Paradoxes, Challenges and Opportunities in the Implementation of Safety Management Systems*

Paul R. Schulman

Center for Catastrophic Risk Management
University of California , Berkeley

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Presentation Points

1. Safety management is different: it's not just another organizational mission

2. An effective safety management system (SMS) is not an add-on to existing organizational jobs and activities. It must be integrated into them and will change their content.

3. Some specific challenges in the implementation of SMS's

Paradoxes in “Safety”

- “Safety is defined and measured more by its absence than its presence.” (James Reason)
  - It's hard to establish that things are "safe". Much easier to recognize “unsafety” or danger in the face of accidents.

- Safety is the continuous production of “dynamic non-events” (Karl Weick)
  - Safety is the consequence of positive actions -- identifying potential sources and consequences of accidents, acting to prevent them, constantly monitoring for precursor conditions, training and planning for the containment of consequences of accidents if they do happen -- in short safety management.

- “Safety" is not the same as the mitigation of risk.
  - "Safety is more than the absence of risk; it requires specific systemic enablers of safety to be maintained at all times to cope with the known risks, [and] to be well prepared to cope with those risks that are not yet known and to address the natural ‘erosion’ of risk controls over time ."

    (Aviation Safety Management International Collaboration Group, 2013)
  - Safety is about assurance; risk is about loss.
  - A number of failures or incidents can occur without invalidating a risk estimate, but a single failure can disconfirm the assumption of safety.

- Safety management is not the same as risk management

  - Risk management is managing to probability estimations of events which apply to a large run-of-operations or number of years. Safety management is managing down to the level of precluding a single event in a single operation.

- “Optimization” is the wrong concept to apply to safety investments and safety management
  - “How much safety are we willing to pay for?” is a risk question, not a safety standard
  - Safety is not achieved in proportion to dollars spent
  - A safety perspective would be: what is our ability to reliably manage for safety across different types of events or accidents? How can we improve that ability?
  - Safety and safety management are not interval variables divisible into discrete portions

A final paradox:

- We cannot demonstrate statistically a consistent correlation, across industries and organizations, between the existence of features of SMS's and reductions in incident and accident rates. (1)

  Why is this so when accident literature and accounts point so frequently to those organizational failings and managerial errors addressed by SMS's as root and even proximate causes of these accidents?

Possible Explanations for the SMS/Safety Performance Paradox

- Relatively few systematic studies of incident and accident rates focused on SMS variables
- Small samples of organizations; few major accidents per year
- Success in avoiding low probability high consequence accidents is hard to measure

  -- are “near-hits” a success or a failure?
- Yearly incident and accident totals may be the wrong units and measurement interval

Possible Explanations (Cont'd)

- Non-linear relationships exist between adding features of SMS's and proportionate improvements in incident and accident rates (2)
- Incidents and accidents are different processes with different causation (slips, trips and falls vs system accidents) and they should not be added to one another.
- In some studies, an organization's declines in incidents or small accidents may even have an *inverse* correlation with system accidents. (3)

- But some studies of SMS and performance outcomes found a stronger correlation with the mediating factor of "employee engagement“ (4)
  - “satisfaction, commitment and discretionary effort”

- These suggest some important challenges to consider in the implementation of safety management systems

Challenges in the Implementation of Safety Management Systems

- There is an important difference between implementing the structural features of an SMS ("safety" officers; safety plans; formal meetings; safety budgets; formal accountability and reporting relationships) and
- achieving a widely distributed *internal acceptance* of safety management as an *integral part of actual jobs*,
- a *collectively shared set of assumptions and values* (safety culture) and
- change in the *individual identity of personnel* in their jobs in an organization.

SMS Implementation (Cont'd.)

- Without wide and deep employee engagement, an SMS will simply be an administrative artifact without a strong connection to actual behaviors that connect to safety-promoting performance and safety outcomes.

- It takes time, persistent effort, adaptive behavior and continuous monitoring and improvement to have an effective SMS.

SMS Implementation (Cont'd.)

- An effective SMS is not achieved once and for all. It is a constant work in progress.
- An effective SMS cannot be imposed by top-level executive orders in an organization. Nor can that implementation be off-loaded to a "safety officer". Implementation must evolve and adjust, correct and improve down through levels and across departments and units.
- An SMS implementation cannot be achieved on a pre-planned timetable. Acceptance, commitment and supporting culture are not established on a predictable schedule.

SMS Implementation (Cont'd.)

- Safety perspectives and practices have to be *integrated* into the performance of a wide variety of tasks -- at all levels -- not simply *added* to existing tasks.

- Do CEO's, Commissioners, Directors, Supervisors and many employees under them have the slack in time, attention and responsibilities (sufficient functional "bandwidth“) in their jobs -- to even add safety management elements to them, let alone integrate SMS's into them?

SMS Implementation (Cont'd.)

- It is unlikely that many utilities and their regulators can successfully adopt safety management systems into their organizations without significant change in the organizations themselves – in such things as reporting relationships and job content.

- The best way for CEOs, Commissioners, Directors and Department Heads, Supervisors and employees to start to integrate safety management into their jobs may be to rethink them.

- Effective safety management requires "higher resolution" jobs with perspectives both wider in scope (to consider system effects of actions taken) and deeper in granularity (down to understanding the content and sub-culture of individual tasks). Also jobs with more overlap in information and responsibilities with other jobs around them (e.g. teams) to promote *prospective* attention to error.

Notes

1. Australian Transport Safety Bureau, "A Systematic Review of the Effectiveness of Safety Management Systems“

   Elan Head, “When Safety Management Systems Fail” *Vertical Magazine* (2015) https://www.verticalmag.com/features/whensafetymanagementsystemsfail/

2. “ (1) there is a limited value of linear thinking followed by the industry, i.e., ‘the more you do with an SMS the higher the safety performance’, (2) “the diversity in SMS implementation across companies renders the sole use of output metrics not sufficient for assessing the impact of SMS processes on safety levels.” “Measuring Safety in Aviation: Empirical Results about the Relation between Safety Outcomes and Safety Management System Processes, Operational Activities and Demographic Data”, Steven Kaspers, et. al. *Presario Confer*ence, 2017.

3. Sydney Dekker, *Safety Differently* (CRC Press, 2014).

Notes (Cont'd.)

4. "A system of safety management practices and worker engagement for reducing and preventing accidents: An empirical and theoretical investigation", Jan Wachter and Patrick Yorio, *Accident Analysis and Prevention*, v. 8 (2014).

   "Safety at Work: A Meta-Analytic Investigation of the Link Between Job Demands, Job Resources, Burnout, Engagement, and Safety Outcomes", Jennifer D. Nahrgang, et. al., *Journal of Applied Psychology*, v. 96 (2011)