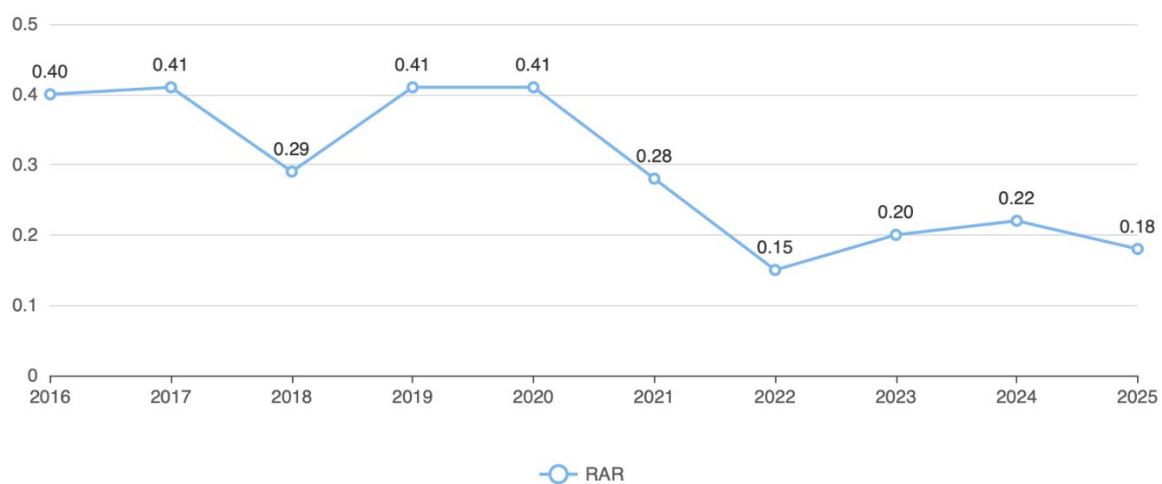
Marketing own staff AIF in 2025 rose to 1.47 from 1.27 in 2024. Marketing contractor AIF increased to 1.00 in 2025 from 0.88 in 2024, see Figure 8B and Appendix 2 Tables A2-4 and A2-5.

Figure 8B Marketing All Injury Frequency (sum of fatalities, LWI, RWI, MTC per million hours worked) in the last ten years



There was a decrease in the Road Accident Rate in 2025 (0.18 compared with 0.22 in 2024), a reduction of 18%. The Road Accident Rate decreased in 2025 following increases since the record low of 0.15 in 2022.

Figure 9 Road Accident Rate in the last ten years - European downstream oil industry



3. PROCESS SAFETY

The American Petroleum Institute (API) has recommended the adoption of Process Safety Performance Indicators (PSPI) in addition to personal safety performance indicators such as those contained in this report. This is intended to better address the potential causes of major process safety incidents, which can have catastrophic effects in the petroleum industry. As from the 2009 Concawe report, the Safety Management Group of Concawe expanded the scope of industry wide safety performance indicators to address process safety, following the reporting guidelines that were developed by the API [31, 32]. The expectation is that expanding the focus to include process safety in conjunction with the personal safety will contribute to a further reduction in serious injury rates in the industry.

The Concawe membership was requested to report their PSPI as defined by the API 754 in 2008 [34] and as further refined in the ANSI/API recommended practice that was published in 2010 [35] and the third edition released in 2021 [32]. The PSPI data that were requested are the number of Tier 1 and 2 Process Safety Events (PSE). Concawe does not explicitly instruct Member Companies as to which material hazard classification option should be used when determining PSE Tier 1 and 2. The Concawe definitions slightly differ from those in the ANSI/API guideline to allow for the use of SI-metric units (kg/m/sec) and for the inclusion of the European Classification and Labelling definitions [36] as an alternative for classifying the PSE.

More detailed consequence related Tier 1 data was collected for the first time in 2023 based on the API 754 consequence classifications. In 2024, this was extended to cover the consequences on Tier 2 events.

Similar to 2024, 41 (one less) companies and joint ventures representing 98% of reporting companies submitted PSE data in 2025 for their Manufacturing operations. 19 companies submitted Marketing PSE data, representing 83% of reporting companies. This is two less companies than last year.

The aggregated 2025 results per sector and for the whole of the European downstream oil industry are shown in Table 8.

Table 8 Aggregated 2025 Process Safety (PS) results for all reporting companies

Sector	Manufacturing	Marketing	Both Sectors
Companies - Total	41	23	23
- PS Reporting	40	19	19
- %	98	83	83
Hours worked Mh	281.9	308.9	590.8
- PS Reporting	281.7 (281.7)	268.4 (268.4)	550.0 (550.0)
- %	100	87	93
T-1 PSE	50	5	55
T-2 PSE	96	13	109
T-1 PSER PSI/Mh reported	0.18	0.02	0.10
T-2 PSER PSI/Mh reported	0.34	0.05	0.20
Total PSER PSI/Mh reported	0.52	0.07	0.30

Of the 19 companies that reported Process Safety Events across both Manufacturing and Marketing in 2025, five companies reported zero Tier 1 events, one company reported zero Tier 2 events, and three companies reported zero Tier 1 and Tier 2 events.

Tables 9, 10, 11 and 12 show the quartile ranges for PSE and PSER.

Table 9 Total PSE quartile distribution ranges and average values for each quartile range

Total PSE				
PSE	Low	High	Average	Co's
Q1	0	1	0.4	10 (25%)
Q2	1	3	1.8	10 (25%)
Q3	3	4	3.5	10 (25%)
Q4	5	21	10.7	10 (25%)

Table 10 Manufacturing PSE quartile distribution ranges and average values for each quartile range

Manufacturing PSE				
PSE	Low	High	Average	Co's
Q1	0	1	0.3	10 (25%)
Q2	1	2	1.6	10 (25%)
Q3	2	4	3.3	10 (25%)
Q4	4	21	9.4	10 (25%)

Table 11 Total PSER quartile distribution ranges and average values for each quartile range

Total PSER				
PSE	Low	High	Average	Co's
Q1	0.00	0.17	0.04	10 (25%)
Q2	0.19	0.31	0.26	10 (25%)
Q3	0.32	0.84	0.59	10 (25%)
Q4	0.87	3.27	2.02	10 (25%)

Table 12A Manufacturing PSER quartile distribution ranges and average values for each quartile

Manufacturing PSER				
PSE	Low	High	Average	Co's
Q1	0.00	0.19	0.05	10 (25%)
Q2	0.24	0.48	0.37	10 (25%)
Q3	0.54	0.95	0.72	10 (25%)
Q4	1.03	3.50	2.11	10 (25%)

Table 12B Marketing PSER quartile distribution ranges and average values for each quartile range

Marketing PSER				
PSE	Low	High	Average	Co's
Q1	0.00	0.00	0.00	5 (29%)
Q2	0.00	0.00	0.00	5 (29%)
Q3	0.06	0.13	0.10	5 (29%)
Q4	0.18	0.41	0.29	2 (12%)

The total number of Tier 1 and Tier 2 process safety events reported in 2025 at Manufacturing sites where the higher process safety risks exist is 146. This is a decrease of 21% since 2024 (184 events). Figure 10 shows count of the total reported Manufacturing PSE for the period 2016 to 2025.

Figure 10 Manufacturing Process Safety Events in the last ten years

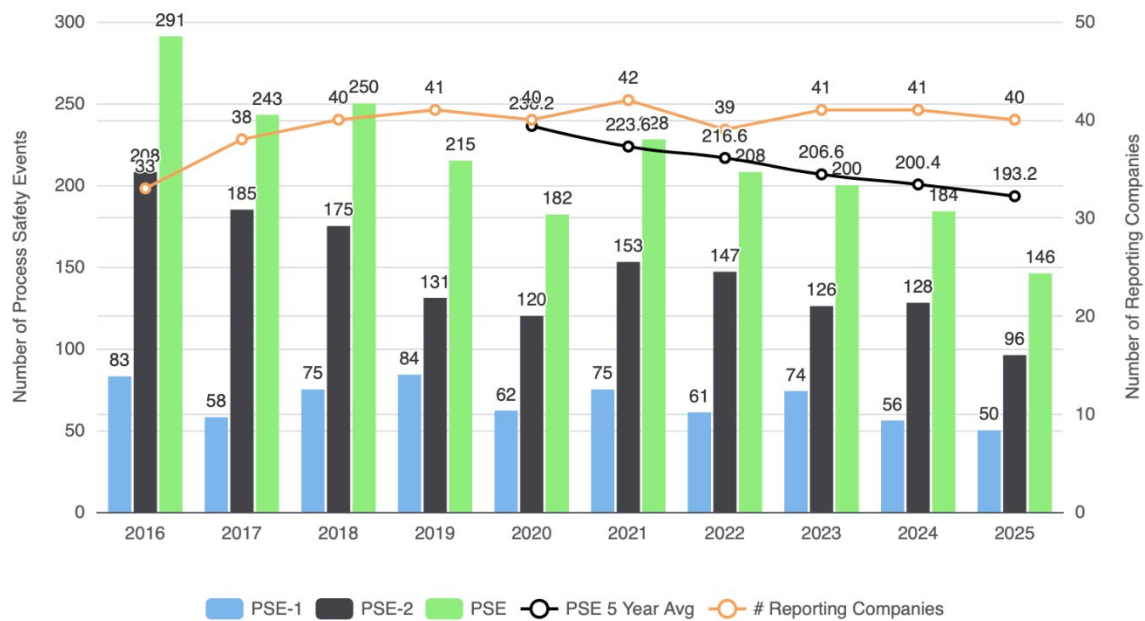
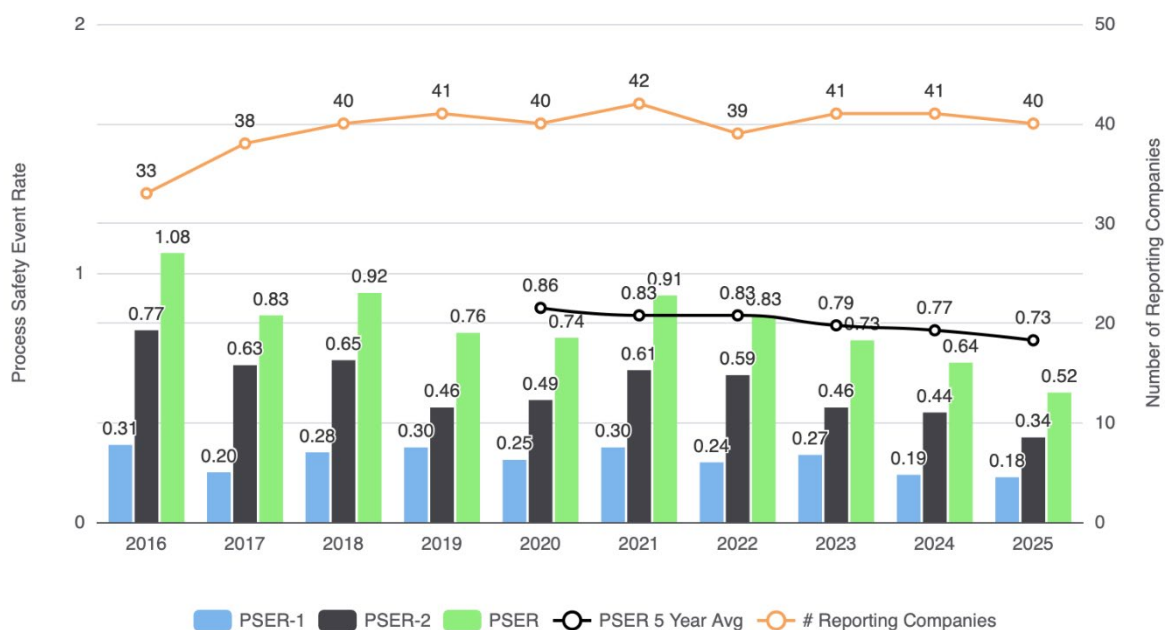


Figure 11 shows the same data as Figure 10 expressed as rates, together with the five-year rolling average PSER.

Figure 11 Manufacturing Process Safety Event Rate in the last ten years



The Manufacturing PSER rate (the total number of Tier 1 and Tier 2 process safety events per million hours reported) in 2025 is 0.52, the lowest recorded values in the past ten years, see Figure 17. Both the 2025 Manufacturing Tier 1 PSE rate (PSER1) of 0.18 and the 2024 Manufacturing Tier 2 PSE rate (PSER2) of 0.34, were also the lowest recorded in the past decade. 2025 therefore saw a further reduction in the five-year rolling average of Manufacturing PSER and it now stands at the lowest value of 0.73.

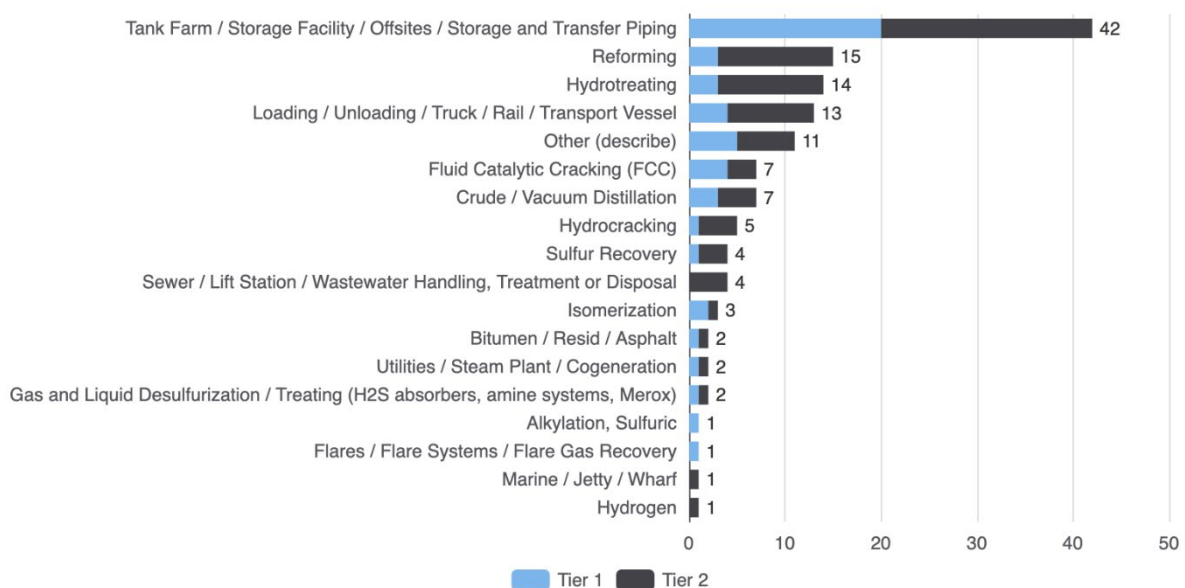
The ratio of Tier 1 to Tier 2 Manufacturing process safety events in 2025 is 0.52 (50 Tier 1 and 96 Tier 2). This is an increase in Tier 1 to Tier 2 ratio since 2024 when it was 0.44 (56 Tier 1 and 128 Tier 2), lower to the ratio of 0.59 in 2023 (74 Tier 1 and 126 Tier 2) and remaining in the range of ratios recorded since 2017 (0.31-0.64).

Information about the circumstances of each Tier 1 and Tier 2 PSE across Manufacturing and Marketing in 2025 are provided in table form in Appendix 4 and in Figures 12 to 16. The following comments relate to the notable responses with regard to refining process, mode of operation, point of release, material released and causal factors.

Type of Process: Process Safety Events in 2025 most frequently occurred in Tank Farm / Storage Facility / Offsites / Storage and Transfer Piping (26% of all Process Safety Events, 36% of Tier 1 PSE and 20% of Tier 2 PSE), see Figure 12 and Table A4-1. This finding is in alignment with recorded PSE since 2017. Note that four PSE Tier 1 and 25 Tier 2 PSE attributed to petrochemical processes are not included in Figure 12 as this refers to refining processes only.

The total number of Tier 1 and Tier 2 process safety events reported in 2025 at Manufacturing sites where the higher process safety risks exist is 146. This is a decrease of 21% since 2024 (184 events). Figure 10 shows count of the total reported Manufacturing PSE for the period 2016 to 2025.

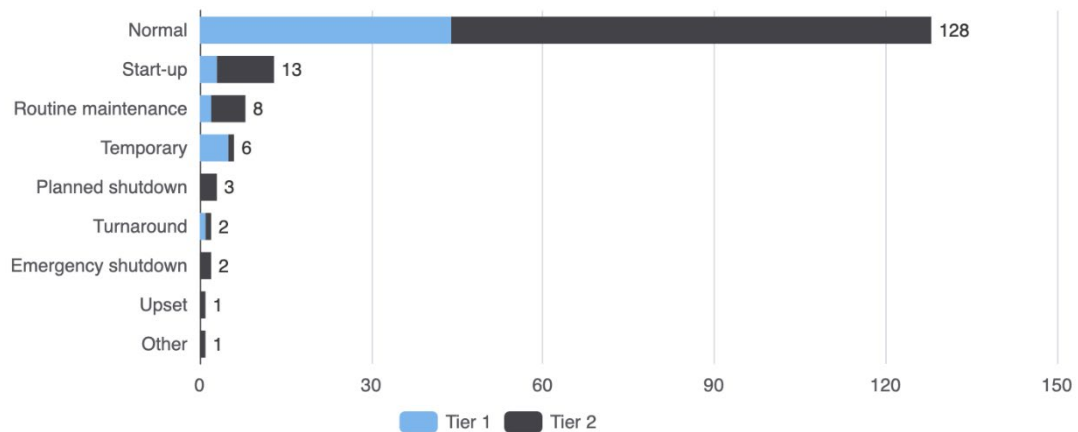
Figure 12 Number of Tier 1 and 2 Process Safety Events (Manufacturing and Marketing) reported in 2025 by Refining Process



Mode of Operation: 78% of Process Safety Events occurred during normal operation, see Figure 13 and Table A4-3. For Tier 1 events, 80% occurred during normal operation and 77% of Tier 2 events occurred during normal operation. Compared with 2024, the overall percentage increased by five percentage points from 73% to 78%. The percentage of Tier 1 events occurring during normal operation

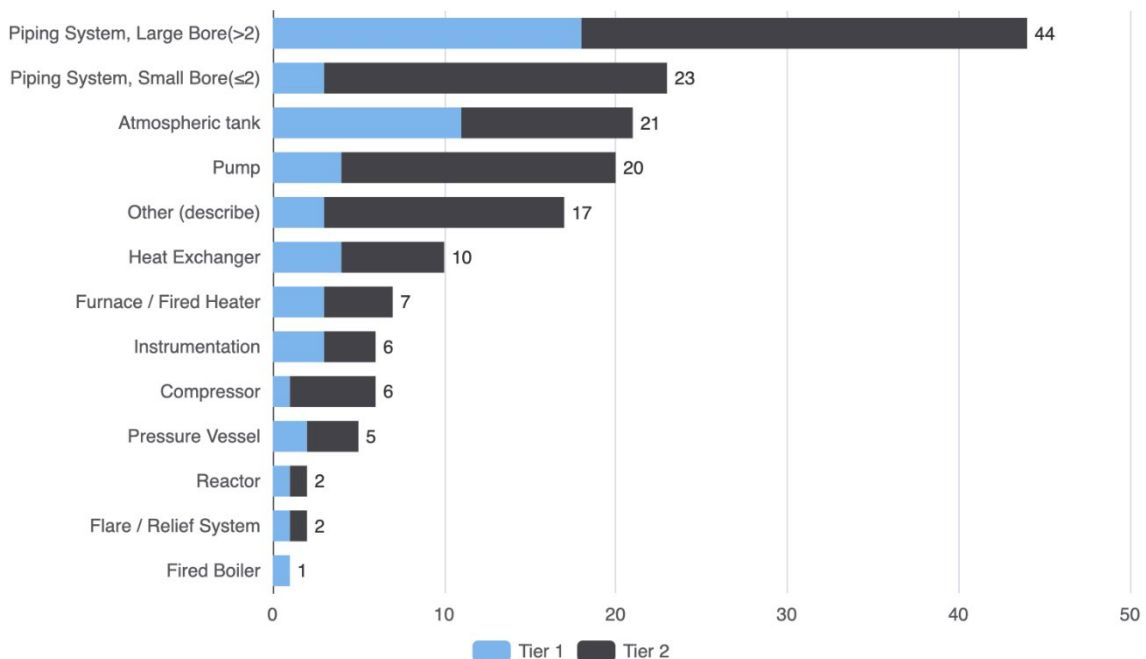
increased by 11 percentage points from 69% to 80%, while the percentage of Tier 2 events increased by 3 percentage points from 74% to 77%.

Figure 13 Number of Tier 1 and Tier 2 Process Safety Events (Manufacturing and Marketing) reported in 2025 by mode of operation



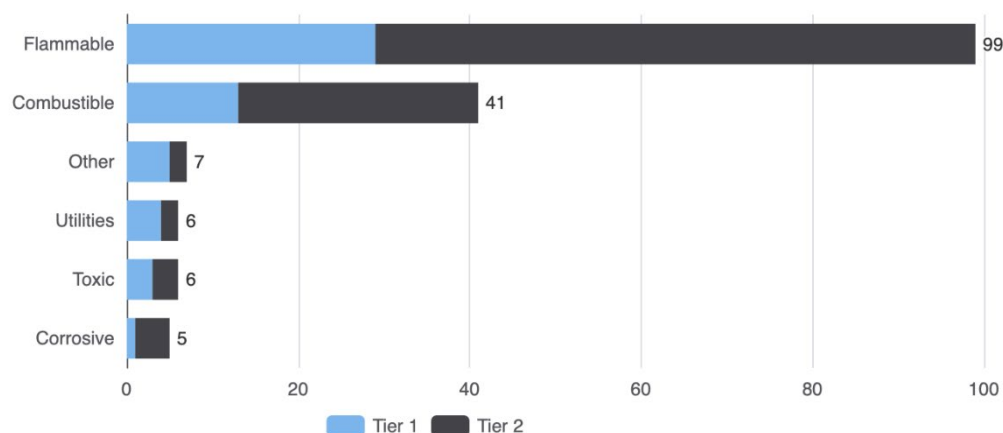
Point of Release: As in previous years, large bore piping remained the main point of release for Process Safety Events (27% of all PSE in 2025, 33% of Tier 1 and 24% of Tier 2 events), see Figure 14 and Table A4-4. Compared with 2024, the total number of large bore piping events decreased from 62 to 44 events, a reduction of 18 events (29%), with Tier 1 events increasing from 16 to 18 and Tier 2 events decreasing from 46 to 26.

Figure 14 Number of Tier 1 and Tier 2 Process Safety Events (Manufacturing and Marketing) reported in 2025 by point of release



Type of material: Figure 15 and Table A4-5 indicate that flammable material was most frequently released in Process Safety Events in 2025 (60% of all PSE, 53% of Tier 1 and 64% of Tier 2 events). The reporting thresholds for reporting flammable Tier events are significantly lower (~2 times) than for combustible Tier events. The proportion of total PSE that are reported as flammable material released is lower than in 2024, decreasing from 71% to 60%.

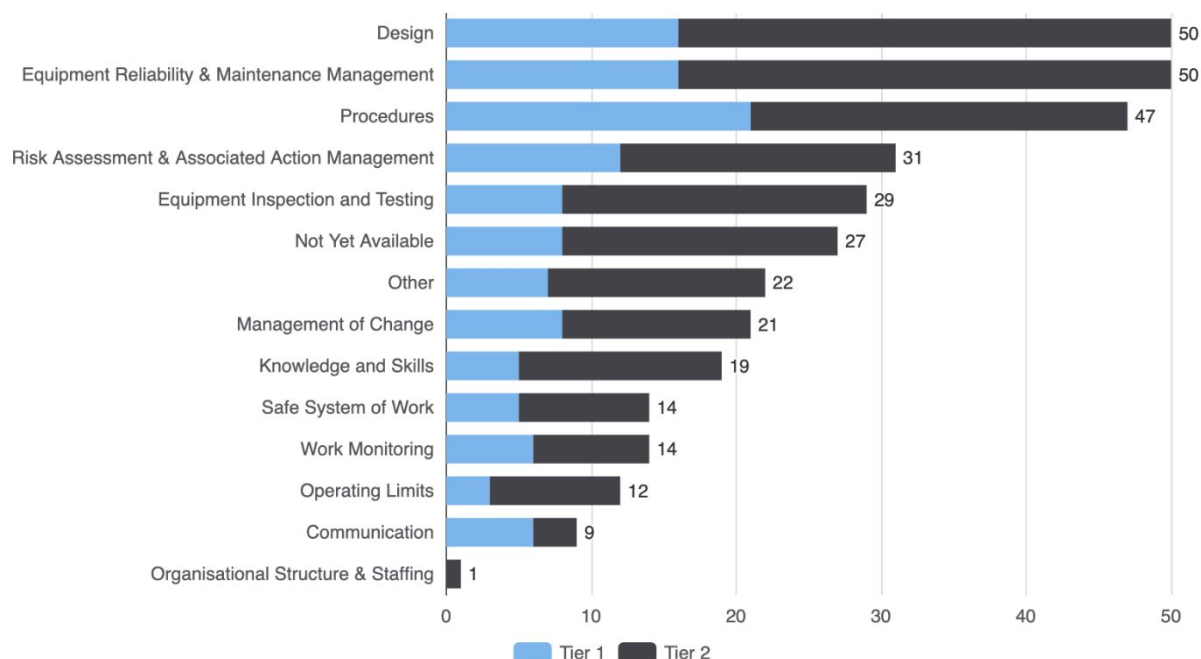
Figure 15 Number of Tier 1 and Tier 2 Process Safety Events (Manufacturing and Marketing) reported in 2025 by type of material released



Causal Factors: Design and Equipment Reliability & Maintenance Management (each allocated to 50 events) and Procedures (47 events) are the most frequently cited causal factors across all Process Safety Events in 2025, see Figure 16 and Table A4-6. Compared to 2024, Equipment Reliability & Maintenance Management decreased by 50 events (-50%), Design decreased by 24 events (-32%) and Procedures decreased by 17 events (-27%). For Tier 1 PSE the most frequently cited causal factors are Procedures (21 events), followed by Design and Equipment Reliability & Maintenance Management (each 16 events). Compared to 2024, Procedures increased by six events (+40%), while Design decreased by 13 events (-45%) and Equipment Reliability & Maintenance Management decreased by 15 events (-48%). Design and Equipment Reliability & Maintenance Management were cited most frequently as causal factors of Tier 2 PSE (each allocated to 34 Tier 2 PSE), with Procedures also cited in 26 Tier 2 PSE. Compared to 2024, Equipment Reliability & Maintenance Management decreased by 35 events (-51%), Procedures decreased by 23 events (-47%) and Design decreased by eleven events (-24%).

Figure 16

Number of Tier 1 and Tier 2 Process Safety Events (Manufacturing and Marketing) reported in 2025 by Causal Factor (note that more than one causal factor may be assigned to an event)



Over time, the collection of this information across the industry is expected to result in an evaluation of the main factors contributing to process safety incidents, which will facilitate the development of approaches to address incident prevention.

Tier 1 and 2 process safety events are investigated in detail within Member Companies and considerable effort is expended in identifying root causes and responding accordingly. As with fatalities and LWI cases in personal safety, such events are now relatively infrequent occurrences at each site so establishing trends on a site-by-site basis and across the industry is a challenge. To overcome this, many Member Companies now look to Tier 3 process safety events for their site-based improvement activity. The definition of a Tier 3 event is often asset specific and therefore trending such events across the industry is not practicable at this time.

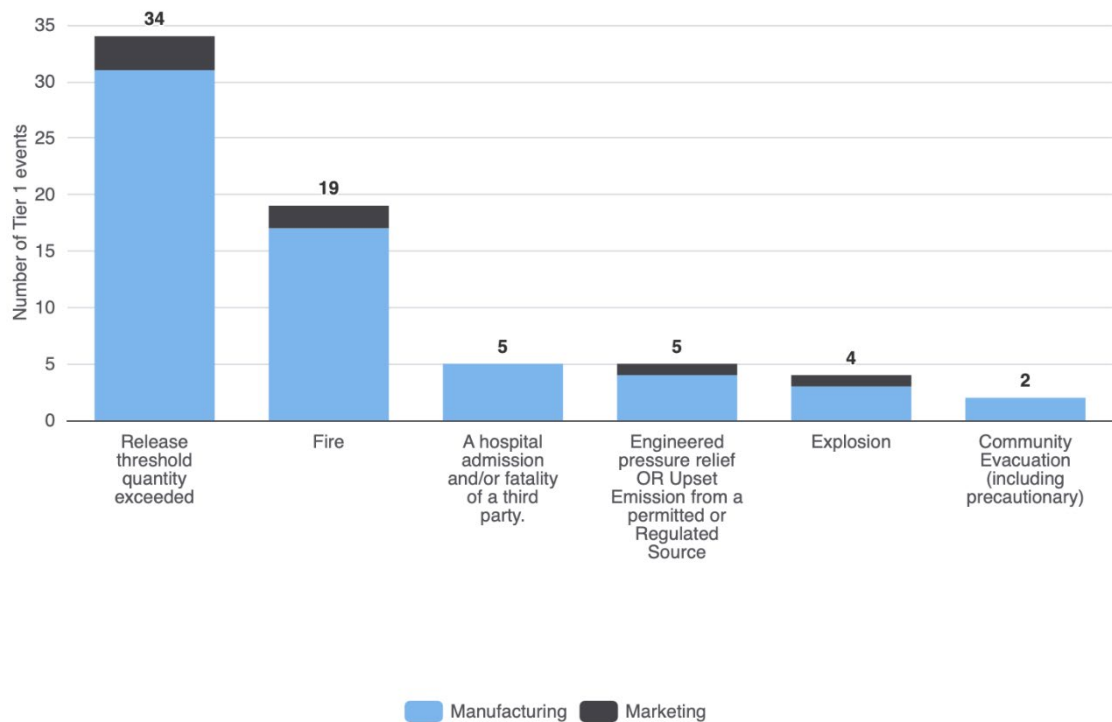
The number of Tier 1 PSEs resulting in LWI or fatality was reported for the first time in 2019. In 2025, no fatalities were recorded against a Tier 1 event and ten LWI (seven explosion or burn, one exposure, noise, chemical, biological, vibration and two pressure release type incidents). Six Manufacturing staff (all LWI) and four contractors (all LWI) were involved in these Tier 1 events which represent 18% of all reported Tier 1 events in 2024. This is a decrease in number of Tier 1 PSE related injuries compared with 2024.

“Procedures” was the most assigned causal factor (nine assignments) for these Tier 1 events leading to LWI. “design” (assigned to sixteen Tier 1 events), “equipment reliability & maintenance management” (sixteen events) and “risk assessment and associated action management” (ten events) were the next most frequently assigned causal factors. Four Tier 2 PSE were reported to be associated with RWI or MTC in 2025 (none in 2024).

In 2025 Concawe collected information about the consequences of both Tier 1 and Tier 2 events. For Tier 1 events, the most reported consequence is release threshold quantity exceeded (31 events in Manufacturing and three events in Marketing). Fire was reported as a consequence in 19 Tier 1 events (17 in Manufacturing), see Figure 17.

Five Tier 1 process safety events were recorded as “upset emission from a permitted or regulated source”. The further consequences recorded for the first event were: “rainout” and “on-site shelter-in-place or on-site non-precautionary evacuation”. There were no second events recorded as a further consequence.

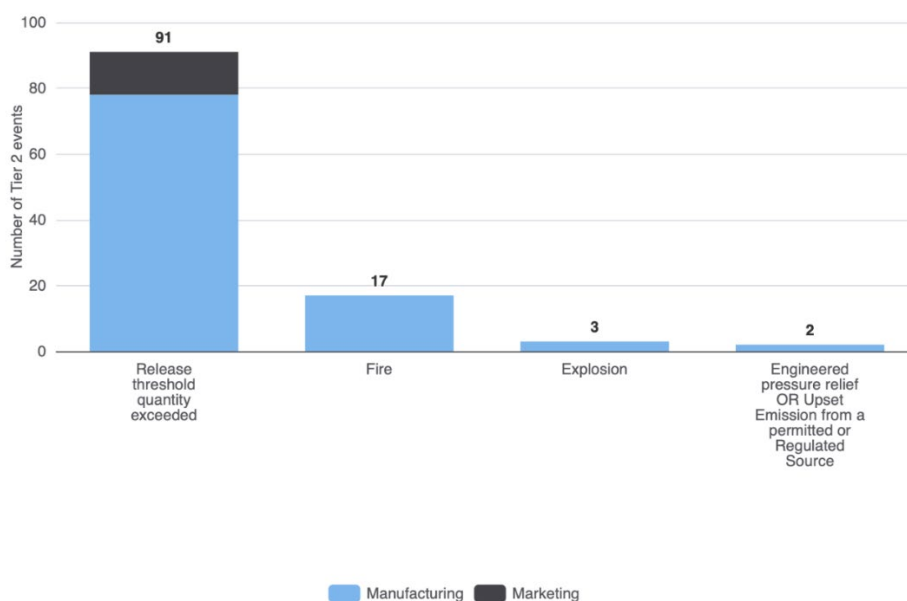
Figure 17. Consequences of Tier 1 process safety events



As with Tier 1 events, the most reported consequence of Tier 2 events was release threshold quantity exceeded (78 events in Manufacturing and 13 events in Marketing). Fire was reported as a consequence in 17 Tier 2 events, all in Manufacturing, and explosion was the consequence of three Manufacturing, see Figure 18.

Two Tier 2 process safety events all in Manufacturing were recorded as “upset emission from a permitted or regulated source” or “engineered pressure relief”. The further consequences recorded for these events were: “rainout” (one event), “discharge to a potentially unsafe location” (one event), “on-site shelter-in-place or on-site non-precautionary evacuation” (one event).

Figure 18. Consequences of Tier 2 process safety events



4. COMPARISON WITH OTHER SECTORS

Most of the safety performance indicators used in the oil industry have also been adopted in many other sectors so that meaningful comparisons are possible, see **Table 13**. The IOGP statistics cover the oil and gas exploration and production activities of participating IOGP Member Companies [32]. In comparison with IOGP statistics for European onshore, Concawe recorded a 2.02 fatality rate, a 1.05 LWIF and 1.82 AIF. These Concawe rates include marketing activities, which are typically not represented in the IOGP data.

Table 13 Comparison of oil industry safety performance (own staff and contractors)

	Concawe 2025	International Association of Oil & Gas Producers IOGP 2025	
		Europe Onshore	Europe Onshore & Offshore
FAR	2.02	0	0
LTIF	1.07	0.57	0.77
AIF*	1.82	1.03	1.82

FAR is per 100 million work hours

LTIF and AIF per million work hours

*AIF reported as Total Recordable Injury Rate (TRIR) by IOGP (number of recordable injuries (fatalities + LWI + RWI + MTC) per million hours worked

The American Petroleum Institute (API) reports that the rate of job-related nonfatal injuries and illnesses for the US Petroleum Refining sector was 1.6 per 100 full-time workers in 2021 [33]. Note this figure does not refer to lost workdays. Note also that this figure is based upon 200,000 work hours as a denominator compared with 1,000,000 work hours used by Concawe. The Concawe 2021 LTIF expressed per 200,000 work hours is 0.19.

The US Refining Tier 1 and 2 PSE rates recorded by API for 2025 are 0.0682 and 0.1728, respectively [35]. The Concawe rates are 0.026 and 0.062 when expressed per 200,000 work hours.

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APPENDIX 1 EUROPEAN OIL INDUSTRY STATISTICS DEFINITIONS AND GUIDING NOTES

Several safety performance indicators have become “standard” in the oil industry and in many other industry sectors. They are mostly expressed in terms of frequency of the incident with the number of hours worked being the common denominator. This taken to be representative of the overall level of activity. Such parameters have the advantage of relying on a small number of straightforward inputs allowing meaningful statistical analysis even when the data sets are incomplete. The “standard” performance indicators considered in this report are FAR, LWIF, LWIS, RAR, AIF, and PSE(R) [29, 30]. There are subtle differences in the way these parameters are used, collected, and reported by different companies. The features, relevance and reliability of each indicator are therefore discussed below in the guidance section.

Abbreviations and Definitions

1. AIF (TRCF) All Injury Frequency (Total Recordable Case Frequency) which is calculated from the sum of fatalities, LWIs, RWIs and MTCs divided by number of hours worked expressed in millions of hours.
2. COCO Company owned and operated sites.
3. CODO Company owned, Dealer operated sites.
4. Contractor A company or an individual engaged to carry out specified work under a contract on company premises (incl. retail stations and office buildings). Off-site contractor activities are considered only for transportation and loading/unloading of hydrocarbons and other products performed on behalf of the company.
5. Distance travelled This is the distance, expressed in millions of kilometres, covered by company owned delivery vehicles, contractor delivery vehicles and company cars whether leased or owned. It should also include kilometres travelled in employee’s cars when on company business.
6. DOCO Dealer owned, Company operated sites.
7. DODO Dealer owned and operated sites.
8. FAR Fatal Accident rate is calculated from the number of fatalities divided by the number of hours worked expressed in hundred million.
9. Fatality This is a death resulting from a work-related injury where the injured person dies within twelve months of the injury.
10. Hours worked Hours worked by employees and contractors. Estimates should be used where contractor data is not available.
11. LOPC Loss of Primary Containment (LOPC) is an unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g., steam, hot condensate, nitrogen, compressed CO₂, or compressed air).
12. LTIF Lost Time Injury Frequency is calculated from the sum of fatalities and LWI divided by the number of hours worked expressed in millions

13. LWI	Lost Workday Injury is a work-related injury that causes the injured person to be away from work for at least one normal shift because he is unfit to perform any duties.
14. LWIF	LWI Frequency is calculated from the number of LWIs divided by the number of hours worked expressed in millions.
15. LWIS	LWI Severity is the total number of days lost as a result of LWIs divided by the number of LWIs.
16. Marketing	Marketing includes all non-Manufacturing activities including Retail Operation which comprises the selling of products to the public at Company owned and operated sites (COCO), Company owned, Dealer operated sites (CODO), Dealer owned, Company operated sites (DOCO) and Dealer owned and operated sites (DODO) as well as "Head Office" personnel and other Marketing activities. COCO and DOCO retail operations are likely to be operated by staff and/or contractors while CODO are likely to be operated by contractors. DODO retail operations are not usually operated by Company staff or contractors and hence their hours are not usually included.
17. MTC	Medical Treatment Case is a work-related personal injury which requires treatment by a medical professional and does not result in time away from work or restriction in duties. It excludes all cases involving first aid treatments as specified in OSHA 1904.7(b) (5) even if these treatments are performed by a medical professional.
18. RAR	Road Accident Rate is calculated from the number of accidents divided by the kilometres travelled expressed in millions.
19. PSE	A Process Safety Event is an unplanned or uncontrolled LOPC. The severity of the PSE is defined by the consequences of the LOPC.
20. PSER	Process Safety Event Rate (PSER) is calculated as the number of PSE (Tier 1, Tier 2 or Total) divided by the total number of hours worked (including contractor hours) expressed in millions.
21. RA Road Accidents	Any incident involving any of the vehicles described above that occurs on or off-road resulting in a recordable injury (fatality, LTI, MTI, RWI), asset damage greater than EUR 2.500 or loss of containment greater than a Tier 2 Process Safety incident. It excludes all accidents where the vehicle was legally parked, the journey to or from the driver's home and normal place of work, minor wear and tear, vandalism, or theft. On-site incidents involving cars or trucks should be covered in the site statistics.
22. RWI	Restricted Workday Injury is a work-related injury which causes the injured person to be assigned to other work on a temporary basis or to work his normal job less than full time or to work at his normal job without undertaking all the normal duties.

23. Tier 1 PSE A Tier 1 Process Safety Event (T-1 PSE) is a loss of primary containment (LOPC) with the greatest consequence. Refer to the definitions in API (2010) ANSI/API Recommended practice 754 for further details. Note Concawe has modified the unit and costs in API RP754 to reflect SI units and € costs. See previous Concawe safety reports [18-28] for further details
24. Tier 2 PSE A Tier 2 Process Safety Event (T-2 PSE) is a LOPC with lesser consequence. Refer to the definitions in API (2010) ANSI/API Recommended practice 754 for further details. Note Concawe has modified the unit and costs in API RP754 to reflect SI units and € costs. See previous Concawe safety reports [18-28] for further details
25. Total days lost The number of calendar days lost through LWIs counting from the day after the injury occurred.
26. PI Permanent impairment: According to the IOGP (International Association of Oil & Gas Producers) Fatality and Permanent Impairment (FPI) injury definitions, Permanent Impairment (PI) is defined as: "The outcome of a work-related injury from which the worker cannot or is not expected to return to their previous (pre-incident) whole person function as a result of an acute, single incident." The injury results in one or more of the following:
Permanent loss of body parts
Permanent reduction of an organ's physiological function
Permanent reduction in skin and musculoskeletal function
Permanent reduction in psychological, social, or cognitive function
For reporting purposes, the classification is to be made within 180 days of the injury.

CONCAWE CATEGORIZATION OF CAUSES FOR FATALITIES AND LUIS

Previous Category	Current Concawe Incident Category	Description
Road accident	Road accident	Incidents involving motorised vehicles designed for transporting people and goods over land e.g. cars, buses, and trucks. Pedestrians struck by a vehicle are classes as road accidents. Fatal incidents from a mobile crane would only be road accidents if the crane were being moved between locations.
Height/Falls	Falls from height	A person falls from one level to another.
	Staff hit by falling objects	Incidents where injury results from being hit by flying or falling objects.
	Slips & trips (same height)	Slips, trips, and falls caused by falling over or onto something at the same height.
Burn/electrical	Explosion or burns	Burns or other effects of fires, explosions, and extremes of temperature. "Explosion" means a rapid combustion not an overpressure.
	Exposure electrical	Exposure to electrical shock or electrical burns etc.
Confined space entry	Confined Space	Incidents which occur within a confined space. Spaces are considered "confined" because their configurations hinder the activities of employees who must enter, work in, and exit them. Confined spaces include, but are not limited to underground vaults, tanks, storage bins, manholes, pits, silos, process vessels and pipelines.
Construction / Maintenance & Other	Assault or violent act	Intentional attempt, threat, or act of bodily injury by a person or persons or by violent harmful actions of unknown intent, includes intentional acts of damage to property.
	Water related, drowning	Incidents/events in which water played a significant role including drowning.
	Cut, puncture, scrape	Abrasions, scratches, and wounds that penetrate the skin.
	Struck by	Incidents/events where injury results from being hit by moving equipment or machinery, or by moving objects. Also includes vehicle incidents where the vehicle is struck by or struck against another object.
	Exposure, noise, chemical, biological, vibration	Exposure to noise, chemical substances (including asphyxiation due to lack of oxygen not associated with a confined space), hazardous biological material, vibration, or radiation.
	Caught in, under or between	Injury where injured person is crushed or similarly injured between machinery moving parts or other objects, caught between rolling tubulars or objects being moved, crushed between a ship and a dock, or similar incidents. Also includes vehicle incidents involving a rollover.
	Overexertion, strain	Physical overexertion, e.g. muscle strain.
	Pressure release	Failure of or release of gas, liquid or object from a pressurised system.
	Other	Used to specify where an incident cannot be logically classed under any other category.

Guidance

Fatalities and Fatal Accident Rate (FAR)

Because of their very low numbers, fatalities and, therefore, FAR are not necessarily reliable indicators of the safety performance of a Company or Industry. A single accident can produce several fatalities and cause an abnormally high result in the indicator for a certain year. Conversely, the lack of fatalities is certainly no guarantee of a safe operation. The safety pyramid of H.W. Heinrich² implies that for every fatality there have been many other incidents with less serious injury outcomes. These less severe incidents provide the opportunities to address equipment, standards, training, attitudes, and practices that may prevent both the less, and the more serious incidents.

LWI Frequency (LWIF) and LWI Severity (LWIS)

The LWIF is the most common indicator in the oil and other industries and has been in use for many years. It is now common practice to include not only a company's own staff but also contractors in the statistics and this is done almost universally in the oil industry. All companies without exception collect employee LWIF data for at least their own staff and this is, therefore, the most frequently used and reliable indicator.

Not all companies keep track of the number of lost days and, in some cases, the numbers are skewed by local interpretation. The overall LWIS reported is calculated taking account only of those companies that report the data. It should also be noted that the difference in interpretation of days lost results in a wide variation in the results and hence trends are difficult to identify.

All Injury Frequency (AIF)

As LWIF figures become progressively lower they appear to reach a plateau. Companies that have achieved very low LWIF levels may need a more meaningful indicator to monitor trends and detect improvements or deterioration of performance. AIF would provide such an indicator, since it records fatalities, RWI and MTC in addition to LWIs. Although it is still less widely used than LWIF, reporting improves year by year with more companies including this indicator into their performance reporting. It should also be noted that not all companies operate a restricted work system and also restricted working is not allowed in some countries. As the total number of injuries is not reported by all companies, only the worked hours for which this number is available are taken into account in the calculation of the overall AIF figure.

Road Accident Rate (RAR)

It is no surprise that, since road accidents remain a cause of both fatalities and LWI in the oil industry, a number of companies have chosen to calculate and monitor these separately outside of their impact on the overall statistics. This allows some extra focus on this key area of concern. The separate road accident data is still incomplete and the overall figures should therefore be considered as indicative only. For this reason, Concawe only reports RAR data for the whole downstream industry and all personnel involved (own staff and contractors), since the level of reporting is insufficient for the segmented data to be analysed. It must be noted, however, that the vast majority of road accidents occur in distribution and retail activities where both sales employees and truck drivers travel longer distances

APPENDIX 2 HISTORICAL DATA 1993 TO 2025

Table A2-1 Performance indicators - All sectors

Year	Fatalities	FAR	AIF	LWIF	LWIS	RAR	Million Hours Reported	Distance Travelled Million km
1993	18	5.04	7.88	4.66	27	3.8	357	252
1994	19	5.36	7.42	3.96	25	3.1	354.8	227
1995	13	3.55	11.15	4.64	24	2.6	366.4	627
1996	14	3.33	10.72	4.71	19	2.0	420.6	705
1997	15	3.39	11.4	4.57	23	1.9	442	720
1998	12	2.55	9.91	4.48	22	1.5	469.7	369
1999	8	1.78	9.45	4.27	21	0.9	448.5	474
2000	13	2.74	8.78	4.25	25	0.9	475.1	1084
2001	14	2.83	9.53	4.28	24	0.8	495.5	1112
2002	16	3.33	6.92	3.91	23	1.1	480	1123
2003	22	4.14	6.34	3.22	30	1.0	531.6	1459
2004	12	2.34	6.28	3.17	33	1.0	513.3	1016
2005	11	1.89	4.47	2.57	35	0.9	581.7	1364
2006	7	1.47	4.62	2.48	30	1.6	477.5	557
2007	15	2.79	4	1.88	35	0.9	538.2	1069
2008	11	1.98	3.69	1.71	28	0.9	555.5	1004
2009	11	2.02	4.00	1.83	30	0.8	545.3	1036
2010	14	2.68	5.00	1.87	30	0.6	522.2	1011
2011	11	1.91	3.48	1.48	42	0.5	577.2	1084
2012	13	2.41	2.92	1.33	29	0.4	538.9	1164
2013	6	1.11	2.68	1.20	34	0.5	540.5	1178
2014	7	1.30	2.03	1.08	43	0.3	539.3	1271
2015	7	1.26	1.69	1.25	29	0.3	554.7	1111
2016	2	0.36	1.56	0.87	34	0.4	559.6	833
2017	2	0.34	1.57	0.94	34	0.4	594.3	953
2018	10	1.73	1.89	1.02	35	0.3	579.1	978
2019	3	0.49	1.65	0.97	35	0.4	617.6	818
2020	2	0.37	1.52	0.88	35	0.4	542.5	725
2021	6	1.08	1.57	0.93	36	0.3	556.4	709
2022	11	2.02	1.82	1.05	31	0.2	544.9	1259
2023	7	1.17	1.95	1.10	40	0.2	595.7	924
2024	8	1.37	1.66	0.98	39	0.2	585.2	812
2025	4	0.68	1.89	1.14	40	0.2	590.8	745

Table A2-2 Performance indicators - Manufacturing Staff

Year	Fatalities	FAR	AIF	LWIF	LWIS
1993	2	2.67	12.71	3.84	50
1994	3	3.98	10.24	2.93	29
1995	1	1.08	12.23	3.58	29
1996	0	0	14.83	3.94	28
1997	2	1.76	15.09	4.78	24
1998	1	0.92	10.76	4.7	20
1999	0	0	12.46	4.45	16
2000	0	0	13.89	3.14	30
2001	5	5.56	9.91	3.35	27
2002	4	5.44	9.67	2.95	28
2003	2	2.5	8.38	2.9	38
2004	3	3.3	6.63	1.87	51
2005	0	0	5.11	1.83	44
2006	0	0	5.06	1.98	28
2007	0	0	3.93	1.78	33
2008	1	0.83	3.69	1.51	32
2009	3	2.63	5.60	2.20	34
2010	1	1.02	8.00	2.27	28
2011	1	0.86	5.70	1.69	76
2012	0	0.00	4.51	1.41	32
2013	0	0.00	3.65	1.29	33
2014	1	0.92	2.96	1.38	44
2015	3	3.00	2.92	1.48	41
2016	0	0.00	2.05	1.24	34
2017	0	0.00	2.26	1.53	35
2018	0	0.00	3.04	1.50	42
2019	0	0.00	2.36	1.54	32
2020	1	0.90	2.24	1.37	39
2021	3	2.74	2.77	1.44	39
2022	2	1.84	3.12	1.41	36
2023	4	3.77	3.67	1.90	39
2024	0	0.00	2.58	1.35	38
2025	0	0.00	2.98	1.45	41

Table A2-3 Performance indicators - Manufacturing Contractors

Year	Fatalities	FAR	AIF	LWIF	LWIS
1993	8	20.68	13.11	5.35	20
1994	1	2.63	12.73	4.57	36
1995	0	0	12.57	7.39	24
1996	3	5.03	18.66	8.26	19
1997	1	1.78	28.45	8.84	23
1998	0	0	25.08	9.32	24
1999	2	3.53	24.47	8.14	19
2000	2	3.07	20.96	8	23
2001	3	4.09	18.13	6.89	24
2002	6	9.89	14.34	6.31	23
2003	6	8.41	12.78	4.55	42
2004	5	6.16	10.23	3.54	30
2005	3	3.36	8.02	3.07	33
2006	2	2.07	6.82	2.88	31
2007	8	7.01	6.2	2.3	25
2008	4	3.09	5.28	1.81	26
2009	6	4.75	6.07	2.21	33
2010	10	7.61	8.84	2.13	32
2011	9	6.59	5.51	1.70	34
2012	7	5.17	4.30	1.48	26
2013	4	3.46	3.92	1.22	32
2014	5	3.91	2.97	1.13	46
2015	1	0.67	1.89	1.71	18
2016	2	1.26	1.48	0.66	42
2017	1	0.54	1.42	0.78	36
2018	7	4.21	2.03	0.99	37
2019	3	1.75	1.69	0.91	40
2020	0	0.00	1.89	1.01	34
2021	2	1.45	2.07	1.12	38
2022	4	2.79	2.45	1.37	29
2023	2	1.19	2.70	1.23	48
2024	7	3.95	2.12	1.02	48
2025	2	1.15	2.42	1.38	48

Table A2-4 Performance indicators - Marketing Staff

Year	Fatalities	FAR	AIF	LWIF	LWIS
1993	2	1.2	6.07	5.68	23
1994	13	8.07	5.95	5.16	21
1995	1	0.62	12	4.93	22
1996	2	1.11	8.64	4.89	18
1997	4	2.4	8.62	4.61	23
1998	3	1.64	7.73	3.41	21
1999	2	1.12	6.5	3.67	23
2000	0	0	4.71	3.68	29
2001	3	1.42	6.68	3.63	27
2002	4	2.1	5.66	3.61	22
2003	2	0.98	5.73	3.33	19
2004	0	0	6.62	3.9	25
2005	3	1.4	4.17	2.98	36
2006	0	0	3.73	2.63	23
2007	2	1.18	3.98	2.12	31
2008	1	0.62	4.04	2.13	27
2009	1	0.62	3.28	1.75	22
2010	0	0.00	2.43	1.81	26
2011	1	0.48	2.17	1.43	32
2012	2	1.17	1.96	1.42	29
2013	0	0.00	2.18	1.33	34
2014	0	0.00	1.52	0.99	43
2015	0	0.00	1.35	1.04	40
2016	0	0.00	1.74	0.94	25
2017	0	0.00	1.80	0.95	36
2018	1	0.63	1.74	0.97	31
2019	0	0.00	1.81	0.90	42
2020	0	0.00	1.42	0.80	29
2021	0	0.00	0.93	0.61	41
2022	0	0.00	1.34	1.04	26
2023	0	0.00	1.14	0.82	38
2024	0	0.00	1.27	0.95	29
2025	1	0.75	1.47	1.06	31

Table A2-5 Performance indicators - Marketing Contractors

Year	Fatalities	FAR	AIF	LWIF	LWIS
1993	6	7.83	3.66	2.9	21
1994	2	2.49	4.34	2.21	25
1995	11	18.16	7.03	3.09	21
1996	9	11.85	3.54	2.57	11
1997	8	7.6	3.37	2.01	20
1998	8	6.79	5.87	3.5	19
1999	4	3.3	5.6	3.23	18
2000	11	9.66	2.86	4.06	17
2001	3	2.48	8.2	4.52	17
2002	2	1.29	4.41	3.79	20
2003	12	6.82	3.4	2.68	31
2004	4	2.77	3.33	2.79	43
2005	5	2.73	2.61	2.28	28
2006	5	4.58	3.79	2.32	19
2007	5	3.94	2.35	1.39	22
2008	5	3.46	1.88	1.31	20
2009	1	0.71	1.64	1.27	28
2010	3	2.53	1.67	1.33	36
2011	0	0.00	1.23	1.08	19
2012	4	3.63	1.23	0.95	29
2013	2	1.70	1.21	0.87	37
2014	1	0.76	1.00	0.89	37
2015	3	2.44	0.85	0.75	25
2016	0	0.00	1.00	0.75	37
2017	1	0.72	0.97	0.67	28
2018	2	1.38	1.01	0.73	28
2019	0	0.00	0.96	0.70	25
2020	1	0.67	0.73	0.48	35
2021	1	0.62	0.89	0.69	24
2022	5	3.09	0.79	0.53	33
2023	1	0.56	0.88	0.72	30
2024	1	0.60	0.88	0.70	34
2025	1	0.57	1.00	0.78	36

Table A2-6 **LWI causes 2018-2025 - Staff and Contractors in both Manufacturing and Marketing**

		LWI 2025				2024	2023	2022	2021
Categories		Manufacturing	Marketing	Combined	%	%	%	%	%
Road Accident	Road Accident	8	13	21	3	4.0	3.5	2.6	3.1
Height/Falls	Falls from height	33	26	59	8.7	9.4	8.1	7.4	7.8
	Staff hit by falling objects	9	5	14	2.1	1.9	2.7	2.3	2.1
	Slips & trips (same height)	117	102	219	32.4	29.9	33.0	27.1	26.9
Burn/ Electrical	Explosion or burns	28	11	39	5.8	6.6	6.9	5.1	6.0
	Exposure electrical	4	6	10	1.5	0.0	1.2	0.5	1.0
Confined Space	Confined Space	0	0	0	0.0	0.0	0.2	0.2	0.8
Other Causes	Assault or violent act	1	5	6	0.9	1.9	1.5	0.9	1.6
	Water related, drowning	1	0	1	0.1	0.5	0.0	0.2	0.2
	Cut, puncture, scrape	43	38	81	12.0	10.0	6.6	10.4	9.4
	Struck by	32	17	49	7.2	10.7	10.8	9.7	10.5
	Exposure, noise, chemical, biological, vibration	20	6	26	3.8	4.2	1.7	4.4	4.9
	Caught in, under or between	41	18	59	8.7	8.6	10.2	10.2	7.8
	Overexertion, strain	32	21	53	7.8	6.6	6.7	8.5	9.6
	Pressure release	8	3	11	1.6	0.7	0.6	1.2	1.6
	Other	20	8	28	4.1	4.9	6.3	9.3	6.8
Total		397	279	676	100.0	100.0	100.0	100.0	100.0

APPENDIX 3 LWI 2025 - CAUSAL FACTORS

		Number of Causal Factors assigned to Lost Workday Injuries (more than one causal factor can be assigned to a single LWI)														
Sector	Incident Category	Management of Change	Communication	Design	Equipment Reliability & Maintenance Management	Equipment Inspection and Testing	Organisational Structure & Staffing	Knowledge and Skills	Operating Limits	Procedures	Risk Assessment & Associated Action Management	Safe System of Work	Work Monitoring	Other	Not Yet Available	
Manufacturing	Assault or violent act	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Marketing	Assault or violent act	0	0	0	0	0	0	0	1	0	1	0	0	4	0	
Manufacturing	Caught in, under or between	1	0	3	1	0	1	21	1	9	16	11	5	6	1	
Marketing	Caught in, under or between	0	0	1	0	0	0	9	0	2	7	7	4	0	2	
Manufacturing	Confined space	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Marketing	Confined space	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Manufacturing	Cut, puncture, scrape	1	3	4	0	0	3	16	0	7	13	14	3	1	4	
Marketing	Cut, puncture, scrape	1	1	0	2	0	0	19	0	8	7	10	3	7	1	
Manufacturing	Explosion or burns	2	1	9	3	1	2	9	1	2	14	6	1	2	0	
Marketing	Explosion or burns	0	1	0	1	1	0	5	0	1	3	3	1	0	0	
Manufacturing	Exposure electrical	0	1	1	1	2	1	3	0	2	2	1	0	0	0	
Marketing	Exposure electrical	0	0	1	1	1	0	1	0	3	4	3	0	0	1	
Manufacturing	Exposure, noise, chemical, biological, vibration	1	2	3	0	1	0	8	1	5	7	4	3	0	2	
Marketing	Exposure, noise, chemical, biological, vibration	0	0	0	1	0	0	1	0	0	3	0	0	2	0	
Manufacturing	Falls from height	0	1	3	4	2	1	6	0	7	12	8	4	1	3	
Marketing	Falls from height	1	4	5	2	0	0	14	0	7	6	4	5	7	1	
Manufacturing	Other	0	0	2	2	0	0	5	0	4	1	1	0	5	2	
Marketing	Other	0	0	0	1	0	0	1	0	1	2	0	0	2	1	
Manufacturing	Overexertion, strain	0	0	1	1	0	1	9	0	2	8	3	2	9	6	
Marketing	Overexertion, strain	0	0	0	0	0	0	9	0	1	2	2	0	7	4	
Manufacturing	Pressure release	1	0	2	0	1	0	1	0	2	1	2	0	1	2	
Marketing	Pressure release	0	0	0	0	0	0	0	0	1	2	0	0	0	0	
Manufacturing	Road accident	0	1	0	0	0	0	1	1	0	0	1	1	4	1	
Marketing	Road accident	0	2	0	2	0	0	7	0	1	2	0	0	3	0	
Manufacturing	Slips & trips (same height)	4	3	20	8	3	1	34	0	10	39	13	8	25	6	
Marketing	Slips & trips (same height)	0	1	8	6	1	0	42	1	10	41	13	8	18	2	
Manufacturing	Staff hit by falling objects	0	2	2	0	0	0	3	0	1	3	4	1	2	0	
Marketing	Staff hit by falling objects	0	0	0	1	1	0	2	0	2	2	1	0	0	0	
Manufacturing	Struck by	0	2	9	2	1	0	12	0	8	11	10	1	5	0	
Marketing	Struck by	0	1	2	3	2	0	7	0	2	0	4	0	1	1	
Manufacturing	Water related, drowning	0	0	1	0	0	0	1	0	1	1	0	0	0	0	
Marketing	Water related, drowning	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	12	26	77	42	17	10	246	6	99	210	125	50	112	41	

APPENDIX 4 PROCESS SAFETY EVENTS 2025

Table A4-1 Tier 1 and 2 Process Safety events by Type of Process (Refining)

Type of Process: Refining	Tier 1	Tier 2
1. Active Warehouse	0	0
2. Alkylation, Hydrofluoric (HF)	0	0
3. Alkylation, Sulfuric	1	0
4. Bitumen / Resid / Asphalt	1	1
5. Calcining	0	0
6. Coking	0	0
7. Crude / Vacuum Distillation	3	4
8. Flares / Flare Systems / Flare Gas Recovery	1	0
9. Fluid Catalytic Cracking (FCC)	4	3
10. Gas and Liquid Desulfurization / Treating (H ₂ S absorbers, amine systems, Merox)	1	1
11. Hydrocracking	1	4
12. Hydrogen	0	1
13. Hydrotreating	3	11
14. Isomerization	2	1
15. Loading / Unloading / Truck / Rail / Transport Vessel	4	9
16. Marine / Jetty / Wharf	0	1
17. Other (describe)	5	6
18. Pilot Plant	0	0
19. Polymerization	0	0
20. Reforming	3	12
21. Sewer / Lift Station / Wastewater Handling, Treatment or Disposal	0	4
22. Sulfur Recovery	1	3
23. Tank Farm / Storage Facility / Offsites / Storage and Transfer Piping	20	22
24. Utilities / Steam Plant / Cogeneration	1	1
25. Vapor Recovery / Light Ends	0	0
Total	51	84

Table A4-2 Tier 1 and 2 Process Safety events by Type of Process (Petrochemical & other process)

Type of Process: Petrochemical & other process	Tier 1	Tier 2
1. Acetic Acid and Derivatives	0	0
2. Active Warehouse	0	0
3. Amines Derivatives	0	0
4. Aromatics Derivatives (cumene, dis-proportionation, aromatic isomerization, linear alkylbenzene)	0	0
5. Benzene	0	0
6. Butadiene	0	0
7. Butane	0	1
8. Cyclohexane	0	0
9. Dehydrogenation (propylene, butylenes)	0	0
10. Diisocyanates (TDA, MDA, IPDA, etc.)	0	0
11. ETBE	0	0
12. Ethane	0	0
13. Ethanol	0	0
14. Ethyl Benzene and Derivatives	0	0
15. Ethylene and Derivatives	1	8
16. Ethylene Dichloride and Derivatives	0	0

17. Ethylene Oxide	0	0
18. Flares / Flare Systems / Flare Gas Recovery	0	0
19. Formaldehyde and Derivatives	0	0
20. Glycols (ethylene, propylene)	0	0
21. Hexane	0	0
22. Hexanol	0	0
23. Isobutane	0	0
24. Isobutene	0	0
25. Isocyanates	0	0
26. Isopropanol	0	0
27. LNG	0	0
28. Loading / Unloading / Truck / Rail / Transport Vessel	1	4
29. Methane	0	0
30. Methanol	0	0
31. Methyl Mercaptan	0	0
32. MTBE	0	0
33. NGL Fractionation	0	0
34. Other (describe)	0	4
35. Paraxylene	0	0
36. Pentane	0	0
37. Phenol	0	0
38. Pilot Plant	0	1
39. Polyethylene	0	0
40. Polypropylene	0	0
41. Polystyrene	0	0
42. Propane	0	0
43. Propylene	0	1
44. Propylene Oxide and Derivatives	0	2
45. Sewer / Lift Station / Wastewater Handling, Treatment or Disposal	0	2
46. Specialty Chemicals	0	0
47. Styrene-Butadiene	0	0
48. Synthesis Gas (CO, H ₂)	0	0
49. Tank Farm / Storage Facility / Offsites / Storage and Transfer Piping	1	2
50. Toluene	0	0
51. Utilities / Steam Plant / Cogeneration	1	0
52. Xylene	0	0
Total	4	25

Table A4-3 Tier 1 and 2 Process Safety events by Mode of Operation

Mode of Operation	Tier 1	Tier 2
1. Emergency shutdown	0	2
2. Normal	44	84
3. Other	0	1
4. Planned shutdown	0	3
5. Routine maintenance	2	6
6. Start-up	3	10
7. Temporary	5	1
8. Turnaround	1	1
9. Upset	0	1
Total	55	109

Table A4-4 Tier 1 and 2 Process Safety events by Point of release

Point of release	Tier 1	Tier 2
1. Atmospheric tank	11	10
2. Blower / Fan	0	0
3. Compressor	1	5
4. Cooling Tower	0	0
5. Filter / Coalescer / Strainer	0	0
6. Fired Boiler	1	0
7. Flare / Relief System	1	1
8. Furnace / Fired Heater	3	4
9. Heat Exchanger	4	6
10. Instrumentation	3	3
11. Other (describe)	3	14
12. Piping System, Large Bore(>2)	18	26
13. Piping System, Small Bore(≤2)	3	20
14. Pressure Vessel	2	3
15. Pump	4	16
16. Reactor	1	1
Total	55	109

Table A4-5 Tier 1 and 2 Process Safety events by Type of Material released

Type of Material released	Tier 1	Tier 2
1. Combustible	13	28
2. Corrosive	1	4
3. Flammable	29	70
4. Other	5	2
5. Toxic	3	3
6. UNDG Class 2	0	0
7. Utilities	4	2
Total	55	109

Table A4-6 Tier 1 and 2 Process Safety events by Causal Factor

Causal Factors	Tier 1	Tier 2
1. Management of Change	8	13
2. Communication	6	3
3. Design	16	34
4. Equipment Reliability & Maintenance Management	16	34
5. Equipment Inspection and Testing	8	21
15. Organisational Structure & Staffing		1
7. Knowledge and Skills	5	14
8. Operating Limits	3	9
9. Procedures	21	26
10. Risk Assessment & Associated Action Management	12	19
11. Safe System of Work	5	9
12. Work Monitoring	6	8
13. Other	7	15
14. Not Yet Available	8	19
Total	121	225

*More than one causal factor may be assigned to a single Tier 1/2 event

APPENDIX 5 CONCAWE MEMBER COMPANIES THAT SUBMITTED DATA

The following member companies provided the data upon which this report is based. The report includes additional data from two member company joint ventures when these are not provided in the member company submissions.

ALMA Petroli	GALP Energia	Motor Oil (Hellas)	Sara
Gruppo API	Gunvor	Neste	Saras
Bayernoil	H&R	Nynas	Shell
BP	Hellenic Petroleum	OMV	St1Tamoil
CEPSA	Ineos	Phillips 66	Tamoil
Crossbridge	IPLOM	ORLEN	TotalEnergies
ENI	Irving	Preem	Varo
Equinor	Klesch	Q8	Vitol
ESSAR	LUKOIL	Repsol	
ExxonMobil	MOL Group	Rompetrol	

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