

## Safety Performance Report

ASSART I

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Benchmarking Progress of ICMM Company Members in 2022

## Contents

01	Foreword	01
02	Introduction	02
03	2022 Safety Data	04
	Fatalities Injuries 2022 Company Benchmark	04 12 13

### Acknowledgements

The Safety Performance Report was compiled by Bob Holwill of Tessera Solutions, in consultation with ICMM's Michael Duvenhage – with input from the ICMM Health & Safety Working Group.

## Foreword

Everyone deserves to work free from harm, within a safe and healthy industry environment. ICMM members are unwavering in their commitment to operate responsibly, as they work to eliminate fatalities towards a goal of zero harm. Tragically, 33 people from ICMM company members lost their lives at work in 2022. Sharing this news is deeply saddening but vital for improving safety.

ICMM began collating and publishing data on members' safety performance in 2012 with the intention of driving knowledge-sharing, transparency and continual performance improvements across the industry. This transparency is our basic obligation and reminds us all of the potentially devastating consequences when things go wrong.

Since then, we have remained steadfast in our belief that we can always find new ways to improve. We can draw strength from the many years of comparable data contained in this report, where through collective developments we see a downward trend in fatality and serious injury frequency. This is encouraging, and rather than a source of complacency, we are determined to use it to redouble efforts to reaching zero harm.

There is no one-size-fits-all answer to mining health and safety; it is multifaceted and complex, requiring constant vigilance at every level. As we enter a period of unprecedented demand for minerals and metals, we will continue to share learnings to identify all the new and context-appropriate critical controls needed to eliminate fatalities.

I am adamant that we can eliminate fatalities from the industry, and until that point, we will continue to be open and honest on how we are progressing.

Rohitesh Dhawan President & CEO, ICMM

# Introduction



This report provides safety performance data of ICMM members in 2022, in line with ICMM's <u>Health</u> <u>and Safety Performance Indicators: Guidance, 2021</u>. Since 2012, ICMM has measured and disclosed the safety performance of its members. This benchmarking report aims to show members' performance in their goal of eliminating fatalities. 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.

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 continue to develop alternative metrics which will provide a greater insight into health and safety performance.

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 footnotes on page 15.



## 2022 Safety Data

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

### **Fatalities**

Thity-three (33) fatalities occurred across ICMM's 26 company members in 2022. This number compares to 45<sup>1</sup> in 2021 and 44 in 2020. Overall, in 2022, the total hours worked increased by 5.7 per cent compared to 2021, whilst there was a 26 per cent decrease in the number of incidents that resulted in a fatality. The Fatality Frequency Rate (FFR) has therefore reduced from 0.017 to 0.012 for the same period.

Graph 1 and Table 1 present the detailed data of fatalities and fatality rate from 2012 to 2022.

Data shows that there were two incidents that resulted in more than one fatality, which is less than in all previous years. Moreover, 50 per cent (13 of 26) member companies were fatality free in 2022; the highest percentage since 2019.





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 – 2022)<sup>3</sup>

Year	Total Recordable Fatalities	Fatality Frequency Rate (FFR)⁴	Total Recordable Injuries (TRI)	TRI Frequency Rate (TRIFR)⁴	Total Hours Worked (Employees + Contractors)
2022	33	0.012	7,126	2.66	2,683,513,114
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 2022, the highest number of fatalities (9) occurred through 'mobile

equipment' incidents. This is less than the 12 mobile equipment related fatalities recorded in 2021, but higher than those recorded in 2020 and 2019. Of these 9 fatalities, 55 per cent occurred underground.

### ICMM's focus areas on Innovation for Cleaner, Safer Vehicles (ICSV)

ICMM's collaborative ICSV initiative is working to improve the safety performance of mobile equipment. A current area of focus within the ICSV initiative is the mining industry's adoption of not only vehicle collision avoidance technology, but also that of 'capable solutions'.

The ICSV initiative has defined a capable solution for vehicle interaction as:

- Delivering better vehicle interaction control performance by improving the quality of decisionmaking – from task execution through to mine operations and design.
- Considering relevant aspects of the operating environment, production requirements and equipment design.
- Where technology is a part of a capable solution, it is operationally integrated with existing controls.

Technology plays an integral part, leveraging advanced sensors, radars and cameras to provide real-time warnings to both vehicle operators and pedestrians, significantly reducing the risk of accidents. These technologies have the potential to greatly reduce the risk of fatal collisions. Conversely, relying too heavily on technology can pose certain risks, and maintaining focus on operating discipline and performance is critical.

Process improvements are also being explored to enhance safety standards across the industry, for example, by optimising vehicle routing, establishing clear protocols for vehicle movements, implementing robust maintenance and inspection procedures, and prioritising comprehensive training programmes.

Additionally, the ICSV initiative recognises the significance of training programmes in mitigating vehicle-related hazards. Comprehensive training can equip both operators and other personnel with the necessary skills and knowledge to navigate highrisk scenarios and make informed decisions. By emphasising the importance of situational awareness, proper use of safety equipment, and adherence to established protocols, these training programmes contribute to a culture of safety within the industry.

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 Location and Associated Hazards Attributed to Fatalities (2022)

The hazard posed by vehicles in the industry transcends geographical boundaries and is not dependent on the specific commodity being produced. Through the collaborative Innovation for Cleaner Safer Vehicles (ICSV) initiative, ICMM members are working in partnership with original equipment manufacturers (OEMs) and technology suppliers to identify and promote effective solutions that can eliminate fatalities resulting from vehicle interactions.

The next highest cause of fatalities (5) is 'falling objects'. This is the highest number of falling object-related fatalities since 2017. Falling object fatalities should be preventable by removing hazards from the work area, or with effective controls being designed and implemented consistently, such as engineering controls.

For example, in recent years, the Minerals Council South Africa (MCSA) has focused on reducing fatalities by facilitating the adoption of leading practices in underground operations such as the revised netting and bolting practices to minimise risk for individuals working under unsupported rock. Additionally, efforts have been made to reduce the damage to rock mass because of poor drilling and blasting. Enhancing visibility in underground operations has also been a key focus area with added benefits.

### More on critical controls

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 have 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. Overall, 61 per cent (20) of all fatalities in 2022 were in 'other process' areas (for example, milling and leaching plants etc.), 33 per cent (11) underground and 6 per cent (2) in open pit environments. For four years, since 2017, underground has been the main location of fatalities (excluding the Brumadinho tailings dam collapse in 2019) and 2022 recorded the lowest percentage of underground fatalities. This correlates with the reduced number of fall of ground associated fatalities.

All falling object fatalities (5) occurred in other process areas, as did all 'working at height' fatalities (4).

Graph 3 shows fatalities associated with fall of ground incidents. In 2022, there was one fall of ground fatality (9 per cent of underground fatalities), while in 2021, fall of ground accounted for eight fatalities (28 per cent of underground fatalities). This reduction follows focused and sustained prevention initiatives in the deep mining industry in South Africa, as in the MCSA example for the previous graph.

In addition to mobile equipment being the greatest cause of fatalities, it is also the most geographically spread, across five countries (Chile, USA, The Philippines, South Africa and Canada — see Graph 4).

### Graph 3: ICMM Fall of Ground Associated Fatalities (2017-2022)



# Mozambique 2

Graph 4: ICMM Associated Hazards Attributed to Fatalities per Country (2022)







Graph 5 shows the number of fatalities by hazard between 2017 and 2022. 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 hazards. Targeting action towards specific hazards based on annual data is a reactive approach and ICMM chooses to focus on a more general programme of action to target foundational components of a robust safety culture that could be more effective at reducing fatalities.

Some foundational components of a robust safety culture include:

- 1. Proactive Prevention: Instead of reacting to incidents, a proactive approach focuses on preventing them by addressing the fundamental aspects of safety culture. This involves creating a culture of safety where all employees are engaged, committed and accountable for safety at all levels of the organisation.
- 2. Holistic Perspective: A general programme targeting foundational components of safety culture considers not only specific hazards but

also broader organisational factors that influence safety performance. It emphasises leadership commitment, employee engagement, training and education, effective communication and continuous improvement, among other elements.

3. Long-Term Impact: By targeting foundational components of safety culture, organisations can create lasting changes that extend beyond reacting to immediate hazards. This approach promotes a sustained commitment to safety and helps to build a proactive and resilient safety culture that can adapt to new challenges and emerging risks. ICMM has been working with members to share the importance of critical controls and develop approaches to improve critical controls to reduce fatalities, and it will remain a core focus of our work going forward. ICMM's <u>Health and Safety Critical Control Management: Good</u> <u>Practice Guide and Critical Control Management:</u> <u>Implementation Guide</u> are freely available for use on our website. Collective efforts around safety culture and other critical controls could help to accelerate performance improvements, and ICMM is assessing opportunities for this going forward.

Table 2 shows the fatalities by continent.

Continent	Total Hours Worked (Employees + Contractors)	% Total Hours Worked	Total Recordable Fatalities	Fatality Frequency Rate (FFR)	% Fatalities
Africa	618,097,591	23%	14	0.023	43%
North America	221,365,067	8%	4	0.018	12%
South America	1,196,637,136	45%	9	0.008	27%
Oceania	320,643,624	12%	2	0.006	6%
Asia	265,909,213	10%	4	0.015	12%
Europe	50,561,518	2%	0	0.000	0%
Other	10,298,965	0%	0	0.000	0%
Total	2,683,513,114	100%	33	0.012	100%

### Table 2: ICMM Fatalities per Continent (2022)

Graph 6: ICMM Number of Fatalities and Fatality Frequency Rate per Continent (2022)



The data in Graph 6, based on Table 2, shows the number of fatalities by continent for 2022. 42 per cent (14) of the 33 fatalities occurred in Africa and 27 per cent (9) in South America. However, the number of hours worked is significantly different across the continents.

The data in Graph 7 shows that the country with the highest number of fatalities in 2022 was South Africa (7)

followed by Brazil (4) and remaining countries with either one or two fatalities. South Africa saw a significant decline in fatalities compared with 2021 (22), particularly relating to fall of ground incidents.

In terms of FFR, Mozambique and Niger recorded the highest values, 0.378 and 0.365 respectively, attributed to 2 fatalities in each country. Total hours worked in Mozambique and Niger each represents only 0.20 per



cent of all hours recorded by country. Table 3 shows the FFR for all countries where a fatality was recorded and allows for easier comparison.

### Table 3: ICMM Fatalities per Country (2022)

Country	Total Hours Worked (Employees + Contractors)	Total Recorded Fatalities	Fatality Frequency Rate (FFR)	% of Total Recorded Hours
South Africa	397,983,285	7	0.018	14.83%
Brazil	548,266,396	4	0.007	20.43%
Australia	296,413,157	2	0.007	11.05%
Canada	122,204,241	2	0.016	4.55%
Chile	372,480,506	2	0.005	13.88%
Kazakhstan	54,794,650	2	0.036	2.04%
Mozambique	5,294,938	2	0.378	0.20%
Niger	5,481,884	2	0.365	0.20%
USA	84,170,698	2	0.024	3.14%
Bolivia	5,336,207	1	0.187	0.20%
Colombia	38,817,515	1	0.026	1.45%
Democratic Republic of the Congo	59,931,817	1	0.017	2.23%
Dominican Republic	21,038,329	1	0.048	0.78%
Indonesia	99,398,181	1	0.010	3.70%
Mali	18,220,488	1	0.055	0.68%
The Philippines	22,127,801	1	0.045	0.82%
Tanzania	32,118,637	1	0.031	1.20%

Graph 8 shows the related critical control issues for all fatalities in 2022. As can be seen, issues around critical control design and critical control execution account for 88 per cent of fatalities. Seventythree (73) per cent of control failures are due to ineffective execution of controls within the operating environment, similar to 2021.

### Graph 8: ICMM Control Failure Type (2021–2022)



### Injuries

Graph 9 shows the injury rate for companies between 2012 and 2022. There was a 3.2 per cent decrease in the number of total recordable injuries from 7,355 in 2021 to 7,126 in 2022. The overall injury rate (total recordable injuries per million hours worked) decreased from 2.90 in 2021 to 2.66 in 2022. The overall injury rate has consistently decreased every year since 2015.



Graph 9: ICMM Total Recordable Injuries and Frequency Rate (2012-2022)





### 2022 Company Benchmark

Graph 10 shows total FFR and TRIFR for each member company in 2022. The graph shows that there is no consistent correlation between FFR and TRIFR across company data.

The total number of fatalities, recordable injuries and frequency rates per company are shown in Table 4.



### Safety Performance Report

### Table 4: ICMM Company Member Data for Fatalities and Recordable Incidents (2022)<sup>5</sup>

Company	Total Recordable Fatalities	Fatality Frequency Rate (FFR)	Total Recordable injuries (TRI)	TRI Frequency Rate (TRIFR)	Total Hours Worked (Employees + Contractors)
African Rainbow Minerals <sup>6</sup>	2	0.052	132	3.40	38,773,445
Alcoa	0	0.000	416	6.33	65,667,979
Anglo American	2	0.008	564	2.19	257,143,936
AngloGold Ashanti	0	0.000	97	1.26	76,988,895
Antofagasta Minerals	0	0.000	122	1.86	65,691,121
Barrick	5	0.037	174	1.30	133,547,221
BHP	0	0.000	667	4.15	160,894,120
Boliden <sup>7</sup>	0	0.000	112	6.98	16,048,353
Codelco <sup>8</sup>	2	0.014	749	5.18	144,647,684
Freeport- McMoRan	1	0.007	590	3.85	153,339,871
Glencore <sup>9</sup>	4	0.013	688	2.22	310,376,099
Gold Fields	1	0.019	106	2.04	51,899,984
Hydro	0	0.000	227	2.42	93,655,843
JX Nippon Mining and Metals <sup>10</sup>	0	0.000	23	4.73	4,862,184
Minera San Cristóbal	1	0.216	10	2.16	4,636,708
Minsur <sup>11</sup>	0	0.000	42	1.27	33,003,841
MMG <sup>12</sup>	0	0.000	34	1.25	27,105,447
Newcrest	1	0.031	114	3.55	32,151,575
Newmont	0	0.000	132	1.83	72,239,440
Orano	2	0.143	23	1.65	13,939,804
Rio Tinto	0	0.000	366	2.02	181,187,553
Sibanye Stillwater	5	0.033	768	5.07	151,438,233
South32 <sup>13</sup>	2	0.056	213	5.94	35,846,277
Sumitomo Metal Mining <sup>14</sup>	0	0.000	25	0.78	31,946,399
Teck <sup>15</sup>	0	0.000	241	2.75	87,481,044
Vale	5	0.011	491	1.12	439,000,058
Total	33	0.012	7,126	2.66	2,683,513,114

Thirteen (13) ICMM members recorded no fatalities during 2022, which was 50 per cent of our membership.

Notably, 5 out of the 13 companies that recorded no fatalities had above average (and in some cases considerably higher than average) TRIFRs. Understanding how the TRIFR indicators influence behaviour in an organisation is critical. By adopting a high standard of operating and reporting of injuries, a company is emphasising the importance of proactive risk management to its employees that builds on a positive safety culture for early intervention, adequate risk mitigation and employee engagement. These factor into developing, implementing and maintaining a safety culture capable of eliminating fatalities.



5. 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.

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

7. Boliden – Total Recordable Injuries (TRI) include 100 per cent of recorded Lost Time Injuries (LTI) even if only an estimated 15 per cent of these required medical treatment beyond first aid and the severity boundary stated by ICMM. In some of the Nordic countries where Boliden operates, employees can decide to stay at home the following day after a minor injury without visiting a health-care provider and still receive 100 per cent of salary. Five per cent of the Injury Without Absence (IWA) estimated to fulfil the ICMM severity boundary for recording are included. Alternative work cases are not included.

8. Codelco does not include employees and contractors performing off-site work-related activities, or third parties in on-site locations, in the data. Codelco does not differentiate between First Aid Case and Medical Treatment.

 Glencore marketing offices are excluded. A few specific exclusions exist in Glencore's classification guidelines that apply in the determination of whether incidents are workplace related to assist in the decision-making process.

10. JX Nippon Mining and Metals has not compiled data of contractors' working hours, since the Industrial Safety and Health Act in its operating country does not require it to be filed to government authorities.

11. Minsur's report includes the safety data of a Joint Venture Operation of Mina Justa (Marcobre S.A.C. - 60 per cent belongs Minsur and 40 per cent belongs to COPEC), Mineracao Taboca S.A. (100 per cent belongs Minsur) and Cumbres del Sur S.A.C. (100 per cent belongs Minsur).

12. MMG – where commuting is provided by MMG (including when transportation is provided by a contractor company e.g. bus transportation from central point of departure to controlled location), incidents of MMG employees are reported and recorded as they are considered as a controlled activity (MMG definition). Exposure hours are included in the calculation of the MMG TRIFR. Contractors' commuting incidents are not considered as a controlled activities. The incidents are not recorded and the working hours are not included in the calculation of the MMG TRIFR. If a contractor transporting ore under contract has an accident, the incident is reported but not recorded as the activity is considered as uncontrolled (MMG definition).

13. South32 has a few specific exclusions defined in its reporting guidelines.

14. Sumitomo Metal Mining – total hours worked in workforce except employees in Japan is an estimate. The data of total hours worked of contractors in workforce is as of May 2022.

15. Teck is reporting on the operations that it directly manages in 2022. The data does not include partnership sites where Teck has a part interest. 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 of or 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.

#### Safety Performance Report

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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