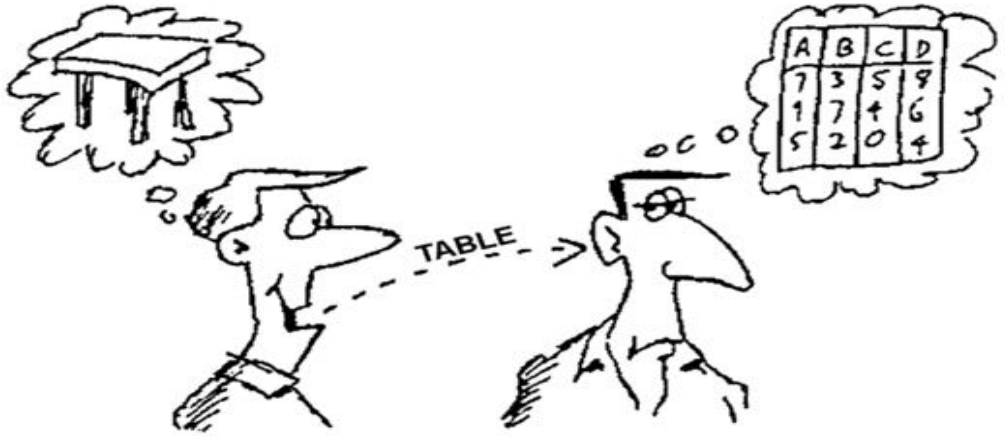
«I know you think you understand what you thought I said, but I'm not sure you realize that what you heard is not what I meant.»

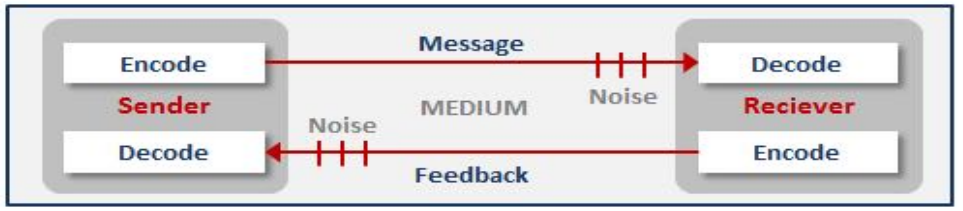
- Alan Greenspan

HSE & Quality Moment

Are we all thinking the same way?



The object of good communication, is to ensure that the "understanding" of the receiver is as close as possible to the "meaning" of the sender.



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Reducing Project Cost Growth Through Early Implementation of Interface Management

Magnus André Nilsen
Master student paper for TechnipFMC

www.incose.org/symp2018

Agenda

- HSE & Quality moment
- Introduction
- What is Interface Management?
- Background and motivation for the research
- Problem statement
- Research approach
- Results
- Conclusion
- Future research

Introduction

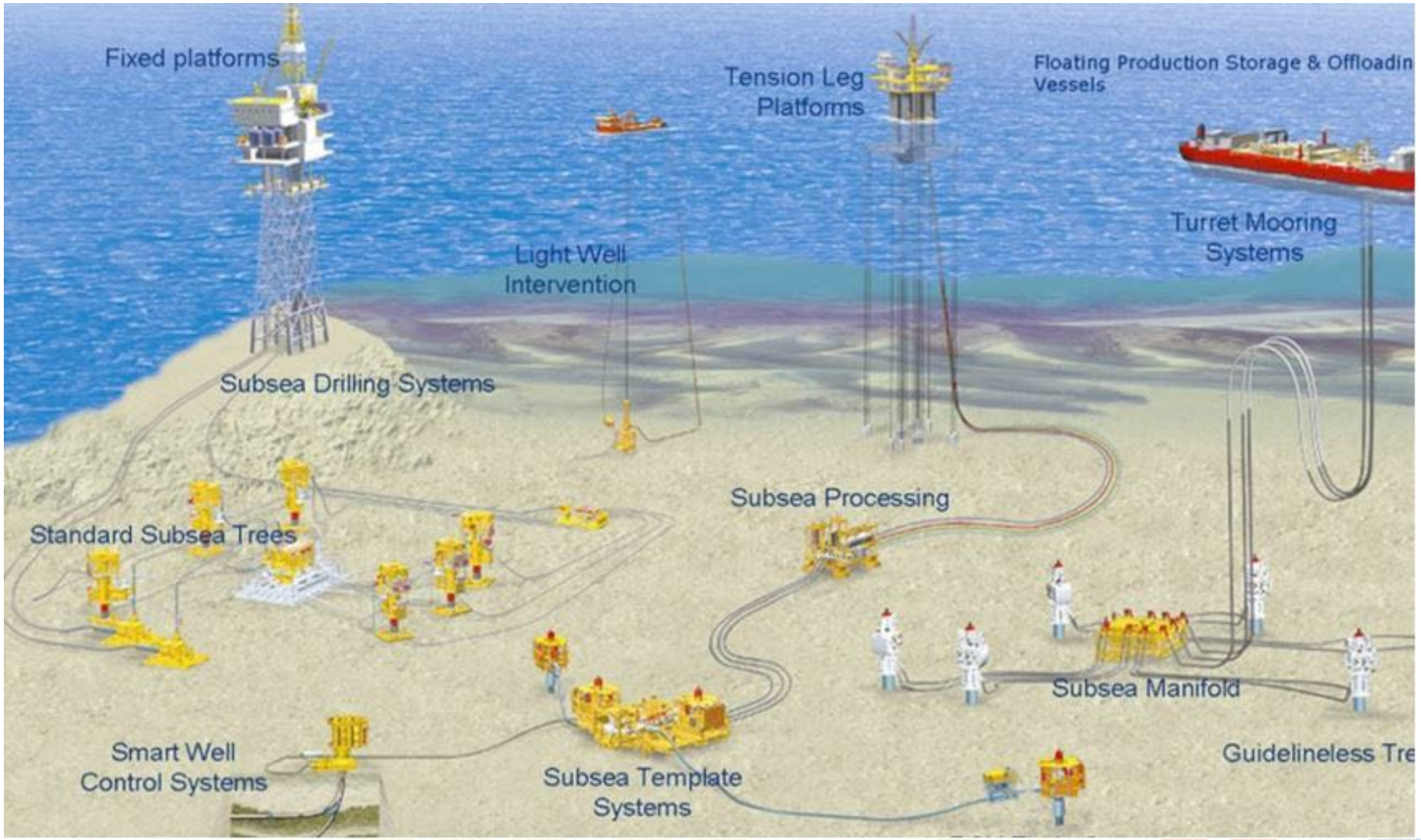
The company

- Technip + FMC Technologies = TechnipFMC
- 40.000 employees in 48 countries
- Research conducted for FMC Kongsberg Subsea AS (FKS), a legal entity of TechnipFMC

Limitations of this presentation

- Covers only the main results
- Not included:
  - Detailed numerical analysis of Interface Management activity
  - Case studies for the reference project
  - Synergies from an integrated contract for TechnipFMC

Introduction (cont.) - Typical contractor deliverables



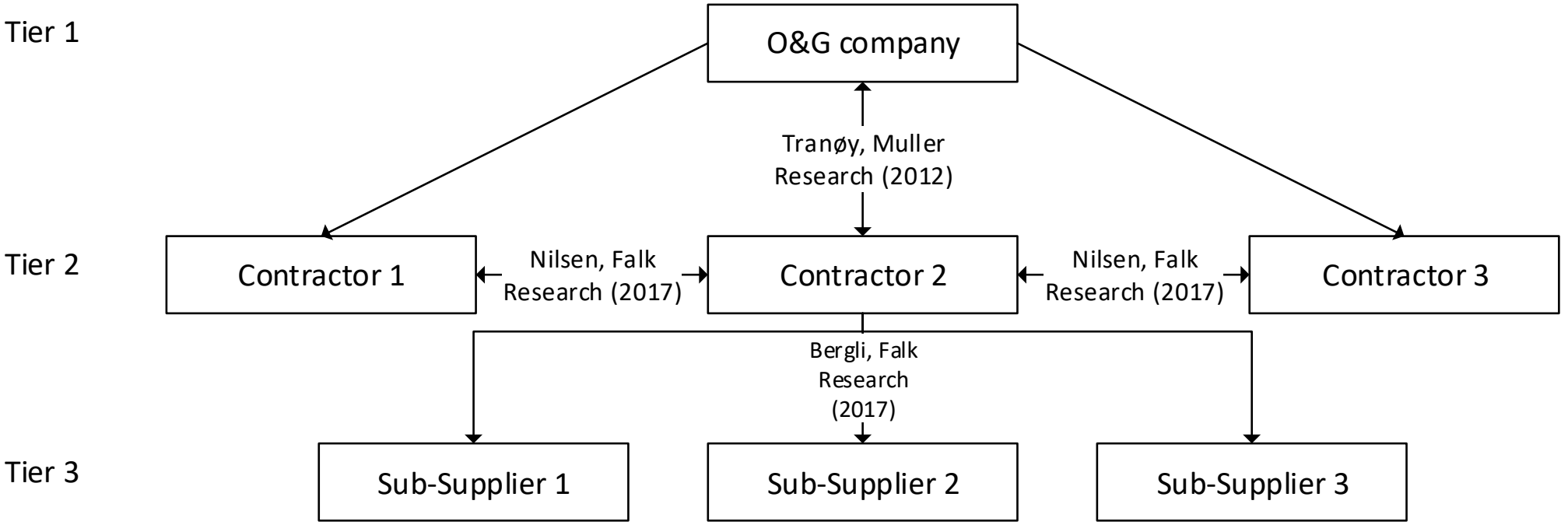
What is Interface Management (IM)?

- Multi-discipline approach involved in technical clarifications, logistics and delivery
- Definitions vary, but a general perception:
  - The processes of identifying, monitoring and follow-up of clarifications between contractors to ensure a well integrated subsea production field
- An interface is a specific query requiring a comprehensible response to ensure mutual understanding
- As part of System Engineering, FKS has its own IM department with professionals

Background

- Construction Industry Institute, Austin, TX
  - Formal IM vs Informal IM → 4% vs 18% cost growth
- System Engineering and scope split from customers
  - Fierce competition in the market
  - What impact on project execution?

Domains for recent research



Problem Statement

- How much cost growth experienced by the clients related to the SPS delivery is due to insufficient Interface Management activity between contractors and contractual gaps between SPS and other contractors?
- Identify possible reasons for these changes and determine how to avoid them.

Systematic approach

Semi-structured interviews

- Eight interviewees
  - Technical, Planning, Logistics, Commercial
- Topics of interest on IM and project execution
  - Specifically FKS' relationship towards other contractors/3rd parties
- Chosen findings to progress with:
  - High-level correlation IM activity vs VORs
  - In-depth study of VORs in a reference project

Quantitative analysis

Interface Databases

- For seven EPC projects
- Unique data extraction
  - Report on number of interfaces and related activities required to solve them

VOR registers

- Variation Order Requests
  - Total number of contractual changes to the FKS contract

Correlation IM activity vs VORs

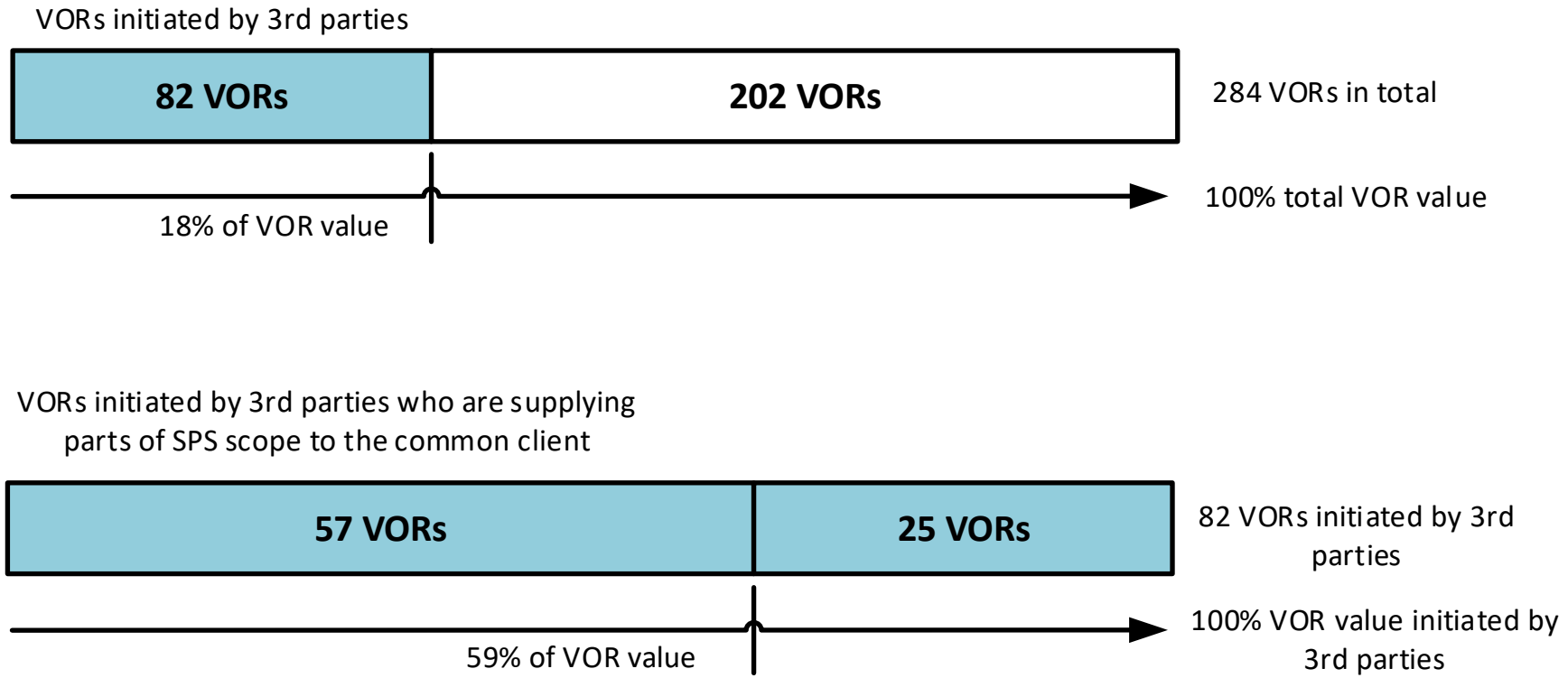
Project ID	No of IM activities	No of VOR	Average
A	7008	179	40 acts/VOR
B	8164	105	78 acts/VOR
C	7061	156	45 acts/VOR
D	2016	50	40 acts/VOR
E	11910	284	42 acts/VOR
F	5161	20	258 acts/VOR
G	2474	101	25 acts/VOR

Reference project

Project E

- Capital project
- Highest number of interface partners/3rd parties yet →17!
- 284 VORs which equals 12% of FKS' initial contract value
- In-depth study of all 284 VORs → initiative allocated to client or 3rd party

Source of cost growth on FKS' contract



Discussion

Management of Change (MOC)

- SPS and Topside first to get contract award
- Other contractors follow 6-12 months later, SPS already at design freeze
- Unclear when the MOC process starts
  - Could IM have solved the problem?

Scope split

- Increases no. of stakeholders
- Increases complexity

Who has the system responsibility?

Conclusion

- Project cost growth still impacts the O&G companies investments
- Early involvement of contractors and Interface Management could help avoid 29% of formal changes and reduce project cost growth by 18% for the client

Future Research

- Conduct research on the effects of early involvement of contractors and the implementation of Interface Management
- O&G industry should establish correlation between Interface Management and project cost growth

- Vision: “Establishing a common robust Interface Management practice”

Benefits outside O&G industry

- Principles of MOC and IM applicable elsewhere
  - E.g. construction and aircraft industries
- Tools and approach described herein
  - Many companies uses similar tools, possible to adapt this research
- Potential to identify cost and schedule drivers
  - Prompts cost savings initiatives
  - Less disrupting activities → reduces risk of schedule delays

Thank you for your attention!

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