What you told us about the future of the rail industry
At InnoTrans 2016, we asked attendees from across the rail industry about their hopes, fears and ideas for the future of our industry.

This is what they told us...
This image depicts a high speed system featuring characteristics from the aviation and shipping sectors. As is similar to commercial aircraft, cargo sits beneath the passenger accommodation. Meanwhile, at the station infrastructure is on-hand to quickly remove the containers for local delivery, similar to the just-in-time multimodal containers delivered to major ports.

There would certainly be challenges in this scenario. The additional weight would impact on the axle loads, as well as the vehicle’s energy usage. Space may also restrict the cargo to small, time-sensitive goods (e.g. refrigerated food and medical supplies). There would also need to be many changes to regulations, including interoperability. But these are all surmountable. Given the ever increasing possibilities in the areas of online ticket purchasing and, in the case of air traffic, luggage – it could be that the passenger/freight combination proves economically viable and worth investigating.

Hans de Grauw and Anton van Himbergen, Senior Consultants, Ricardo Rail, Utrecht
The regulatory requirements for entering vehicles into service is necessarily thorough, but also complex. Each vehicle type usually has to chart a unique path, meaning the process can be difficult to master. Approval Bodies are trying to alleviate the burden by combining assurance activities in varying schemes (e.g. NoBo, DeBo, AsBo, ISA) and by getting all stakeholders together at an early stage so that possible pitfalls are detected early. Staying one step ahead of the project can also help keep the process, including submissions, more efficient - especially when projects involve implementing new systems in cross-border railways or complex changes to those already in operation.

On a more tactical level, approval bodies are following changes proposed by the Fourth Railway Package relating to the roles of the European Union Agency for Railway (ERA) and that of National Safety Authorities (NSAs). This, together with the adoption of more automated processes (like electronic submissions of technical files) can bring the concept of ‘one stop shop’ for the authorisation of railway systems to the market to a reality.

Jorge Aldegunde, Business Manager, Ricardo Certification, Madrid
Electrified routes can be more energy efficient than Diesel and their increasing adoption (around one third of the global track is electrified) opens the way for increased use of zero local emission vehicles. But the source is critical – if from coal-fired power, for example, then it will have a similar global impact to Diesel engine vehicles (in carbon emissions). Gas will have reduced GHG impacts against a Diesel engine, but depending upon the location, supply may not be secure. However, local renewable sources could provide a system with minimised impact on the environment.

But there are measures that can be applied to existing Diesel fleets. Ricardo’s TorqStor flywheel, for example, has shown how regenerative energy capture can be retrospectively applied to DMUs and return 10% of fuel savings. Other options, such as battery or ultra-capacitor energy storage systems, combined with Diesel-electric traction technologies, will allow “silent” running into and out of critical urban areas. As electrification progresses, bi-mode vehicles will become desirable for both new-build and mid-life retrofit/upgrade, in combination with on-vehicle energy storage. These will enable downsizing engine options and flexible operating control strategies to maximise Diesel engine efficiency when they are required for tractive power.

Ricardo is working in a number of areas within the biofuels industry to support the development of new fuels with the aim of supplementing or replacing traditional fossil fuels. As they come on stream, the rail industry can be a key early adopter, due to the high volumes of fuel usage and long hours of operation.

Jonathan Brown
Chief Engineer - Large Engines, Ricardo, Shoreham
AvAILABILITY

Condition monitoring technologies are helping the industry to adopt more efficient maintenance regimes which ensure that a greater number of vehicles are available for service. Giving maintenance teams access to accurate, real-time data about the condition of rolling stock and infrastructure will also significantly improve reliability.

With a major part of the inspection and control process automated, it also means maintenance will become cheaper. By analysing ‘in-service’ data, the workshop knows which components and systems require attention, with the correct resources in place at the next available maintenance window. This proactive approach will help reduce unforeseen breakdowns.

Will van Roij
Principal Consultant, Ricardo Rail, Utrecht

RAIL’S GREEN CREDENTIALS

Rail will clearly have an important role to play in any cleaner, more integrated future transport mix. Even today, it emits lower CO₂ emissions per passenger kilometre when benchmarked against other transport modes.

But improvements can still be made. Changes to rolling stock design, such as the use of light-weight materials, improved aerodynamics to reduce drag, and optimising train-set configurations, can all have significant benefits in terms of reducing energy consumption. Whilst regenerative braking is now commonly used to convert kinetic energy to electrical energy and feed this back to the electricity supply network, new technologies such as flywheel energy storage systems can offer additional energy efficiency and cost-saving benefits for the rail sector.

More efficient operational practices can also, collectively, make a big difference. Drivers can be taught ‘eco-driving techniques’ that minimise energy use; timetables can be reconfigured to be more responsive to demand; and smarter use of on-board air conditioning and heating can be automatically regulated depending on the number of passengers on the train.

Sujith Kollamthodi
Practice Director - Sustainable Transport, Ricardo Energy & Environment, Oxfordshire
Rail projects – such as the construction of a new metro line, as in the case of Mumbai – can take many years to move from concept to build and eventual operation. Officials and decision makers may only experience one major scheme while serving their role.

An important part of any major project is not only understanding the lessons from similar schemes around the world, but an early understanding of the technological risks in the project’s unique ‘real life’ conditions is also a critical success factor.

Partnering with a company well-versed in scrutinising a new technology’s readiness level and the maturity of the design across the whole supply chain in different scenarios is critical.

Francisco Siro
Principal, Ricardo Strategic Consulting, Leamington Spa

Do individual cities have the knowledge and the capability to make decisions about complex technical issues?

“Railways are becoming ever more reliant on complex digitally interconnected systems. Systems such as remote condition monitoring, train control, traffic management, and passenger information and entertainment, all bring great benefit.

However, these systems have, by their inherent nature, issues with security. In order to meet this challenge, the industry must be prepared to partner with experts and adapt to the specific challenges faced by the railways. This is an issue that cuts across all stakeholders and calls for a coordinated and informed approach.”

Alex Bishop
Assistant Consultant, Ricardo Rail, York
The widespread implementation of ERTMS has always been a long-term vision, but its progress is as much to do with the machinations of the industry as it is the technical complexity of the product. Throughout this period, rolling stock – procured long in advance and with up to 40 year lifespans – has continued to be specified and manufactured to existing requirements, with ERTMS compatibility a low priority. Meanwhile, the development of ERTMS itself has been pulled in different directions as countries imposed local amendments and variations.

But the technology behind ERTMS Level 2 is proven and is gradually being implemented. All new EU mainline projects must adopt it and almost half of all ERTMS investment to date has been outside Europe, in countries such as Turkey, Saudi Arabia and China.

Now that it is under the stewardship of the European Railway Agency (ERA), the technology will be standardised, supply chains will fall into line, and migration programmes will be mastered. There is no doubt that the general direction of the industry is towards digitally-based, centralised control systems like ERTMS.

Dr. Daniel Woodland
Professional Head of Signalling & Train Control, Ricardo Rail, London

The political
We have the technology, but half the story of ERTMS is the political will. Some countries are understandably wary of the upheaval and risks involved in replacing deeply-ingrained national rules and practices. For others, financing is a key challenge.

Here in Denmark, the government listened to the advice of our infrastructure manager that a full migration to ERTMS would achieve economies of scale via the planning and procurement stages, and streamline the complex safety approvals and authorisations process.

By 2021, more than 2,000km of existing lineside signalling technology across Denmark will have been replaced by ERTMS – a project Ricardo has been closely involved with – putting our domestic rail sector at the forefront of ERTMS implementation.

Thomas Rasch
Rail Business Manager, Ricardo Certification, Copenhagen

It is now over 25 years since the EU first launched plans to develop a common system of signalling and train control, yet widespread adoption is still some distance off. Are we any closer to achieving that ‘Lisbon to Moscow’ service?
Policies and procedures are, of course, essential in safety-critical environments like the railway. A Safety Management System, for example, is all about ensuring a safety-first culture is in place, with everyone aware of their role to ensure incidents are prevented or correctly responded to. It demonstrates the importance of safety to the entire operation.

But it is the frontline staff who meet passengers, deal with freight and maintain the depots and infrastructure. They are the first to see where improvements can be made, or when processes need to be flexible. Therefore, within the parameters of essential procedures, the observations and opinions of staff should be respected by employers, as well as the public. Staff need to know they are trusted and that their insight has been listened and responded to. How things have ‘always been done’ may not be what we require today.

Dr Seok-Kyun Shin
Business Development Manager, Ricardo Rail, Seoul
FOOD FOR THOUGHT...

CONSERVATIVE CULTURAL THINKING

Just keep things ticking over...

If you standardise you can innovate across the whole world.

Not open to new smart technology. Involved in their own procedures.

closed minds decades of practice.

INFOTAINMENT

Easy access boarding

ATTRACTIONS

RUN for the PEOPLE not the engineers

INTERNATIONAL TRAVEL "CAB" like Uber for trains anywhere.

PERSONALISED

We are becoming head down animals...

REMOVE INNOVATION BARRIERS!