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Title

Comparison and Practice of CAST and FRAM on Train Fire Accident

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Abstract

In accident analysis of a complex system, it is important that analyzing mismatch of function state or undesirable change for the whole system, instead of analyzing the causes of accidents only with equipment failure or human error.

CAST (Causal Analysis based on Systems Theory) is a method to analyze accidents based on the concept of STAMP. By analyzing the design of the entire of a system, we find out the potential factors leading to the accident.

FRAM (Functional Resonance Analysis Method) is an analytical method based on the concept of Resilience Engineering, which assumes that increasing successes lead to safety. In FRAM, the fluctuation of the function resonates and it becomes uncontrollable, resulting in accident, and then FRAM analyzes the relationships between functions and function fluctuations in terms of six aspects (input, output, preconditions, resources, control, time) , and finds factors that have become uncontrollable.

These two methods differ in their way of thinking and procedure. On the other hand, possibly leading to more detailed analysis such as new UCA (Unsafe Control Action) extraction in CAST by analyzing on six aspects of FRAM. Therefore, we analyze train fire accident with CAST and FRAM and organize their characteristics in practice. In addition, we compare the analysis results and discuss the possibility of complementing and cooperating with FRAM analysis on the analysis result of CAST.

Keywords

- (1) STAMP
- (2) CAST
- (3) FRAM
- (4) accident analysis