The Bumpy Road to Better Risk Control

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Abstract

By now, we know at least by orders of magnitude, the type and strength of damage mechanisms, by which despite all measures an unintended release occurs. Often in such cases, management was not aware of impending calamity, and operators were not making wrong decisions. As we heard Prof. Nancy Leveson stating at last year’s MKOPSC symposium, even with all components functioning, dysfunction of the system can still be a cause of mishap. Safety expert, Prof. Erik Hollnagel, asserts it in even stronger terms: the Efficiency-Thoroughness Trade-off, or ETTO principle or rather dilemma, contends that man can never do it perfectly well. Perfect thoroughness, certainly in complex situations, requires an amount of time that efficiency will not allow. For improved risk control and sufficient resilience, we must adopt a system approach. This way of thinking shall provide an improved overview and situational awareness after the safety constraints are defined and risk controls installed. A system awareness presupposes that hazards to the system, consisting of process installation, personnel, and procedures, have been identified. Fortunately, in recent years two potentially helpful tools have become available: Blended Hazid, a vastly improved combination of HazOp and FMEA, and Bayesian networks, a tool to model cause-effect structures allowing inclusion of uncertainty information. Bayesian networks enable also the use of indicator values to relate the result of management effectiveness implying such factors as safety attitude, competence, workload, and motivation with their effects on error and failure probability. The paper will explain the directions these developments are advancing and the openings they provide for process safety research, which in the end shall result in a stronger overall control of system risk.