

COMPARING SAFETY PERFORMANCE IN MINES

A SOUTH AFRICAN CONTEXT

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Abstract

How do we effectively measure the safety performance of mines in South Africa? How do we compare the performance between mines? How do we make sure we are comparing the proverbial “apples with apples”? There is a wide array of frequency rates available, and each mining house has a preference to which frequency rate they prefer on a board report. There seems to be quite a selection of metrics. This article indicates the common practice for comparing safety performance across mines currently, as well as look to the future for a better contextual indicator of safety performance and maturity of a mine.

Introduction and Context

Currently, the most common comparative metric for measuring the safety performance of mines, is the lost time injury frequency rate or LTIFR. This is widely used in industry to report performance on injuries per man-hours worked. This metric is used to report to government institutions upon visits, executive boards and investors and also used to compare a certain mine’s performance against another. But what happens when mines do not interpret definitions the same way, calculate hours worked differently, or use different data clustering mechanisms?

Where some mines use 200 000 man-hours as a factor, other mines use 1 000 000 man-hours as a factor. The true hours worked also differs from mine to mine, as one mine might draw their hours worked from a time and attendance system, where the other will calculate averages based on actual compliment. Some mines include visitors, the other does not. The mines calculating hours worked, use 9.2 hours per employee per day, and another uses 8.5, where the reduction is due to the subtraction of several types of unavailability. The variances now start to create some doubt as to whether we are in fact comparing apples with apples.

The Most Common Frequency Rates

The most common frequency rates are listed in the table below. We will briefly look at what industry commonly defines each classification as, based on their interpretation of the legislation.

Common Frequency Rates	
<i>The following definitions are used in the normal frequency rate formula.</i>	
FAIFR	First Aid Injury Frequency Rate Refers to the type of treatment that can typically be given by a person who underwent first aid training. Plasters, bandages, etc.
MTCIFR	Medical Treatment Injury Frequency Rate Treatment to be administered by a trained medical professional. A doctor putting a plaster on someone is not medical treatment, it is still first aid.
LTIFR	Lost Time Injury Frequency Rate If a person is unable to perform his duty or similar duty the next calendar day. It is irrelevant whether the person feels up to it, whether they do have a shift the next day or not. The question remains, is the severity of the injury such that they can or cannot perform their duty or similar duty the next calendar day.
SIFR	Serious or Reportable Injury Frequency Rate A person who loses 14 calendar days or more due to an injury. A person who incurs an irreversible disability.
FIFR	Fatal Injury Frequency Rate The number of people that have died due to an incident, and not the number of incidents.
TIFR	Total Injury Frequency Rate The sum of MTC, LTI and FAT.
SR	Severity Rate The number of calendar days (not shifts) lost due to injury. If a person loses 3 calendar days and returns to work, the number is 3. If this person returns to the doctor for the same injury and is booked off again for another 3 days, the number is now 6 days.

Some might indicate that we have missed the classification of multiple fatals. The reason we do

not have this category, is because we list each fatal separately, but keep the incident as one.

The Most Common Calculations

The calculation of the frequency rates is relatively standard across the industry and even within international safety portfolios. The area where the opportunity for variance is introduced, is in the classification of the injury incurred.

First, let us look at the formula itself.

Legend

Frequency Rate (FR) | Factor (F) | Hours Worked (HW) | Number (No)

$$FR = \frac{No \times F}{HW}$$

This would mean that if you would like to calculate the LTIFR, the calculation would look like this using a factor of 200 000 man-hours:

$$LTIFR = \frac{22 \text{ LTI} \times 200\,000}{1\,253\,144 \text{ HW}} = 3.51$$

While we can understand the number of LTI as well as the HW, some mines are not sure why they are using a factor of 200 000 man-hours and other 1 000 000 man-hours.

The reasoning behind the factors is best explained from OSHA as follows:

“OSHA has established specific mathematical calculations that enable any company to report their recordable incident rates, lost time rates, and severity rates, so that they are comparable across any industry or group. The standard base rate for the calculations is based on a rate of 200,000 labour hours. This number (200,000) equates to 100 employees, who work 40 hours per week, and who work 50 weeks per year. Using this standardized base rate, any company can calculate their rate(s) and get a percentage per 100 employees”

While the 200 000 man-hours would be great for smaller organisations, larger organisations tend to use 1 000 000 man-hours to reduce the actual “size” of the number so to speak. This is also why government institutions, committees, councils and associations monitoring performance of mines, request the hours worked and number of injuries per classification from the mines, in order to measure all mines on the same level. As per OSHA, the 200 000 man-hours relates to 100 employees, and thus 1 000 000 man-hours factor would relate to 500 employees.

The Industry Preference

The mining industry in South Africa, has the highest preference for LTIFR as a measure of performance between mines. The reason for this, is that this is the level of injury where the severity is to such an extent that a person cannot perform their duty or similar duty the next calendar day. MTC sees the employee return the next day, and may only be minor scratches, bruises etc. On the opposite side of the spectrum, are injuries that are so severe, that the person loses 14 or more days from work in order to recuperate. Even though there are a relative number of these injuries, they do not come close to the number of LTI.

It is for this reason, that the mining industry views the performance of a mine based on the LTI classification, and the subsequent rate to compare mines of all sizes on an equal platform.

How Accurate Is LTIFR Then As a Measure?

Even though the calculations seem straight forward, there is still an opportunity for mines to skew the statistic by “uprooting and repotting” an injury in a different classification. Allow me to explain.

Let us say that the table below reflects the statistics for a mine for a certain month. You will note that the first aid case classification is not included in the table. The reason for this, is that in most cases mining houses in South Africa are not a level of maturity as yet, to report first aid cases. Proper processes and systems have not been compiled yet, for the reporting of first aid injuries. This is supported by the fact that very view mining houses can align their statistics with the Frank Bird triangle as well, with LTI standing out like a “beer belly”.

The fact is, that we do not report “minor injuries” and incidents that “could have resulted in”, referring to near misses. We are a “tough country” brought up with “cowboys don’t cry” and “that’s nothing, put some spit on it and carry on”.

While this seems very humorous, it is a South African fact. It is for this reason that international benchmarking of safety systems fall on its face when we try and implement it in South Africa, we are a tough culture. In other countries, people sue each other for inappropriate comments or sneers, in South Africa, we “sort each other out”, outside. In other countries, children go to the emergency room for falling off a bike, in South Africa, we brush it off and spray Mercurochrome, before the child carries on.

This is a South African fact, and the root for poor reporting, because we don't see these minor things as important.






But let's not digress and start a new article ... let's get back to the statistics.

Now, let us total the figures, of the mine injuries as described above.






MTC	LTI	SER	FAT
10	5	2	1

Totals	
MTC	10
LTI	5
SER	2
FAT	1
Total Injuries (TI)	MTC + LTI + FAT = 16

Why do we not count the **SER** in the TI? The reason is, that we have already allocated the injury to a level of severity where days are lost. The fact that a person loses 14 days or more, or incurs an irreversible disability, is an indication of the severity of the injury only. It is with this same reasoning that we do not count a fatal as an LTI, because it would be senseless to view lost days as the person will never return, hence it is allocated in its own category and counted. Another way to explain it would be as follows:

				
MTC	MTC	LTI	LTI	LTI
MTC = 2		LTI = 3		
Now, let us assume that the blue LTI loses 14 days or more, what happens now?				
MTC	MTC	LTI	LTI SER	LTI
In addition to being an LTI, the injury is also classified as SER to indicate the severity of the injury, but it is only counted as an LTI because of the "Lost Time"				
MTC = 2		LTI = 3 SER = 1		
In conclusion, you would have 3 LTI of which 1 is SER.				

What does this mean and how does it affect LTIFR? The opportunity exists where mines remove (uproot) the injury from the LTI classification when it becomes SER, or does not even register it as an LTI when the severity is irreversible and takes it straight to SER (repot). The counting would then look like this:

				
MTC	MTC	LTI	LTI	LTI
MTC = 2		LTI = 3		
Now, let us assume that the blue LTI loses 14 days or more, what happens now?				
MTC	MTC	LTI	SER	LTI
As the LTI is now classified as SER, it is not counted under LTI and thus, not part of the LTIFR. This would result in a lower LTIFR.				
MTC = 2		LTI = 2 SER = 1		
In conclusion, you would have 2 LTI and 1 SER.				

A Further Complexity by Line Management

To make matters even more complex, operations allow the ability of a person to "deal with the injury" to play a part in classification. While one person might be able to return to work after an injury, deeming them a MTC, another person, perhaps fatigued, malnourished etc. may need a day or two, deeming them an LTI. It is here where line management put pressure on medical staff to book the person back to work, they will let him take it easy. Regardless of the method and process, an injury must be classified on severity and not on the person's ability to "deal with it" or line management's promise to give him light duty or even just sit at the office.

According to labour legislation, an employee has the right to their sick leave, let alone the sick leave due to a mine injury. If the medical practitioner has booked a person off for 5 days, it means that in essence, their medical certificate of fitness has been suspended for 5 days. Allowing a person onsite without a medical certificate of fitness is against the law, irrespective of what they are doing there. It is my opinion, that if medical staff of safety staff become aware that a manager has allowed the above practice on their operation, the manager should be charged in terms of the disciplinary code.

In some instances, line management states that the injured person must come to site, where they will be given training. This is equally incorrect as the reason the doctor booked the person off, is to rest. If training is important, train the person when they are booked back to work.

A Common Error in Roles & Responsibilities

While medical staff are trained and competent in diagnosing and treating patients, safety staff are trained and competent in investigation, analysis and reporting of injury and scene information from investigations on detailed forms, required by the DMR such as SAMRASS forms. The safety department typically does the reporting to the DMR and works with Chapter 23 of the MHSA. It is critical that the barrier of medical and safety not be crossed by either staff member. Safety staff do not diagnose, and medical staff do not classify. Line management should stay as far away as possible from both medical staff and safety staff in this regard. However, line management is more than welcome in visiting hours, do demonstrate care for their employees. Here they can also involve the HR department, for aftercare visits when the employee is at home, if this is part of their program and values of care.

The role of the Medical Staff

The role of the medical staff, is to assess the injury and determine whether the employee can perform their duty or similar duty the next calendar day. That is where the information from the medical staff ends. This is done to eliminate the “ability of a person to deal with the injury” or to remove line management pressure on medical staff for classification as LTI classification affects line management bonuses in many operations.

Also, medical staff are not aware of working arrangements for each operation, let alone overtime, extra shifts etc. Thus, the medical staff must deem the person fit to work the next calendar day as per the MHSA and not the next shift. A person might be injured on a Friday, only work on again on the following Monday, and as he is not losing a shift, medical staff will classify the person MTC. This is incorrect, and another reason why classification should not be done by medical staff as they are removed from the operational environment. Medical staff need to indicate to safety staff whether the employee is fit for work the next calendar day, whether the person has a shift the next calendar day is irrelevant, safety staff need to know the severity of the injury and if the person is booked off, for how long.

The Role of Safety Staff

Safety staff take the information from the medical staff and classify the injury based thereon, as per MHSA. Can the person return to work the next calendar day? Yes, then they are MTC, no, then they

are LTI. Did the medical staff book the person off for 14 days or more, yes, LTI + SER.

In the same way line management and safety should not debate diagnosis with medical staff, line management and medical staff should not debate classification with safety staff. Each department focusses on its subject matter area.

Classification of Fatal

This is an area with much debate over the years, when to register a fatal on an injury register, if the incident occurred in January and the person passed away in March.

Once again the solution is quite simple.

The reason we register and analyse injuries, has more to do with the scenario and conditions surrounding the injury. We analyse, draw trend lines, compare statistics etc. We then develop campaigns, often due to trend analysis indicating a certain spike in conditions due to rainy seasons, holidays such as Christmas and Easter, we call silly seasons etc. It is for this reason, that even if a person passes away 3, 4 or 5 months later, we need to register the incident on the day it happened, connected to the severity of the incident. How do we connect a severity to the incident, we record the fatal statistic with it.

In essence, we can use a statistics that indicates, “we incurred a fall of ground in January that caused the death of an employee”, rather than analysis that indicates, “we had a fall of ground in January” and then in March, “oh by the way, we have a fatal this month, but we have no incident to connect it to”. Several mines argue that the fatal should be added in the month the person passes away, but there is no statistical or analytical basis of support for this approach. These same mines would stand by their point, until a person gets injured in the last month of a financial year and passes away in the first month of the next financial year. Very suddenly they will tend to agree with the way I am indicating now, to eliminate a blemish on a fresh year’s record.

Is There a Better Indicator?

The above scenario makes it clear that interpretation or legislation and calculation methodology can skew the figures. Thus, we need an indicator that cannot be skewed, or at least, be less open to being skewed by interpretation. The solution I believe, is to simply count all injuries that occurred, in line with slogans such as “One Injury is One Too Many”, “Zero Harm”, “Zero Tolerance” etc.

From this perspective, we simply count all injuries, irrespective their severity. After all, if a fall of ground occurs and scrapes a person's shoulder, it is perhaps an MTC, but move that person 20cm closer to the rock, and we could have a fatal. I firmly believe that TIFR needs to become the "lagging indicator of the future" if you really want contextual performance indication for any mine.

In Conclusion

Injury frequency rates have been used for years, and I believe that they will be here for many years to come, as the mining houses are diverse. Whether you use 200 000 man-hours to focus on 100 employees because you have a small company, or whether you use 1 000 000 man-hours because you are a large company, I believe that we can measure "apples with apples" using frequency rates. Large companies can also compare their performance to smaller companies by adjusting their rate from 1 000 000 to 200 000 or smaller companies doing the opposite. You can also just multiply or divide the rate by 5.

In essence it is not about the rate you have, it is about how much you can reduce that rate. The fact that mines calculate different hours is not the issue. The key lies in consistency of calculation. One mine might have a rate of 8.5 and another on 2.4, but if the mine at 8.5 can reduce to 7.0 it is a better achievement than the mine of 2.4 going to 2.0.

We can use LTIFR and other frequency rates, but the focus should be on what happens to the rate, rather than the rate itself.

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