

The changing risk profile in rail freight operations following the introduction of open access competition

Introduction

This paper is intended to share some observations on how 'open-access' arrangements and market competition may affect the sources of risk in rail freight operations. It is written from a UK and Irish perspective, but may be of relevance to virtually any nation where there is a transition underway from a monopolistic state railway to multiple operators engaged in competition. It is not the intent of this paper to critique each (or all) of the key changes in rail freight from a safety perspective, as many of these topics are worthy of papers in their own right, but mainly to stimulate some thinking on how rail regulatory bodies may need to change their focus as the situation evolves.

The evolution of competition

In much of Europe, the implementation of Directive 91/440/EEC (and the amending 2001/12/EC) have now had far reaching consequences for rail freight operations. In Great Britain, full separation of infrastructure and train operations occurred as part of a privatisation process between 1994 and 1996, which created an 'Infrastructure Manager' (then 'Railtrack') and a number of freight companies which were quickly re-consolidated following sale into only two (EWS and Freightliner) to become the freight 'Railway Undertakings' (RU's).

Wholesale competition did not occur initially as the two privatised companies did not contest each other's traffic flows and commodity groups, but moves did commence to become more efficient and leaner operations. This took the form of rationalising their maintenance facilities, reducing the staff headcount and replacing older more maintenance intensive equipment. For a new entrant to enter the market it was going to be necessary to identify potential areas to achieve cost savings and production advantages while being able to offer at least comparable service and reliability. By 1999 this had been achieved with new entrants or spin-off companies in competition for nuclear fuel, coal, intermodal and infrastructure traffic. Ten years further on there are now some seven competing freight companies.

Once competition became a reality, the incumbent operators (RU's) were forced to accelerate restructuring their businesses, rationalising locomotives and stock, changing working practices and staffing levels and adopting some new technology. One interesting result from this was the realisation that as open access became a reality in Continental Europe, they were well placed to enter the market there, with the subsidiary businesses Euro Cargo Rail and Freightliner PL coming into being in France and Poland respectively.

In contrast, in Ireland (both the Republic and Northern Ireland) the railways remain vertically integrated and currently without competition. The two respective organisations being Iarnród Éireann (Irish Rail) and Northern Ireland Railways respectively. Freight traffic is very limited and totally confined to the Republic of Ireland, although there are a number of reasons accounting for this.

Comparing risk between freight and passenger operations

While many aspects of train operations are common to both freight and passenger, such as the signalling system and rules they observe when on shared infrastructure, the 'freight only' RU's may have a very different distribution of incidents compared to those recorded by the NSA to passenger operators. Some of these can simply be explained by the indicator measured being specific to freight. For example, a passenger train is much less prone to suffering a derailment from uneven load distribution - while it is entirely conceivable that this could occur with a freight wagon. However, it is worth looking beyond the obvious to see how the compartmentalisation of a railway business and introduction of competition can affect safety performance in both negative and positive directions. I have chosen to do this by highlighting a few key areas of change.

1. Shunting and the role of the shunter

Shunting has always been a higher risk activity in relative terms for operating staff and because of its nature and the hazards of the work environment is unlikely to disappear from scrutiny. Shunting and manual coupling / uncoupling is very much a core activity for freight operators.

In the typical monopoly state railway organisation, large numbers of staff were (or are) qualified to shunt trains, but in many cases this might form only part of their duties at particular location. Typically many station staff were involved in shunting duties. In the UK context, market liberalisation and partition radically changed the role of train preparation and shunting. Freight shunting immediately became the sole preserve of the freight undertaking at most locations as the move towards fixed formation passenger trains (i.e. push-pull and EMU / DMU's) has largely eradicated passenger train shunting outside of the heavy maintenance depots. Shunters became known as 'ground staff' and because only a few locations justify a full time staff presence for cost reasons, the concept of the 'mobile' shunter came into being. The staff often travel by road or rail to the outlying freight terminals to shunt and prepare each train, sometimes visiting more than one site in a shift if train paths and travelling time allows.

From a safety perspective this innovation has the benefit of concentrating a task with known hazards in the hands of a smaller number of individuals who do it regularly. It also makes it easier for a Railway Undertaking to target safety initiatives as it is dealing with a defined group of individuals and removes some conflict in managing the staff that would exist if they have other roles i.e. there may be an inclination to disregard bad practices in shunting if a member excels in their other duties such as station commercial duties.

The changes to how the role may however raise questions in the human factors arena. By making a shunter mobile, a significant proportion of their time may be taken up travelling to and from site. The impact of this on fatigue needs to be calculated as driving long distances particularly at night may adversely affect an individual's performance in making subsequent safety critical decisions. For a safety regulator it may be worthwhile asking how a RU intends to identify and manage this risk for their staff.

2. Train Driving and the role of the train driver

Train driving has also tended to become more specialised in an industry where open access competition is in place, although perhaps less so in freight than in passenger. In the traditional monopoly operator set up, freight workings would be covered when required by train crew drawn from the nearest depot, with many drivers being deemed competent to work a wide variety of traction types (freight and passenger) and who may have the requisite route knowledge of the local area.

The freight RU's have moved away from train crew depots where staff routinely begin and end their shift and have moved towards drivers travelling straight to where required, potentially increasing the useable driving time. Once again the issue of how travelling time is categorised and counted becomes important.

The fluctuating business requirements of Freight RU's may create issues with route familiarisation as certain freight flows may be seasonal, irregular or outside the existing area of operation. This is particularly the case when a new entrant operator is becoming established in an area (or country) and has a small workforce. Route learning is an expensive activity as it is all non revenue earning working time and the RU may not have access to or be willing to pay for route learning material from established operators. Where freight RU's are contracted to operate Engineering / infrastructure trains over routes that are normally only used by passenger trains, there may be an unwillingness to hire conductor drivers and rely on historical knowledge from the drivers past. Generally, drivers for freight RU's tend to work over a far greater route mileage than their passenger RU counterparts and the need to refresh routes is left to the drivers to highlight.

While these facts would suggest that Freight RU's are more likely to have operational incidents such as Signals Passed at Danger (SPAD's) than passenger RU's, making direct comparisons is difficult as shunting and propelling movements are arguably more likely to lead to these events. Indeed, it may well be worthwhile investigating further if the additional variation in routes is helpful in preventing train handling errors attributable to the onset of complacency and boredom if shunting SPAD events and possession incidents are removed from the statistics.

3. Management and Supervision of staff

As would be expected, changes to the working patterns and activities of the workforce has also affected the way in which they are managed. By moving staff out of defined 'depot' locations and making them more mobile there are implications for certain long accepted supervisory tasks such as 'fitness for duty' checks. In the past, train crew were (at least notionally) observed commencing duty by supervisory staff, which was a mitigation and deterrent against the use of drugs and alcohol.

With the move towards staff effectively not passing through the 'home depot' location, the Freight RU's have moved to a sample check system (typically being 15% of staff or more). It has been argued that the development and use of Drugs and Alcohol (D&A) testing has acted as a successful active deterrent to intentional substance abuse by train crew and this approach is more useful and scientific than the very subjective 'observations' of the duty manager. It has been noted that 'remote booking on' is also becoming common in passenger RU's in the UK as well. The 'fitness for

duty' checks are now performed by line management when staff are visited at work for competence assessment and also potentially when attending rostered safety briefings and meetings.

While the frequency of personal contact between management and frontline staff may have been reduced, the impact in terms of overall supervision and competence monitoring may not be that detrimental. Many RU's in the UK (including passenger) have merged competence management with general employee management, so that it is conceivable that staff may be actively assessed as much as under previous regimes. This does require management to staff ratios to be set at the correct levels, particularly if they are dispersed geographically. As freight locomotives are fitted with OTDR /OTMR (data recorders) this has also opened up opportunities for assessing driving behaviour remotely. Voice recording equipment in signal boxes has also been regularly used for assessing safety critical communications although it has been noted that freight RU's have been under represented compared to passenger RU's in engaging in joint communications monitoring with the Infrastructure Manager in the UK.

The previously mentioned subject of fatigue is also very relevant to the management and supervision of staff. While freight 'RU's may have some regular traffic flows, in some companies a large proportion of trains run may be on an irregular or 'as required' basis. There may also be huge variations in demand over time from freight customers. Consequently freight train crew may have much more irregular shift patterns than those who undertake passenger work, as a stable timetabled service is easier to create diagrams around. Within the UK, rostering is built around the 'Hidden rules' which formed a recommendation from the Clapham disaster in 1988. These suggested restrictions on maximum number hours on duty, number of hours rest between turns of duty, maximum number of consecutive turns of duty etc and have been applied to all safety critical roles.

Smaller freight RU's with a limited workforce (and no spare resource) may find they have no option but to request drivers to work excessive hours or have reduced rest periods when experiencing staff sickness or during late running from network disruption.

Thus a safety regulator may wish to know how an RU manages and checks its rostering of staff to ensure that safety is not unacceptably compromised by commercial pressures. Are they compliant with their own or accepted industry guidelines and their safety management system? Is there a high likelihood of non-compliance in everything but ideal operating conditions?

4. Rolling Stock and Equipment

Market liberalisation in rail freight sector has also had an obvious impact on the rolling stock in use and the way it is maintained – both subjects which should be of interest to National Safety Authorities.

In the classic European state railway, while some freight locomotives would be purchased for certain traffic flows, many would be cascaded to freight work when displaced by newer passenger locomotives. In other cases mixed traffic machines would be purchased (as is the case in Ireland) to obtain maximum flexibility and utility. In the competitive freight market RU's have moved towards purchasing dedicated freight locos and there has been substantial renewal in the wagon fleets. Some new entrants have used re-manufactured or reconditioned locomotives to enter the market, but this has mainly been a stop gap solution while new machines are procured or the business is grown.

It is worthy of note that six of the seven freight UK operators have the Canadian built EMD JT42 CWR locomotive in use, better known as the 'Class 66'. The same design is now certified and used in France, Germany, Poland, Sweden, Norway, Luxembourg, and Denmark by open access operators. A similar machine is also in use in Ireland in mixed traffic use.

One of the principal factors behind purchasing newer locomotives has been to gain economies in operation. The newer locomotives are more reliable and easier to maintain not requiring inspection pits for routine examinations, thus enabling maintenance facilities to be reduced. Indeed, some operators arrange for basic maintenance inspection / examinations to be undertaken by 'mobile fitters' who travel to the locomotives locations by road vehicle as this is cheaper than specially repositioning a loco to a maintenance depot with its attendant fuel and driver costs. Higher reliability and less maintenance time mean higher utilisation, thus allowing fewer locomotives. This can mean equipment failure and fatigue may develop earlier than expected through greater intensity of use.

In the case of wagons, similar principles apply. Modern disc braked wagons with self adjusting brakes can have their planned maintenance at six monthly intervals – double the three monthly intervals for older types. The payload has been increased on many newer wagons which can help offset the initial purchase or leasing cost. 'Track friendly' bogies also attract lower track access charges from the Infrastructure Managers and may permit faster speeds on certain routes.

The standardisation of equipment has also been motivated by the desire to bring equipment into service as quickly as possible and to avoid development and testing costs. This makes the scrutiny of the initial type approval by the NSA especially important, but then subsequently reduces the workload as each purchaser buys 'off the shelf' products. However, the importance of getting an initial approval correct cannot be underestimated in an industry where many operators are using the same product.

Another factor driving standardisation of equipment is that much of the rolling stock is procured through leasing companies who are mindful of residual value. Locomotives are much easier to re-lease if other operators already have drivers and maintenance staff familiar with them, thus avoiding training costs.

It is highly likely that NSA's may see the manufacturers being much more heavily engaged with the approval and commissioning process in future in order to obtain orders for their products. In the more fluid competitive freight industry, the challenge for NSA's comes with ensuring that not only are the maintenance procedures for equipment fit for purpose, but also that they are also followed and that any safety critical defects are reported and notified to other operators. In the UK this is achieved through the template 'NIR Defects Notices'. For the NSA, the emergence of an active leasing market (particularly in wagons where it may be international) creates new challenges in terms of understanding how maintenance responsibilities are divided, particularly after an incident or failure. The recent incident in Viareggio, Italy in June 2009 has raised the profile of wagon maintenance as a subject.

5. Infrastructure

Should the progression towards a competitive and liberalised market create issues or concerns for NSA's with regard to the infrastructure away from the main running lines that they operate or lease? There would not appear to be any significant evidence to suggest that this is the case so far in the opinion of this author. Competitive operators will understandably seek to undertake only necessary maintenance and renewal of the track work in their yards and depots in order to reduce costs and match spending to the volume of train movements. However, historically, yards and depots have not necessarily received much substantial investment or attention even when part of the vertically integrated railway, with often cascaded track materials being used and lower maintenance frequencies.

It is challenging to draw clear conclusions on whether open access competition changes infrastructure based risk. Derailment events in yards and sidings are not necessarily reportable to NSA's. Track condition may also take a long time to deteriorate to the point where it features in safety statistics – perhaps longer than open access competition has been around. Looking at workforce injuries in yards is another possible indicator - if overhead lighting is not being maintained, walkways are not improved and vegetation is allowed to encroach, particularly in infrequently or less used yards, then slips, trips and falls will increase.

Conclusion

The liberalisation of the rail freight market has undoubtedly resulted in considerable change for all the RU's, some of which inevitably have the potential to affect safety and consequently the focus of NSA's needs to be directed at these. It is probably reasonable to say that new entrant freight undertakings that do not have the backing of large parent companies or existing RU's warrant closer scrutiny to ensure they are able to comply with their own approved safety management system. The role of the regulator is made all the more challenging by balancing the desire for a safe and improving railway against over-legislating and preventing rail being able to compete with other modes on cost, thus potentially increasing the overall risk to society.

It is important to remember that advances in engineering and materials, technology and human factors have the potential to balance out some of the competitive pressures which can affect safety. There is also a high business risk from being found to be non-compliant and facing disruption from regulatory action which may act as a reasonable deterrent and help keep safety a higher priority.