

**A DISCUSSION PAPER FOR THE FUTURE OF THE  
ON TRACK PLANT INDUSTRY WITHIN GREAT  
BRITAIN**

**JUNE 2016**

## **Contents**

|   |           |
|---|-----------|
| <b>ROAD RAIL VEHICLES: A CRISIS IN THE OFFING</b> | <b>3</b>  |
| <b>THE CURRENT SITUATION</b>                      | <b>5</b>  |
| <b>RECENT INDUSTRY CHANGES</b>                    | <b>9</b>  |
| <b>CERTIFICATION ISSUES</b>                       | <b>11</b> |
| <b>THE FAILURE OF THE STANDARDISED MACHINE</b>    | <b>13</b> |
| <b>RISKS TO FUTURE SUPPLY</b>                     | <b>14</b> |
| <b>TOWARDS A SOLUTION</b>                         | <b>16</b> |

## **Road rail vehicles: a crisis in the offing**

Like Network Rail, Quattro Group takes passenger safety to be of paramount importance and is working with the industry to improve standards. However, there is a looming bump in the track which threatens to derail this for everyone.

This white paper is a call to action for the rail industry to avert what could be a major crisis over the investment and availability of road rail vehicles for Network Rail's future investment programme on the railways.

Currently, the industry is beset with a series of structural difficulties that threaten its long term future. In the past four years, the UK fleet available to Network Rail has shrunk, after a major supplier went bankrupt and required Network Rail's support to stay afloat. As a result, the total number of road rail vehicles in the UK is insufficient to adequately support Network Rail nationally.

Many companies have kept old machines operating in order to ensure contracts are fulfilled.

The majority of the UK fleet is ageing, and reliability is a concern to Network Rail. This is an unsatisfactory situation both for Network Rail and the road rail vehicle supply industry.

Ensuring a steady supply of new equipment is challenging. There are not enough converters or upgraders in the UK able to sufficiently meet demand. To make matters worse, converters in continental Europe are reluctant to supply equipment because of the complexity and bureaucracy of UK legislation. Despite RSSB lobbying, no significant European manufacturers want to build machines to British specification.

The situation has been made more difficult by constant changes to the regulatory regime.

In the past ten years, the standards affecting track machinery have been amended six times. This has resulted in a lack of engineering and management know-how.

A crisis point is being reached as the average age of the fleet is rising. The industry needs to act now because the age profile of the machinery means the converters will not be able keep up with demand. Reliability and possibly even safety may suffer, which is unacceptable to all parties. A major interruption in investment could result if there is another bankruptcy.

We need solutions so Network Rail has access to a UK fleet of road rail vehicles that are ready and able to work anywhere reliably.

Quattro Group would like to work with the industry to drive through some changes. We commissioned this report – written by Christian Wolmar, an independent and experienced rail journalist – in order to highlight the issues and stress the urgent need for a way forward.

Adam Richardson  
Chairman  
Quattro Group



## **The current situation**

There are currently around 1,000 road rail vehicles (RRVs) in use in the UK and they are the workhorse of the industry, essential for three typical projects: maintenance, renewal and enhancement work. Each of these projects roughly account for a third of all RRVs deployments. Network Rail owns 150 vehicles themselves to deal with emergencies. However, most road rail equipment is hired for specific projects. Typically, RRVs are JCB type 360-degree excavators, which have been converted with the addition of wheels to run on rail, while retaining their road use characteristics. Operating these vehicles is a very skilled task and requires highly trained drivers, who are fully aware of the particular risks posed by working on the rail network.

Network Rail commissions about a third of the projects itself, and the rest through principal contractors. There are also some projects undertaken by London Underground which involves these vehicles, but this is a small part of the overall market.

The value of the total market is around £120m - £130m per year but demand can rise and fall sharply. As a result of the uneven flow of work and the difficulties of ensuring a steady supply of funding for new equipment, some contractors have gone out of business, notably Hydrex which had to be bought out by Network Rail in 2011 to ensure that the equipment – 300 RRVS – was still available.

As a result of the current structure and practices of the industry, there are a number of specific characteristics around these vehicles that determine the way that the market has

developed and these have now lead to questions about the long term viability of the current situation.

- a) Road rail vehicles are bespoke. There is no manufacturer of such vehicles and therefore existing types of mass produced equipment for road use need to be modified by specialist companies to adapt them for use on the railway. This is a lengthy process, taking up to a year, and therefore the provision of new road rail vehicles cannot be undertaken quickly. Network Rail, in an effort to overcome this constraint, attempted to obtain a custom-built road rail vehicle. However, after approaching several manufacturers of conventional heavy lifting equipment, none showed any interest in producing equipment specifically for this market.
- b) Network Rail and its contractors are the only source of requirement for these vehicles. This means that the equipment has no alternative use and suppliers are entirely dependent on Network Rail to ensure their viability. This also has the effect of pushing up the cost of using these vehicles, since the suppliers have to cost in a considerable amount of risk. The basic contract employed by Network Rail places much of the risk on the suppliers, as Network Rail can cancel any order around 36 hours in advance.
- c) RRVs are expensive because of the nature of their work. While a standard JCB will cost in the order of £100,000, the price will have risen to around £300,000 once these vehicles have been adapted for rail use. This is in part due to the extra safety requirements of the railway. For example, the vehicles have to be fitted with special equipment such as a Rated Capacity Indicator (RCI) used to help the operator ensure that the machine does not get overloaded and lose stability.

- d) The vehicles are also particularly long-lived because of the nature of their use. While a normal JCB might last eight to ten years, the fact that road rail vehicles are used for only a small part of the week (due to the lack of possession opportunity in the rail industry – possession meaning when an operator hands over the track to an engineer) means that they may still be in a good condition for 15 years. This is partly because they are not used constantly in the traditional excavator mode but rather as a lifting machine, which does not result in so much wear and tear.
- e) It is not only the lack of possessions that reduces the proportion of the week that road rail vehicles are in use. It is also a result of the fact that there is no clear advance programme of work. Therefore, while road rail vehicles are required for most jobs on the railway, the suppliers do not have a workload that is predictable beyond a locked down timescale target of four weeks when possessions are finalised. However, this four week target for final requirements to be assessed is often not achieved by Network Rail.
- f) Equipment is ordered either directly from Network Rail or via one of their Principal Contractors. However contract terms between the two methods are not standardised which causes confusion to the RRV suppliers. A major part of the contract is to ensure that the vehicle is available at the site. Therefore the suppliers are as much haulage contractors as they are the source of the road rail vehicles. Consequently, Network Rail spends 30-35% of the fee on the haulage as on the hire of the vehicles themselves.
- g) The Rail Plant Association (RPA) is the industry trade association for suppliers of specialist plant and equipment for use on the railway infrastructure, and as such should

be ideally placed to take a lead on this matter. There is a perception that over the last 10-years the RPA has become too 'compliance biased' and has not taken enough of a strategic lead. Current changes at the RPA, including the advent of the RPA Leadership Alliance, should soon see the RPA in a position to reassume the strategic lead on behalf of the industry at some point in the near future.

- h) Much of the risk is on the road rail vehicle supplier. If the vehicle is not delivered, then the supplier is liable for the whole cost of the shift. There is no set cancellation arrangement. The time for cancellation at no charge to Network Rail varies from four weeks prior to the work to the moment before the dispatch of the machine from the depot.
- i) The regulatory regime is complex as the vehicles have to comply with legislation for road vehicles and for rail vehicles, as well as EU standards. Requirements have changed and are being added to without proper risk assessment on whether the change is really necessary.
- j) There is a particular problem in that as the UK has a smaller loading gauge than other countries, its equipment can be used pretty much anywhere else but the reverse is not true. Most equipment from abroad would not be able to function here because it is larger. This means there is no possibility of filling a sudden gap in the supply chain through purchases or rental from abroad.

## Recent industry changes

Several recent changes have affected the rail industry and raised concerns about whether the present model needs to change.

- a) Network Rail has become a government-owned company. This has affected its ability to put expenditure, especially costs which have overrun, on the Regulated Asset Base, which is effectively used like a credit card. This has led to greater uncertainty in the industry.
- b) The possession regime has become much tighter. With the concerted move by Network Rail to a seven-day railway during the past decade, in response to much greater passenger demand for travel at weekends, possession time has been reduced dramatically. Where the line used to be handed back on a Monday morning, it is now often Sunday lunchtime. This has exacerbated the issue of light use of road rail equipment, meaning some vehicles will be used for only 70 or 80 shifts per year. In the future, there may even be fewer possession opportunities if more trains run at night.
- c) Allied to the reduction in the length of shifts, there is less weekday working. This has implications for staff, as experienced drivers and mechanics want five shifts per week, whereas now they are getting only one shift. This has both cost and personnel implications.
- d) The possessions reduction poses an added risk, as it lengthens the life of the machines at a time when future requirements in say 10 to 12 years' time are uncertain, given the technological developments and

changes in working practices. Will the rail industry requirement be for the 1,000 vehicles currently in operation, 750 vehicles or fewer?

- e) There is much less old railway land available to store equipment. Therefore haulage costs have risen as equipment is likely to have to return to the supplier's depot during the week.
- f) High output factory trains, which involve a series of equipment in a train and are designed to carry out work in a single six or seven hour shift, has somewhat reduced the demand for road rail vehicles as they require only two: one at the front and one at the back. However, factory trains are not suitable for work on many sites, such as at stations or sharp curves.
- g) There is uncertainty about the capacity of the supply chain. In particular, are there sufficient numbers of converters in order to turn the basic excavators into road rail vehicles to meet a requirement of 100 annually, let alone 120?
- h) With Network Rail now on the Government's books, it is looking to the industry to supply all the new road rail vehicles as it is reluctant to purchase any equipment given the new financial constraints it is under. This may require the industry to increase its annual level of investment.
- i) Modern track laying methods, such as using larger prefabricated sections of rail, may require bigger equipment than most of the current stock, and may also be beyond the loading gauge capability within the UK.

- j) [The Shaw Report](#) published in November 2015 and updated in March 2016 adds another level of uncertainty. The report suggests that more power over decisions on investment should be devolved to the routes. It is unclear precisely which decisions will be made at the route level and which at national level. If routes are able to determine levels of output, this will add further uncertainty to predictions of the future programme of work and consequently the level of equipment required.

## **Certification issues**

Like all on-track plant, road rail vehicles have to comply with railway industry standards, which is about to be revised under Rail Industry Standard 1530 – PLT Issue 6. While technically this is not a mandatory standard (it is supposed to be merely an industry guidance document), it has been mandated by Network Rail for on-track plant that operates on its infrastructure and consequently, all on-track plant must have a valid certificate of engineering acceptance.

Several fundamental problems emerge from the process. First, getting approval for any new modification is a time consuming exercise and entails very detailed consideration of the equipment, even if it is widely used on railways in other countries. This makes introducing innovations expensive and slow. For example, some equipment can take in excess of 18 months to get certified but has fallen foul of red tape around the way that the Failure Mode Effect Analysis has been written. This type of difficulty deters equipment manufacturers from catering to the UK rail market.

A second issue relating to certification is the large number of changes to the standards. There have been seven iterations in the past ten years and the latest 'Issue', number six, is about to be adopted. Often changes from one Issue to another appear to be made arbitrarily with little recognition of the cost implications and with little proper assessment of the safety benefits.

Moreover, some years ago, the notion of requiring renewal of certification every seven years was introduced, again with little justification of why that period was chosen. Given that most equipment has a longer life than that, suppliers have to make a difficult decision about whether to upgrade equipment, at a cost that can easily be tens of thousands of pounds, even if it entails little added safety benefit. There seems to be no justification for why some of these changes are needed, such as suddenly upgrading the RCI Performance Level C to D when a new Issue was published in December 2015

The dilemma over updating has another dimension. While older equipment may be perceived to be more unreliable, it is often possible to repair quite easily, sometimes on site. Newer equipment, which is far more computer-dependent, is not so easily repairable and its failure cannot be rectified on site.

The overriding impression is that there is not sufficient interaction with the industry when these changes are made. Not only are changes made too frequently, but they are also decided upon with insufficient explanation or analysis.

The companies carrying out the conversion work of standard equipment for rail are concerned at the difficulties of catering to a small market while keeping costs down. They are also concerned at the risk they face in developing new adapted products without any guarantee of sufficient orders to pay for the research and development. The certification process is

particularly onerous as every single vehicle, not just vehicle type, has to be certified, which is both expensive and time consuming.

## **The failure of the standardised machine**

A few years ago, Network Rail announced that it would buy the machines for the industry. The machine, codenamed Liftex, would have been made the standardised equipment for use throughout the rail network. Network Rail asked the principal manufacturers of 360-degree excavators that if it consolidated the demand so that it was purchasing for the whole rail industry, would they produce a purpose-built road rail vehicle? Network Rail hoped that it would provide sufficient demand to ensure that the manufacturers would be interested. However, they were un-swayed as they saw RRVs as specialist equipment that would never generate sufficient volume.

This failure had the effect of creating a hiatus in investment because none of the suppliers thought it worthwhile to commission and buy new kit during the two years that Network Rail considered this concept. The industry has now started to invest again but possibly not sufficiently to guarantee future supply. Moreover, there is still some uncertainty as to whether Network Rail will try again.

## **Risks to future supply**

The current contracts between the supply industry on the one hand and Network Rail and its contractors on the other are very one-sided. Network Rail operates a standard contract for road rail vehicles. Up to Thursday lunchtime before a possession, the risk sits with the supplier. In other words, if Network Rail cancels a possession before that time, then there is no compensation liability. Network Rail accepts that it is not a sustainable position. In the new contracts that Network Rail is looking to award, it is looking to two aspects.

First, Network Rail will be looking for a discount if they order a reasonable time in advance, say six to eight weeks as that is effectively taking the risk away from the supplier.

Secondly, the new contracts will have a more equitable arrangement around cancellation charges. The current situation of allowing cancellation on Thursday lunchtime enables the supplier to save some costs, such as fuel and haulage, but they still incur the expense of having equipment that will not be used.

The current contracts are essentially based on price rather than any other factor. While this resulted in cheap plant, it introduced a much greater element of risk of failure which went against Network Rail's requirement for reliable plant. A single failure at a site can result in all work on a possession ceasing, and the minimum cost of any possession is estimated to be at least £250,000. For example, one unit breaking down out of half a dozen, will result in the possession no longer becoming viable.

About three years ago, Network Rail Track Renewals decided to include a reliability criterion in its contracts and advised the industry accordingly. Although at the time Network Rail said it

was happy to pay for the requirement of reliability, rates have not been increased to reflect the extra risk taken on by suppliers.

There are a number of risks to the continuity of future supply which Network Rail and the industry must address together. The major Network Rail concern is that because there has been less investment in recent years, as many as 120 to 150 vehicles may need to be retired annually over the next few years, and the industry may not be able to do this. The industry needs investment signals and the financing to ensure this can happen.

In 2014, Network Rail agreed contracts on 10-year deals to give the industry a level of certainty. This is expected to percolate down to the sub-contractors, such as suppliers of road rail vehicles. Network Rail sees these longer term arrangements as a partnership to ensure that, among other things, the wrong sort of equipment does not get bought. As a result, Network Rail hopes there will be something like eight-year agreements with suppliers of road rail vehicles, but reliability remains very much the focus of Network Rail's requirements.

However, Network Rail remains concerned that there is the possibility that demand may exceed supply – such as through the sale of equipment abroad in the expectation that it is no longer needed. The risk is that the industry does not get the right signals to ensure that its investment expenditure will be worthwhile.

In the past, Network Rail has tended to avoid machines that are 10 years or more old. That practice may have to change in order to adapt to new circumstances where vehicles are only being operated for 80 or fewer shifts per year. In Switzerland, some equipment, which is maintained to a very high standard, is 50 years old. Keeping equipment in use

longer may be one way to ensure continuity of supply, but there is a danger that this would be at the cost of some reliability.

## **Towards a solution**

No single player can resolve these fundamental issues. There is a need for much better collaboration than in the past, and a readiness to adapt. This needs to be both in the nature of the contracts, to ensure that there is a better sharing of risks, but also in the way that decisions are made.

The Rail Plant Association (along with Network Rail) should take the lead as the trade association responsible for this industry. Although Network Rail Track renewals are well represented in the lead to change the industry, it is of some concern that the operations directorate is not so well represented. Given that further devolution of power to the routes has been proposed within the Shaw Report, this has to be of some concern for a consistent approach across Network Rail.

The Rail Plant Association can't act alone. As an industry there is a need to pull together as one to solve the issues facing the sector, working collaboratively with Network Rail to ensure action is taken.

This is a call for a meeting in the next 4 weeks of all stakeholders to discuss a way forward. The industry needs to take collective responsibility to ensure the future of our industry, improve standards and ensure passenger safety, whether you are an RRV supplier, converter, industry body or principal contractor.

At this meeting an independent chairperson should be appointed to manage this meeting to help us shape the future of the industry.

Failure to act together could lead either to the bankruptcy of various players, or to a shortage of machines available for rail work. Either would lead to severe disruption of Network Rail's investment plans. Action must now be taken to work together to shape the future of the industry.

Christian Wolmar is a writer and broadcaster specialising in transport. He has written a column for Rail magazine for the past 20 years and has contributed to numerous publications including every national newspaper apart from the Daily Star and a wide variety of magazines ranging from Transport Times to The Oldie. He has acted as a consultant for several organisations with an interest in the rail industry and recently attempted to obtain the Labour nomination for the 2016 London mayoral election.

He appears frequently on TV and radio as a commentator. He is the author of a dozen books, mostly on transport matters and the most recent is *to the edge of the world* the history of the Trans-Siberian Railway. He is currently writing a history of Indian Railways and working on a TV series about the influence of railways in the 19th century.

We'd also like to thank our contributors, whom Christian interviewed

Steve Featherstone, Programme Director Track, Network Rail  
Mark Carrington, Chief Executive, King Vehicle Engineering Limited  
Neil Halliday, Professional Head of Plant, RSSB