Safety Corner

What is Resilience Engineering?

Traditional risk assessment frameworks are based on the modeling of accident scenarios – bad things that can go wrong, and the calculation of their probabilities and consequences to register the level of risk (or degree of un-safe) of an engineering system.   Risk mitigation measures are then devised to prevent the occurrence of accidents or keep the impact to minimum.

There has been a new approach investigating how complex systems show capability to recover the balance after a mishap, or keep the balance in the presence of continuous stress.   In contrast to traditional safety thinking, which with structural means tries to prevent accidents, this new approach, called Resilience Engineering, focuses on the ability of an organization or an engineering system to actively anticipate changes and threats by building a capability to better recognize and adapt to risks.   A resilient system should have the following abilities:

- To respond, quickly and efficiently, to regulate disturbances and threats.
- To continuously monitor irregular disturbances and threats, and to revise the basis for the monitoring when needed.
- To anticipate future changes in the environment that may affect the system's ability to function, and the willingness to prepare against these changes even with uncertain outcome.

Resilience engineering provides the methods by which a system's resilience can be gauged or measured, and the means by which a system's resilience can be improved.   Organizations applying Resilience Engineering develop abilities to adjust their performance to adverse conditions and to anticipate the changing shape of risk before damage occurs.   Failures are viewed as the temporary or permanent absence of this ability to be resilient, rather than just a breakdown or malfunctioning of normal system functions.

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