Exploring the link between complexity and risk

Jay Armstrong – Principal Consultant, Logikal
The Construction View
Outline

- How does complexity impact the construction industry?
- What are the conditions of complexity that affect the construction industry?
- How do these challenge traditional risk mitigation techniques?
- How can we improve the way we operate going forward?
- Questions & Discussion
How does complexity impact construction?

“I think the enormity and complexity of Crossrail in all manners: the stations; the trains; the signaling systems; the software integration; the control systems; the interface with Network Rail; the truth is that the complexity was not fully understood,”

Mark Wild
Crossrail Chief Executive

New Civil Engineer – February 2019 edition
How does complexity impact construction?

- 1 to 3 years delay
- KPMG estimates cost increase of £1.6 billion to £2 billion
- Industry reputation and political damage
  - Tier 1 contractors
  - TFL
  - Network Rail
  - Mayor of London
How does complexity impact construction?

- Complexity compounds the likelihood and impact of risk
  - Increased interfaces often not appreciated
  - Scope and integration requirements often not well understood
How does complexity impact construction?

- Increases the likelihood of change over the lifecycle of the project
  - Increased programme risk
  - Increased commercial and cost risk

- Project benefits may be watered down or impacted
  - cost engineering exercises reducing value/benefits

- Future investments may be delayed
What are the conditions of complexity that affect the construction industry?

- Construction projects inherently assume a lot of risk
  - Often multidisciplinary
  - Lots of moving parts
  - Increasingly not just ‘construction’
    - Consents, Technology, Environment, Design, Third Party Assets etc
    - No longer just ‘digging holes and filling them with concrete’
What are the conditions of complexity that affect the construction industry?

- The ‘unknown unknowns’
  - Very good at modelling and quantifying above the waterline
What are the conditions of complexity that affect the construction industry?

- Interfaces of project delivery
What are the conditions of complexity that affect the construction industry?

- Logistics of project delivery
What are the conditions of complexity that affect the construction industry?

- **The way we deliver projects themselves**
  - Joint Ventures (JV) delivery structures,
  - Public Private Partnerships,
  - Matrix based organisation structures
  - Many traditional contract delivery models encourage a confrontational client vs contractor approach
  - Discourages integrated teams despite best intentions of parties involved
What are the conditions of complexity that affect the construction industry?

- Underlying challenges in productivity, profitability, performance, labour and sustainability

- Skilled labour shortages – increasing complexity coupled with reduced experience is a risk multiplier

- Small / shrinking margins and a tendency towards ‘short term-ism’ limits ability (and appetite) to invest in critical technology
A number of the traditional risk mitigation techniques actually increase complexity:

- JV’s are designed to reduce or transfer project risk exposure

- JV’s also have:
  - More stakeholders
  - Complicated project structures
  - Politics and differing company cultures
  - Confusion due to unclear reporting lines
  - Multiplies administration requirements
  - Poor accountability as often difficult to ascertain where responsibility sits

- JV’s increase complexity and therefore delivery/managerial risk
How do these challenge traditional risk mitigation techniques?

- Transference of risk down the supply chain is somewhat misleading
  - Ultimately everyone loses (client included!) if costs blow out or delivery is delayed

- Sheer volume of interface risks

- Difficult to identify, manage, quantify and model effectively
How can we improve the way we operate going forward?

- Recognize as an industry that a number of the traditional risk mitigation techniques actually increase complexity
  - Be willing to review and adapt practices

- Properly assess risk avoidance strategies that transfer risk down the supply chain
  - Are we just delaying / avoiding the issue by making it someone else's problem?
  - Is it really a ‘best for project approach?’
  - Are delivery / contract structures aligned with desired behaviours
How can we improve the way we operate going forward?

- **Contract delivery structures that incentivize all parties**
  - All share in final project finalization and benefits
  - Encourage more collaboration using the contract itself
  - Reduces contract risk exposure

- **Need to change the embedded industry culture**
  - Business and delivery models often based on more traditional construction risks
  - Highly competitive, low margins (typically 2-5%)
  - Bid low to win the work and use change to deliver margins
  - Ignores contract risk

6/02/2019

LogiKal
How can we improve the way we operate going forward?

- Construction companies must join the digital future in order to stay ahead of the competition or they risk being left behind or overtaken by competitors.

- Encourage or incentivize construction companies to adapt
  - UK Government Sector Deal
  - BIM legislative framework

- Learn from other Industries
  - These challenges are not unique to the construction sector.
Questions & Discussion