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Risk vs. Risks

Risk Assessment Lessons from Weather Forecasting

BY THEA DUNMIRE

One of the important issues to be addressed in drafting ISO 45001 is defining the requirements related to risk assessment needed in an occupational health and safety management system (OHSMS). What is complicating this determination is a lack of clarity around the meaning of the term "risk." Individuals often use the terms "risk" and "risks" interchangeably even when they are actually referring to very different concepts. As a result, when we discuss risk, we may not even be talking about the same thing and no consensus is reached on what the requirements related to "risk" should be.

You can certainly consider probability—that is, uncertainty—in your planning processes, but what is much more important is determining relevance and significance.

This is not surprising.

As in life, the term "risk" is used in occupational safety and health management systems to refer to three related but different concepts:

- Probability: what is the risk?
- Relevance: is the risk important to me?
- Significance: how much do I care about the risk?

To understand the differences in these concepts related to risk, it is useful to examine them in the context of something we all deal with every day: the weather.

RISK AND PROBABILITY

The first concept associated with risk is probability. This is the concept of risk we learned about in statistics classes. Probability is the statement of likelihood of occurrence of an event, as in:

- The odds of winning the lottery are 1 in a million.
- The risk of being killed in a car accident is 1 out of 7,700.
- The chance of rain today is 50 percent.

This concept of probability is associated with the degree of certainty or uncertainty attending a particular event. Probability is a technical determination, often determined using standardized statistical analysis tools. The focus is on determining mathematical or empirical levels of uncertainty. Importantly, when used for forecasting, this concept of risk applies only to events in the future since there is no uncertainty associated with events that have already occurred.

In weather forecasting, significant advancements have been made in characterizing probabilistic risk. The use of computers has improved both short- and long-term weather forecasting by allowing the sophisticated analysis of large data sets and the development of computer simulations to test and assess the accuracy of weather forecasts. The key to these advances in weather forecasting has been the collection of a sufficient quantity of "good data" (that is, valid numbers) and the development of analytical tools that are trustworthy, understandable, and useful.

The same cannot be said for the determination of OHS risk. There is often a serious lack of real data, both in the quantification of the exposure of workers to hazards and in the health consequences associated with such exposures. In addition, compared to the sophistication of the tools used for weather forecasting, many of the methods used for determining OHS risk are crude at best.

RISK AND RELEVANCE

The second concept often associated with risk is relevance. This definition of risk recognizes that risk is important to people only if it is relevant to them. For example, I only care about the odds of winning the lottery if I have bought a ticket.

Risk is only important if it matters to me.

In weather forecasting, I am primarily interested in the weather where I am or where I plan to be. One may simply enjoy watching weather forecasts, but most of us are primarily interested in the weather that is going to affect us directly. For example, I am much more concerned about a hurricane when the forecasted path is centered on my house. Similarly, the insurance industry is primarily interested in the landfall forecast for tropical storms, not the overall activity forecast, since their losses are triggered when hurricanes strike land, not when they stay out at sea.

The risk that matters within a particular management system differs depending on what the objectives of that management system are. This additional concept of relevance is included in the definition of the term

"risk" that is set out in ISO 31000: "effect of uncertainty on objectives."

In a quality management system, the risks related to a hurricane that are relevant are those that relate to the organization's ability to meet its customer expectations. For example, this may include potential damage to raw materials and finished products, inability to manufacture product because of facility damage and power outages, or the likelihood of disruption of transportation of products.

In an environmental management system, the risks related to a hurricane that matter most relate to potential environmental impacts. This may include hazardous material releases associated with flooding or tank breaches caused by high winds.

In an OHS management system, the risks that matter most are those associated with the potential for worker injury. The risks of concern related to a hurricane might include injuries related to the cleanup of storm debris and chemical exposure during cleanup efforts.

The risk that is relevant is not the same.

RISK AND SIGNIFICANCE

The third concept often associated with risk is significance. This concept is related to risk characterization—that is, how much you care about a particular issue.

For example, you are likely to care more about the winning lottery number if you purchased fifty lottery tickets rather than just one.

In the context of weather forecasting, the concept of significance relates not to whether it will rain where you are, but rather to the analysis of the impact the rain will have on reaching your objectives, whatever they may be.

For example, you may care about any of the following:

- Will it be a gentle shower or a deluge?
- Is the rain going to cause my house to flood?
- Will the rain be enough so I don't need to water my garden?

There are many factors that go into the determination of significance. Importantly, many of these depend on individual priorities. Which factors are important also depends on the subject being assessed. Which risk assessment methodologies should be used can be a complex and situation-specific determination. One of the commonly used methods of determining the significance is considering the combination of probability of the occurrence of an event and the likely impact if the event does occur. There are, however, many other risk assessment methodologies that can be used when conducting a significance evaluation. Some of them may even be better.

This concept of risk is subjective.

RISK VS. RISKS

This brings me to a discussion of the difference between the terms "risk" and "risks."

In addition to having different views on what concepts should be included when defining the term risk, individuals often use the terms risk and risks interchangeably, even though they have very different meanings.

For example, let's take the risk of a hurricane. Usually, when people discuss the *risk* of a hurricane, they mean the likelihood that the path of the hurricane is headed in their direction. It's the determination whether the hurricane is going to come ashore in New Orleans or New York.

Yet, when people talk about hurricane *risks*, the discussion is usually focused on the potential impacts when a hurricane does reach their location. Hurricane risks, in this context, include concerns such as flooding, wind damage, electrical outages, and downed trees—the impacts that might happen if the hurricane does arrive.

In an OHS management system, this distinction is important.

You can certainly consider probability—that is, uncertainty—in your planning processes, but what is much more important is determining relevance and significance. Only when risk includes these considerations can the appropriate planning be done to address potential impacts to worker safety.

What you are seeking to control are risks, not risk. S