

Improved Project Management Through Effective Information Exchange in Rail

Information Sheet

Development of Complex Rail Systems as Part of a Broader Network can be Challenging



When you're developing complex systems that have to integrate into a broader network, effective communication, both with external stakeholders and across your different internal functions, can be the most important thing to ensure the success of your project.

Keeping everybody in the loop in rail engineering used to be much easier. But, as stakeholders demand better technology, greater assurance and more integrated systems, the process of gathering requirements, sharing information and ensuring traceability can become very challenging and very tedious. Trying to manage the development of a complex system using a communication process established in simpler times, can be a bureaucratic nightmare, and because nobody can see the big picture, mistakes can both be made and go undetected much more easily.

Yet getting all of your stakeholders on board – and more than that - understanding what they *really* want, and sorting the necessary from the dispensable – is increasingly seen as a critical mitigation of risk as rail projects become more complex.

According to the Project Management Institute's global 2019 'Pulse of the Profession' study, project managers in manufacturing industries overwhelmingly report inaccurate requirements gathering, and poorly defined opportunities and risks, as the primary causes of project failure.

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I N F O R M A T I O N S H E E T

The later in the project your requirements change, the more expensive that change will be, and those costs start accumulating very quickly. Life cycle costs of an engineering project tend to get locked-in early in design and development, long before they are expended. This can rapidly multiply the cost of changing design direction at a late stage. Naturally, this leads to budget and timetable overruns, or even cancellation.

And, even before you think about external stakeholders and your own supply chain, supplying to the rail industry involves the input of multiple functions and capabilities. Product, design, development, manufacturing, quality, compliance and more, will have an input into your process.

All of these disciplines have a unique and highly valued set of skills, but as a result of their different perspectives, it can be challenging for them to keep one another's needs in mind.

The big picture matters in your own process too, not just in terms of how the part of the product any individual is concerned with fits into the whole, but understanding how the needs, expectations and process of other functions can have significant advantages.

In other words, engineering works better when it's more joined up. It comes down to effectively sharing information between teams, but as the rail industry becomes more complex, rail supply and engineering will have to look at different ways of making this practically achievable.

What this would mean is moving past ad hoc communication between teams – passing emails, documents and spreadsheets around the organisation – and towards a way of handling shared information, with respect for the needs of other functions inherently built in.

Such an approach would need product and task information to be specified in a standardised format that is designed to

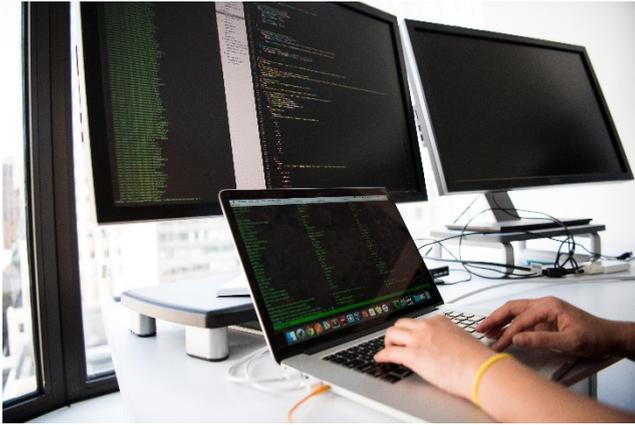
meet the needs of everyone expected to use that information.

It would also need to be responsive to change, and enable seamless propagation of any updates to project goals, specifications or standards across all engineering functions, while keeping everyone on the same page by guarding against errors, miscommunication and poor traceability.

When you put it that way, you wonder if the best way to think about sharing information is 'communication' at all. Communication implies two separate stores of knowledge interacting.

When in fact, all your engineering functions could be working from a single source of truth - a big picture that is constantly maintained, adapted and used by everyone involved, requiring them to think about the needs of others by virtue of how the information is structured.

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By setting things up this way, you can significantly diminish the burden on engineers to spend time communicating effectively and traceably. And at the same time, you can make sure everyone's information is accurate, up-to-date, secure, traceable and as complete as they need it to be.

Thinking in terms of the big picture is more than a cast of mind, it requires a specific set of skills. Embedding those skills throughout your organisation can make your development process considerably leaner and more effective, while enabling project managers to focus on what really matters.

Systems engineering allows the rail supply industry to take a whole life cycle view of its products, and better understand how they integrate with the rail network as a whole.

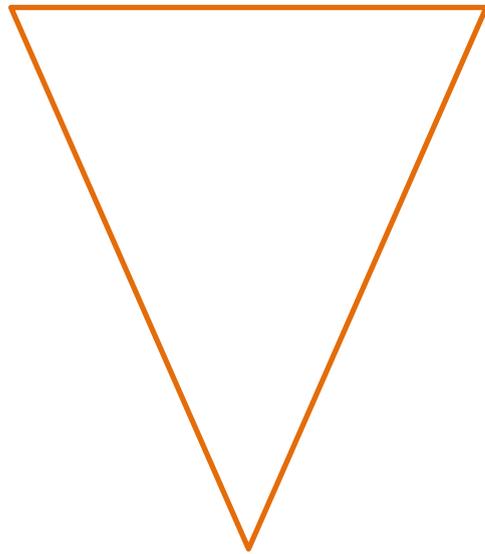
It has a strong focus on good practice in requirements engineering and uses that to develop models of a system which can be used for simulation and anticipation of potential emergent issues ahead of time.

In other words, systems engineering is about getting it right from the start when you're dealing with complexity. It comprises a series of processes and techniques for analysing the properties of a whole as more than the sum of its parts, but more than that, it is a way of thinking about a project which

keeps focus where it should be, on how what you're doing fits into the big picture.

Systems engineering needs the right skills, the right process and the right tools. But with these in place, rail supply could respond to the complex challenges of the industry's ever more demanding needs by enhancing the efficiency of its process, and reducing project risks.

The opportunities are there for the taking, and big-picture thinking is there to help the rail supply industry meet them.



This technical article is an excerpt from SyntheSys Technologies White Paper about Managing Complexity in Rail Supply. Read the full White Paper [\[here\]](#).

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