



Bridging the Technical Safety Risk Gap from Aerospace to Oil & Gas

Tim Thornton

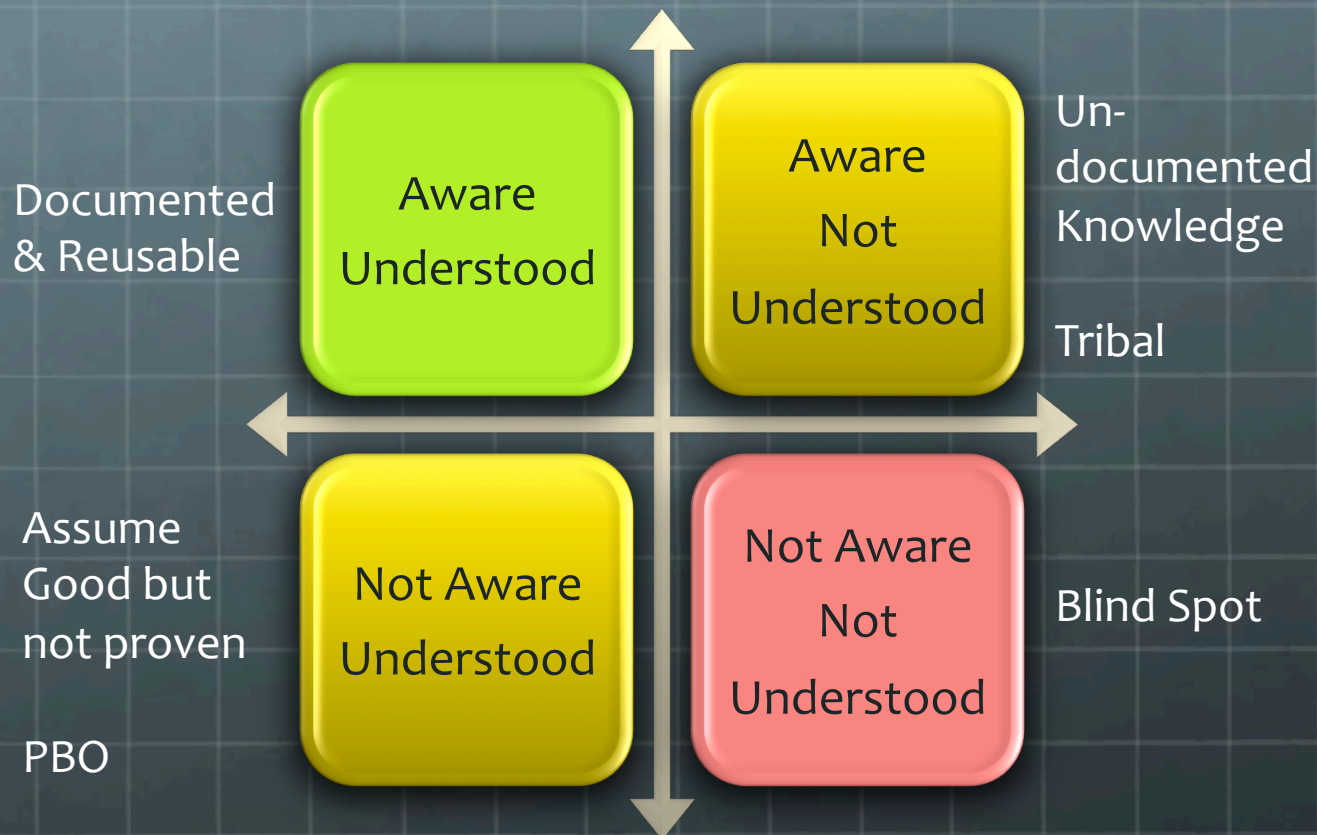
Agenda

- 🌐 Technical Safety Risk (different viewpoints)
- 🌐 Invest in determining “unknowns”
- 🌐 What you don’t know
- 🌐 System Level Risk Management
- 🌐 The Cost
- 🌐 What investment

Technical Safety Risk

- 🌐 Different viewpoints
- 🌐 Aerospace: Think of all possible 'outside of the envelope' scenarios and mitigate them. (exceed AS9100)
 - 🌐 Primary: Safety & Mission Success
 - 🌐 Evidence of thorough risk documentation (FMECA beyond design)
- 🌐 O&G: Test within 'the envelope' and declare it safe. (meet API)
 - 🌐 Primary: Cost & Schedule (Delivery)
 - 🌐 Missing elements: FMECA beyond design

Invest in Determining “Unknowns” of Risk



"There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know." - Donald Rumsfeld

What you don't know can result in failure



Invest in System-Level Risk Management

Management

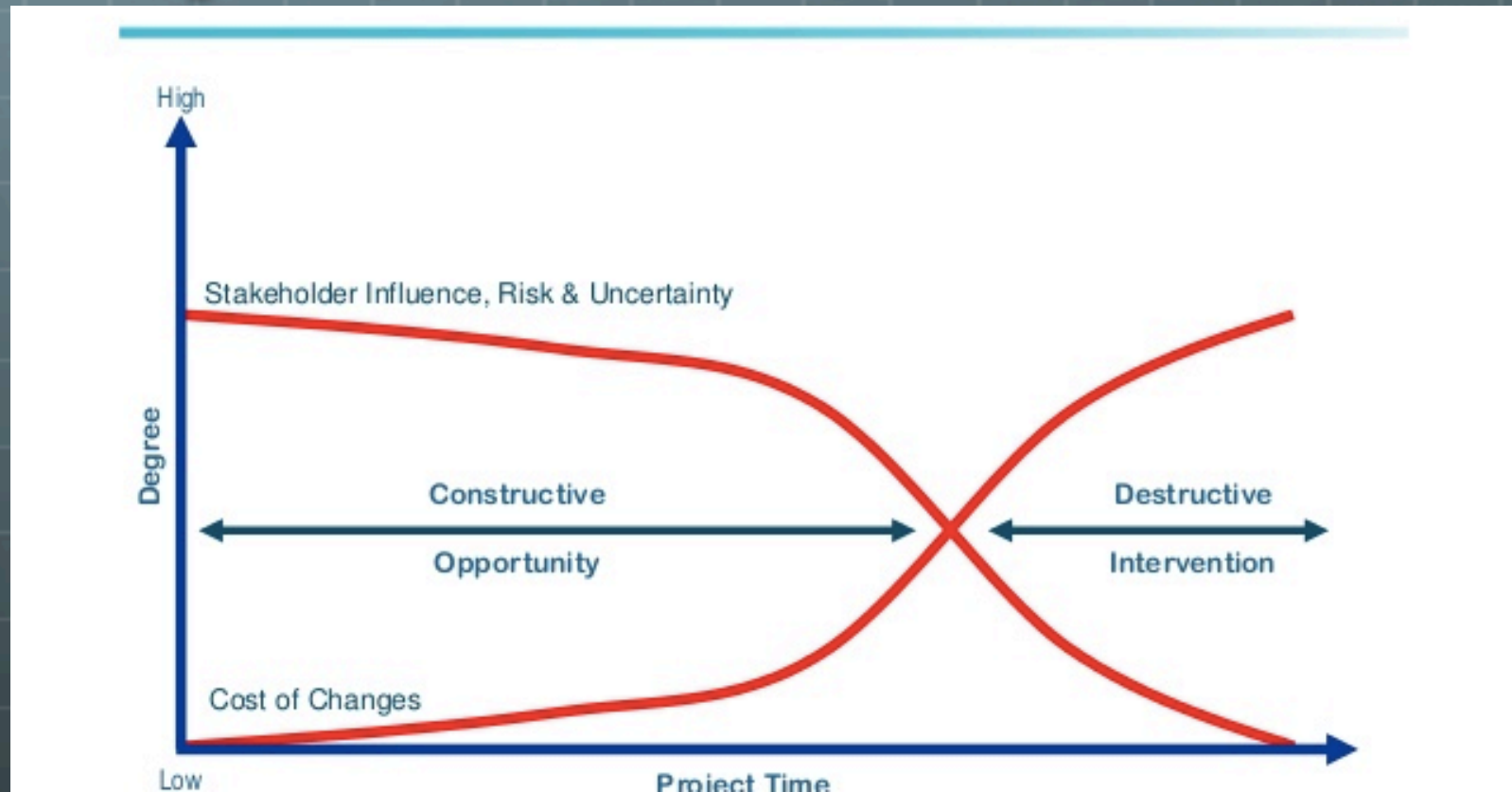
Permafrost

Risk Management



Pyramid

Pay me now, or Pay me much more later



Bridge the Gap

Prevention Methods

- FMECA, Hazard Reports (beyond design)
- Early, Continuous Update

Risk Reviews

- Who owns the risks? Is there ownership transfer?
- Require regular discussion / rollup
- What's not on fire? Opportunities?

Discipline & Vigilance

- Understand Weaknesses, Residual Risks, Vulnerabilities
- Insight into the unknown
- Learn lessons (not just collect) <- Raise the Bar

Thank You

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