

*Diagoras: "No one hears the stories of the drowned sailors..."*

## Survivors are killing safety!

### Unsafe behaviours with lucky outcomes convince us that we are acting safely

*Patrik Lund, 12 November 2017*

A lot of safety is focused on blame – so I am going join the trend, but with a slightly different focus. The difference being that I am blaming the survivors. However, I am not blaming the survivors of accidents, instead I am blaming the survivors that never come near to an accident.

I also need to further clarify and narrow down the focus of blame to only include the survivors, who are working unsafely, but through luck and catlike skills never have an accident. This fact that you can work without following the safety rules and still escape unscathed is something that continues to confuse and disrupt the safety profession. Bear with me, there is a serious point here.

As safety consultants or safety trainers we have all experienced being challenged by experienced workers or engineers who have been doing something for a long time, and not experienced any

accidents. And their seemingly invincible argument is backed up by the confident statement 'we never had any accidents...'; which can be hard to dispute.

### A lot of safety is related to outcomes with low probabilities

When the risk probability of a work activity is low, we are much more likely to make unsafe conclusions - especially if the activity is conducted frequently. This is exacerbated by observing other people behaving unsafely and surviving. This error in judgement happens naturally, as we fail to see the people who are injured or killed by the same type of behaviour, because the accidents did not happen at our company / our factory / during our shift etc.

You can drive many hours without having a crash that requires a seatbelt to save you. And our minds have a strong tendency to conclude that if we do something many times without bad outcomes, then this is something we can keep doing.

**So, this means safety management and training is frequently fighting against strong behavioural instincts.**

### Diagoras spotted the error a long time ago

Nassim Taleb in his book, *The Black Swan*, presents Diagoras of Melos (500BC) as one of the first people to raise the problem of survivor bias thousands of years ago. When believers informed Diagoras that some sailors had been saved by praying to the gods, Diagoras asked if the sailors who drowned had not also prayed for their lives? The simple point being that if all sailors start praying when hit by a storm, then praying could not be argued to have saved the sailors who survived.

In the same way as the sailors who prayed (and survived), employees who do not follow safety rules and survive conclude that their decisions are based on an intelligent and advanced understanding of the risks.

### How the survivor bias fools us

To understand the problem, assume that we have a lot of factories with work teams paying little or no attention to safety. With time some of these worker teams will experience a serious accident, which may cause them to revise their safety attitudes. They might

even be more open to safety procedures and training in the future.

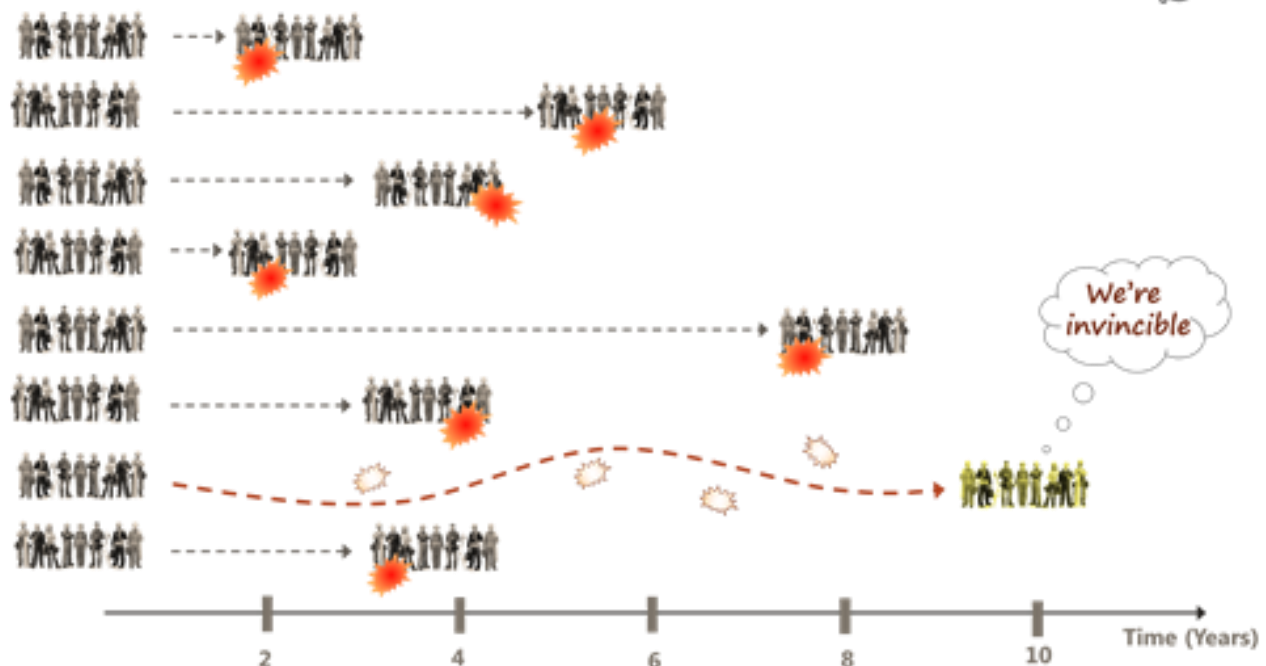
On the other hand, there will also be many worker teams that come through years of not taking safety seriously without ever experiencing any kind of accident. This is the key point – if you have enough workers with these attitudes, you will have ‘invincible workers’ with perfect safety records even after 5, 10 or even 20 years.

### And facility managements are also fooled

The same thing can be said for company managements that consider safety to be unimportant and therefore decide not to spend sufficient funds on safety. Some of these managements will be lucky and get away with these poor practices without having an accident, which gives them a convincing validation for their views. Sometimes these managements might have started off with responsible attitudes towards safety, but with time the lack of accidents made them complacent and they began to think that less effort was acceptable and more cost effective.

### Work-teams not following safety guidelines...

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*If you have enough work-teams working unsafely, you will have some of them surviving without any accident even after many years. And the longer they are 'lucky', the more confident they will become.*

**3 out of 100 operated for 10 years without any accident**



**3 out of 100 had an accident during the first 12 months of operation**



## Who's the hero?

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*An accident or the lack of accidents does not provide sufficient information to accurately assess a company's safety performance*

### Praising companies with zero accidents

I have seen many factories that were operating without any safety management. There was no quality PPE, no machine guarding and no safety training, but many of these companies had not experienced any serious accidents during their operation. Should these companies be praised for their safety performance?

Of course, these companies should not be praised for exposing their workers to unacceptable risks just because they are lucky to avoid accidents. However, it can be very difficult to convince these owners that their operation was and continues to be extremely dangerous.

### What about the safety experts?

We have discussed how owners, managements and workers can all be fooled by the survivor bias, but what about safety professionals? Even us safety consultants are highly susceptible to being impressed by numbers. If we are informed that 100 factories have been carefully monitored for three years, and the following safety results were reported:

- 13 out of the 100 companies achieved zero accidents during the 3-year monitoring period.

Our brains are wired to be impressed with the 13 factories that achieved zero accident results. The companies have been successful according to our goals of avoiding accidents. But what if further investigation informs us that all 100 factories had terrible safety systems and procedures? Are we still impressed by the 13 companies?

### Unfortunately, the opposite is also possible

If we acknowledge that companies with no efforts for safety management can operate for years without an accident, it is equally important to acknowledge that the opposite is also possible.

Let us assume we now follow and monitor 100 companies that are highly motivated in keeping their workers safe, and implement the highest possible safety standards, and allocate resources for safety equipment, training etc. What is the probability that one or two of these companies will have a serious accident during a five-year period?

The subsequent accident investigation will identify weaknesses and errors in the safety procedures highlighting how the accident could have been avoided. This will give us the notion that the company

with the accident was in fact not worthy to be part of the 100 top-class safety companies. But...

What if all or many of the 100 companies had the same safety weaknesses and errors? Note: even companies that are serious about safety make errors in their procedures. Does this mean we are back in the arena of luck? The fact we need to accept is that even when companies are serious about safety, this makes the probability of an accident very low, but this probability is never zero.

### Are safety gurus the result of survivor bias?

If we can be fooled by 'lucky' companies, does this mean we can also be fooled by 'lucky' safety consultants providing flawed advice and unproven safety models?

Just like the example of 100 factories operating poorly, we can in theory have 100 safety consultants providing dangerous advice, and some of them will come through without mishaps. In fact, consultants have even more chance of 'surviving', because their involvement with companies is often brief and limited to a training or safety audit.

Therefore, it is possible that safety consultants can be providing incorrect advice and their clients are simply experiencing a lack of accidents due to pure luck or because the workers have become extremely alert and nimble?

How can we be sure that the zero accidents goal was achieved because of the new and expensive behaviour based safety program?

### Recommendations for reducing the harmful effects of survivor bias on safety management

We need to be more careful about how we assess safety including the following steps:

- Acknowledge that zero accidents can be achieved by luck or maybe simply due to the workers becoming quick like cats. Equally important, an accident might not indicate that a company has acted irresponsibly, and the

company's safety efforts could easily exceed a lot of other companies (with zero accidents). We therefore need to be more sophisticated in how we assess safety success and failure.

- We need to be much more careful before jumping onto the latest safety idea – how can we measure that it really works? The survivor bias means that we need a lot of companies, and a lot of time to be able to properly assess that new safety concepts are really making us safer. So much more caution and sceptical thinking is needed.
- For safety training, we should explain the survivor bias to all levels of the enterprise to help people understand that just because they have avoided accidents in the past, they might still be taking unnecessary risks for themselves and their co-workers. It is possible to play Russian roulette and win...especially if you have enough players.
- We need to be much smarter and critical in how we collect and analyse safety data. Data is becoming increasingly available, but if we fail to be rigorous in our analysis, and remain susceptible to the survivor bias, we can easily reach conclusions that are not only wrong, but also putting lives at risk.

#### Patrik's brief bio:

As an environmental engineer, I have enjoyed 25 years of working on exciting and challenging projects in oil & gas, mining, sustainable forestry, infrastructure, and manufacturing. I advise clients in managing risks related to resettlement, environment and safety.



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