Functional Resonance Analysis Method as Approach for Safety Management

by

Florian Willers, Dipl.-Ing. (FH)

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florian.willers@wesertrainer.de

Agenda

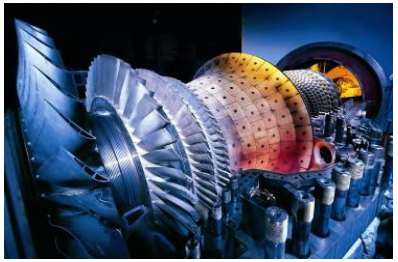
- Accidents Models
  - Sequential Approach
  - Epidemiological Approach
  - Systemic Approach
- Functional Resonance Analysis Method (E. Hollnagel)

Accident Models

Risk assessment requires an adequate representation – or model – of the possible future events.

Two types of accident models

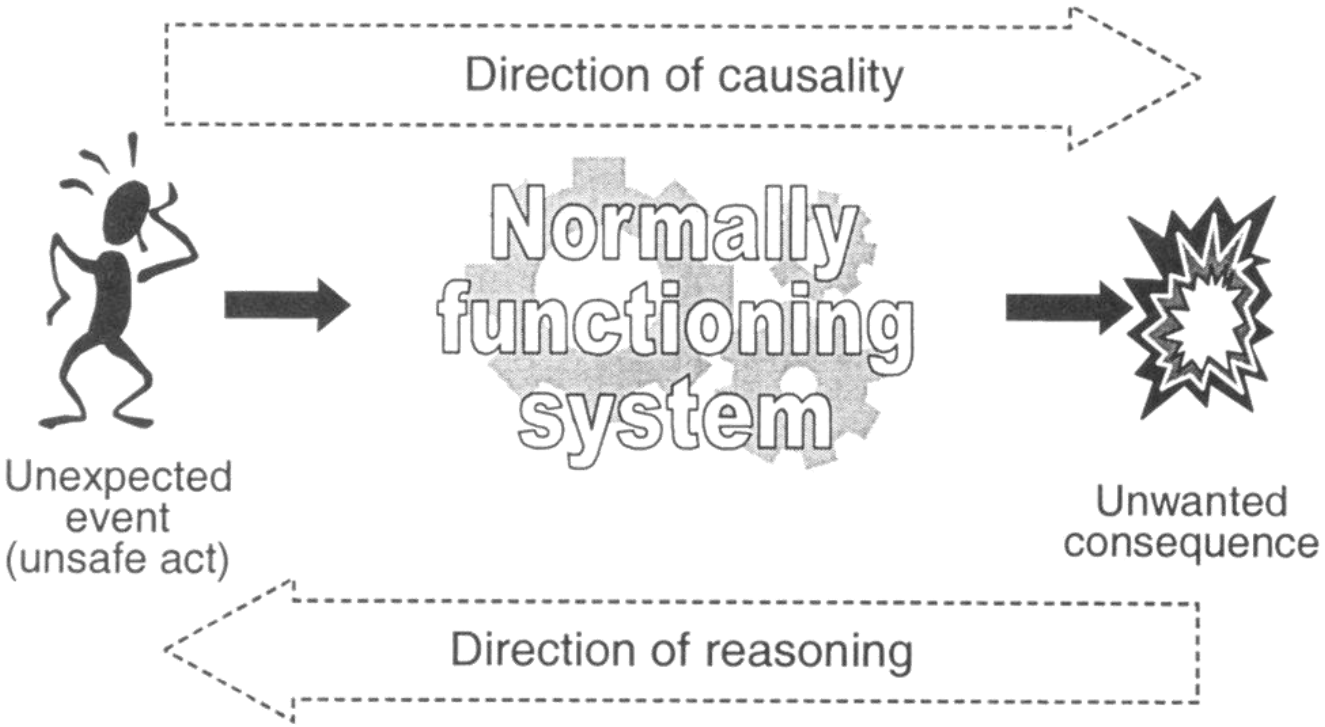
- **Linear**
  - Sequential
  - Epidemiological
- **Non-Linear**
  - Systemic



The chosen representation must be powerful enough to capture the functional complexity of the system being analyzed.

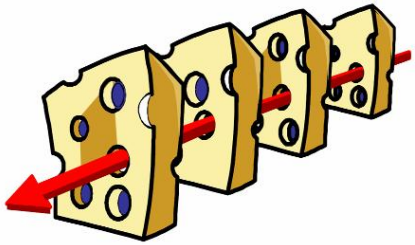
Sequential Accident Models

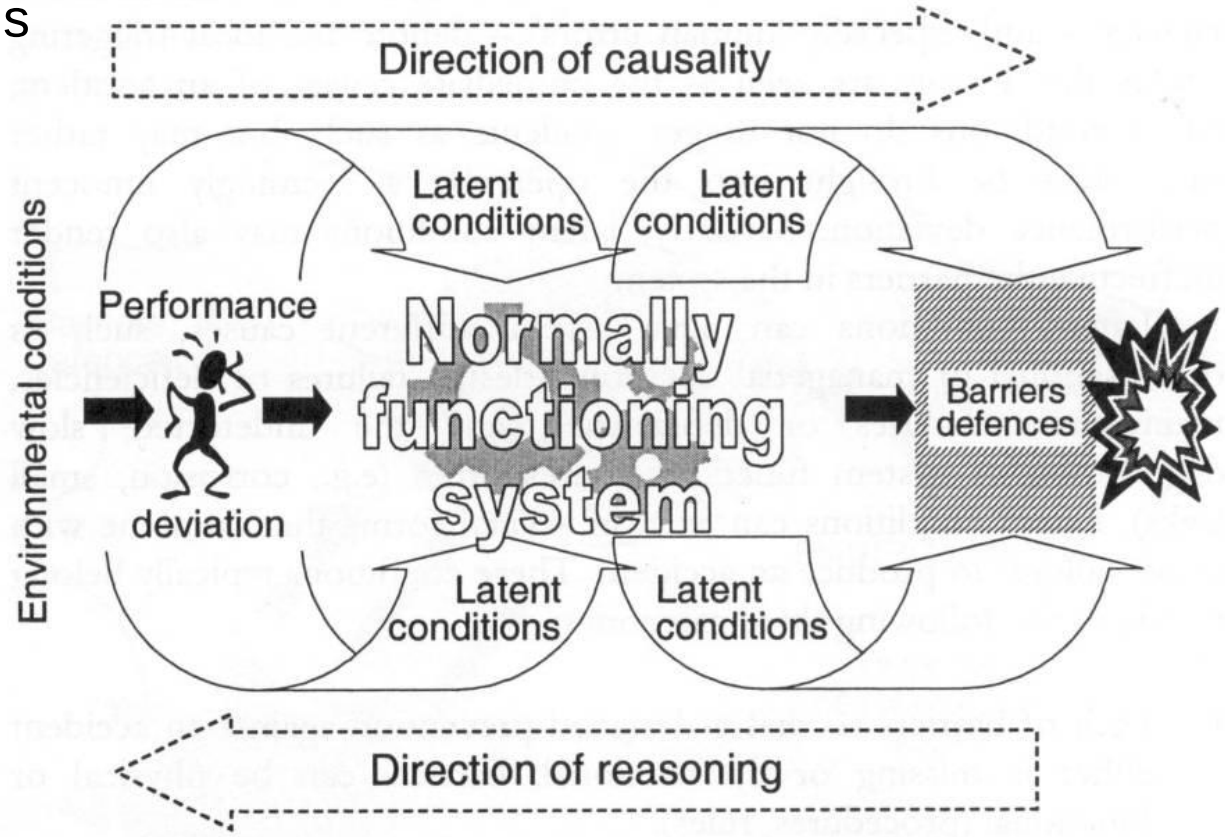
- Linear Accident Model
- Sequence of Events
- Specific Order
- cause – effect links
- Calculating failure probabilities
- Visualization by tree-diagrams



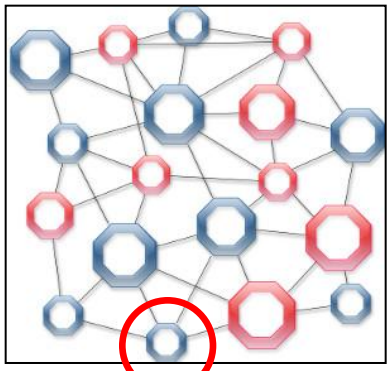
Epidemiological Accident Models

- Linear Accident Model
- Performance Deviations
- Environmental Conditions
- Latent Conditions
- Barriers

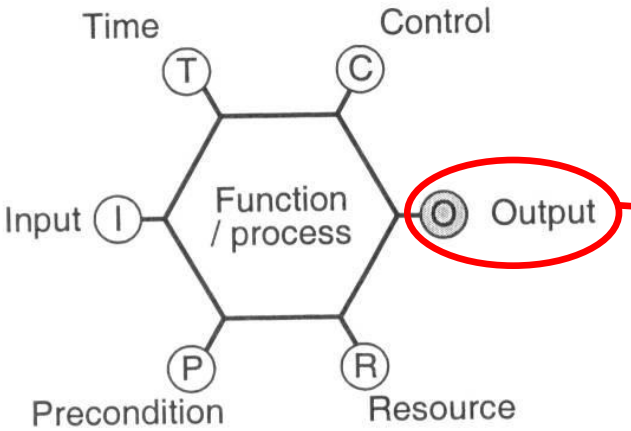


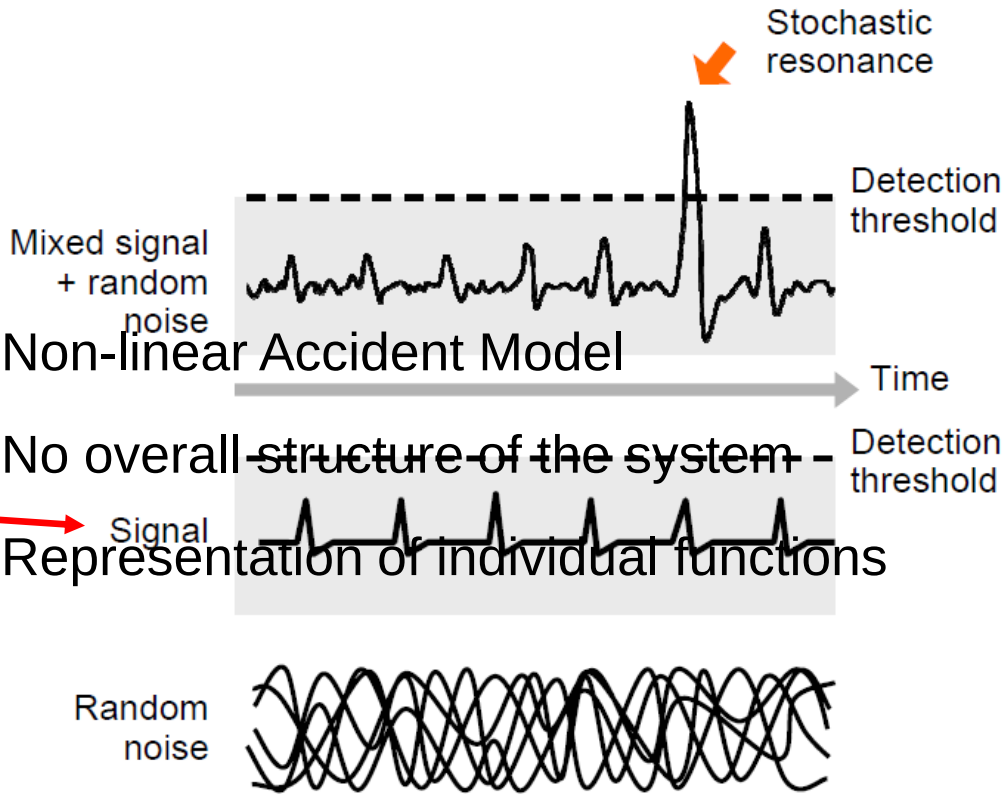


Systemic Accident Models



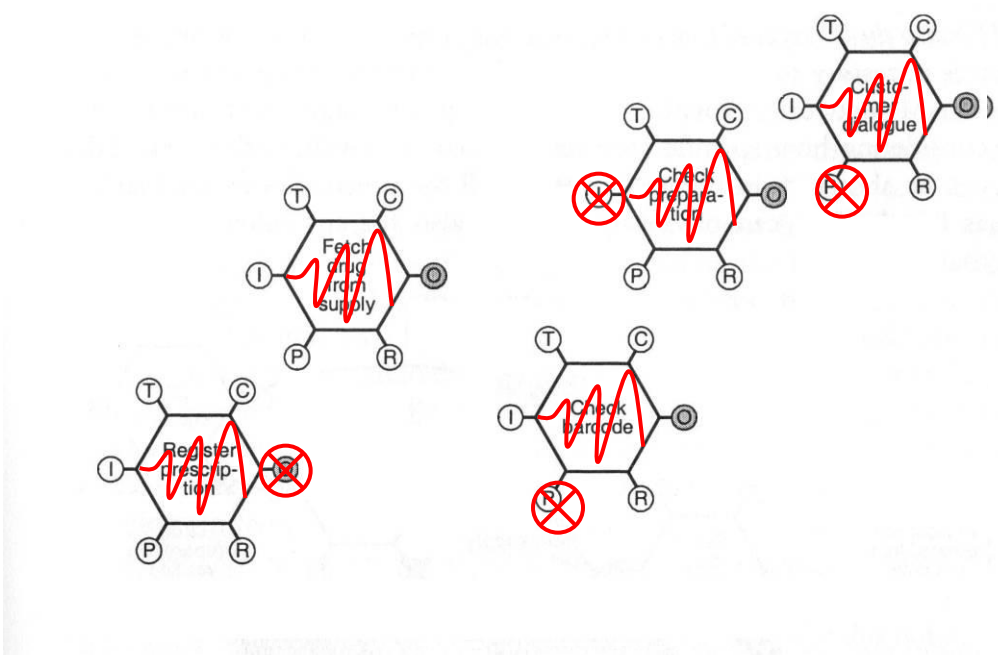
"If failures are seen as a result of combinations of normal performance variability rather than of single malfunctions, then the chain analogy is no longer adequate." (E.Hollnagel)





- Non-linear Accident Model
- No overall ~~structure of the system~~
- Representation of individual functions

Functional Resonance Analysis Method (FRAM)

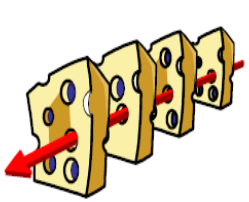


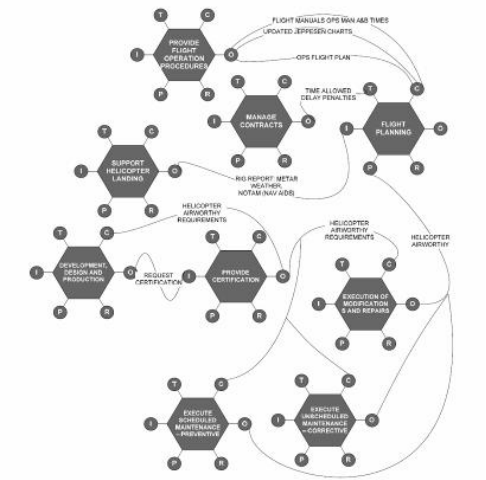
1. Identify essential system functions
2. Determine the potential for variability
3. Define functional resonance based on dependencies among functions
4. Deciding on Countermeasures

Summary

Linear Accident Models

- Sequential & Epidemiologic approach
- Sufficient for technical systems
- Visualization by tree-diagrams





Non-linear Accident Models

- Systemic approach
- Complex, socio-technical systems
- An accident is the result of the performance variability of a system
- Visualization by
  Functional Resonance Analysis Method

Questions?

Thank you for your attention.