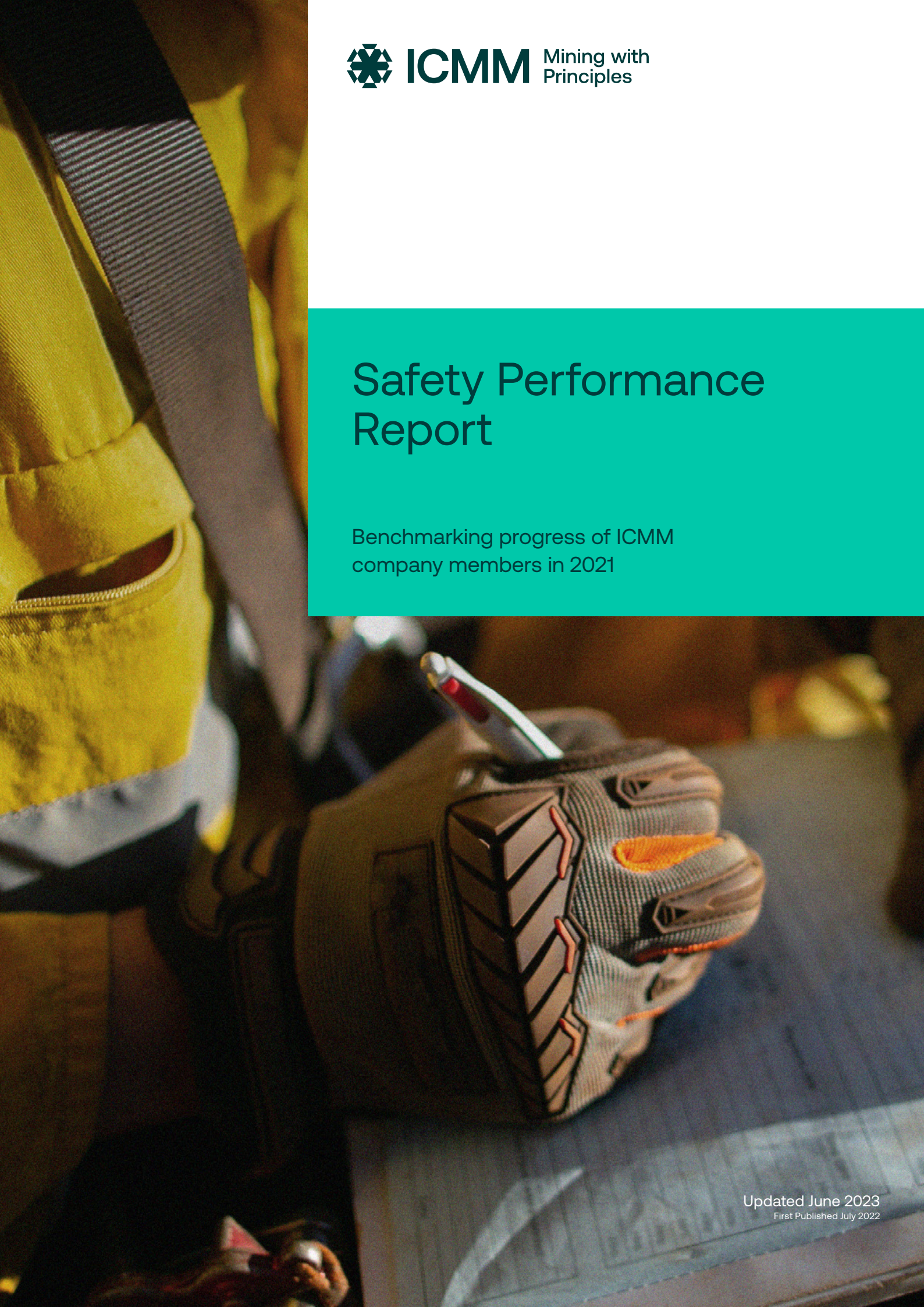
ICMM Mining with Principles

Safety Performance Report

Benchmarking progress of ICMM company members in 2021



Updated June 2023
First Published July 2022

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Acknowledgements

The safety performance report was compiled by Helen Bates and Bob Holwill of Time Associates, in consultation with ICMM's Christian Spano and Verónica Martínez – with input from the ICMM Health & Safety Working Group.

Foreword

Safe working conditions are a fundamental human right at the heart of every responsible mining company. ICMM members have an unwavering commitment to the health and safety of workers, and work unceasingly to eliminate fatalities and prevent injuries.

However, despite the industry's focus on operational, cultural and leadership transformation that has reduced fatalities in recent years, we have still not achieved our goal of zero harm. In 2021, 45[1] people from ICMM company members lost their lives at work. Any year with even a single fatality is unacceptable. This means, as an industry, we must and will continue to work to improve our safety performance so that every single worker returns home safely.

ICMM began collating and publishing company members' safety data in 2012 with the aim of encouraging information and knowledge-sharing, and catalysing learning across the industry. And as an industry, we can draw strength from how far we have come, but we will remain deeply uncomfortable until zero harm is actually achieved.

ICMM's new three-year strategy is focused on ambitious collective action. In health and safety, we will work together to explore the root causes of why harm continues to occur and hunt for the next step change to make zero harm a reality.

Our past tells us that in the face of trying circumstances, we can summon our collective will and find ways to work together to create a safer future. I am confident in the unwavering commitment of every ICMM company and association member to do the same in this instance and achieve a true step-change in our collective safety performance.

Rohitesh Dhawan
President & CEO, ICMM

1. ICMM originally reported 43 fatalities in 2021. This data has been updated as safety incidents at Sibanye Stillwater and Anglo American during 2021 led to one fatality at each company during 2022. The fatalities were assigned to the year of the incident.

Introduction

02

Since 2012, ICMM has measured and disclosed the safety performance of its members. This benchmarking report aims to show members' progress in their goal of eliminating fatalities. This report provides safety performance data of ICMM members in 2021, in line with ICMM's Health and Safety Performance Indicators: Guidance, 2021.

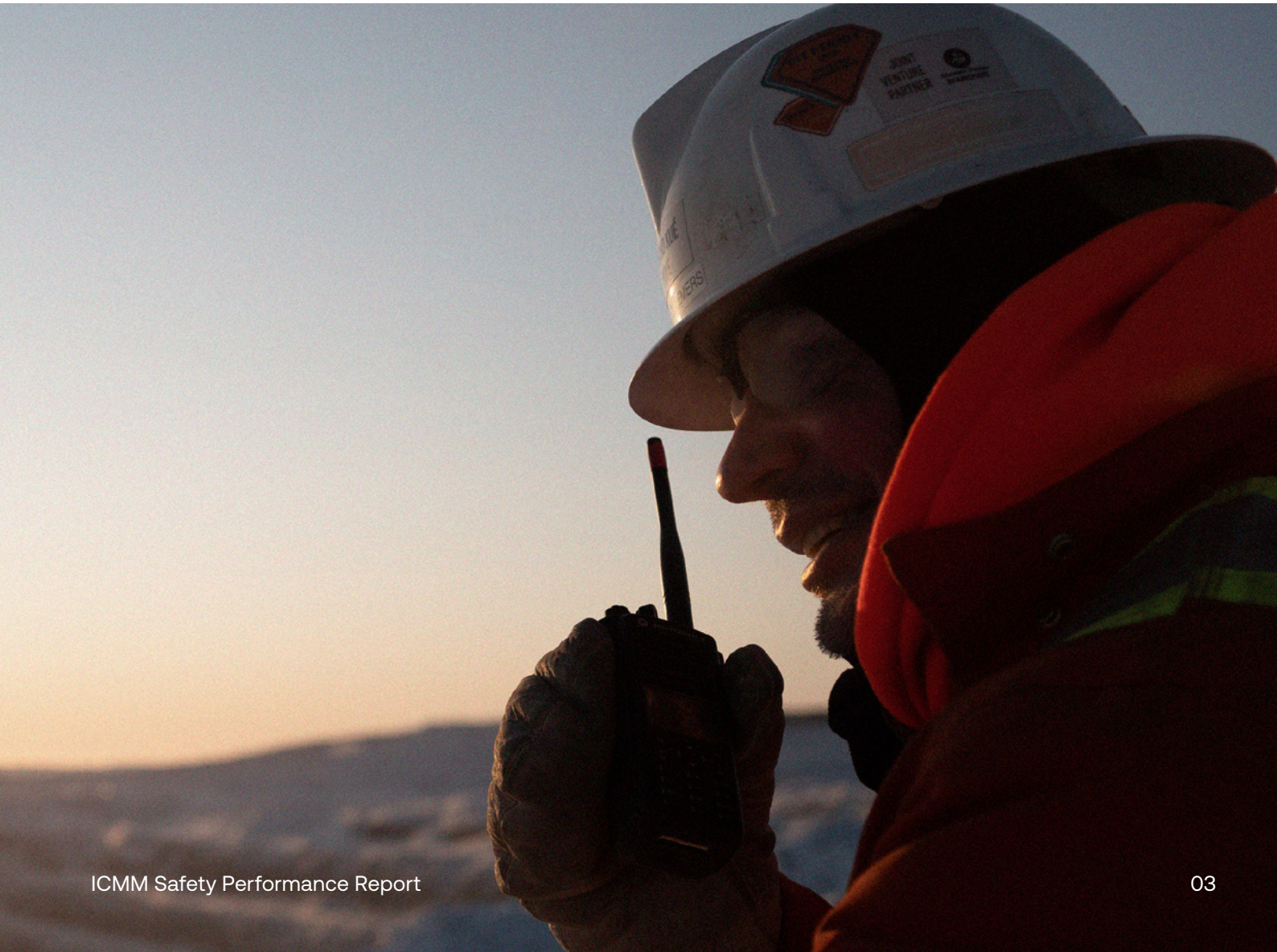
As ICMM members, companies are required to report their safety data in their annual sustainability reports in line with Global Reporting Indicators (GRI) requirements. Comparing these data sets can be challenging due to differences in reporting criteria. In some cases, because of differences in jurisdictional or institutional reporting requirements, reporting periods or criteria by which injuries are recorded, datasets may not be directly comparable.

By collating ICMM company member data using a consistent reporting period (calendar based versus various financial years) and unifying it under a common set of indicators, we can present it in a coherent way.

This safety data continues to play an important role in informing leadership decisions and health and safety strategy. Ongoing analysis of incidents and their associated root causes will continue to inform innovative and impactful approaches to improving safety performance across the industry.

Historically, ICMM has compiled and published members' safety performance data using Fatality and Total Recordable Injury (TRI) numbers and frequency rates as primary measures. However, we are now reviewing which metrics most effectively help companies and our stakeholders achieve fatality elimination.

In 2021, ICMM's guidance was updated to provide greater clarity on how companies determine if an incident is 'recordable'. If there are any deviations from the ICMM guidance, then these are explained in the endnotes found at the end of this document.



2021 Safety Data

03

This section provides an overview of ICMM member safety performance in relation to fatalities and injuries.

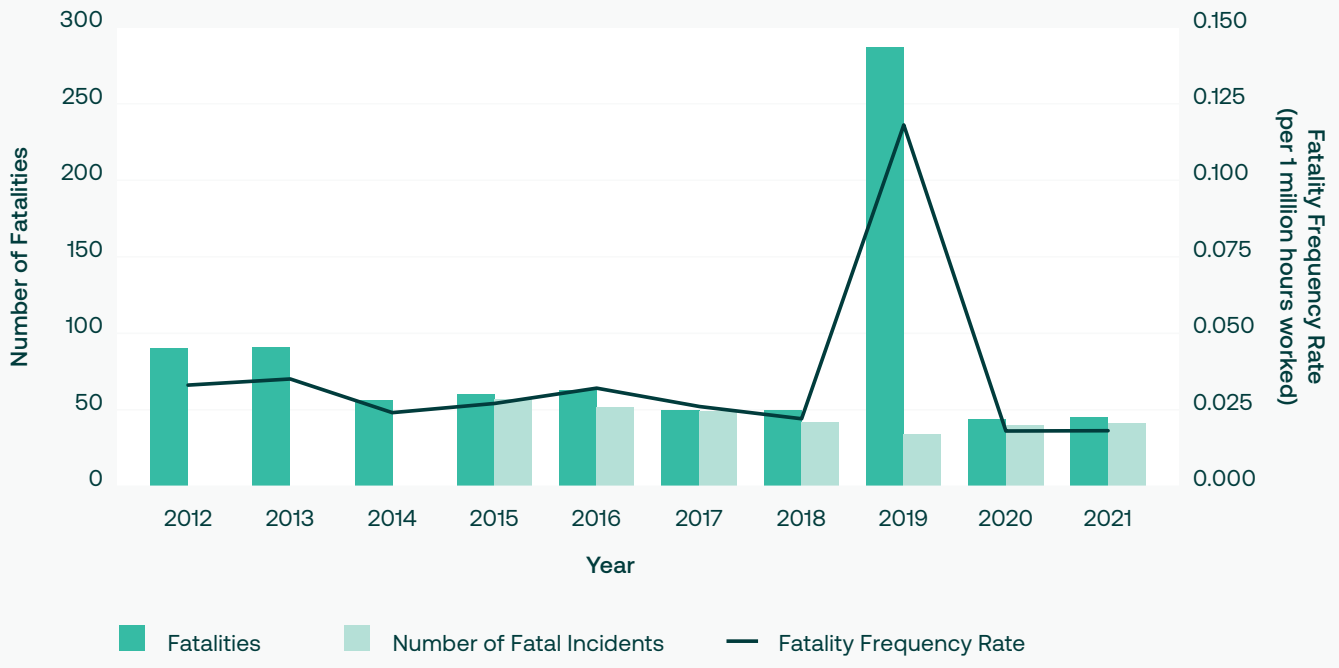
Fatalities

Forty-five[1] (45) fatalities occurred across ICMM company members in 2021. This number compares to 44 in 2020 and 287 in 2019 (the total of 287 in 2019 includes the 250 workers who died in the Brumadinho tailings dam collapse). Overall, in 2021 there was a 7 per cent increase in the total hours worked compared to 2020, but a 2.5 per cent increase in the number of incidents that resulted in a fatality. This has resulted in a leveleing in the Fatality Frequency Rate (FFR).

There were three incidents which resulted in more than one fatality, which is equal to the number of multiple fatality incidents in 2020.

The data shows a decrease in the fatalities since 2016 (if the tailing dam collapse of 2019 is not considered) but appears to have levelled off in the last two years.

Graph 1: ICMM Total Fatalities and Fatality Frequency Rate (2012-2021)[2]



1. ICMM originally reported 43 fatalities in 2021. This data has been updated as safety incidents at Sibanye Stillwater and Anglo American during 2021 led to one fatality at each company during 2022. The fatalities were assigned to the year of the incident.

2. The total of 287 in 2019 includes the 250 workers who died in the Brumadinho tailings dam collapse.

Table 1: ICMM Safety Performance Data (2012 – 2021)[3]

Year	Total Recordable Fatalities	Fatality Frequency Rate (FFR)[4]	Total Recordable Injuries (TRI)	TRI Frequency Rate (TRIFR)[4]	Total Hours Worked
2021	45	0.018	7,355	2.90	2,538,696,213
2020	44	0.018	6,997	2.94	2,380,942,303
2019	287	0.118	7,780	3.20	2,430,830,685
2018	50	0.022	7,751	3.41	2,275,510,188
2017	50	0.026	7,515	3.94	1,906,708,433
2016	63	0.032	8,445	4.26	1,981,148,588
2015	60	0.027	10,494	4.70	2,231,437,832
2014	56	0.024	10,455	4.50	2,324,525,784
2013	91	0.035	11,636	4.52	2,571,500,557
2012	90	0.033	13,895	5.07	2,738,579,590

The data in Graph 2 shows the most common type of incidents causing a fatality. This helps to identify focus areas for fatality prevention efforts. In 2021, the highest number of fatalities (12) occurred through 'mobile equipment' incidents (this is the highest number of fatalities for mobile equipment since 2018).

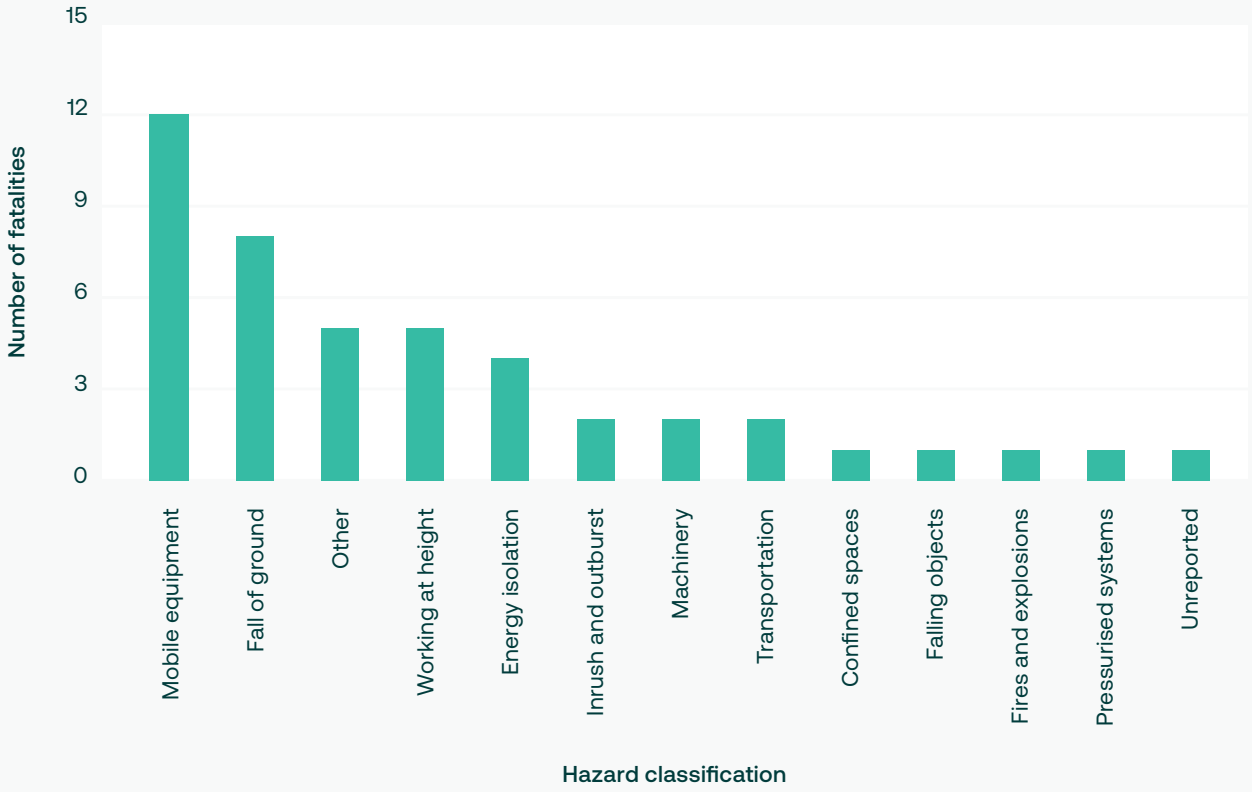
The hazard posed by vehicles is common across the industry since it is not dependent on geography, or the commodity being produced. As part of ICMM's collaborative Innovation for Cleaner Safer Vehicle (ICSV) initiative, members are working in partnership with original equipment manufacturers (OEMs) to identify and promote solutions including collision avoidance technology, process improvements and training capable of eliminating fatalities from vehicle interactions.

In addition to mobile equipment being the greatest cause of fatalities, it is also the most geographically spread, across seven countries (see Graph 4).

3. Data was not collected prior to 2012 and is therefore not included in the graphs and tables in this report. Companies that joined ICMM after 2012 are represented in the dataset from the first full calendar year that they were members.

4. Rates are per 1 million hours worked (calculated by dividing the total number of fatalities or TRIs by total hours worked, and then multiplying by 1 million). Fatality rate is shown to three decimal places, injury rate shown to two decimal places.

Graph 2: ICMM Associated Hazards Attributed to Fatalities (2021)



The next highest cause of fatalities (8) is 'fall of ground'. This is a reversal of the data seen in 2020 where 'fall of ground' was the most prevalent incident.

Twenty-eight fatalities occurred in underground working, 5 in open pit and 12 in other process workings (Graph 3).

Fall of ground incidents can be:

— **Induced or intentional**, meaning rock-falls are caused by the mining method such as caving rock behind a longwall face, collapsing roof in a retreat room-and-pillar mine or caving rock in a block-caving hardrock mine.

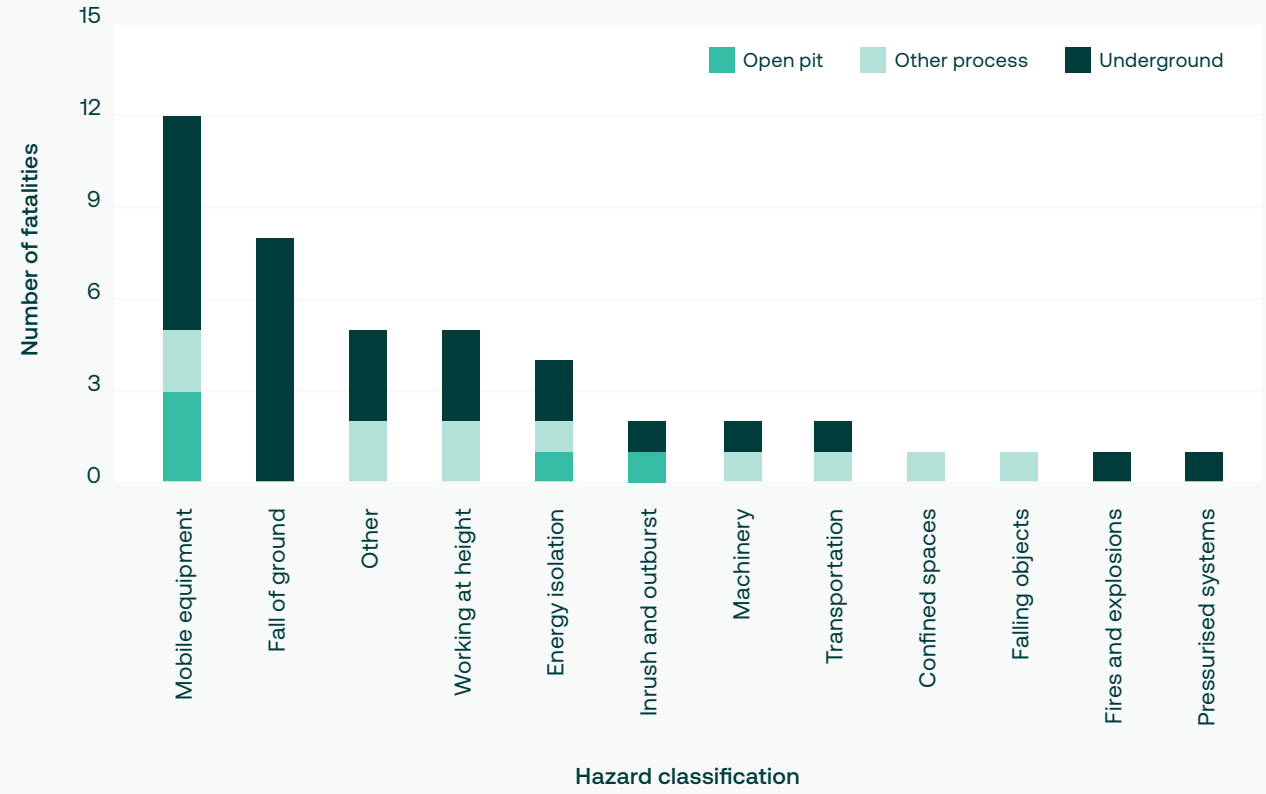
— **Unplanned or unintentional (eg earthquake),** meaning any rock fall in mine workings where humans could be present.[5]

It is the latter type of rock failure that is significant when people are injured.

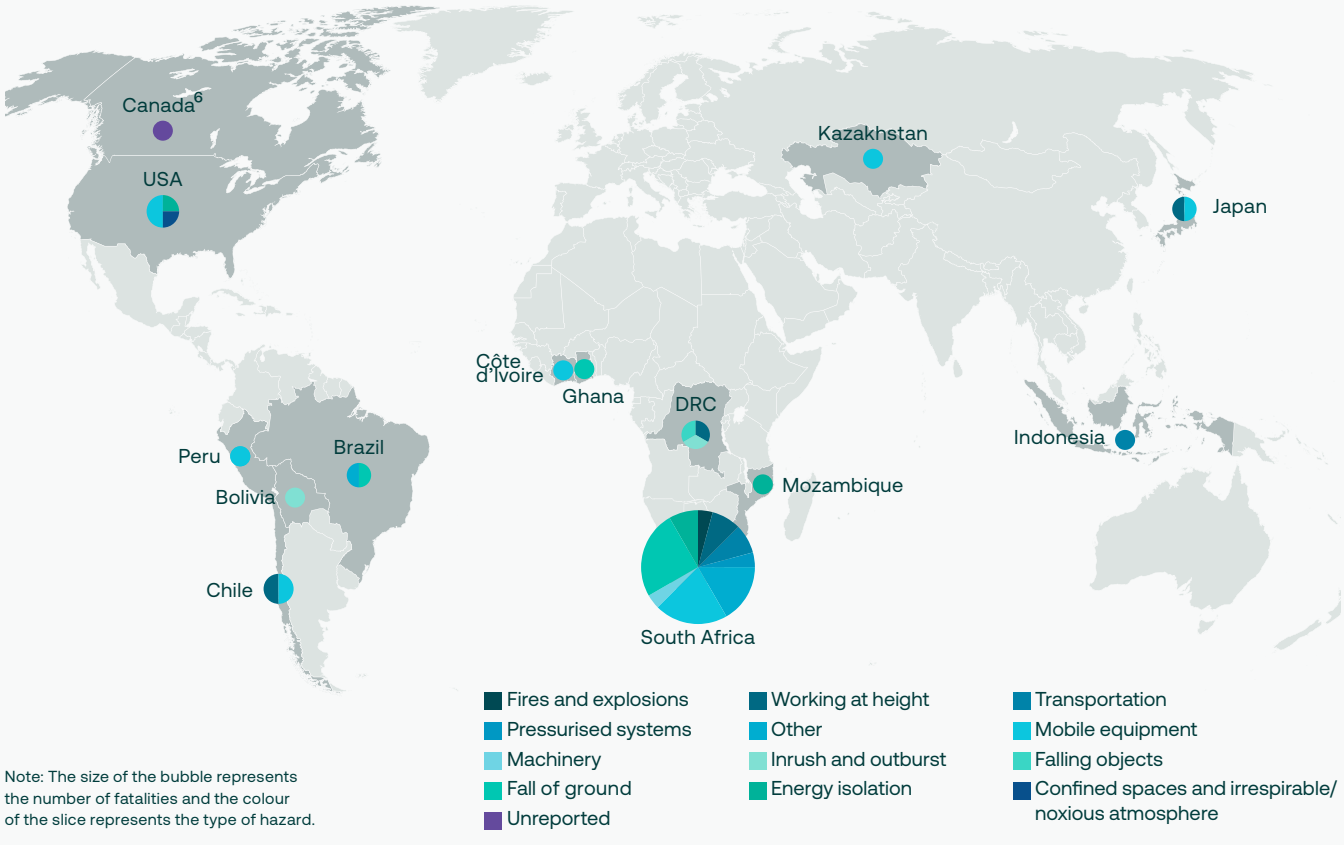
Fall of ground incidents accounted for 29.6 per cent of underground working fatalities. The remaining fatalities in underground working are from causes similar to open pit and other process which suggests that a common approach to fatality prevention across all mining operations is feasible.

5. Root causes of grounds fall related incidents in U.S. mining industry: https://www.cdc.gov/niosh/mining/userfiles/works/pdfs/rcogr.pdf

Graph 3: ICMM Location of Fatalities (2021)



Graph 4: ICMM Associated Hazards Attributed to Fatalities per Country (2021)



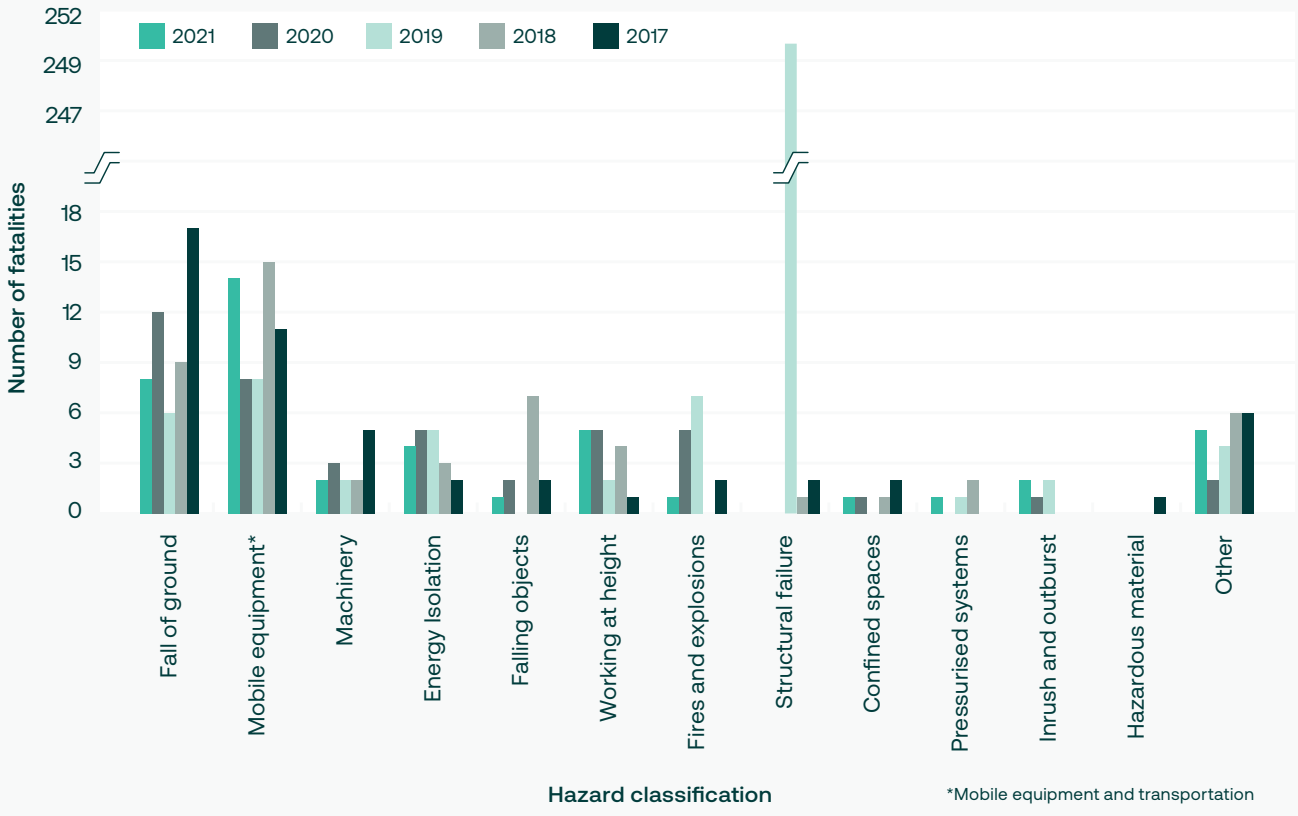
Note: The size of the bubble represents the number of fatalities and the colour of the slice represents the type of hazard.

6. The fatality in Canada had no reported hazard. This fatality is shown as 'unreported'.

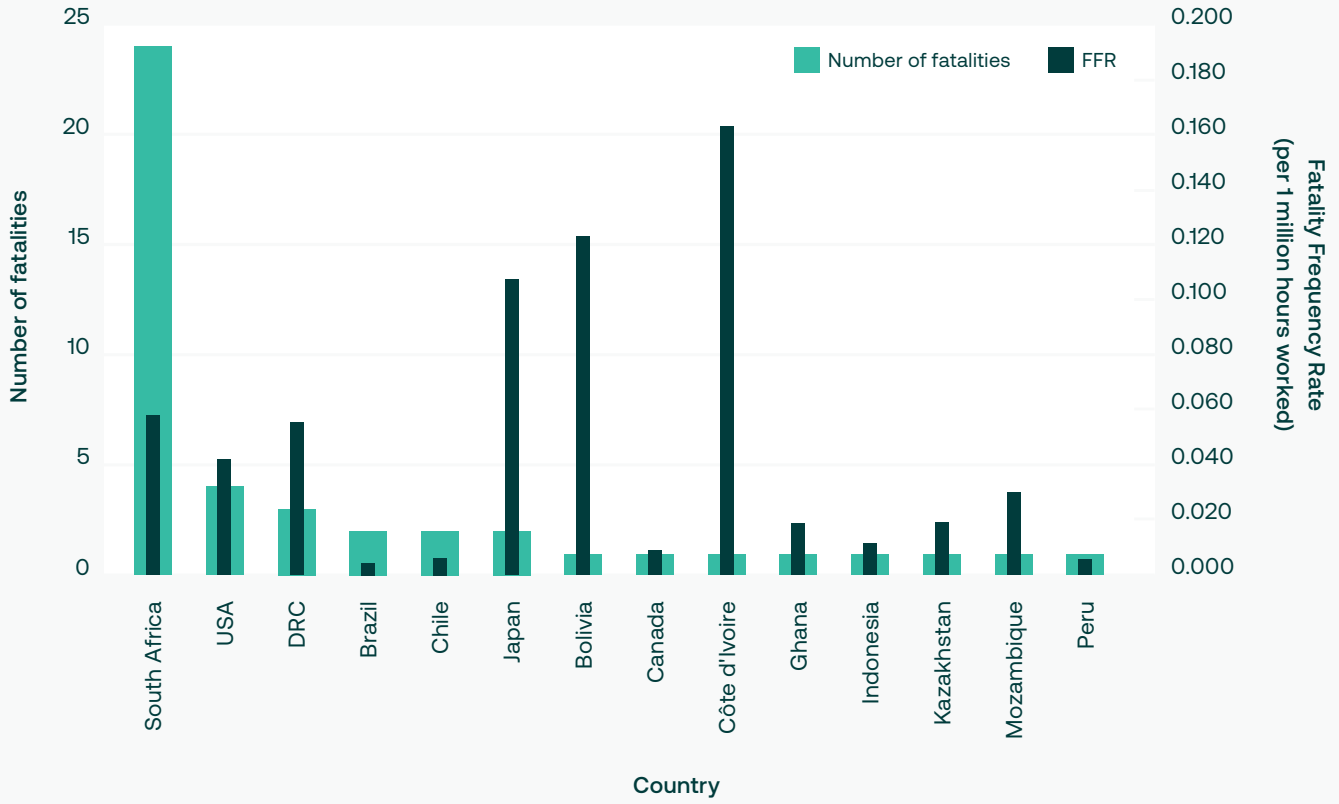
The data in Graph 4 shows the cause of fatality by country for 2021. Of the eight fall of ground fatalities recorded, six occurred in South Africa. Injury from fall of ground incidents is the most common occupational injury in the South African mining industry due to a prevalence of deep, high-stress mines in the country (the deepest mines can extend 3,500m below the surface). The Minerals Council South Africa has focused its efforts on fall of ground incidents, and this could be a driver in the reduction of these fatalities.

Graph 5 shows the number of fatalities by hazard between 2017 and 2021. The year-on-year comparison (excluding the very high number of deaths in 2019 due to the Brumadinho tailings dam collapse shown under the structural failure category) shows a variable pattern of fatalities due to a range of causes, such as fall of ground and mobile equipment. This suggests that action to target foundational components of a robust safety culture such as safety leadership and human performance could be more effective at addressing the underlying causes of the fatalities.

Graph 5: Associated Hazards Attributed to Fatalities (2017-2021)



Graph 6: ICMM Number of Fatalities and Fatality Frequency Rate per Country (2021)



The data in Graph 6 shows that the country with the highest number of fatalities in 2021 was South Africa (24), followed by the United States (4) and the Democratic Republic of the Congo (3). However, in terms of Fatality Frequency Rates, the data shows Côte d'Ivoire with the highest levels (0.163), which is due to the relatively low number of hours worked in the country (6,128,213 hours). Bolivia (0.123) and Japan (0.108) have the second and third highest rates, respectively.

Table 2 shows the continent with the highest number of fatalities was Africa, accounting for 64 per cent of the total fatalities across ICMM members in 2021. South America was the next highest followed by North America.

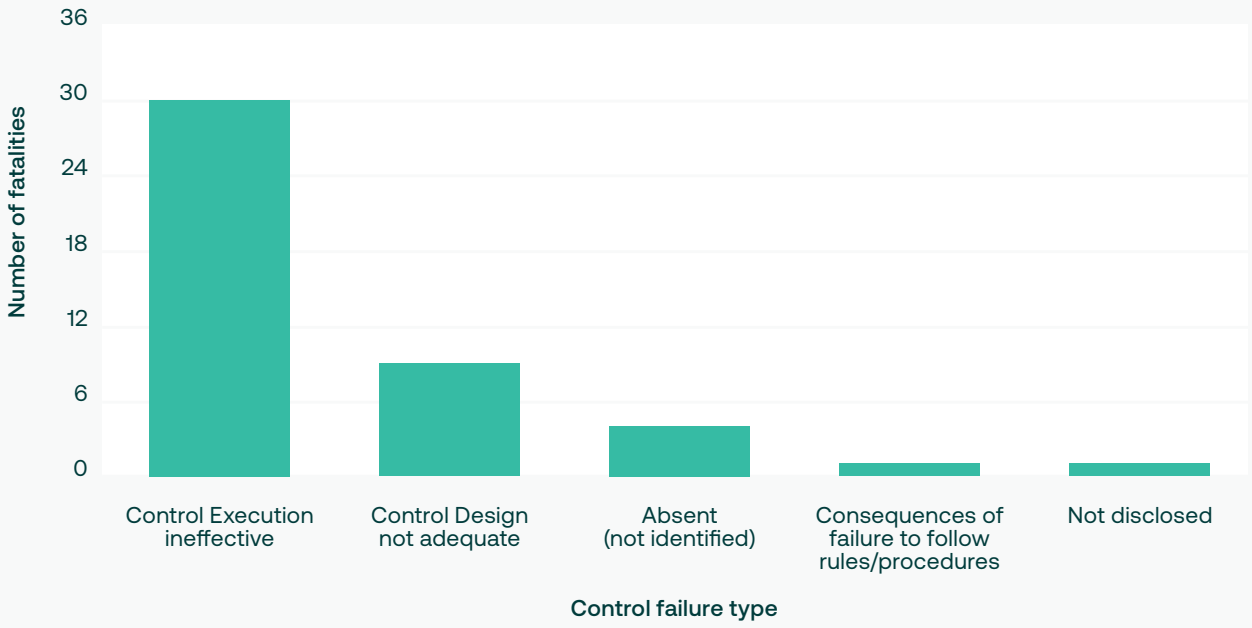
Table 2: ICMM Fatalities per Continent (2021)

Continent	Total Hours Worked by Continent	% Total Hours Worked by Continent	Total Recordable Fatalities	Fatality Frequency Rate	% Fatalities by Continent
Africa	648,600,693	26%	29	0.045	64%
South America	1,015,527,725	40%	6	0.006	13%
North America	223,639,351	9%	5	0.022	11%
Asia	119,672,937	5%	3	0.025	7%
Other	6,403,810	0%	1	0.156	2%
Europe	83,808,994	3%	0	0.000	0%
Oceania	441,042,703	17%	0	0.000	0%
Total	**2,538,696,213**	**100%**	**45**	**0.018**	**100%**

Critical controls, or barriers, are the actions taken to prevent hazards from developing into dangerous events. Where critical controls are missing, eg where full risk assessment and management has not been completed, there is no barrier to prevent incidents from happening. Where controls are in place but not executed, eg where standard procedures are not followed, incidents can also happen. Maintaining effective controls is a core activity in risk management.

Graph 7 shows the related critical control issues for all fatalities in 2021. As can be seen, issues around critical control design and critical control execution account for 87 per cent of fatalities. A critical control is crucial to preventing an event or mitigating the consequences of an event. ICMM has been working with members to share the importance of this and approaches to improve critical controls to reduce fatalities, and it will remain a main focus of our work going forward. ICMM's *Health and Safety Critical Control Management: Good Practice Guide* and *Critical Control Management: Implementation Guide* is freely available for use on our website.

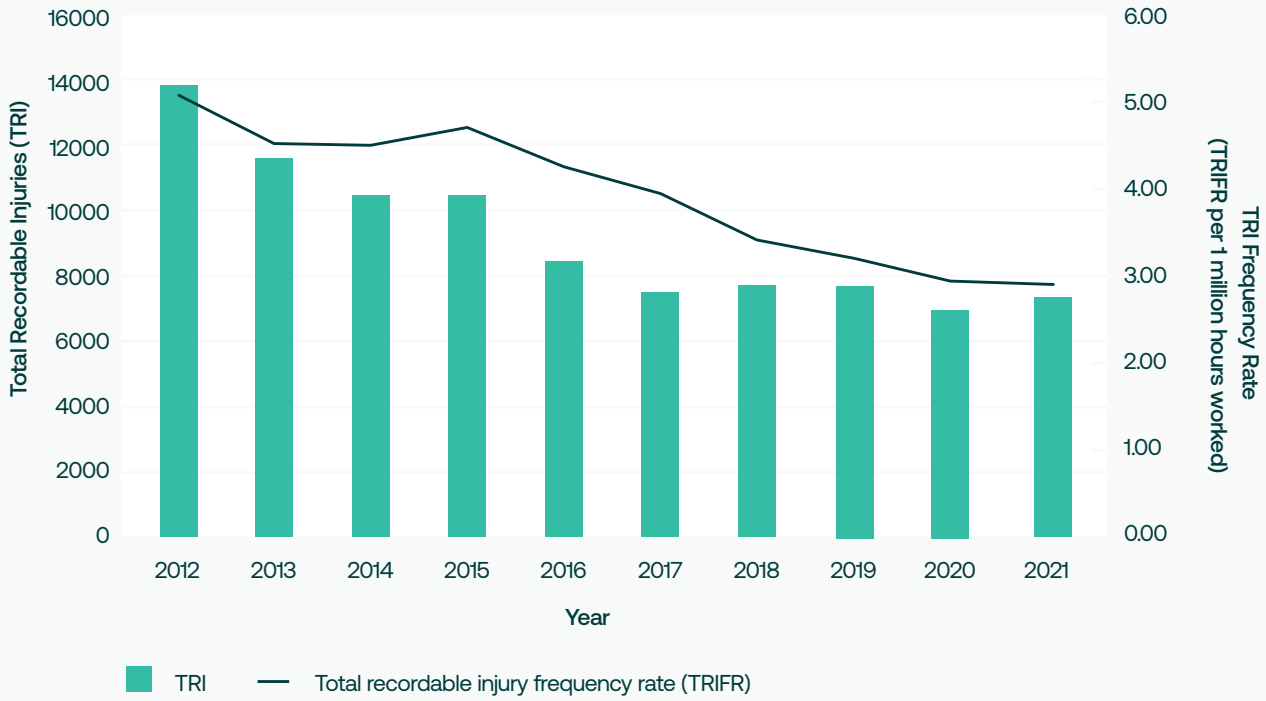
Graph 7: ICMM Control Failure Type in 2021



Injuries

Graph 8 shows the injury rate for companies between 2012 and 2021. There was a 5 per cent increase in the number of total recordable injuries from 6,997 in 2020 to 7,355 in 2021. Due to the higher hours worked, there was a reduction in the overall injury rate from 2.94 in 2020 to 2.90 in 2021. However, this reduction is marginal, and the injury rate appears to plateauing.

Graph 8: ICMM Total Recordable Injuries and Frequency Rate (2012-2021)



2021 company benchmark

Graph 9 shows total Fatality Frequency Rate (FFR) and Total Recordable Injury Frequency Rate (TRIFR) for each member company in 2021. The graph shows there is not a consistent correlation between FFR and TRIFR across member company data. Inconsistency in the classification of recordable injury between companies and their operating country's local legislation remains a source of variation in the data.

The total number of fatalities per company is shown in Table 3. Sibanye Stillwater recorded 17 incidents which caused 21 fatalities, 47 per cent of total fatalities. Eleven ICMM members (42%) recorded no fatalities during 2021.

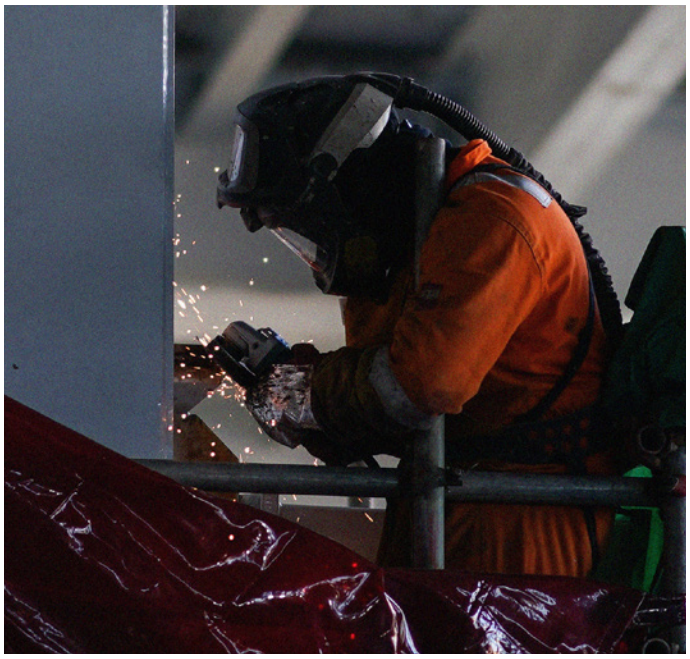
Interestingly 5 out of the 11 companies that recorded no fatalities, had above average (and in some cases considerably higher than average) TRIFRs. Understanding how the Total Recordable Injury Frequency Rate indicators influences behaviour in an organisation is critical. In some cases an organisation can have a high TRIFR and several fatalities, while another with a very similar TRIFR may have no fatalities for many years.

Graph 9: ICMM Fatality Frequency Rate and Total Recordable Injury Frequency Rate (2021)

Table 3: ICMM Company Data for Fatalities and Recordable Incidents (2021)[7]

Company	Total Recordable Fatalities	Fatality Frequency Rate (FFR)[3]	Total Recordable injuries (TRI)	TRI Frequency Rate (TRIFR)[3]	Total Hours Worked
African Rainbow Minerals[8]	1	0.024	147	3.60	40,884,231
Alcoa[9]	0	0	356	6.34	56,141,828
Anglo American	2	0.008	554	2.24	246,779,393
AngloGold Ashanti	2	0.027	158	2.14	73,824,754
Antofagasta Minerals[10]	1	0.017	137	2.29	59,896,857
Barrick[11]	2	0.017	176	1.47	119,740,724
BHP[12]	0	0	644	3.89	165,651,787
Boliden[13]	0	0	110	7.26	15,203,495
Codelco[14]	1	0.008	667	5.29	125,979,551
Freeport-McMoRan	2	0.015	455	3.48	130,691,211
Glencore	4	0.014	671	2.36	284,593,251
Gold Fields	1	0.021	105	2.16	48,606,828
Hydro	0	0	299	3.32	89,965,858
JX Nippon Mining and Metals[15]	0	0	25	5.39	4,634,601
Minera San Cristóbal	0	0	8	2.11	3,796,829
Minsur[16]	0	0	42	1.50	27,920,304
MMG[17]	0	0	27	1.09	24,689,470
Newcrest[18]	0	0	101	2.87	35,230,795
Newmont	0	0	117	1.75	66,806,533
Orano[19]	1	0.08	28	2.25	12,446,844
Rio Tinto	0	0	344	1.98	173,318,077
Sibanye Stillwater	21	0.133	1122	7.10	158,056,032
South32[20]	2	0.052	173	4.48	38,631,039
Sumitomo Metal Mining[21]	2	0.069	36	1.24	28,984,961
Teck[22]	1	0.014	242	3.29	73,564,539
Vale	2	0.005	611	1.41	432,656,421
Total	**45**[1]	**0.018**	**7,355**	**2.90**	**2,538,696,213**

Table 3 shows significant variation by company in the hours worked and a lack of a correlation between hours worked and fatality rate. There are many factors which may be relevant, including the geographic location of the work, the workforce capability and the underlying safety culture in the company.



7. While all effort is made to ensure the data complies with the definitions, it should be noted that some minor differences still exist between companies. Acknowledging this, we are continuously looking at ways to improve the consistency of data.

8. All African Rainbow Minerals operations are managed in Joint Ventures. This data does not include non-managed coal operations.

9. Alcoa data includes directly supervised contractors as employees.

10. Antofagasta Minerals reporting of TRI considers the fatality (+1).

11. Barrick's definition of First Aid and Medical treatment applies the following Group rule: Internal care = First aid and External care = Medical treatment, whereas ICMM differentiates between two lists (a first aid list and a medical list, i.e., the OCI model) depending on the procedure performed.

12. BHP's data provided includes BHP's Petroleum business. BHP definitions are aligned with OSHA as per: https://www.osha.gov/recordkeeping which may include some variations compared to ICMM standards. The BHP reporting boundary is aligned with the revised ICMM reporting boundary.

13. Boliden records fatalities on its workplaces and controlled areas. It enforces vehicle and driving safety considerations by contract for traffic to/from its work sites on public roads. Fatalities on public roads outside its control to maintain, set speed limits etc are recorded separately as traffic fatalities (there were no traffic related fatalities during 2021).

14. Codelco does not include employees and contractors performing off-site work-related activities in the data. Codelco does not differentiate between First Aid Case and Medical Treatment.

15. JX Nippon Mining & Metals have not compiled data of Contractors' working hours, since the Industrial Safety and Health Act in their operating country does not require it to be filed to government authorities.

16. Minsur data includes the safety data of their Joint Venture operation of Mina Justa (Marcobre S.A.C. - 60% belongs to Minsur and 40% belongs to COPEC) and Cumbres del Sur S.A.C. (100% belongs Minsur)

17. MMG - Data does not include incidents where injuries occur through contractors commuting or contractors transporting ore under contract as they are not considered a controlled activity as per MMG's internal definition.

18. Newcrest define Medical Treatment as "Use of prescription medication (except initial single dose administered during initial treatment is first aid)". Also note, Newcrest exploration sites are presented in individual countries of operation.

19. Orano does not follow certain cases of exclusion listed in the ICMM guidance to comply to the French regulations which require recognition of accidents at work on assignments under all circumstances.

20. South32 - although the specific exclusion is still contained within the current South32 Reporting Procedure, no such Fatalities or Injuries occurred during the reporting period. Therefore, the results are aligned to the ICMM Guidance on H&S indicators.

21. Sumitomo Metal Mining do not report contractor personnel in off-site locations, such as drilling related work for exploration. Also, the total hours worked in the workforce (except employees in Japan) is an estimate. The data of total hours worked of contractors in workforce is as of May 2021.

22. Teck is reporting on the activities that it directly manages in 2021. The data does not include JV partnerships. Also per Teck's definition of a Medical Aid, the use of prescription medication alone for any treatment other than eye injury is not a reportable medical treatment. Use of prescription medication for eye injuries is a reportable medical treatment. Medical treatment also includes the application of a cast or other professional means of immobilising an injured part of the body.

Responding to Key Industry Challenges

04

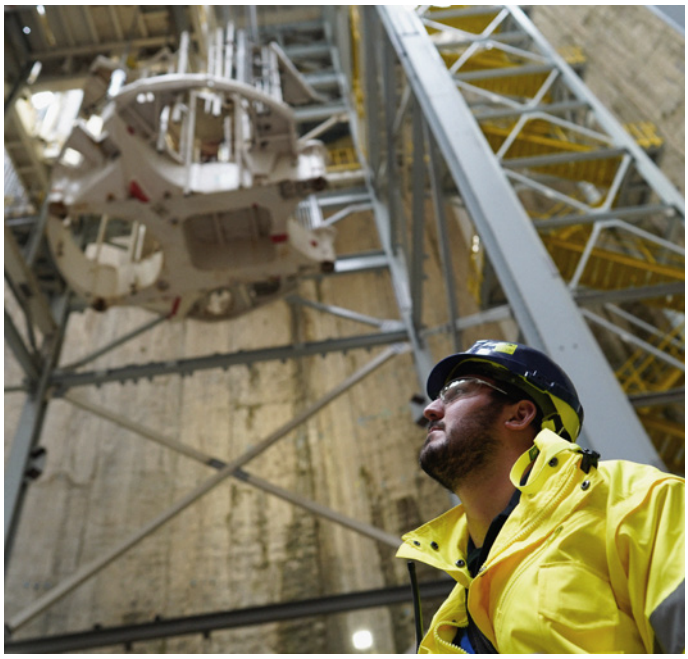
ICMM's new three-year strategy is focused on ambitious collective action. In health and safety, we will work together to explore the root causes of why harm continues to occur and hunt for the next step change to make zero harm a reality.

ICMM priorities for the 2022-2024 strategy cycle are:

— **Strengthen our leadership position beyond guidance:** ICMM members have an unwavering commitment to the health and safety of their workers and work unceasingly to eliminate fatalities and preventable injuries. We will continue to encourage and facilitate knowledge sharing, using lessons learned from failure to help prevent future fatalities, and explore innovative approaches to health and safety controls with technology providers, OEMs and academic institutions. We will also explore innovations related to human performance.

— **Promote operational and technical innovations:** ICMM's Innovation for Cleaner, Safer Vehicles (ICSV) initiative brings together ICMM members and some of the world's largest OEMs, in a non-competitive space, to accelerate the development of a new generation of mining vehicles that will minimise the operational impact of diesel exhaust and make vehicle collision avoidance technology available to mining companies by 2025. To this end, we are supporting companies in solving industry level issues and pursuing operational and technical innovations.

— **Align on new and more balanced collective metrics:** Monitoring and reporting on occupational health and safety indicators plays an important part in driving performance improvement. We are working together to define appropriate occupational health performance data collection and reporting parameters, based on leading performance indicators (including high potential incidents (HPIs), fatalities, serious incidents, and other indicators).



ICMM stands for mining with principles.

We bring together a third of the global mining and metals industry, along with key partners to drive leadership, action and innovation for sustainable development, ultimately delivering a positive contribution to society.

Through collaboration, ICMM member companies set the standard for responsibly produced minerals and metals in a safe, just and sustainable world.

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Updated June 2023
First Published July 2022