Minimum Prescriptive Requirements in a Goal Setting Environment

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“If there is an answer in the back of the book, just tell me what it is! We can skip all this ALARP BS.”

“If I knew then what I know now, I would have done it differently”
Pendulum swings...

- Trial and error
- Codes and standards
- Rules and regulations
- Post Piper Alpha
  - Goal Setting
  - Business as Usual - Management System
- “Mature” Post Piper Alpha
Regional approaches

- **USA**
  - Rules based regulations (14C, 2A, etc.)
  - HAZOP and Consequence Modeling
  - Design features focus
  - Hazard based optimization
  - Primary focus on “execution and operations” safety

- **UK**
  - Rules based regulations
  - Piper Alpha
  - QRA and Safety Cases
  - Risk Goals based ($10^{-4}$ Numbers)
  - Safety Critical Elements and Performance Standards
  - Iteration and optimization
Goal Setting Approach

- Identify hazards
- Estimate consequences, likelihood, impacts...
- Identify credible controls and barriers based on the hazards
- Select and implement controls and barriers based on ALARP
- Validate overall risk managed to ALARP through QRA and TIV
- Iterative approach to “Optimize” safety features
- Potentially out of step with typical project engineering
Prescriptive approach

- Based on history
- Design features that prevent / control previous accidents
- Codes and standards focused (historically)
- Aligned with US regulations
- Potential to base on wisdom from previous learning's and assessments

“Figure out what happened to the last crew here, and tell the next crew not to do that.”
Example Areas

- Escape routes
- Fire water
- Navigation aids
- Helideck specification
- Area classification
- Lifeboats
- Ship impact criteria
- Emergency communication systems
- Life rafts
- Blast criteria
- Fire ratings
- Riser ESDV
- Fire / blast walls
- Standby vessel
- Fire and gas detection system
- Emergency shutdown system
- Emergency depressurization system
Suggested minimum requirements

- **Accommodation / (Temporary Refuge) TR**
  - Blast rating – 0.5 to 2 bar
  - Fire rating – A60, H60, H120
  - Smoke and gas ingress tightness – 0.1 to 0.5 ACH

- **Escape routes**
  - 1.2 x 2.2 meters
  - Continuous, straight perimeter routes on each deck level
  - Stairs in corners

- **Critical Primary Structure**
  - Fire rating for Critical members potentially exposed (H60 to J120)
Minimums Continued

• Emergency Shutdown System
  - Integrated fire and gas detection, ESD and Automatic Blowdown
  - Rapid blowdown – 10-15 minutes
  - Riser ESD valves on all hydrocarbon lines

• Layout
  - Hot side / cold side / physical barriers between hazards and people
  - Risers located as far as practical from people and ship movements

• Lifeboats
  - Capacity at TR + Alternate
  - Fit for sea conditions
Selection of Minimums

• Aligned with industry and company expectations
• Critically important as a group
• Simple number or specification
• Actionable by engineering contractor
• Set for type of installation (Jacket, FPSO, TLP, Refinery, Chemical Plant, etc.)
• Avoid “gold plating” & “nice to have”
Issues / Unintended Consequences

- Are these sufficient?
- Will the minimums be the new maximum?
- Inherently safe?
- Is it ALARP?
- Cost effective?
Closing

- Idea – set the goal posts
- Test – use with ongoing projects
- Learn – does it work, how to improve
- Improve – less rework, lower cost?, better safety!