



1



2

Do we live in a linear or complex world?

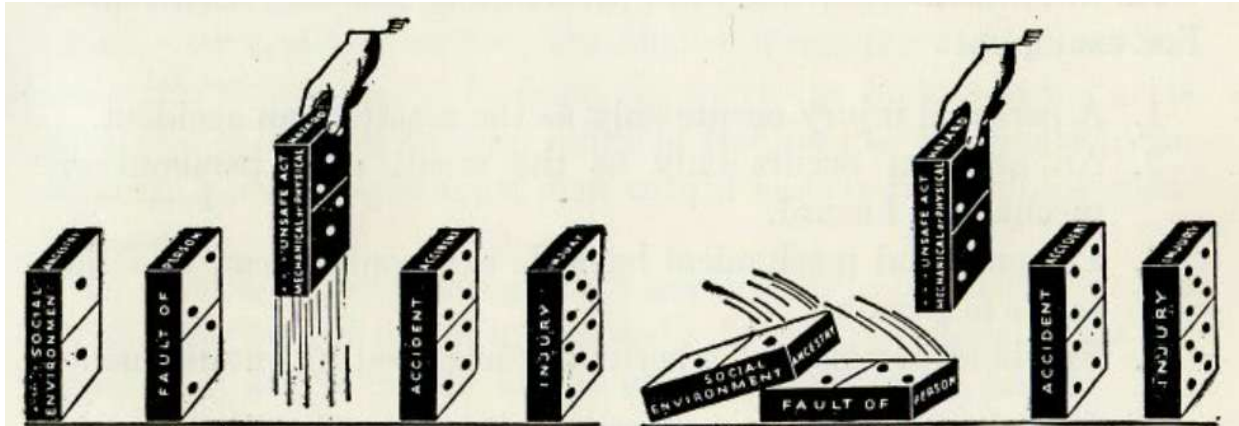
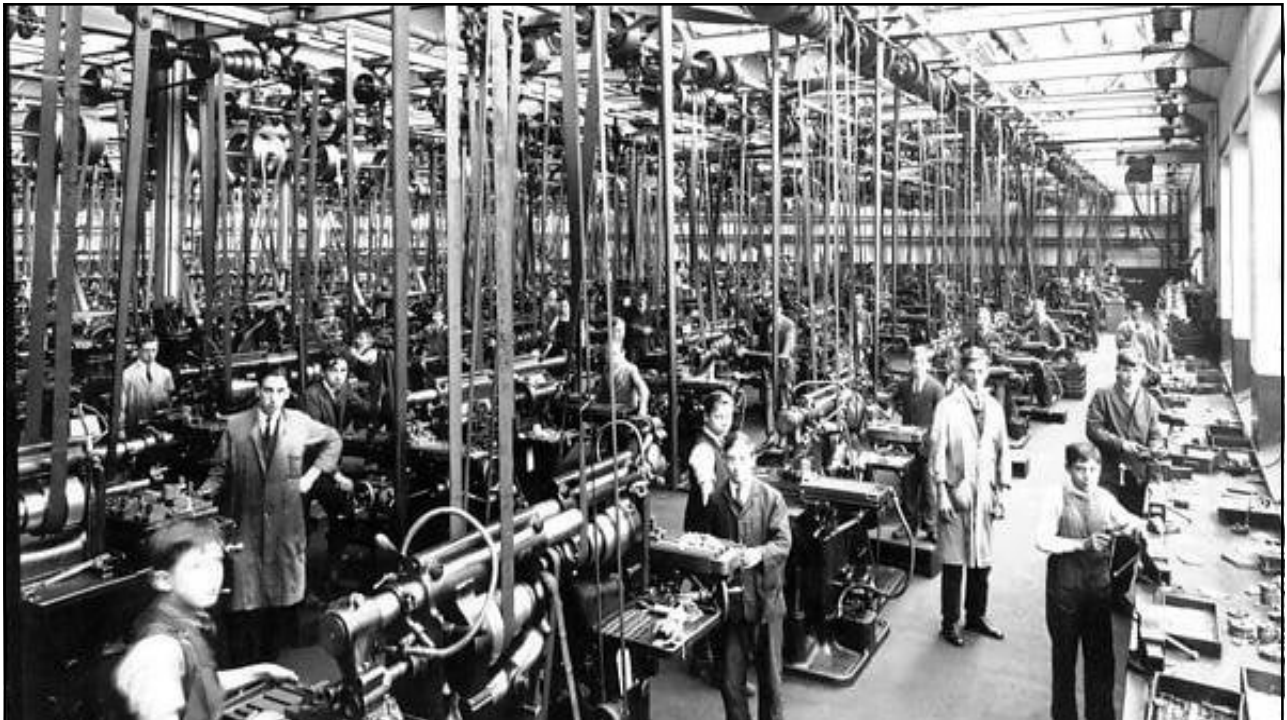


FIG. 4. The unsafe act and mechanical hazard constitute the central factor in the accident sequence.

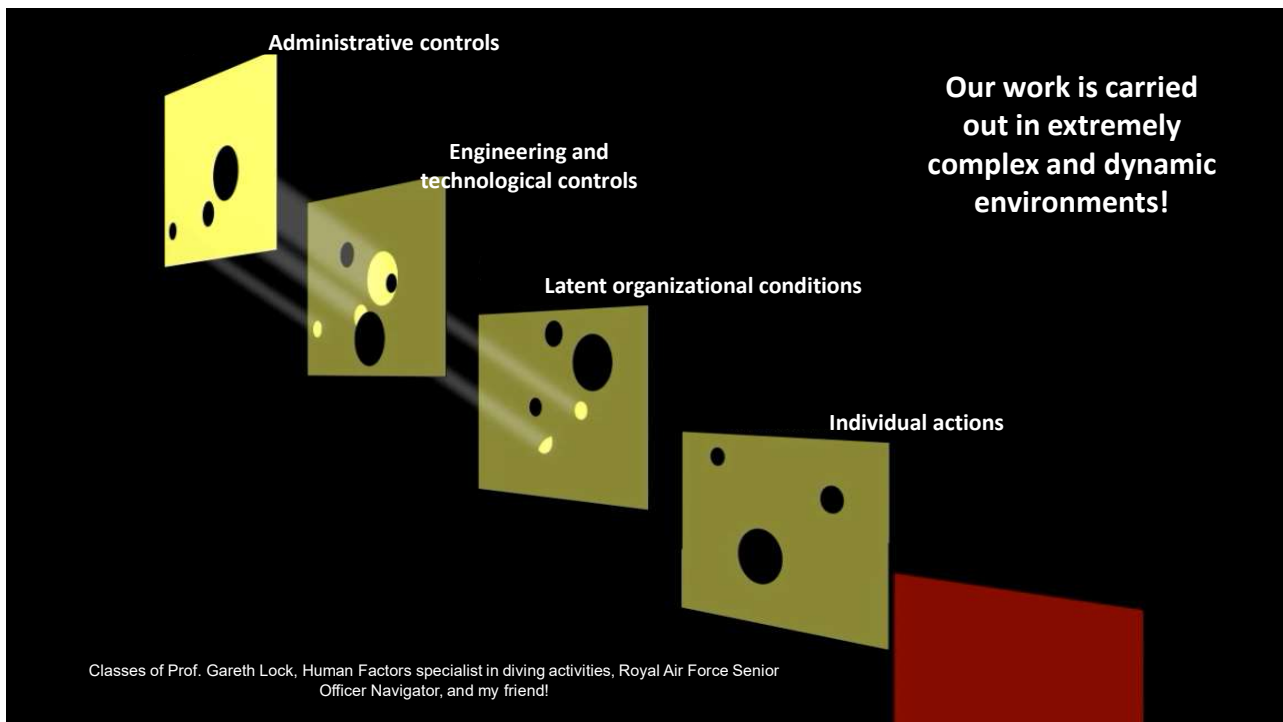
FIG. 5. The removal of the central factor makes the action of preceding factors ineffective.

Source: Heinrich, H.W. (1931) Industrial Accident Prevention: A Scientific Approach. McGraw-Hill, New York.

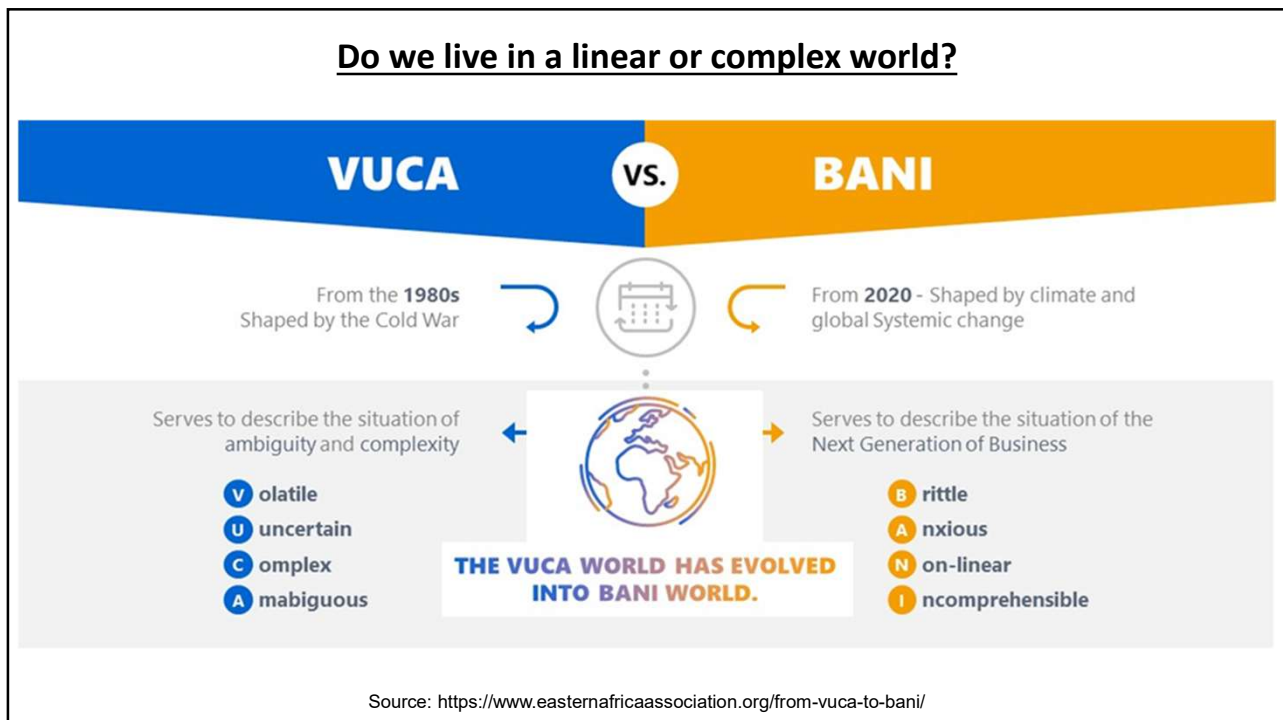
3



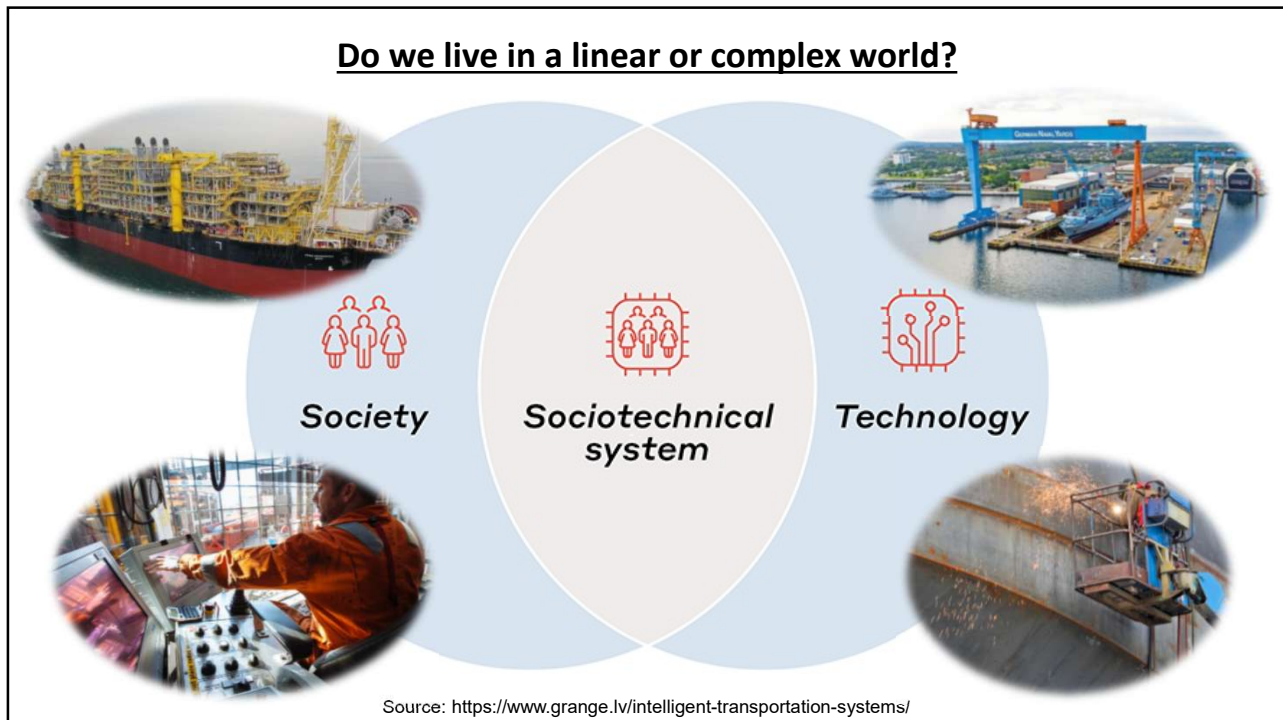
4



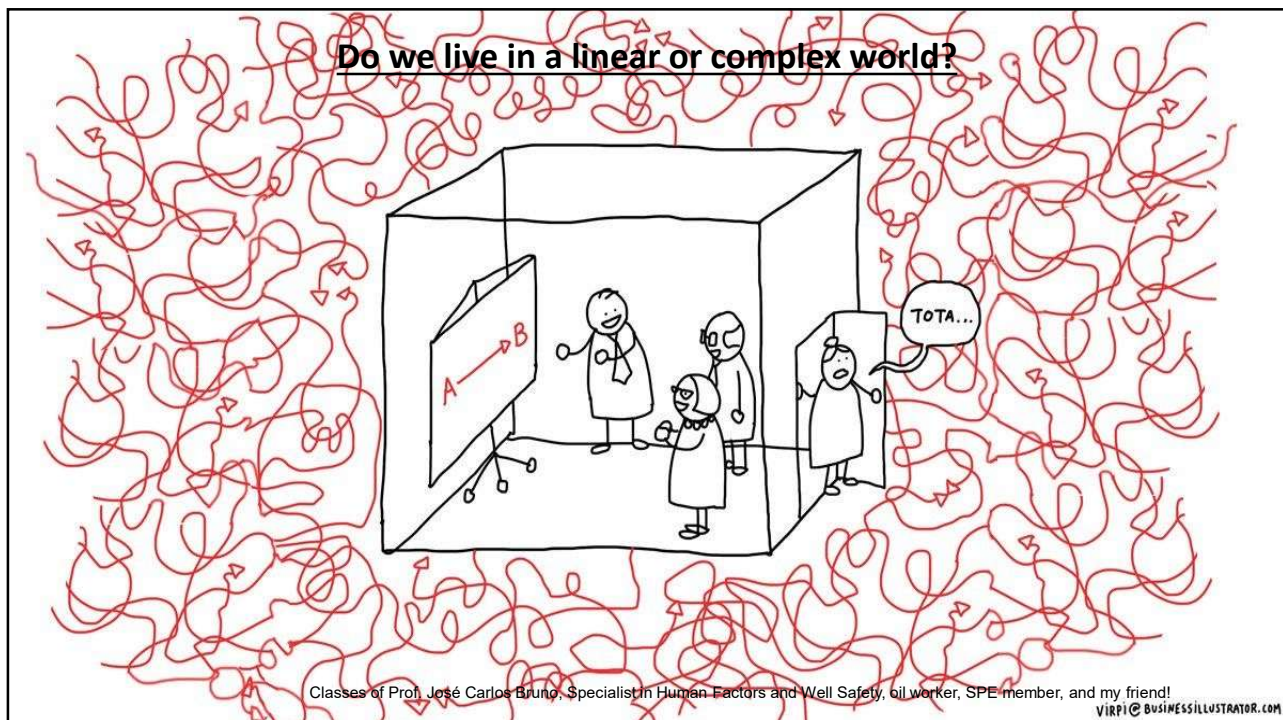
5



6



7



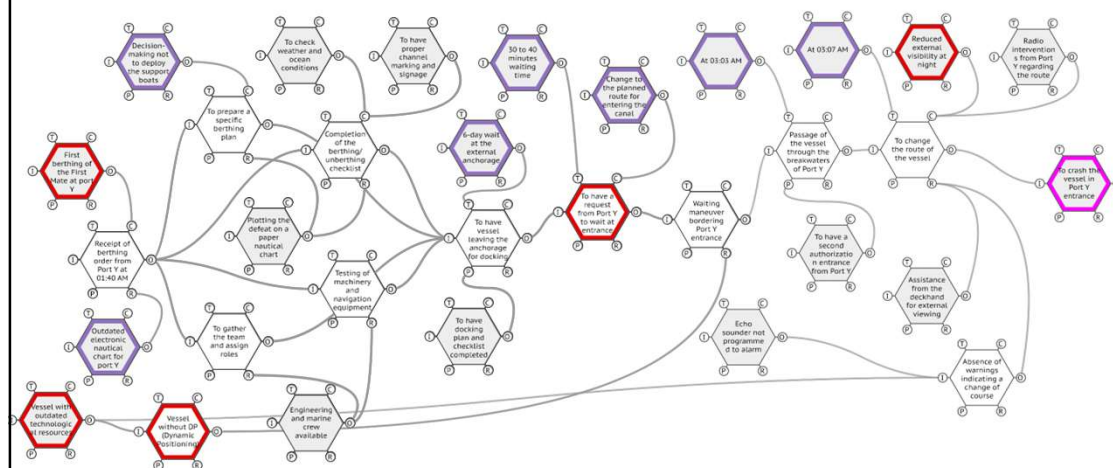
8

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



9

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



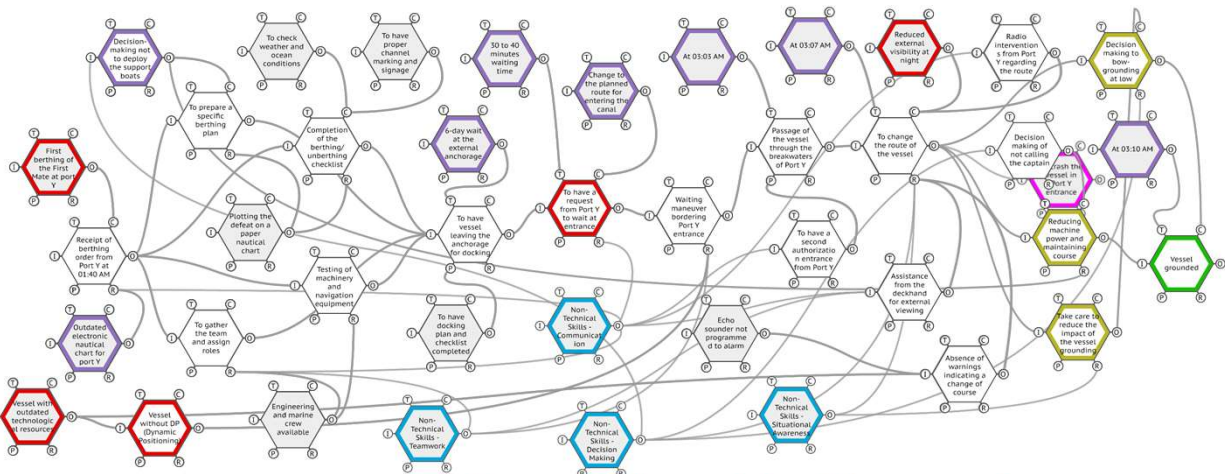
A possible accident happening...

WAI (Work-As-Imagine) – How things should happen...

How the “problems” started: a call from Port Y to wait at entrance.

10

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis

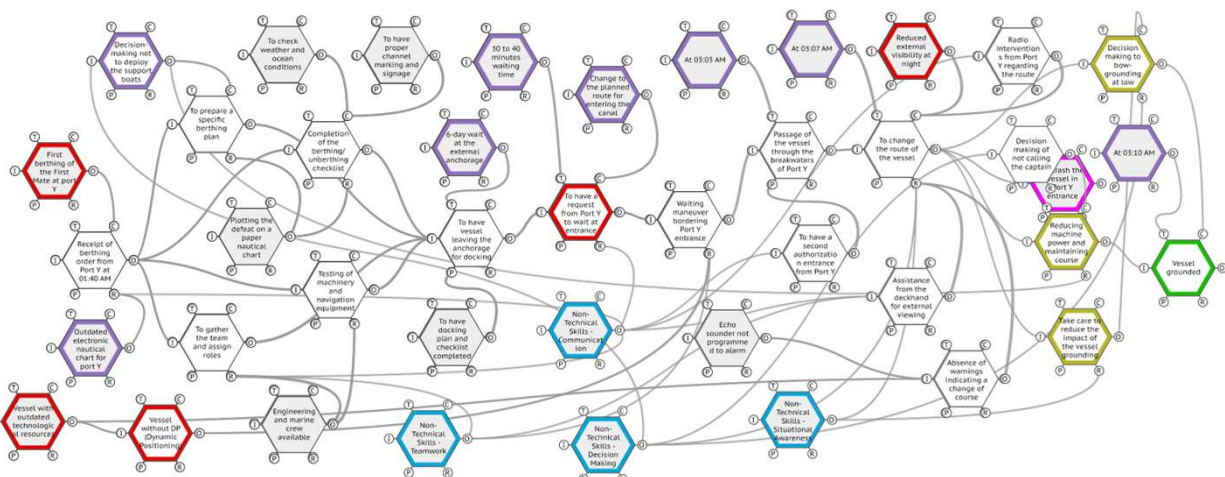


~~A possible accident happening...~~

WAF (Work-As-Fail-Safe) – People, workers, do their best to deal with conflicting goals, lack of resources, time pressure and any other emergent demand from complex workplaces!

11

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



WAI (Work-As-Imagine) – How things should happen...

WAF (Work-As-Fail-Safe) – People, workers, do their best to deal with conflicting goals, lack of resources, time pressure and any other emergent demand from complex workplaces!

WAD (Work-As-Done) – A probable accident

12

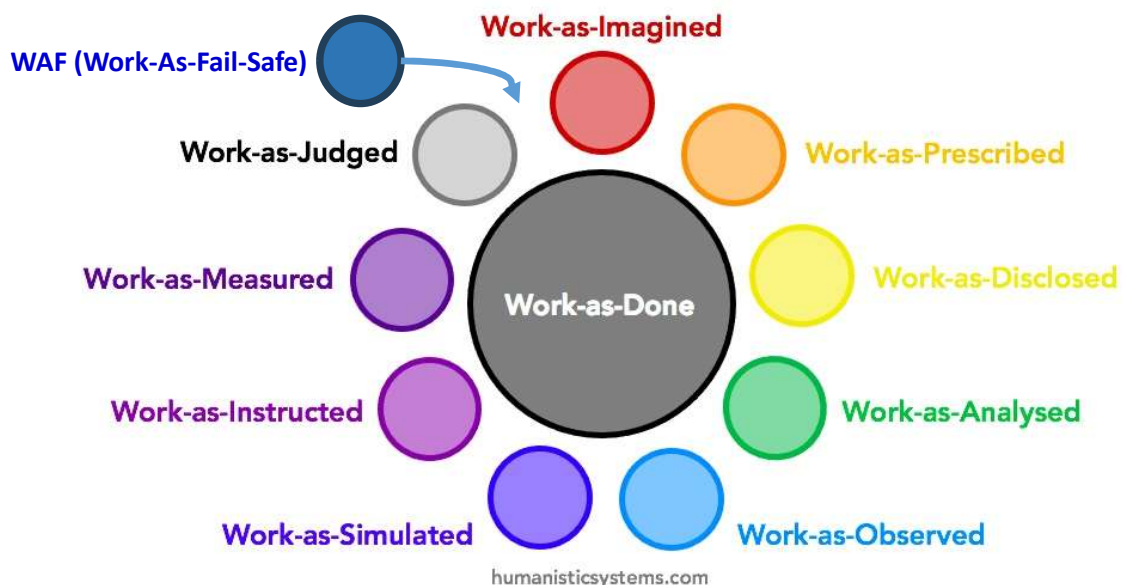
At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis

Important takeaways from this analysis:

- Initially oriented to blame the 1st officer, the accident investigations changed for a learn and improve process.
- The observable non-technical skills – communication, teamwork etc – helped to the fail-safe scenario and its recovering actions.
- The FRAM was included by the company as one of their accident investigation method, enabling an improvement in this process.
- WAF (Work-As-Fail-Safe) – People, workers, do their best to deal with conflicting goals, lack of resources, time pressure and any other emergent demand from complex workplaces!

13

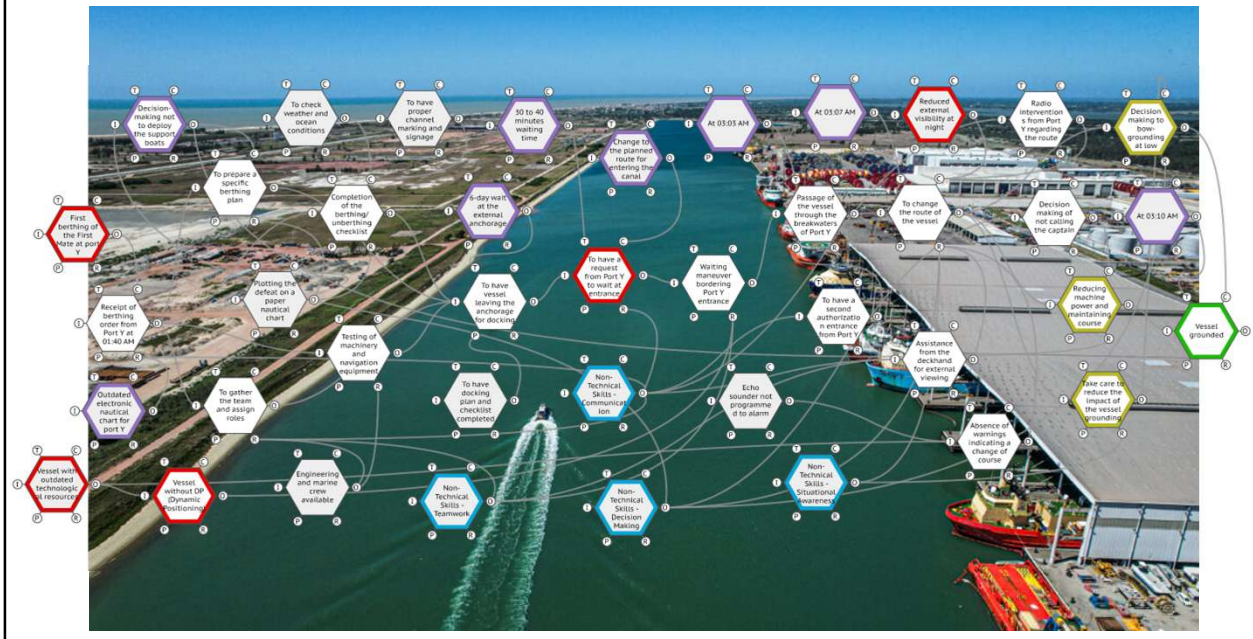
At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



Source: <https://humanisticsystems.com/2020/10/28/proxies-for-work-as-done-1-work-as-imagined/>

14

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



15

At the Edge of Control in a High-Traffic Port – A FRAM multi-analysis



People are not the problem; people are the solution!

16