Finding All the Hazards: How Do We Know We're Done?

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ABSTRACT

System hazards must be found or system safety cannot be practiced. While methods are available for identifying system hazards, no single method or combination of methods is capable of assuredly identifying all of the hazards within a system. Despite this, the claim is often heard that "all" of the hazards in a particular system have been found. To gauge the degree of thoroughness achieved by a method for identifying system hazards, one must know how many hazards actually exist there. This implies that all hazards within the system must first be found to serve as the measurement base. An obvious logic conundrum arises: if there were a method for finding all of the hazards for use as the reference base, then that absolute method used in finding all of them would be used universally and there would be no reason to evaluate the effectiveness of a less thorough method. Researchers in Finland have employed a practical approach to gauging thoroughness. Results of studies of two hazard discovery methods in eleven plant systems have been sobering: thoroughness at identifying system hazards is often found to be below 50 percent and rarely exceeds 80 percent unless multiple dissimilar hazard search methods are used.

BACKGROUND — Origins of the problem

In the practice of system safety, hazards are threats of harm to assets we want to protect. These assets may include life, limb, health, equipment, the environment, productivity, etc. System safety practitioners seek to identify the hazards posed both *by* and *to* a system. Risk that each hazard poses to each asset is then assessed in terms of the severity and the probability of the potential harm. Risk at intolerable levels must then be either abated or accepted (Ericson, 2005; Manuele, 2008).

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