

An aerial photograph of a river winding through a forested landscape. The river is a vibrant blue-green color, contrasting with the surrounding green and brown trees. The terrain appears to be a mix of dense forest and open areas. The image is used as a background for the title slide.

The Case for Systems Engineering Investment in Early Stages of Australian Rail Projects

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SHOALTM

Introduction



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Agenda

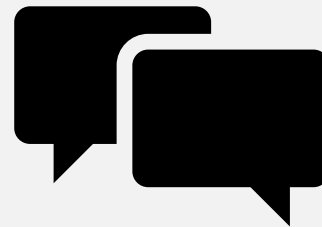
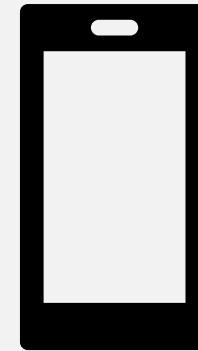
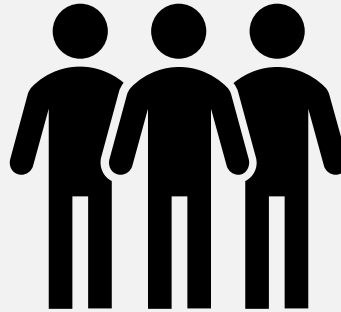
- Challenges faced by modern rail projects
- Overview of systems engineering
- Recommended steps in Australia

Challenges



Current challenges

- Population
- Technology
- Expectations



Project complexity



Issues in major Australian rail projects

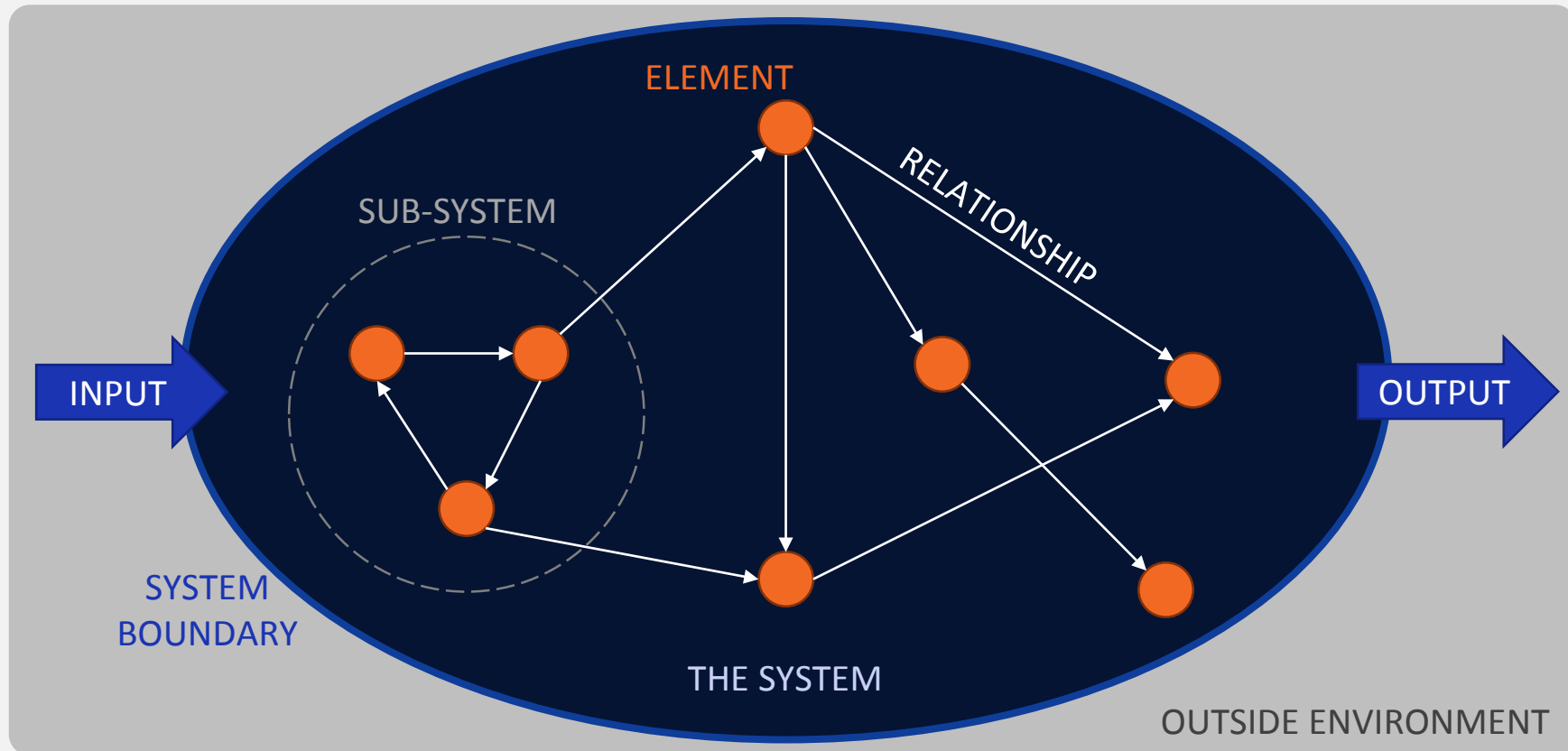
- Limited holistic consideration during early phases of the project
- Lack of defined objectives and project success criteria
- Eroding value for money in contractual negotiations

Systems Engineering



What is a system?

Systems thinking is concerned with **wholes**

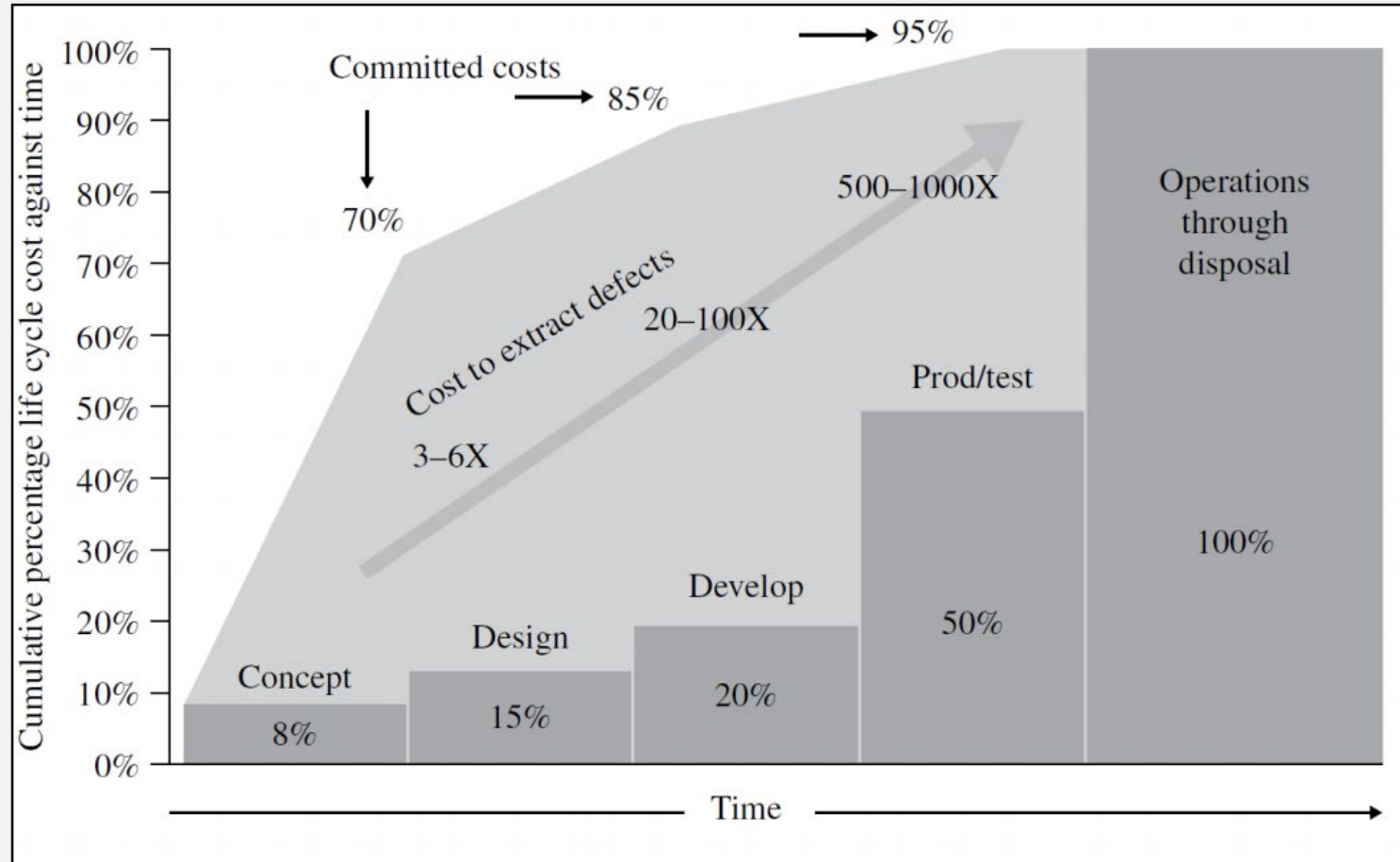


What is Systems Engineering?

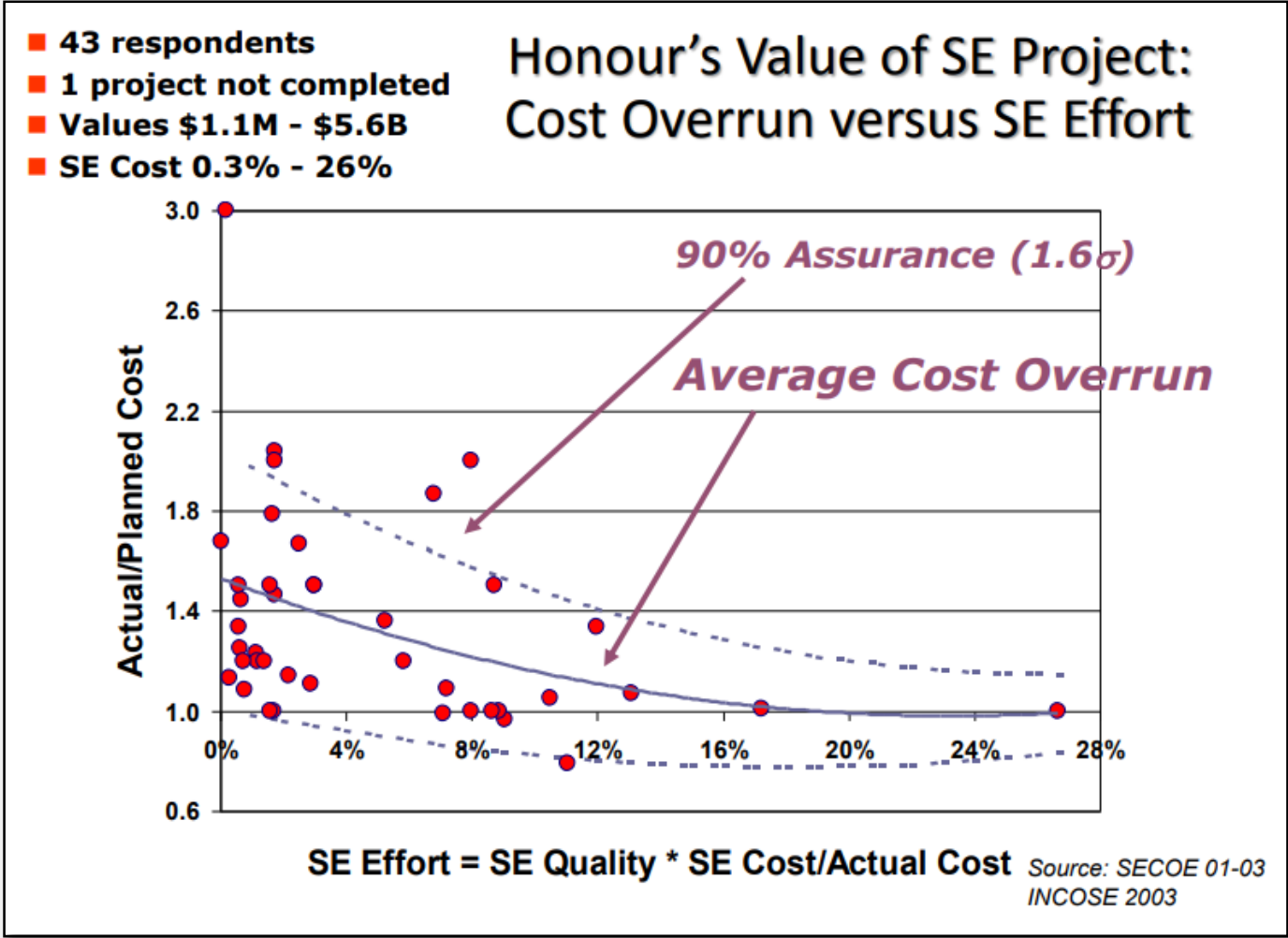
Systems engineering (SE) aims to:

- understand the **complete** problem
- **integrate** work across disciplines and speciality groups
- define stakeholder needs and system functionality **early** in the system life cycle

Why bother?



Is there proof?



Does this apply to rail?

- Highly complex environment ✓
- High number of integrations required ✓
- High public/stakeholder expectations ✓
- Low tolerance to project failure ✓



Recommendations



Cultural change

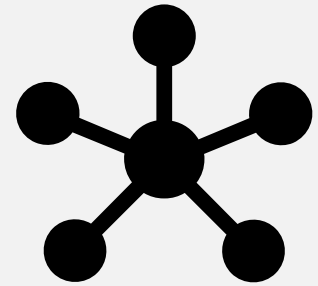
“Systems integration is often perceived as the stage in the project where the subsystems are integrated with one another to form the system...

... Systems integration actually takes place when the scope of the subsystems is defined”

Rolison R. Taming complexity on major rail projects with a collaborative systems engineering approach. 2013

Continue the positive steps

- Some agencies and private organisations are currently developing and applying system engineering practices
- Learnings need to be captured, analysed and shared





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