Webinar

Some myths about industrial safety, con Erik Hollnagel. June 2015

Question and answer

Q: Is there any difference in natural and local and international laws? As you mentioned that there is no law for safety.

A: There is plenty of *legislation* for safety, and it varies between domains, countries, and continents. But there are no *laws of safety*, in the same way that we have the laws of physics (e.g., Newton), the laws of electricity (e.g. Ohm), etc. A 'law of safety' would enable you both to make strong predictions and to provide proven (and useful) explanations of events.

Consider, for instance the so-called Murphy's Law, which says that anything that can go wrong, will go wrong. You cannot predict anything useful from that, and you cannot use that to explain anything. It is, in fact, an epigram rather than a law.

Q: What does WAI and WAD stand for?

A: WAI stands for Work-As-Imagined and WAD stands for Work-As-Done. The terms are used to highlight the difference between how we assume that work is going to take place – or should take place – and how it actually takes place. WAI is necessary for instance in relation to equipment design, work planning, work management, and investigations. But WAI will always be different from WAD for the simple reason that work-as-done never is fixed or static, but develops continuously as the work environment (especially resources and demands) changes.

Hollnagel, E. (2015). Why is work-as-imagined different from work-as-done? In R. L. Wears, E., Hollnagel & J. Braithwaite (Eds). Resilient health care, Volume 2: The resilience of everyday clinical work. Farnham, UK: Ashgate.

Q: The "causes are built." Knowing this, how to improve?

A: Causes, or rather explanations of how things have happened, are built rather than found. The causes represent a social agreement, usually unspoken, based on tradition and common experience. A "cause" is the identification, after the fact, of a limited set of aspects of the situation that are seen as the necessary and sufficient conditions for the effect(s) to have occurred. Causes can be associated unequivocally with known structures or functions (people, components, procedures, etc.); it is possible to do something to reduce or eliminate them within accepted limits of cost and time; and they conform to the current "norms" for explanations.

The search for causes should always recognise this and avoid pretensions of finding the "true" or "root" cause. One useful advice is to look for "second stories".

Woods, D. D. & Cook, R. I. (2002). Nine steps to move forward from error. *Cognition, Technology & Work, 4*, 137-144.

Q: Erik, looking at page 33, can it happen, that investigation of the similar incident will conclude to different "root causes" in different countries?

A: This can definitely happen, cf., the argument above that determining the cause of an accident/incident is a psychological rather than a logical process. There are even examples where different investigations of the same accident leads to different results. A good examples of that is the explosion in an isomerization unit at the BP Texas City site on March 23, 2005, which killed 15 workers and injured more than 170 others. Here six different investigations yielded six different results – and six different sets of recommendations.

Q: Is there an alternative to accident investigation?

A: Basically speaking, when an accident has happened then it is necessary to investigate it. This must be done both to establish the probable cause and to relieve the uncertainty that often follows. The investigation can, however, take place in several different ways. From a Safety-I perspective, the purpose of the investigation is to find the (possibly unique) causes that explain the accident and provide the target for remedial actions. From a Safety-II perspective, the purpose of the investigation is to understand how work is done when the same activity produces the desired outcomes, i.e., when there are no incidents. This understanding can be used both to explain why the usual actions did not succeed, and to find ways to make sure they are more likely to succeed in the future.

Hollnagel, E. (2014). Safety-I and Safety-II: The past and future of safety management. Farnham, UK: Ashgate.

Q: In your opinion, what is safety culture and how to measure it?

A: Safety culture is "what people in an organisation do when no one is looking." Safety culture is used as a short-hand reference for the "attitudes, beliefs, perceptions and values that employees share in

relation to safety." It represents the values and tacit assumptions that often guides or even determines the choices that are made during work. The values and tacit assumptions are unquestionably there but the notion of a uniform safety culture is mostly a convenient simplification that is useful for communication. Attempts to define and measure safety culture, for instance in terms of the 'level of safety culture', are therefore misguided and potentially misleading. Instead we should try better to understand what 'safety culture' represents.

Q: Don't you think that the first myth conclusion is too fatalistic? What shall we do then to prevent accidents?

A: In my view, the first myth ("All accidents have causes which can be found and treated") is too deterministic (or too absolutistic) rather than too fatalistic. In practice, there are many cases where causes cannot be 'found and fixed' (cf., also the above question about causes.) But we can always try to find out how work is actually done, and use that to support or facilitate it. Safety cannot be achieved only by preventing things from going wrong (Safety-I). Safety also requires that we become better at ensuring that things go right (Safety-II). Safety is 'an event', and not the 'absence of a non-event'.

Q: What is a practical example of Safety II?

A: A practical example of Safety-II is looking at how work is done and then trying to support that. Or trying to ensure the conditions necessary for successful outcomes, such as confirming that the necessary resources are available or making pre-emptive tests. Training is an example, when it is used to enable performance rather than to constrain it.

Q: How do you define "resilient" safety management? How is developed in practice?

A: An organisation's performance is resilient if it can function as required under expected and unexpected conditions alike (changes / disturbances / opportunities). If that is possible, the organisation will obviously be safe as well. The question is therefore how we can manage such 'resilient performance' rather than 'resilient safety'. The answer to this requires that we look closer at what is required for performance to be resilient. The simple answer is that it requires the abilities to respond, monitor, learn, and anticipate. In practice this means that we must develop ways in which to nurture these four abilities, not only individually but also how they work together.

Hollnagel, E. (2009). The four cornerstones of resilience engineering. In: Nemeth, C. P., Hollnagel, E. & Dekker, S. (Eds.), *Preparation and restoration* (p. 117-134). Aldershot, UK: Ashgate.

Q: Following Nietzsche's quotation, is the emotional need for early anxiety removal (i.e., uncertainty removal) an obstacle to Safety Management?

A: The emotional need for safety may affect how safety is managed and in particular how investigations are carried out. The need to feel safe may favour solutions that are efficient and which can be done quickly, rather than solutions that are thorough but which take longer time. The best remedy against that is to acknowledge that the need to feel safe is real and to take it seriously.

Q: If things that go wrong happen in the same way as things that go right, why do we have so many things go right?

A: In my view the question should be rephrased as follows: "If things that go wrong happen in the same way as things that go right, why do things sometimes go wrong?" The fact is that accidents and incidents usually are quite rare, although we tend to misjudge their frequency due to their attention-grabbing characteristics. The main reason why the things that go right sometimes go wrong is that the basis for everyday performance is approximate adjustments (also called performance variability). We quickly learn to use the adjustments (short-cuts, workarounds) that work. But because they are approximate rather than precise, the adjustments may every now and then combine in ways that were unforeseen and possibly lead to adverse outcomes.

Hollnagel, E. (2009). *The ETTO Principle: Efficiency-Thoroughness Trade-Off: Why things that go right sometimes go wrong*. Aldershot UK: Ashgate.