

Configuration Management in the Rail Industry

Information Sheet

Adaptable Products

As railway operators increasingly look to improve their efficiency by extending the life of their assets rather than replacing them, rail refurbishment – and in particular rolling stock refurbishment – has become a foundational activity in keeping the United Kingdom (UK) rail sector moving.

A service designed to increase efficiency for your customers would ideally be as streamlined as possible as you provide it, but engineering for rail refurbishment can often feel frustratingly like reinventing the wheel. Reworking requirements and specifications can be tedious and expensive, and when the work involves replacing parts that are no longer available, or upgrading to meet higher safety standards, keeping control of your information becomes critical to managing risk.

The mindset that rolling stock – as well as other parts of the rail network – is a static product that won't undergo significant changes in the course of its life cycle should have vanished from the industry long ago. Yet the tools used by rail engineering are often poorly equipped to deal with this reality.

Industries like aerospace and defence have always had to think in terms of engineering products with customisation and major in-life upgrades in mind, and the tools and systems engineering principles developed in support of those industries could now see greater applicability in the rail sector, both in terms of futureproofing new products and the refurbishment of existing assets.

A systems engineering approach to configuration management starts by distinguishing a special category of 'baseline' configurations, which are known to work. Deviations from that baseline are carefully tracked and interpreted in terms of changes to the requirements for the system.

Variant components are defined separately, and the design and modelling of a new configuration is built from the baseline out of these atomised subsystems, allowing you to minimise duplication of effort in reusing components. As a result, when you need to reuse requirements, you don't have to just duplicate the entire set of requirements and then manage them separately: you can reuse those components that are not changing, use the correct version of those that do change, and be able to add or remove components as necessary.

In a rail refurbishment context, being able to track the change in product requirements and configurations over time, and reuse existing knowledge in new projects, prevents your engineers from having to go back to square one. Instead, they can start from where they ought to start, with the properties of the existing system known, understood and ready for change.

The Siemens Desiro: A Train for All Seasons



The Siemens Desiro has been an extremely successful family of recent trains, with 170 of the 'City' models running on the British rail network alone, following their introduction five years ago.

A major key to the Desiro family's success has been its flexibility and adaptability, which has allowed the baseline model to be adapted to a wide variety of purposes. As a result of the ability to reconfigure the design both before and after sale to meet particular needs, it runs on British tracks under three separate class numbers: the 700, 707 and 717. These models differ in safety features, power systems and interior features to meet the needs of the different routes, alongside providing options for the operator to achieve a wide variety of passenger capacities, lengths and configurations while the train is in operation.

By building the Desiro with variants and reconfiguration in mind, it is able to serve a wider variety of markets in a manner that better serves the local need, and is futureproofed against the changing needs of the network.

Rethinking your History

Those who cannot remember the past are condemned to repeat it, and those who don't retain previous specifications are doomed to reengineer them.

The benefits of configuration management go beyond the retention and easy reuse of existing work: by taking an atomised view of configurable components, engineering for refurbishment can become as much an exercise of putting together the right building blocks of existing designs as it is one of creating something new.

Retaining your history in this way, as separable subsystems that can be reused rather than just through completed designs, allows your engineers to focus on what really matters: the genuinely new, and how it all fits together.

For this to work effectively, your tools have to be built around managing product variants and separable components rather than a linear progression toward a single integrated design. Planning for configuration management needs to be baked into your activity from the moment you start engineering your requirements.

In the current environment, rail engineering needs to be using tools which build in change from the ground up.

This information sheet is an excerpt from SyntheSys Technologies White Paper about Embracing Change in Rail Supply. [Read the full White Paper \[here\]](#).

About SyntheSys

SyntheSys provides defence systems, training, systems and software engineering and technical management services over a spectrum of different industry sectors. Along with distinct support and consultancy services, our innovative product range makes us first choice provider for both large and small organisations. Established in 1988, the company focus is on fusing technical expertise with intuitive software applications to solve common industry challenges.

