Lessons in risk governance for the pipeline sector from past procurement failures

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Outline

- Procurement failures in the public and private sectors
- The Risk Governance in Procurement for Future Fuels project
- Procurement risks and associated failures
- Grenfell Tower fire (2017)
- Boeing 737 Max failure (2018-2019)
- Buncefield Tank Farm fire (2005)
- Procurement lessons to be learned

Public and private sector procurement failures

Building sector incidents


Grenfell Tower, London, 2017**


Lacrosse Apartment, Melbourne, 2014*


Opal Tower, Sydney, 2018***

Image source: *https://www.theguardian.com/australia-news/2017/jun/17/former-fire-chief-says-melbournes-lacrosse-tower-still-poses-risk
**https://www.smh.com.au/world/london-fire-grenfell-tower-may-have-been-renovated-with-deadly-cladding-20170614-gwr9qf.html
*** https://www.news.com.au/finance/business/blame-game-over-crumbling-building-begins-as-experts-claim-its-part-of-a-much-wider-problem/news-story/5df0832490ec2d1d3401d6756ecd95bf

Public and private sector procurement failures

NSW public transport failures

Image source: *https://www.news.com.au/technology/innovation/nsws-2-billion-new-trains-are-too-wide-to-get-through-tunnels/news-story/47bd2ee36f43cd3cdd2819078feb6011
**https://www.abc.net.au/news/2021-11-14/sydney-transport-woes-despite-billions-spent-of-infrastructure/100618634
***https://www.abc.net.au/news/2018-09-13/government-told-in-2012-light-rail-project-would-waste-money/10214988

The project: Risk Governance in Procurement for Future Fuels

Research questions

- Why have recent significant procurement failures in the gas industry and elsewhere occurred? What can be learned from them?
- What are the risks associated with the procurement process in the gas industry and what risk governance practices can be used to prevent the recurrence of procurement failures in the context of future fuels?
- What does a robust procurement risk governance framework look like in a future fuels environment?

Risk Governance in Procurement for Future Fuels

Research methodology

The project entails four main stages:

- Literature review
- Study current procurement practices
- Develop a risk governance framework
- Develop risk mitigation recommendations

Risk Governance in Procurement for Future Fuels

Key procurement risk sources in the supply chain identified from the literature:

- Supply Chain Coordination and Management
- Suppliers
- External Environment
- Trust and Cooperation

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Supply chain coordination and management risks

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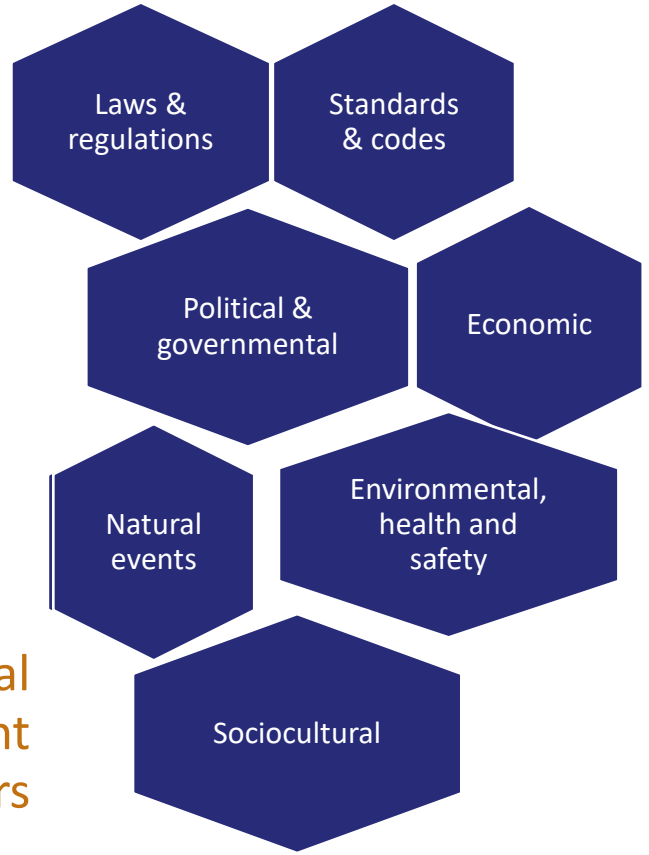
External environment factors



Risk Governance in Procurement for Future Fuels

Major procurement failures

	Incident	Sector	Main issue
1	Lacrosse apartment fire (2014)	Building	Non-compliant material
2	Grenfell tower fire (2017)	Building	Non-compliant material
3	Hyatt Regency walkway collapse (1981)	Building	Design change management failure
4	Opal Tower cracking (2018)	Building	Design and construction compliance failure
5	Channel Tunnel (1985-1994)	Infrastructure	Poor planning
6	Demolition of the Royal Canberra Hospital (1997)	Infrastructure	Incompetent contractors / QA failure
7	I-90 Tunnel ceiling collapse (2007)	Infrastructure	Specification failure/Non-compliant product
8	Berlin-Brandenburg Airport project delays (2011-2020)	Infrastructure	Poor planning/Interface management failure
9	NSW public transport failures	Infrastructure	Specification failure
10	The CBD and South East Light Rail project in Sydney	Infrastructure	Poor planning
11	Loss of Space Shuttle Challenger (1986)	Aerospace	Operation beyond design limitations
12	Boeing 737 Max failure (2018-2019)	Aviation	Design flaw
13	The Myki ticketing system failure (2005-2014)	ICT-based transport	Poor planning
14	HMAS Westralia ship fire (1998)	Maritime	Non-conforming products
15	South Korean nuclear reactor shutdown (2013)	Energy generation	Fraudulent certificates
16	Xcel Energy Company Hydroelectric Tunnel Fire (2007)	Energy generation	Insufficient contractor selection and oversight
17	Explosion at Shell in Moerdijk (2014)	Chemical process industry	Unsuitable product
18	Donaldson Fireworks Disassembly Explosion and Fire (2011)	Chemical process industry	Insufficient contractor selection and oversight
19	Buncefield explosion and fire (2005)	Oil industry	Flawed change management

Grenfell Tower fire (2017)

Image source: https://www.bbc.com/news/uk-40301289

Non-compliant building material

- Replace the cladding with cheaper aluminium panels containing a combustible polyethylene core.
- Failure of testing, certification and inspection of the cladding.

Grenfell Tower fire (2017): Procurement lessons

- The contractor was selected purely based on price. The consideration of cost should be balanced with quality and safety requirements and the contractor's technical competency.
- The supplier demonstrated unethical behaviour by manipulating tests and providing misleading information about the performance of building products. Purchasers need to have internal testing and auditing mechanisms in place to verify the information provided by suppliers. Industry and regulatory bodies should set a clear code of conduct for suppliers.
- The privatized material/product testing and certification lack independence and transparency. The testing and certifying process need to be undertaken by an independent third-party to avoid conflict of interest and provide reliable product or material information.
- The surveyor approved the use of non-compliant cladding panels, suggesting the enforcement is inadequate and ineffective. Auditing mechanisms should be in place to review and monitor the performance of regulation officers and enhance their professional accountability.
- The ineffective enforcement was partially attributed to the building surveyor's lack of competency. Regulation officers need to be equipped with adequate skills and clear about their roles and responsibilities.

Boeing 737 Max failure (2018-2019)

Image source: https://www.bbc.com/news/business-47548083

Design flaw

- Boeing failed to supply a fit for purpose product.
- QA/QC requirements for the new aircraft were fatally flawed.
- Boeing concealed material information on the airplane operation from the FAA.
- Lack of independent oversight.

Boeing 737 Max failure: Procurement lessons

- Boeing cut corners in complying with their own safety systems due to schedule and cost pressures. The potential for cutting corners to recoup costs by the successful supplier should be identified, assessed, and mitigated where possible, likely by additional inspection/audit activities.
- The supply chain configuration separated Boeing's activities from the actual airline operating pilots and their needs. Pilot training provided by Boeing failed to address key safety issues. Having operational personnel embedded in the design office would likely uncover this type of issue.
- Operational input to the aircraft design was provided by Boeing technical pilots whose loyalty was to Boeing rather than the airlines. They were actively involved in hiding design problems from the FAA. This emphasizes the importance of having operational input from those who will actually be operating new facilities.
- QA/QC were not effectively provided through the regulatory system. FAA certification activities were significantly undertaken by individuals working in-house at Boeing, so they lacked any independence or power when problems arose. Arrangements with third-party certifiers must be structured to ensure no conflict of interest either individually or organizationally.

Buncefield Tank Farm fire (2005)

Image source: https://www.theguardian.com/uk/2010/jun/18/buncefield-fire-oil-company-guilty

Flawed change management

- Poor design of the key safety device.
- Lack of communication along the supply chain (failing to obtain necessary data from the manufacturer).
- Failure to provide sufficient oversight of the ordering, installation and testing procedures.

Buncefield Tank Farm fire: Procurement lessons

- Contractual terms and conditions: Only informal arrangements were in place for providing safety-critical equipment. No clear vendor data was supplied for the safety-critical items. Formal arrangements must be in place where safety-critical equipment is to be provided to ensure that requirements and responsibilities are clear. Vendor data on key items is critical.
- The replacement high-level switch was designed differently to the one it was replacing and yet the safety impact of the differences was not assessed. Effective ‘management of change’ is important when procuring replacement items.
- No explicit specification was provided regarding the new high-level system. Clear specifications for safety-critical equipment must be mandatory

Lessons from failure cases by risk category

Risk category	Risk source	Occurrence in cases		Proportion of risk sources	
Supply chain coordination and management	Supplier selection Interface management Scope and baseline specification QA/QC Experience and expertise	11/19	58%	54/73	74%
Supplier	Supplier behaviour Supplier performance	5/19	26%	5/73	7%
External environment	Legislation	5/19	26%	5/73	7%
Trust and cooperation	Trust and cultural issues	9/19	47%	9/73	12%

Conclusions: Top five lessons for risk governance

- Ensure that a selected contractor or supplier has the technical capability to do the work

Prequalifying suppliers who are competent. Extra inspection/supervision is required.

- Clearly define responsibilities and supervision

Linked to this is the need for a high-level of project team experience and effective oversight.

- Value QA/QC and make it independent

Procurement goes wrong when the work of suppliers and contractors is not independently checked or inspected. Problems identified must also be taken seriously in the short term because making changes is usually more difficult as time goes on.

- Embed operational requirements into procurement decision-making

Procurement failures occur when operational requirements are not adequately considered in procurement decisions. This can be avoided by the preparation of specifications to ensure the right operational inputs and outputs are included.

- Establish common organizational goals

For complex projects, ‘partnering’ style contracts are preferred to align goals and share risk and reward.

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Thank you for your attention.