A methodological approach to the management of risk and safety

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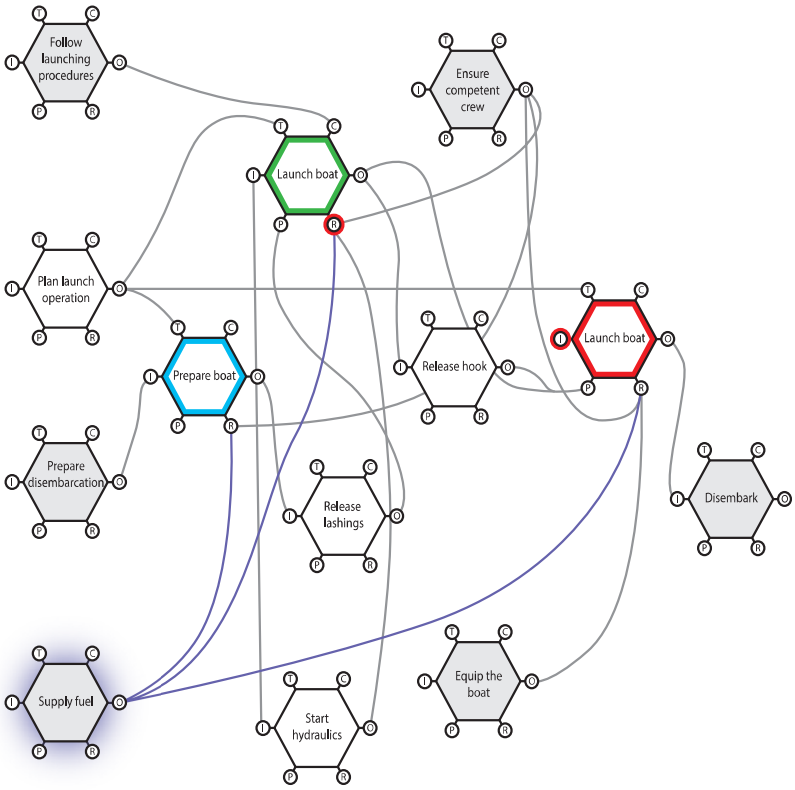
Organisations don't make safety. Organisations exist to make profits and safety is a necessary evil that needs to be overcome in the face of finite resources, limited knowledge, conflicting goals and intense competition. A seafarer could either spend all day working a job in accordance with all available procedures and instructions or opt for a reasonably acceptable job in limited time to the best of his or her experience and ability.

There always is a balance between efficiency and thoroughness in undertaking any job. So what appears as an unsafe act or rule violation on the surface is merely an adjustment required to get work done. But occasionally when adjusting and improvising, a worker may also get injured. Whilst improvisations and adjustments leading to everyday success are difficult to measure (or even notice), safety gets easily measured based on negative outcomes. Success and failure are equivalent and often matters of hindsight, outcome and judgment (of selected few).

Furthermore, minor improvisations and adjustments in complex socio-technical systems (i.e. systems comprising of humans working with technology for example ships, planes, hospitals, power plants etc.) may emerge in the form of major consequences. In a resource constrained world with systems being pushed to their limits this is not difficult to imagine. As Aristotle once said, the sum is greater than the parts. Finally human and technological functions in socio-technical systems may resonate in complex ways to generate unintended outcomes. For instance applying an incorrect helm in confined waters would have far serious implications for vessel safety than in open waters. Adjustments, equivalence, emergence and resonance are vital aspects of socio-technical systems.

Given that high risk facilities operate as complex socio-technical systems, it follows that the management of risk and safety requires a systems approach. One such methodological approach that has gained increased popularity in recent years particularly in high risk industries is Functional Resonance Analysis Method (FRAM). The practical application of the model is vast and generic. It includes management of everyday operations, management of change, system design, safety management, risk assessment, and monitoring of system performance. A unique strength of the model is that it could be applied for both risk management (forecasting) and accident investigations (regression).

The actual FRAM model aims to provide an overview of functional interactions and critical



interdependencies within the system (see figure). Each function consists of an input, output, control, resource, time and precondition. The overall aim is to understand how minor adjustments may become a source of significant performance variability in the system and lead to unintended outcomes (accidents).

The model aims to understand performance variability simply by examining how workers do their job (and not what the procedures may dictate). In so doing, the subtle details of workplace culture and the values and perceptions of workers can come to light.

Human error as we all know too well is the cause behind 90% of the accidents. But if for every one thousand successes there is one accident then what is the reason for 999 successes? Surely credit cannot be assigned to diligent rule following or robust technical designs – not at least in our industry! In a resource constrained world, adjustments and adaptability (or seamanship as we know it) are fundamental to understanding why things go right. By examining what normally goes right we would know why things sometimes can go wrong, and find constructive ways of controlling variability and improving performance. FRAM offers a structured method and conceptual framework.

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For further information on how to build a FRAM model go to: http://functionalresonance.com/how-to-build-a-fram-model/index.html