CAST Analysis of the Buncefield Incident

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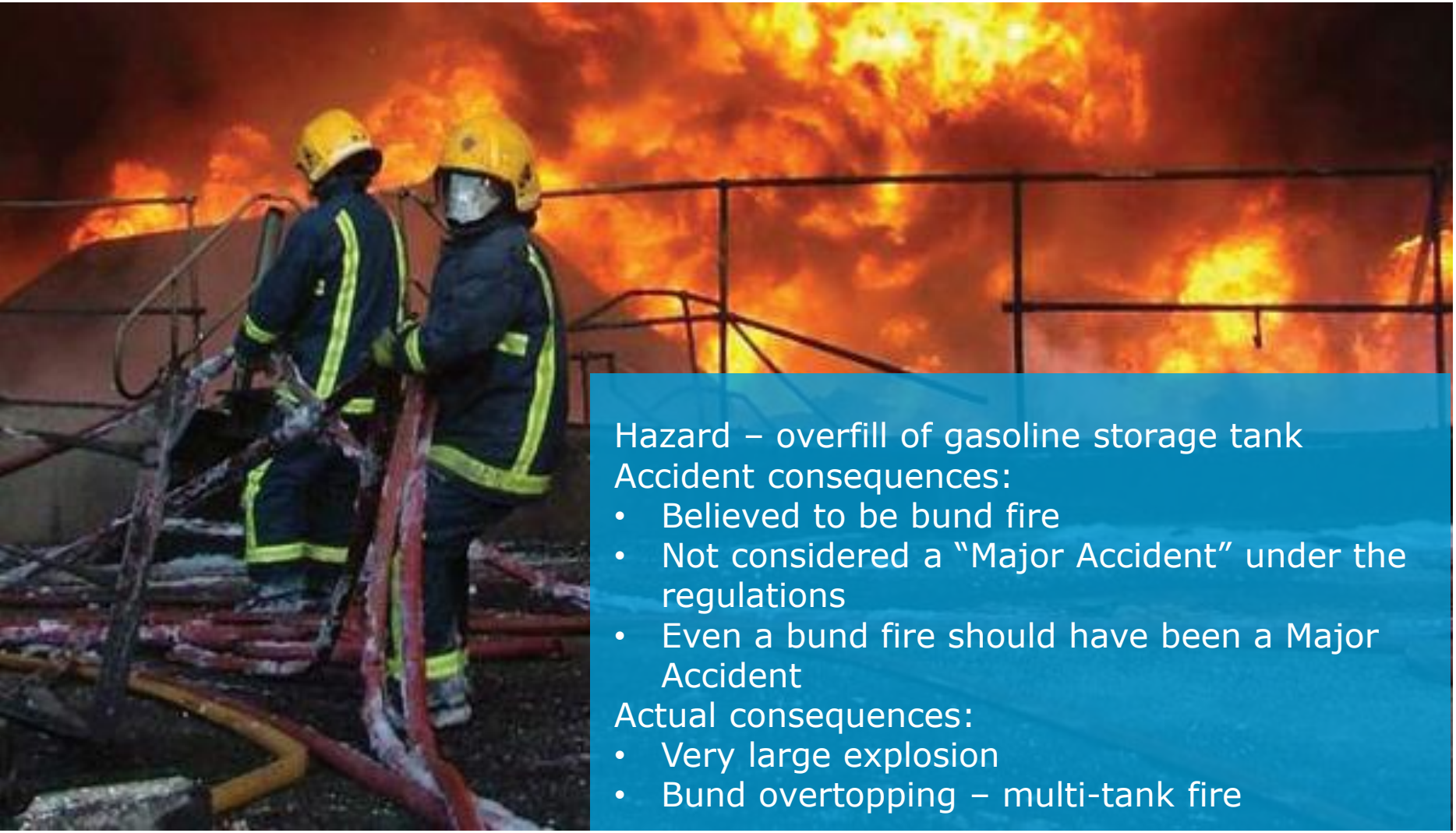
Buncefield, UK - 11 December 2005

- 250 000 litres of gasoline overfilled a storage tank
- Huge vapour cloud and explosion
- 20 tanks engulfed
- 40 injuries, no fatalities
- Major environmental pollution

Accident consequences not recognised



Hazard – overfill of gasoline storage tank

Accident consequences:

- Believed to be bund fire
- Not considered a "Major Accident" under the regulations
- Even a bund fire should have been a Major Accident

Actual consequences:

- Very large explosion
- Bund overtopping – multi-tank fire

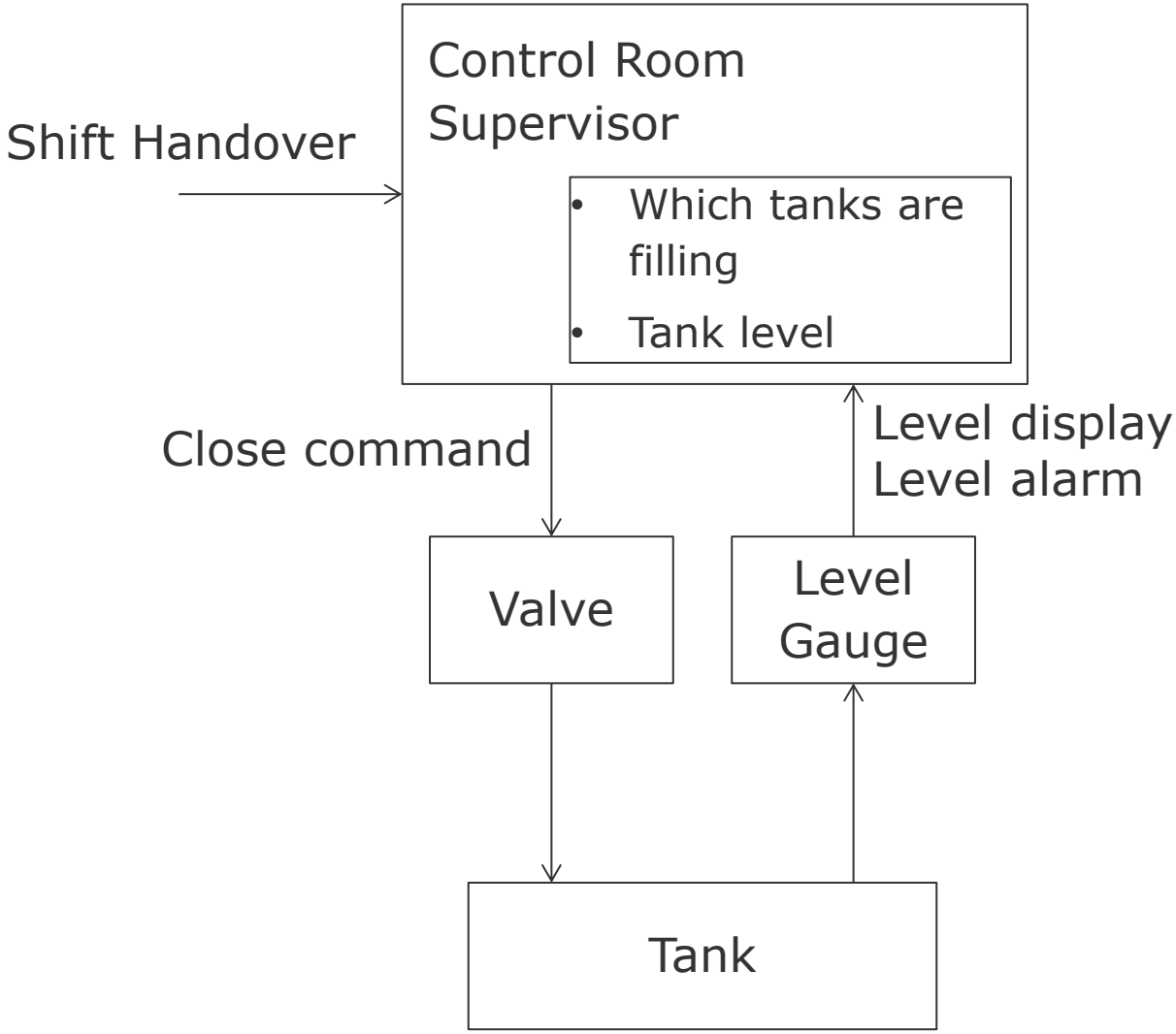
Key Messages

- Unsafe Control Actions:

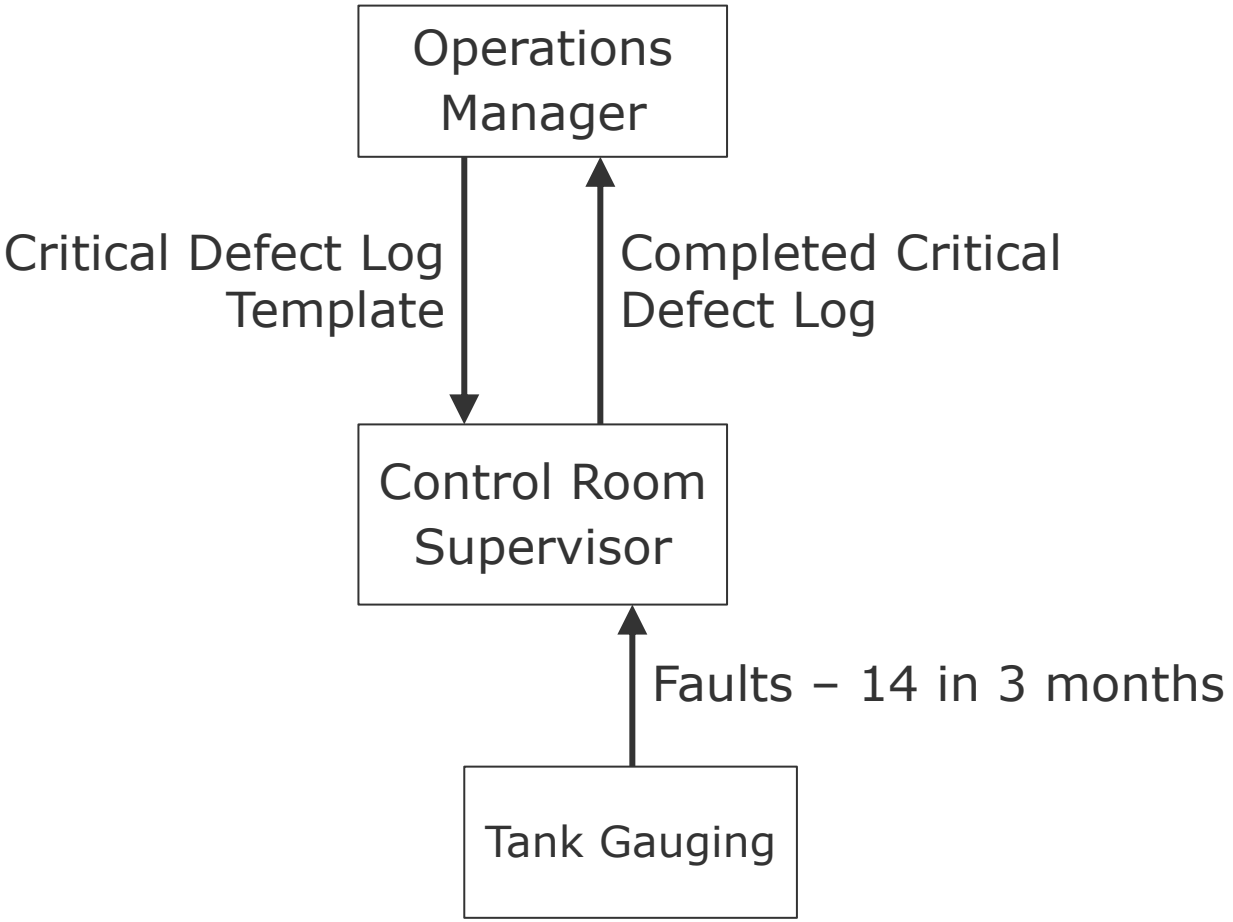
1. Supervisor – Organisational issues

2. Trip System – engineering procurement – Safety Guided Design

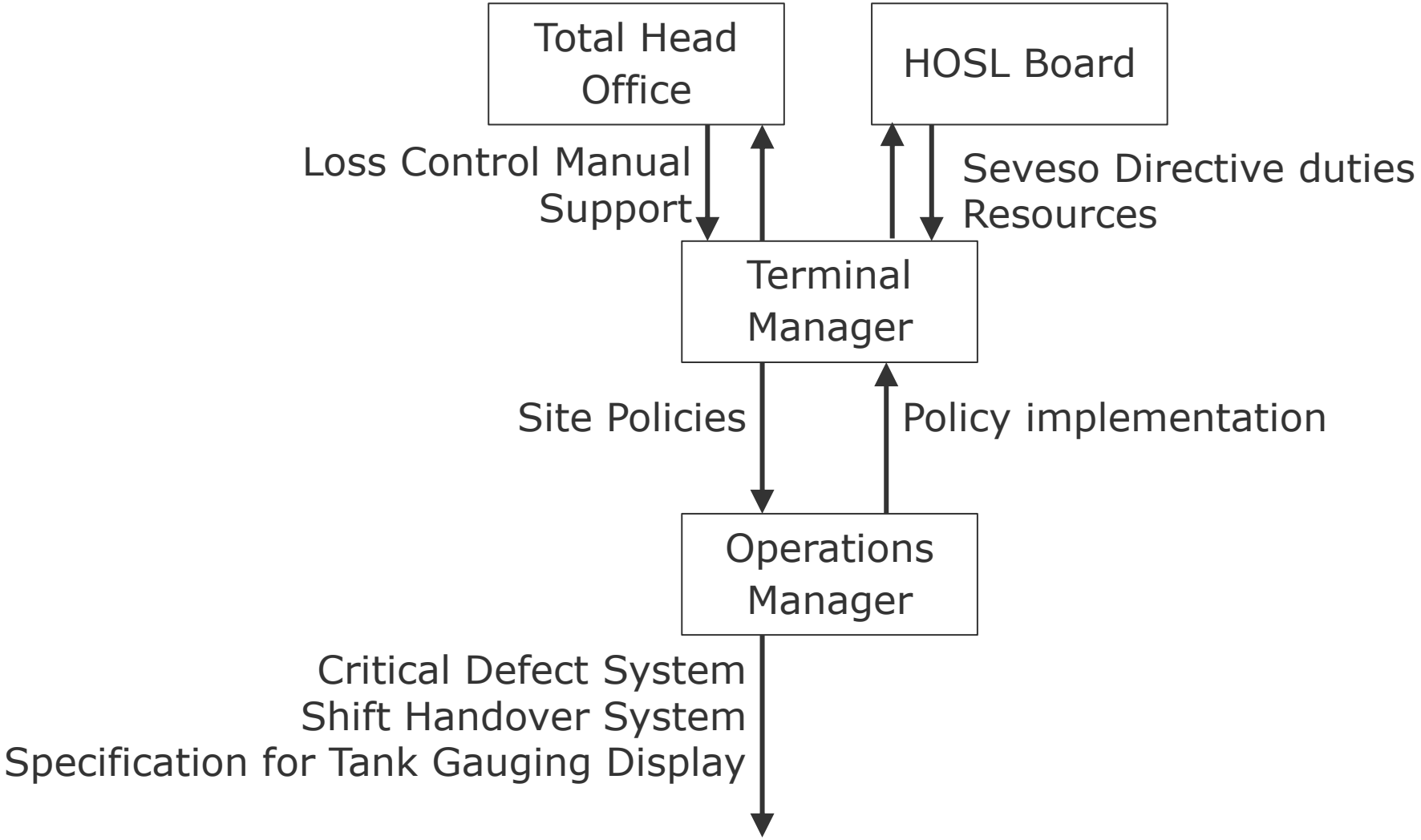
Level gauge did not work



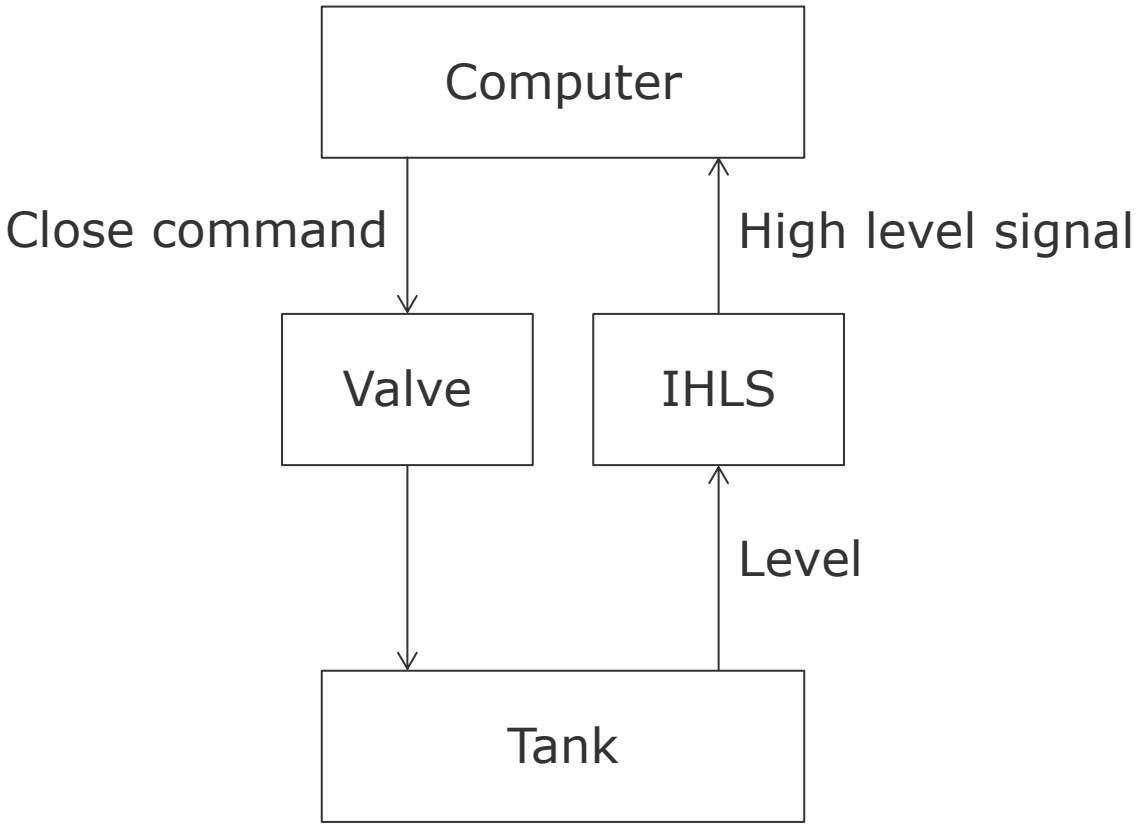
Defects not communicated



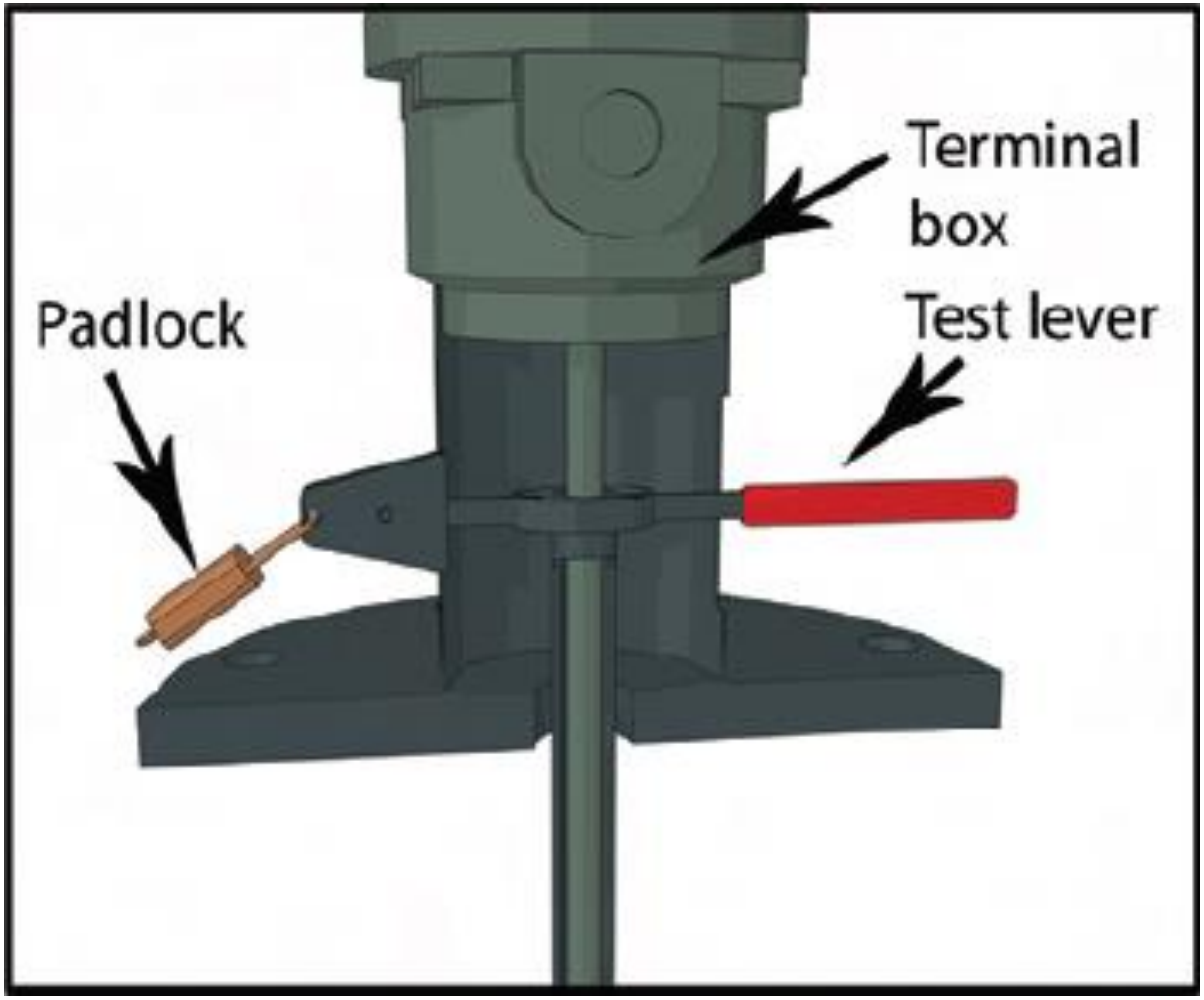
Overlapping responsibilities



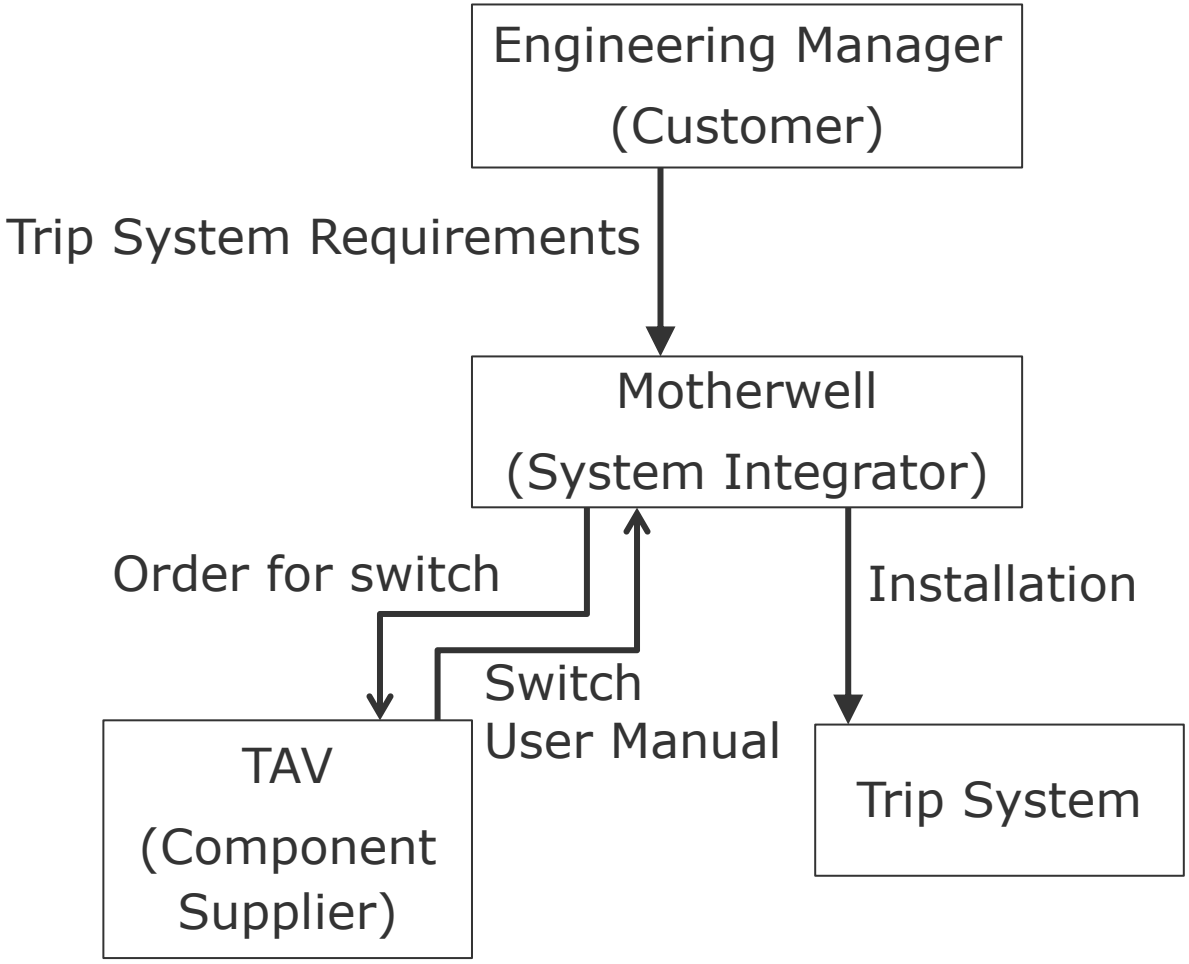
Independent High Level Switch (IHLS)



IHLS - The padlock problem



Contracted out engineering



Safety Guided Design – Intent Specification

- IHLS Requirments:

1. In the event of high tank level, provide an alarm to the supervisor and send a signal to close the valve.
2. Must be able to be tested to ensure that it functions.

- TAV's constraint on the maintenance technicians:

1. Replace the padlock on the IHLS after testing.
   Rationale: To prevent the test lever from falling or being left in the test position, which would inhibit the functioning of the trip in the event of a real high level.

- Intent Specification - common basis for communication
- Could have changed design to avoid this constraint

Conclusions

- CAST highlights organisational design flaws
- Safety Guided Design facilitates communication between, customer, integrator and component suppliers

Thank you

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