

# **Digital Engineering**

## **Code of Practice**

This Rail Industry Safety and Standards Board (RISSB) product has been developed using input from rail experts from across the Rail Industry. RISSB wishes to acknowledge the positive contribution of all subject matter experts and DG representatives who participated in the development of this product.

The RISSB Development Group for this Code of Practice consisted of representatives from the following organisations:

ARTC	Aurizon	BECA
Bentley Systems	GHD	PTA WA
Queensland Rail	SMEC	Transport for NSW
WSP		

Development of this Code of Practice was undertaken in accordance with RISSB's accredited processes. It was approved by the Development Group, endorsed by the Standing Committee, and approved for publication by the RISSB Board.

I commend this Code of Practice to the Australasian rail industry as part of the suite of RISSB products assisting the rail industry to manage rail safety, improve efficiency and achieve safety outcomes through interoperability and harmonisation.



**Deb Spring**  
Exec. Chair / CEO  
Rail Industry Safety and Standards Board

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RISSB product can be found at: <http://www.rissb.com.au/products/>.

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## 1 Vision

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Throughout Australia, the rail industry is currently embarking on a significant ‘once-in-a-generation’ program of infrastructure development and renewal. RISSB as a major rail body recognises the significance of data and information management throughout the lifecycle of these infrastructure assets. With digital engineering (DE) as the centrepiece/enabler, RISSB’s vision is to modernise how the rail industry design, develops delivers, operates and sustains rail infrastructure to provide the maximum benefit to the asset owner.

For the rail industry to embrace innovation and to harness the benefits of digital transformation, it will require strong leadership and new capabilities that drive strategic information management. Asset owners must develop new ways of working that leverage and exchange structured information throughout their organisations and their broader value chains. At the centre of this change is the recognition that data is a critical asset that, if procured and managed correctly, will derive significant long-term value to the rail industry.

DE relies on collaboration, through existing and new technologies, to enable a step change in productivity throughout all stages of the asset lifecycle. At its core, DE provides more reliable data and information management that drives better business outcomes such as improved safety, reduced risk, greater cost certainty and improved sustainability.

Moving forward, RISSB is able to further continue research in this area given that industry is able to demonstrate interest and commitment to continue the conversation around the topic of digital engineering within the rail sector.

The progression of this code of practice is reliant upon strong industry engagement and commitment towards DE. RISSB will work with the rail industry in the transition of digital engineering practices through the onward development of supporting standards and guidance which will have a national application. This code of practice is the first step in this journey.

## 2 Context

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### 2.1 Scope

This code of practice is to provide the rail industry with a guide to the use of information management standards and technology which would enable the rail industry to better manage projects by mitigating time delays, materials waste and cost overruns during the ongoing operations and maintenance (O&M) stages of the asset’s lifecycle.

This document demonstrates how DE is used to procure information as a structured information management process through the project lifecycle. By connecting and managing data through the common data environment, all project stakeholders including the end user will benefit by having the relevant information to make informed decision.

This document will:

- provide overall understanding of digital engineering and relevance to the rail infrastructure industry;
- provide understanding of the benefits of a digital engineering approach;
- outline the use of information management standards and technology to capture, explore, and maintain consistent and coordinated planning, design, construction and operational data;
- provide direction on the provision and use of digital engineering to achieve greater project insight for cost, schedule and constructability, maintainability and safety in design;
- illustrate the steps required for an organisation to change to be ready to work in a digital engineering environment.

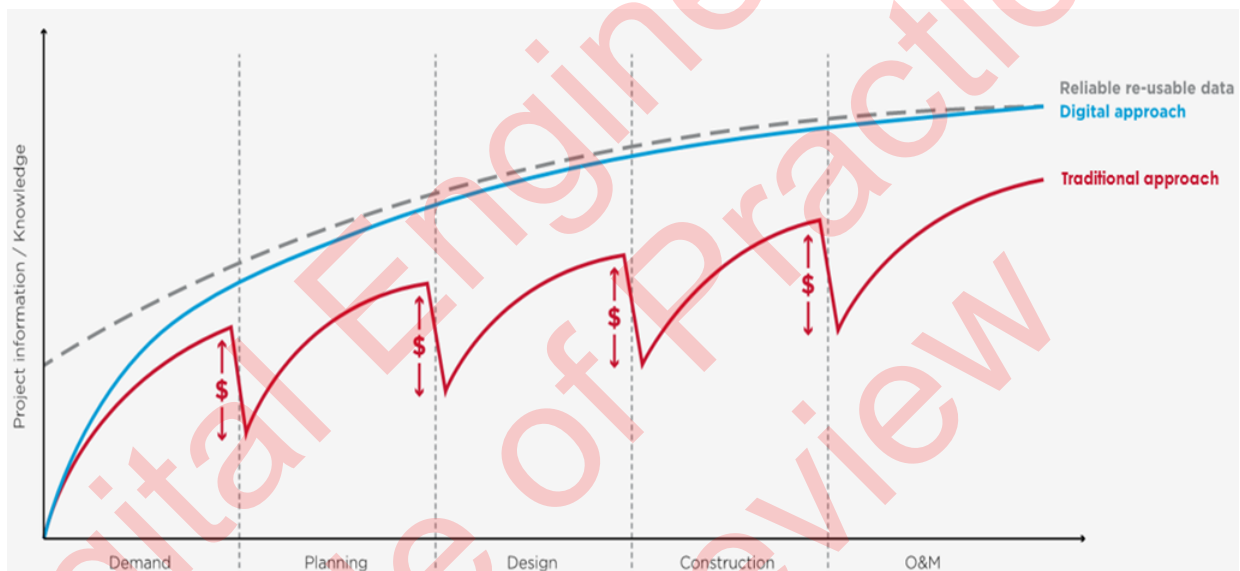


Figure 2:1 Traditional Project Delivery vs Digital Engineering

The diagram illustrates the consequences of information loss suffered at each project milestone using a traditional approach to project delivery based on a paper-based methodology. By adopting a digital engineering approach, the need to recreate information is mitigated.

The code of practice does not specify information technology (IT) software or systems.

## 2.2 Purpose

This code of practice promotes the use of digital engineering within the rail industry. The document caters all industry stakeholders and is intended to start DE focused conversations for all projects, thereby delivering an industry wide DE revolution within the rail industry through the whole project lifecycle.

All stakeholders within the project will benefit from DE even though their experiences will vary as each stakeholder will have different information requirements. However, the value of finding information more easily, gaining data driven insights and making faster, more informed decisions will enhance the way we all work through the whole project lifecycle. The illustrations below capture the benefit of mitigating information loss provided by adopting a DE approach and also showcasing the reduction in the level of cost and effort from the capex phase to the opex.