

Accident prevention should look at the big picture of what went wrong

March 31 2015, by Paul Salmon And Natassia Goode



A lifejacket won't save your life if you are not wearing it, says NSW Maritime. But any accident investigation needs to ask more than just why a lifejacket was not being worn. Credit: Flickr/NSW Maritime, CC BY-NC-ND

Accidents, as we all know, happen. But unfortunately, the traditional approach to accident investigation is still blighted by root cause thinking. That's despite the fact that it is now well known that there is never one thing wholly responsible for an accident.

There is no root cause. Accidents are caused by multiple interacting factors, and often even normal, commonly accepted behaviours play a role in adverse events. Root cause thinking ignores the complexity of accidents — as well as the many factors that contribute to them.

On top of this, and despite best intentions, there is a tendency for investigations to focus on those individuals close to the event, such as the pilots, drivers or ship captains.

But accidents can often arise from the decisions and actions of all actors within the system including regulators, CEOs, managers, supervisors and front-line workers. Often these seemingly unconnected decisions occur years before the event itself.

Even in the case of wilful violations, there is typically a myriad of interacting factors that enabled the incident to happen.

The responsibility for accident causation is therefore shared across the system in which it occurs. Yet, for various reasons, there is often a desire to blame an individual.

As a result, we tend to focus on and even punish individuals, and fix only parts of the system rather than the system itself. And broken systems invariably fail again.

A better way to investigate

So how can we do accident prevention better? The key lies in gathering and understanding appropriate data about accidents, as well as near-miss events where system failure was prevented.

Critically this data needs to describe the actors and contributory factors across the overall system along with the interactions that cause hazardous

situations and shape behaviour.

Organisations need to continuously collect and analyse such data so they can understand what the systemic problems are that create unsafe performance – and they need the right tools to help them do this.

The need for incident reporting and analysis has been well known for some time now. But the systems adopted are often not underpinned by an understanding of accidents and how they unfold.

The data they collect doesn't tell the whole story. As mentioned, there is a focus on a root cause or the individual deemed to be responsible, overlooking important factors that play a role.

Taking action

Thankfully in some areas, organisations are taking the steps to build appropriate data collection and analysis systems. And these steps are occurring in an area that you wouldn't normally associate with paradigm shifts in accident investigation — the led outdoor activity sector.

This includes organisations operating under the banners of outdoor education, school camps, adventure tourism and outdoor recreation.

These are activities where there are some obvious (and some not so obvious) risks to deal with to make sure people are safe. But accidents do happen and examples of recent major incidents in this sector include:

- the Mangatepopo gorge incident in New Zealand in 2008 in which six Year 12 students and their teacher drowned during a gorge walking activity
- 12 year old Kyle Vassil's drowning in 2010 in a waterhole while on school camp at Alpine Ash Mountain Retreat in Toolangi,

Victoria.

Applying systems thinking to both events shows clearly that there were [multiple contributory factors involved](#).

But there was still a tendency to focus on the individuals overseeing the activities to understand why the [events occurred](#).

A trial run

Over the past four years, the led outdoor activity sector has embarked on a major research program involving the development of an accident reporting and learning system. This collects data about what happened across the overall led outdoor activity system, rather than just what those directly involved in the incident did wrong.

The research has led to the recent implementation of Understanding and Preventing Led Outdoor Accidents Data System ([UPLOADS](#)).

UPLOADS enables organisations to report and analyse injury and near-miss incidents, providing the capability to collect and analyse data on the system-wide causes of incidents.

It covers factors relating to government policy and funding, regulation, schools, parents, company management and supervision, as well as factors relating to workers, equipment and the environment.

In addition, UPLOADS enables identification of the relationships between contributory factors. This allows it to go beyond what is typically captured by incident reporting systems, providing a far greater description of incidents.

The results so far

Close to 50 organisations are now using UPLOADS – and the outputs so far are compelling. It tells us that there are many things outside of the participants, instructors, and the activity environment that contribute to accidents.

For example, our analyses of the first UPLOADS dataset found a complex web of contributory factors related to schools, parents, standards and codes of practice, regulatory bodies, government agencies, organisational culture, training, program design and activity centre management and supervisors.

In addition, it has identified important relationships, such as the way in which centre management and organisational culture influences the type and condition of equipment and ultimately how participants use it during activities, which in turn can lead to [accidents](#).

For example, this tells us that using a lifejacket incorrectly or not at all is a symptom of problems in the overall system rather than the result of bad behaviour by participants.

The data allow us to fully understand accident causation, which in turn enables appropriate countermeasures to be developed. In the example above, the data tells organisations to focus on improving organisational culture and policies around equipment purchasing, maintenance, training and usage rather than just by buying new equipment and telling people off for not using it properly.

The data provide a watershed moment for the sector. There is no doubt that continued use of the system will reveal other factors related to procedures, risk management systems, policy and legislation, managers, CEOs, auditing, regulation and so on. The list goes on and on.

A wider use in accident prevention

Accidents in this led outdoor activity sector are a complex beast, just as they are in any sector.

In future it is hoped that similar systems will be developed in other safety critical sectors such as road, rail, aviation and workplaces generally. This, in our opinion, is the key to better accident prevention.

Accident prevention is something that we are not yet masters of. Moving forward it is critical that organisations begin to design and implement appropriate data systems that will support, rather than hinder, accident prevention efforts.

Without the big picture that such systems provide, the initiatives produced through accident prevention activities will continue to have only marginal effects. Systems thinking in accident prevention needs systems data.

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