

SMART ASSURANCE

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1.0 BACKGROUND

Throughout history many significant safety incidents have occurred where the outcome could have been predicted. Three Mile Island, Clapham Junction Rail Crash and Challenger Space Shuttle are all catastrophic events which could have been prevented had the right management information been collected, reviewed and acted upon. Equally, organisational change is often cited as an underlying cause where the organisation fails to identify and act upon significant risks. In April 2020, following a period of protracted organisational change, a tragic accident occurred, when a trackworker was hit by a train resulting in fatal injuries near Roade in Buckinghamshire, England (Roade fatality).

Whilst any investigation will cite multiple latent failures that contribute to any significant incident (Reason, 1997), there were two areas that in the immediate aftermath became clear needed improvement. The first was the monitoring and assurance of the supply chain when working on the Network Rail infrastructure and the second was a structured and co-ordinated approach to continual improvement.

The plan, do, check, act model (Deming 1986) identifies a clear and trusted method of implementing a robust, proactive manner to manage the safety of those impacted by business operations. Network Rail had become very focussed on checking with hundreds of pieces of assurance being undertaken every month without any focus on level of risk being introduced nor the accountability for that risk. Lots of assurance is not necessarily effective assurance.

Capital Delivery (CD), North West and Central (NW&C) Region, Network Rail was the area of the business accountable for the works being undertaken at the time of the Roade fatality. This part of the business is in charge of leading capital expenditure programmes in the NW&C region. The works covers large scale enhancement projects, renewals and minor works programmes up the western side of England, from London to Carlisle (just south of the border with Scotland).

There had been a blurring of lines of accountability in the application of both contractual requirements and duties under legislation such as the Construction (Design and Management) Regulations 2015 (CDM). Under CDM, in general, Network Rail hold the duties of Client and Principal Designer giving them accountability for planning the work

and assuring that the Principal Contractor (the supply chain) is undertaking their duties. As an ‘informed Client’ Network Rail would also be accountable for the protection of the railway asset and ensuring that any risk to that asset was appropriately managed. However, Network Rail had stepped into the space of trying to manage the construction risk (which is clearly the accountability of the Principal Contractor) regardless of impact on the railway. This had left the Client / Principal Designer organisation assuring in the role of Principal Contractor, absolving the Principal Contractor of their accountability and assuming greater liability by the Client / Principal Designer.

Equally, the protracted reorganisation had meant teams had taken their eye off the ball (HSE, 1994) and were reliant on their professional aptitude and competence to ‘do what was right’. The blurring of lines had resulted from a lack of clarity of roles and responsibilities and created a culture to ‘get the job done’ and deliver work. This resulted in the Network Rail teams stepping in to support the supply chain resolving issues but leaving a void for positive learning and sharing of good practise.

As learning was absent the outcomes of the assurance activities were not being analysed in a useful format to inform management, therefore opportunities to improve planning and deliver works were being lost. A plethora of unco-ordinated and unfocussed improvement actions were being taken both locally and at national level with multiple similar workstreams ongoing created by silo working resulting in duplication of effort creating inefficiencies and confusion for staff and supply chain working for the Client / Designer organisation. A vicious circle being created – assure, don’t learn or share, act, don’t learn or share; assure, etc. This needed resolving to reduce the confusion being created.

Finally the UK rail regulator (ORR) report for the previous two years, including their maturity matrix measure (RM3) shows that whilst leadership was strong the approach to assurance was weak, a demonstration of trying to do the right thing but not working to the processes in the robust management system. Evidence was available of high volumes of checklist assurance, but this is very different from effective assurance.

2.0 OBJECTIVE

The purpose of this paper is to share how the Capital Delivery team (NW&C) in Network Rail (the team accountable for the Roade fatality) took action to make improvements to the working practices which had become the norm and were preventing positive safety management.

Following the Roade fatality it became apparent that whilst under the legislative requirements of CDM there were clear responsibilities for Client, Principal Designer and Principal Contractor and roles that each would play in the Plan, Do, Check, Act model (Deming, 1986) these lines had become blurred and the business was reliant on people acting on their competence and not necessarily in line with their responsibilities.

2.1 Plan

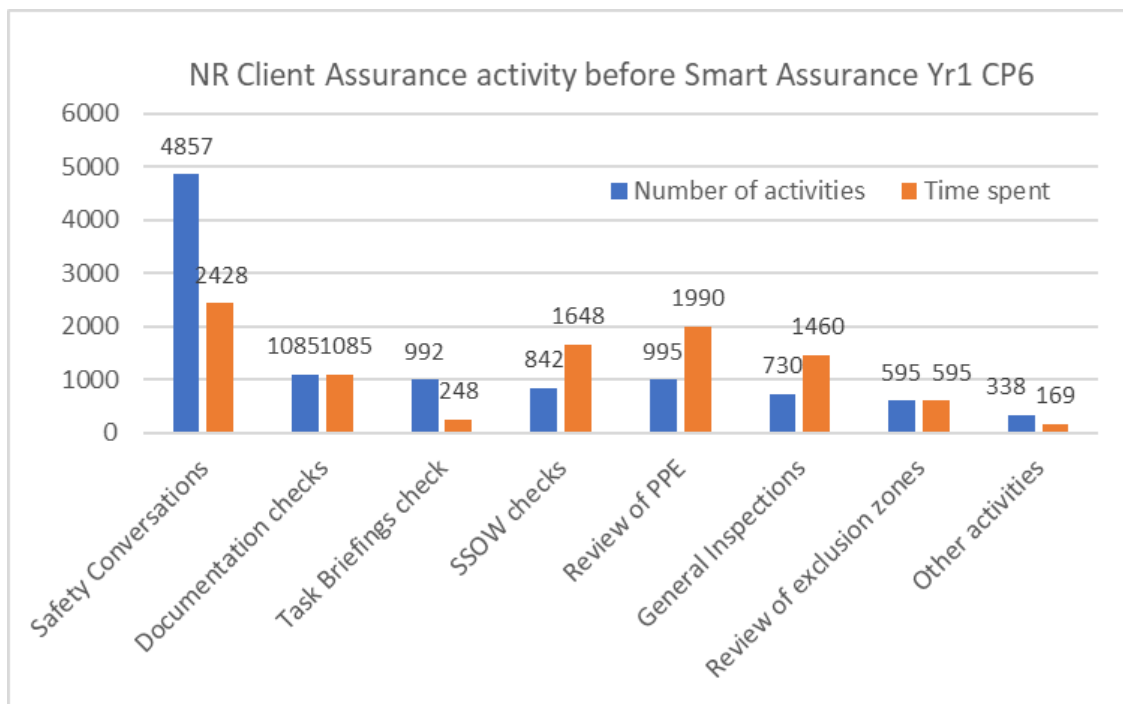
There is a requirement for Network Rail (as Client and Principal Designer) to provide an appropriate level of information on the risks associated with the construction work. This was being produced and issued largely in a timely fashion with an acceptable number of checks being undertaken on this. This area will not be explored by this paper.

2.2 Do

The supply chain (the Principal Contractor) were generally performing well with safe delivery of works. The planning documents were acted upon with control measures put in place. Generally, where risks were identified they were acted upon promptly however this was based on gut feeling rather than through management information. Network Rail were confusing and over burdening the supply chain through a level of assurance, based on the construction risk and not the Network Rail owned risk.

2.3 Check

There was an extensive assurance regime in place, conducting a large number of assurance activities in accordance with the company processes. The checking tended to be a scatter gun approach as management information on Network Rail risk and prioritisation was not available. Assurance was focussed on the site based obvious issues that were low hanging fruit as this was believed to be the right thing to do. Network Rail had become too focussed on identifying the supply chains flaws to fix and were not focussed on significant railway risk. Due to the protracted reorganisation our teams had returned to their construction knowledge rather than risk based assurance. Prior to the Smart Assurance approach, there were circa 11,000 Client led assurance activities conducted per year (see graph 1). These were not risk based and offered low value in terms of positive changes to risk management. Any reference to assurance is based on level 1 assurance which is defined as assurance ‘operational management oversight to confirm processes are well controlled to manage inherent risks’ and ‘assurance activities conducted within a business unit that primarily provide assurance to the business unit leadership team’.



Graph 1 – Assurance activity prior to Smart Assurance

2.4 Act

Network Rail collaborates with our supply chain to deliver improvements in health, safety and environment. As the protracted reorganisation had been implemented and a Regional model, as opposed to national, had been adopted, Network Rail were now asking the supply chain to work on improving the same risks in 5 slightly different ways. This resulted in duplication of effort, discussion and debate. Equally, the improvements being identified were either knee jerk responses or based on gut feeling and not on management information which would identify significant risks and prioritise action in a systematic manner.

The existing governance framework for improvement actions was through Regional Safety, Health, Environment Leadership Teams (SHELT's). These were not co-ordinated and had numbers of independent workstreams that were similar in nature and duplicating effort. Similar to the assurance these were not risk based.

This paper will focus on the Check (assurance) and Act (improvement) elements.

3.0 METHODS

The hypothesis to be proven was two fold.

- The level 1 assurance being undertaken by Capital Delivery NW&C was insufficient.
- Improvement actions are risk focussed, have a single approach and avoid duplication of effort

Two distinct workstreams were put in place to work on both the assurance and improvement hypothesis.

3.1 Assurance

3.1.1 Regulator Maturity Matrix Review

An initial review was undertaken based upon the requirements of the regulators maturity model (RM3). The focus of this was the assurance of workforce safety. The model dictates the following topics:

- Proactive monitoring arrangements
- Audit
- Incident investigation
- Management review
- Corrective action

The review was a rapid assessment based on interviews of 6 senior managers and a review of associated documentation.

A review was also undertaken of the regulators report on performance against the maturity matrix.

3.1.2 Data analysis

Evaluation of available data was undertaken to understand what the significant risks were and how these should be approached. Whilst incident data was available the decision was taken to look at precursor information as this was more plentiful and hoped to provide richer insight.

Close call data (situations reported which could have led to harm occurring) is collected through a central system that collates data from both internal Network Rail teams and the supply chain. This data was analysed to identify:

- the numbers of close calls identified by category
- the numbers of close calls identified by level of risk

The risk ranking was then used to identify the significant risks and where the focus of assurance should be placed. The result of this would be risk based assurance, Smart Assurance.

3.1.3 Smart Assurance

Once the data had been analysed the ‘new’ Smart Assurance process was developed. This was then trialled with three members of the supply chain ahead of full roll out and targeted site based assurance being implemented.

3.2 Improvement

An initial piece of work was taken to understand how the 5 Regions of Network Rail could work more collaboratively, providing a single approach and reducing duplication of work for both internal teams and the supply chain. Consultation across all 5 SHELTS was undertaken with a proposal then developed in consultation with the supply chain.

Following this, analysis was undertaken by the governance structure that was established to identify how improvements could be identified from a risk perspective and reduce the reliance on gut feeling and knee jerk reaction.

This analysis consisted of mapping key risks based on data on the causes of national accidents and incidents. This was then risk rated. A map was then created to plot key risks to all the current workstreams. The outcome was to enable identification of missing workstreams and removal of duplicated workstreams.

4.0 RESULTS

4.1 Assurance

Assurance was the first of the two workstreams to be worked on, this was to determine the right approach to risk base Smart Assurance.

4.1.1 Regulator Maturity Matrix Review

The review that was undertaken identified that CD NW&C were ‘managing’ the assurance but there was scope of significant improvement. Monitoring processes were in place across CD but they were recognised to be highly reactive and delivering limited insights. The effectiveness of auditing activities was constrained by a focus on checklists and there was a weak link connecting risk and assurance activities. Management review arrangements were extensive and tracked a wide range of indicators but the reviews failed to translate to any improvements on site. The processes in place to track closure of non-conformances but the impact of the CD leadership team on the supply chain to influence broader safety improvements was limited.

The ORR had expressed concerns regarding the effectiveness of the assurance regime in place in particular the level 1 tactical assurance.

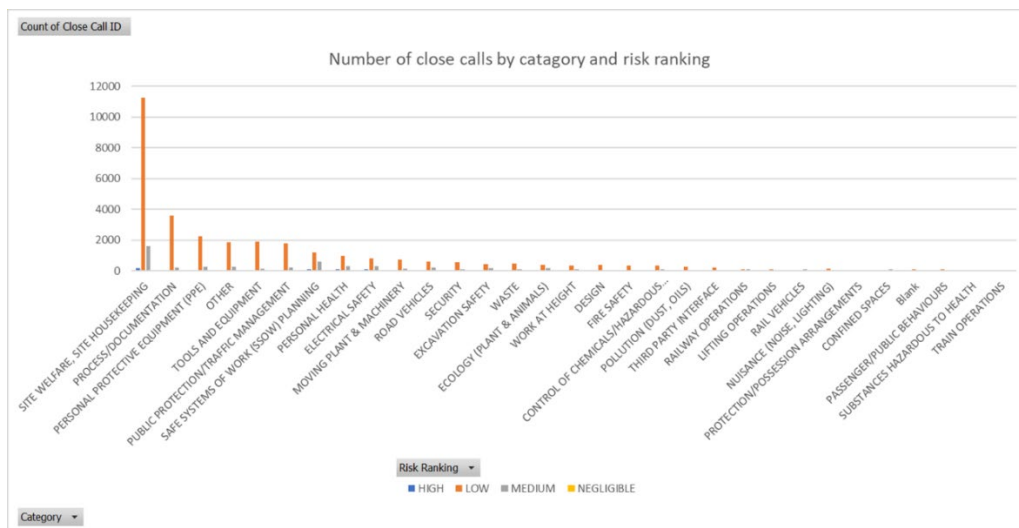
The level 1 assurance has been dominated by compliance with company standards and the number of checks being targeted rather than the quality of the assurance activity, this was borne out by the findings from the review undertaken internally which identified the number of activities without risk focus.

The outcomes from the assurance activities were largely trivial in nature with focus being on missing documents and signatures rather than substantive health and safety risks. This was borne out by the internal review which identified that low hanging fruit was the focus.

4.1.2 Data analysis

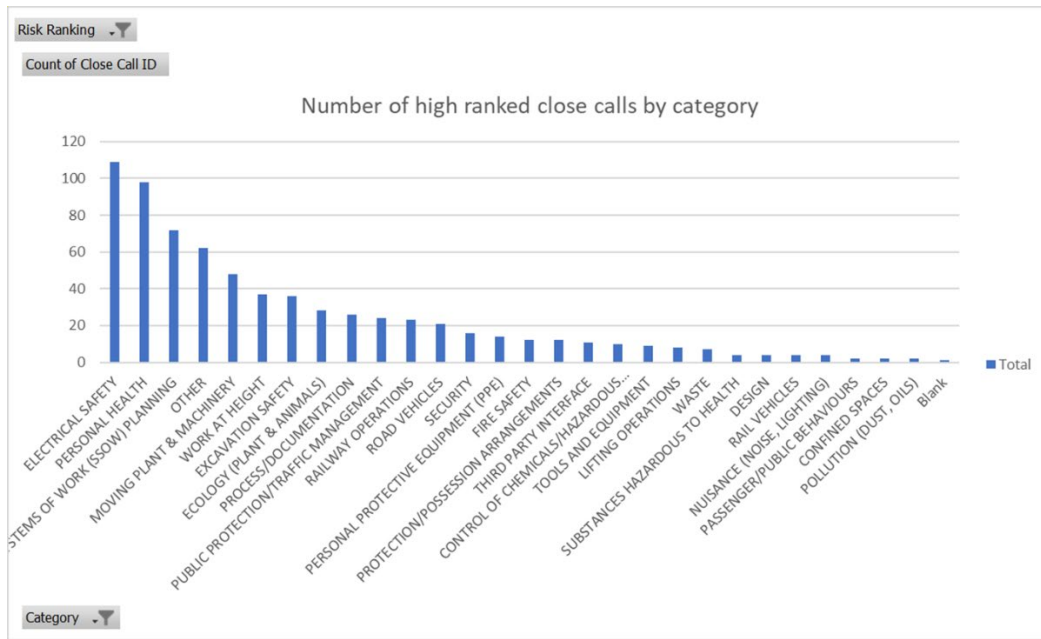
Data analysis of close calls demonstrated much of the assurance was undertaken on low risk high frequency issues that were underlying causes to many of the accidents for example slips, trips and falls, housekeeping and welfare (see graph 2). This data supported the introduction of a risk based approach to assurance focussing question sets specifically around significant risk and assuring the suppliers assurance.

Graph 2 below is a pareto of the close calls by category. The dataset contains 37,782 close calls from April 2019 to June 2021. It shows that the highest number of close calls reported were against lower risk items such as welfare and site tidiness / condition. Whilst these are important areas for improvement, deficiencies in these areas are less likely to cause serious harm compared to other areas such as electrical safety, excavation safety or working at height. Network Rail and their supply chain were incentivised to report close calls which can result in a high number of lower risk items being reported. Close calls are risk ranked and as can be seen below, 85% are low risk, 13% Medium risk and 2% are high risk. Reflection through the analysis identified that the low risk items were to some extent masking the more serious pre-cursor information contained in the high a medium risk close calls.



Graph 2 Close Call risk ranking

Graph 3 below is a pareto of the close calls categorised as ‘high risk’ – those more likely to result in serious harm. The order changes very significantly and is far more meaningful in understanding what the significant risks are to workforce safety.



Graph 3 Significant risk identification

This close call analysis illustrated that the large volume of assurance activity was not focussed on the highest risks. For example, electrical safety or working around excavations does not feature explicitly in the 11,000 activities undertaken and these would have been prevalent activities over the same timescales that the data was taken from.

This data enabled the team to identify that the assurance activities being undertaken matched the low risk categories and proved the hypothesis that the level 1 assurance being undertaken was insufficient.

4.1.3 Smart Assurance

Work then began on creating Smart Assurance. Smart Assurance is a way of undertaking risk based assurance to improve workforce safety. Smart Assurance aims to focus assurance effort on high impact workforce safety risk prioritised by insight from management information and informing action. It improves efficiency through focussed assurance effort and maximized safety benefit. Most importantly it allows collaboration and sharing of positive safety performance to allow both internal teams and supply chain to learn.

The Smart Assurance system was developed to align to the Client and Principal Designer roles ensuring clarity of responsibility and a focus on Network Rail (not Principal Contractor) risk. It was also aligned with the Network Rail health and safety management system to ensure compliance to processes. A framework was created for both targeted site based assurance activities and smart assurance on management system implementation and assurance activities of the supply chain.

Smart assurance was also linked to well established processes such as the assurance of construction planning information, Principal Contractor Licensing (all Principal Contractors must hold a license to work on Network Rail infrastructure and assurance of this is level 2 business assurance).

A two stage approach was established to assure both site activity (targeted assurance) and assurance of safety management system (smart assurance).

The first test runs were on the Smart Assurance element. The system was developed to assure the Principal Contractors based on the significant risks identified co-ordinate with the high risk activities that that particular contractor was undertaking at the time. The Plan Do Check Act model was followed in terms of a question set with four basic questions. Demonstrate how you:

- Plan for [assurance subject matter]
- Undertake [assurance subject matter]
- Assure [assurance subject matter]
- Make improvements to [assurance subject matter]

The openness of the questions has led to the assurance activity being an open discussion about any challenges and non conformances that the Principal Contractor may have, but more importantly has provided great learning on the positive safety management activities being undertaken. This has then led to the establishment of best practise sharing workshops to enable the good practises and learning to be shared (see below).

With Smart Assurance developed and implemented, targeted assurance question sets were made available in the significant risk areas and these are routinely used to undertake site based checks. The focus of these is not to look for issues on site but to look at how the Principal Contractor is doing their assurance and checking processes are complied with.

These question sets have allowed for specific topic focusses when accident investigations or other assurance activities have identified that there is a specific risk. Special topic inspections have been carried out on task planning and lifting operations in the last 6 months. This has given valuable information of any weaknesses so that improvement action could be taken.

4.1.4 Learning and sharing

This risk based approach has identified significant numbers of best practises previously undetected. Improvement workshops have been established with the wider supply chain community to share these best practises and build on our continuous improvement ethos to safety, health and environment. This has led to specialisms being identified in quality and plant safety with future groups planned to share learning across these areas.

The results from both the targeted assurance and smart assurance are trend analysed and discussed in a monthly business review where decisions are made based on the information for further improvement actions and further assurance activities such as specific topic focusses as identified above.

4.2 Improvement

Improvement actions were the second part of the jigsaw.

Following the consultation with the supply chain and SHELTS it was evident that our hypothesis was incorrect and that there was no single approach, avoiding duplication, for improvement actions. A proposal for governance was agreed for a meeting which would feed into the national strategic meetings but also act as a direction and co-ordination point for each of the SHELTS. This was established and the structure can be seen in fig 1. The Collaboration Group then acted as a focal point for identifying national improvement actions and appointing an owner to deliver the work.

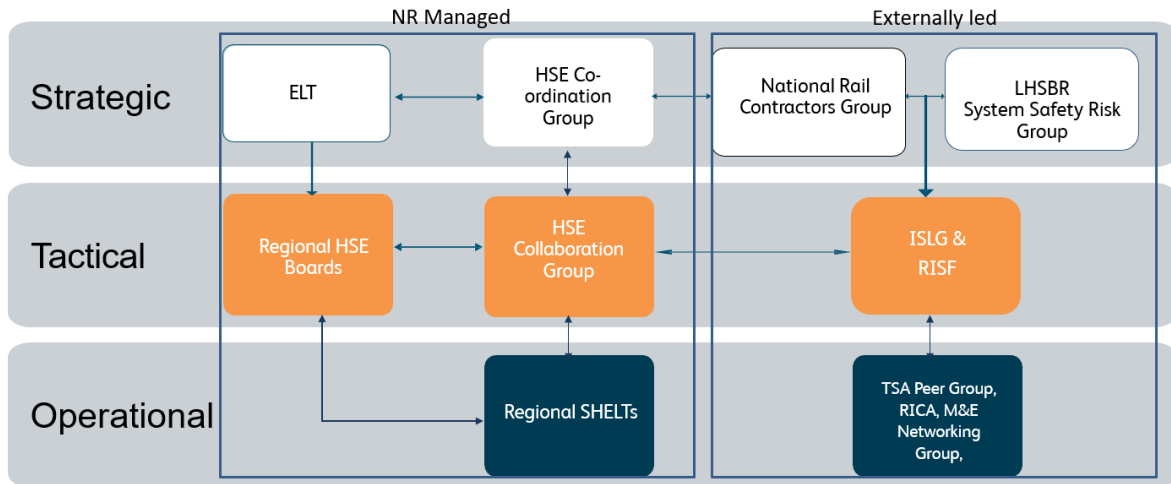


Figure 1 Governance structure.

With this structure in place the analysis could be undertaken on national risk and identification of improvement actions. This analysis identified the top risks in terms of injury and then was mapped against the existing working group (of which there were 112). The root causes of the accidents and incidents were also linked with the analysis (see figure 2).

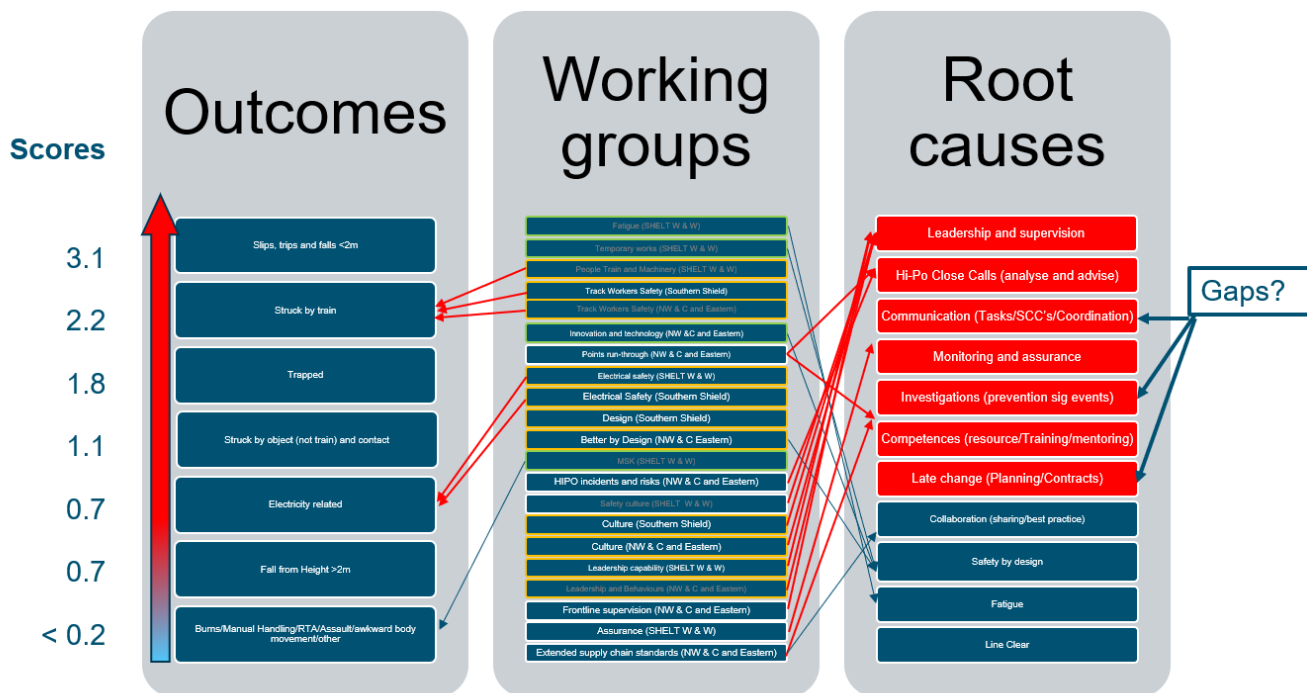


Figure 2 Analysis of Incident Root cause linked to working group

This allowed us to identify our top 5 working groups which have then been designated to a lead Region. Whilst this is in its early stages it has resulted in more efficient working for Network Rail and the supply chain with duplication of effort removed.

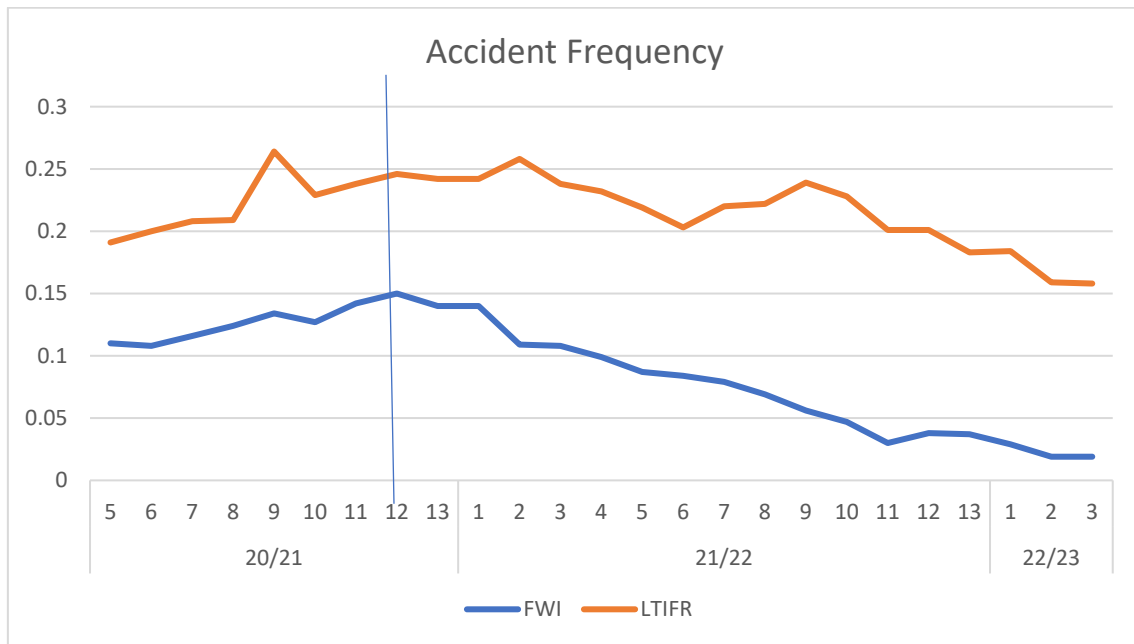
The top 5 working groups to be established are:

- Communication
- Planning & Late Change
- Monitoring & Assurance
- Investigations & share learning
- High Potential Events

5.0 CONCLUSION

The hurt that was felt when we lost a colleague will stay with us, however the work that has been done since has helped to prevent a further tragedy. The additional visibility of risk profiles in line with effective assurance on those significant risks means that the barriers to latent failure stronger and more effective.

Since the introduction of this process there has been a steady decline in our accident and incident frequency rates with all time low month on month for the last 5 months (see graph 6).



Graph 6 Accident Frequent pre and post Smart Assurance

The reduction in accident frequency rates (in particular FWI) demonstrates the positive impact the introduction of this process has achieved. The impact of Smart Assurance has not only improved our safety performance but also developed a more efficient risk based way of working which has been well received by all. Figure 3 demonstrates the low value high frequency assurance which was being undertaken pre Smart Assurance and today's model.

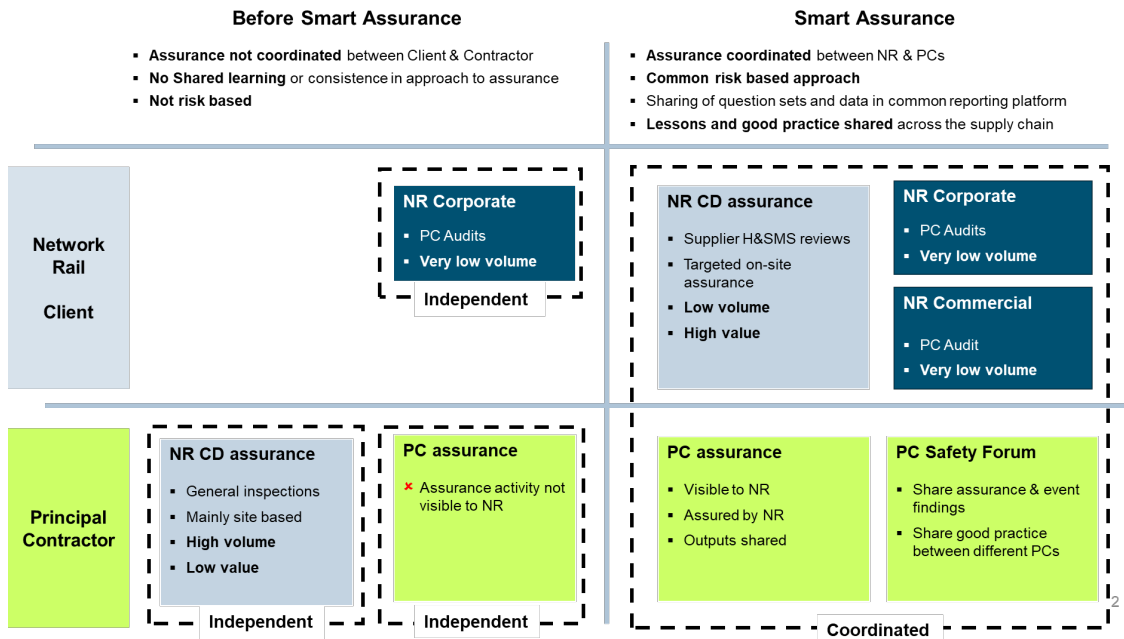


Figure 3 Pre and Post Smart Assurance

The feedback received from the ORR and supply chain has been positive and the process well received by those participating to date. The ORR are programmed to observe a full Smart Assurance activity later this year.

The process has been shared with the rest of Network Rail and work is being done to deliver a national roll out of Smart Assurance and the governance process.

In the interest of continual improvement, refinements will be ongoing to hone the process which will hopefully lead to further reduction in accident numbers. There are further linkages to make with accident investigation and with supply chain assurance data feeding into the risk analysis. This will aid a stronger picture in terms of management information and allow better intelligence for risk profiles and assurance.

The intelligence from the assurance is beginning to be utilised to drive our strategies for improvement actions both at a national and local level. It is also helping to determine local interventions and support our supply chain in taking safe decisions for their own operations.

Smart Assurance has enabled CD NW&C to redefine the boundaries and clarify role and responsibilities for assurance and improvement in line with both the duties for Client, Principal Designer and Principal Contractor under CDM and with the Plan Do Check Act model.

Work will continue in line with the assurance programme, lessons will continue to be shared and best practise sharing adopted.

Keywords: Smart; Assurance; Improvements; Data; Plan, Do, Check, Act