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Contents

1 Introducing the review team

This review was commissioned as part of the 2017 P3M3 assessment of Network Rail IP by Aspire Europe Limited.

Aspire Europe have been at the leading edge of programme management development over the last 10 years and led the design and authorship of Managing Successful Programmes (MSP) framework for both the 2007 and 2011 versions. Additionally, they have been at the heart of P3M3, having provided the team that led the design and authorship of P3M3 itself, for the 2008 and 2015 versions and as such have a unique insight into programme management and transformational change.

The team for this assignment included:

- Rod Sowden – MSP® and P3M3® lead author
- Eileen Roden – P3O® lead author
- Geof Leigh – MSP® and P3M3® author

2 Executive summary

In 2018 the programme will cease being a major programme and the legacy to Network Rail IP will be:

- Thameslink Programme is the first socio economic transformation programme run by Network Rail. It has developed a range of working practices that can be deployed to the next generation of programmes and will underpin the development of GRIP for Programmes.

- A committed and capable workforce that are strongly bonded as a unit and can operate to high levels of quality productivity. If they disperse they will take their knowledge with them and the sustainability of the high performing teams will be lost.

- Ground breaking commitment to social and economic sustainability within the environment in which it operates. It has developed processes to cover local engagement and opportunity development for residents and improving the management of the environmental impact.

- The programme has been at the dawn of the Digital Railway; the innovation and integration of track and train based technology has laid the foundations for automated and safe operations in the future.

- Collaborative working internally and with supply chain partners has yielded benefits through programme risk mitigation and the creation of a culture of trust and openness between Network Rail and key members of the supply chain.

- Challenged and changed traditional engineering practices and developed new approaches to design and deploy engineering solutions.

2.1 Thameslink Programme context

This is not an attempt to capture or highlight all the lessons from the Thameslink Programme. It is intended to provide an insight into the achievements of the first genuine transformation programme delivered by Network Rail staff and some pointers for people who are interested in adopting their practices.

Thameslink as a concept has been around for 35 years. Services were restored through the Snow Hill tunnel reopening in the 1980s, but services quickly became overcrowded and a number of attempts to move forward in the 1990s floundered. This resonance of the infamous Thameslink 2000 programme still has baggage within the sector.

In 2006 the government gave the go ahead for the £3.5bn Thameslink Programme that will cease to be a major programme in 2018, following this Thameslink will deliver its remit as a major project until final completion.

The complexities and challenges that faced the Thameslink Programme are often underestimated. During the same timescale Crossrail and HS2 have often grabbed the headlines with glamorous pictures that have gained industry and public attention.

Thameslink Programme has been the source of major disruption for Londoners as the transformation has been happening along a live rail route. Its achievements have largely gone unnoticed as the major benefits to the travelling public will only have been seen when all the work is completed and new rolling stock shoots through central London at the rate of 24 trains per hour connecting the south coast to the Midlands.

The Thameslink Programme **objectives** were:	It was tasked to deliver the following **outputs**:
- Reduce overcrowding on Thameslink Programme and other commuters' services - Reduce overcrowding on London Underground - Reduce the need for interchange between mainline and London Underground train services - Provide for the introduction of new cross London services, so improving public transport accessibility in the South East - Provide capacity for future increases in passenger demand	**Key Output 0** – increase from 8 to 15 trains per hour during peak periods between Blackfriars and St Pancras. This was achieved in 2009 **Key Output 1** – allow 12 car train operation between Brighton and Bedford, which required major changes to stations and platforms along the line. This was completed by 2011 **Key Output 2** - enabling 24 trains per hour by 2018, which required remodelling of London Bridge station plus a range of other workstreams to support the operation of a new fleet of trains with state of the art signalling to support the through rate

The Network Rail IP Thameslink Programme is part of a wider Department for Transport programme which includes the acquisition of a new fleet of 115 trains and a re-design of the franchises around the routes.

Unlike many UK infrastructure investments, this one is on schedule to achieve its objectives, deliver the major outputs on time and within 12% of the overall budget. During the timeframe of the programme, passenger traffic has increased 50% above initial predictions. This success has not come easily and many aspects of the programme have been ground breaking, not only within Network Rail but within the industry.

The programme has extensively documented lessons learned, however, this paper endeavours to capture the programme management legacy and how it was achieved.

The value of managing the aggregated investment across a number of projects as a programme has been gaining traction over the last 10 years. The first examples being West Coast and PSU, in effect these were first generation programmes. Thameslink Programme has taken Network Rail into a second generation to include transformation through business and socio economic benefits, which leaves a significant legacy for the next generation of programmes that are forming and taking shape at the moment.

2.2 Method

This paper is the result of a commission to undertake a lesson learned about Thameslink Programme from a programme and project perspective. The approach undertaken was to:

1. Conduct informal interviews with senior managers who had seen the majority of the Thameslink Programme lifecycle
2. Workshops with teams of people that covered:
    a. Sponsorship and benefits
    b. Organisations and project management
    c. Sustainability and safety
    d. Engineering and quality
    e. Finance, Programme and Commercial services

Outputs of the work also included:

a. Slide pack with a summary of the workshops
b. Individual slide pack records of each workshop
c. 20 video messages from workshop attendees on major lessons they would like to share with others.

Programme Environment

"During the data gathering

it became apparent that

there were a number

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and culture for success."

3   Programme environment

In the past, we have undertaken many reviews of programmes and organisations and have written extensively on the common causes of success and failure. During the data gathering it became apparent that there were a number of unique factors present in the Thameslink Programme that have contributed to the success. They have illustrated the criticality of setting an environment and culture for success. They have not all occurred by design, but those that are within Network Rail's control, should be considered when setting up future programmes within Network Rail IP.

3.1   Establish effective and consistent governance.

The Thameslink Programme has enjoyed stable and effective leadership since inception in 2007. This has come at three levels of governance.

- **Stable client.** Department for Transport, as the client, has had a stable team that has enabled consistency of direction and decision making at the strategic level. There was little change in the DfT programme team during the critical stages of evolution which enabled consistent and coherent direction from one or two key individuals.

- **Programme direction** within Thameslink Programme has benefited from only two changes to the Major Programme Director during the lifecycle. As it has moved between tranches (delivery phases) the style of leadership matched the evolution of the programme, with a visionary and aspirational style at the outset to support mobilisation (Andy Mitchell) , but with a more detailed, delivery and control focus during the delivery stages (Jim Crawford, Simon Blanchflower)

- **Embedded sponsorship**. The programme has benefited from a closely embedded and stable sponsoring team that has enabled transparency and joined up thinking with highly capable and dedicated sponsors engaging with equally capable and committed delivery teams. The co-location and co-creation of solutions to achieve the Key Output specifications provided the bond.

This stability in the governance model is unusual and the success that it has created should be used as an example to the third generation of Network Rail programmes of what can be achieved if the right governance model is put into place. It is not usually possible to control the design of the governance environment, but Thameslink Programme has certainly benefited from this.

Supporting video
• Maintaining delivery within a changing political climate • Establishing a collaborative culture

The complex nature of the requirements has meant that the programme is delivering an infrastructure that spans 3 Routes (LNE, Anglia, South East), two regions and interfaces with TfL. This meant there was a complex management model to deliver and support the achievement of the outcomes. The gap in the governance has been around the Routes, where the business changes required to deliver the major outcomes resides. This is covered later in the risk section.

3.2 High calibre, right amount and stable resources

Thameslink Programme has managed to recruit and retain top class talent that have remained through the majority of the lifecycle – much of this is down to the fact that the programme was seen in the market as a highly challenging programme which would enhance reputation. The strong internal brand and ethos has enabled it to retain many of the original team that have been able to provide stability of relationships and implement continuing improvements, based on developing internal experience, knowledge and enhanced expertise.

Strong leadership has been part of that attraction. A number of the people were attracted by the challenge and motivational style of leadership in the early years and that turned into a strong sense of commitment to achieving the goals, which in turn created loyalty to the programme and its deliverables.

The programme has been able to transcend the traditional internal constraints and break new ground in ways of developing processes, procedures, methods of working, governance, assurance and controls that exited in Network Rail. The dividend has been continuity of thinking across the programme with embedded knowledge and understanding; it has avoided the disruption of regular change and churn in the workforce whilst being able to attract and nurture talented people.

The Thameslink Programme has enjoyed the benefit of control of a fixed budget which has enabled them to pioneer new ideas and options not normally available to individual projects, as such they have been a breeding ground for innovation that can be universally deployed.

The progressive nature of the team and the openness to innovate is well illustrated by the establishment of the in-house Signalling Design Team, which was able to overcome the design and upgrade challenges for London Bridge that previous attempts through supply chain commissions had failed to do. The closure of Key Output 1 by a dedicated Network Rail team enabled the programme to focus on London Bridge and Key Output 2, it also provided a more objective approach to closing a tranche.

3.3 Inheritance from predecessors

A particularly unexpected discovery was the amount of inherited knowledge from predecessor "first generation" programmes, namely West Coast and PSU. This mainly happened through the human interface as people from these programmes joined Thameslink Programme and brought their knowledge with them.

This knowledge enabled them to implement similar systems and processes that had been used on West Coast, but enhancing them for the new environment and using that experience to ensure the lessons from the past were implemented for Thameslink Programme.

The West Coast information and document management systems were adopted and enhanced for use by Thameslink Programme and now provide successor programmes with a proven foundation on which to build.

The innovative nature of the Thameslink Programme has enabled it to take these lessons and address the challenges that a programme approach brings to the project world, specifically the need to be able to aggregate information from multiple projects and suppliers to establish and maintain effective control.

They have taken on board the lessons learned and as the "second generation" of Network Rail programme management, they have developed a number of their own contributions to best practice for future Network Rail programmes.

3.4 Programme isolation

Not all of the environmental factors have been helpful, some have worked against the programme. As a brand, Thameslink have been burdened by the failures of the past, and even now there are many in the sector that scoff at the mention of Thameslink due to the shelved Thameslink 2000 programme, hence we have used 'Thameslink Programme' in this paper.

The team has been accommodated away from the Route based Network Rail teams which has minimised the day to day interactions and the potential for knowledge flow in both ways. Furthermore, the size of the Thameslink Programme has led to be it being regarded by the main IP organisation as a region as there was no precedence on how IP would manage a large programme.

The impact has been that some of the ground breaking developments have not been extensively recognised or adopted as they are seen as "programme" lessons, not relevant to a region. Equally, developments in regions are not obvious to the Thameslink team.

Supporting video

- Delivering London Bridge transformation

This isolation was noticeable in the lack of interaction with Crossrail and the opportunities to share lessons with other live railway programmes have been missed.

Advice from Thameslink Programme

1. Do not underestimate the need for effective programme branding, particularly when it has been preceded by failures or has the same name as a route.
2. Separating the programme team from the rest of the organisation provides the opportunity to create a strong culture and sense of purpose in the team
3. Isolating the programme creates an air gap with the parent organisation which creates problems with communications
4. The autonomy of the programme has been a contributing factor in its success, it has enabled it to innovate, overcome obstacles and break with tradition in a way it would not have within the mainstream.
5. However the autonomy of Thameslink has led to challenges about how it is perceived by the wider NR organisation i.e. aloof, arrogant and to disconnected from 'mainstream' NR issues.

Thameslink Achievements

"The programme has been driven by clear and challenging objectives that have focused the team. It has established a team that has great belief in what is needed and the self-confidence to try to achieve this. Even where performance is excellent, they are still driving for better."

4   What did Thameslink 2018 achieve?

The achievements of the programme are numerous and well documented in a variety of papers that are part of the GRIP process stages and there is an evolving communications strategy to create a sustainable reference point for the work over the last 10 years.

The programme has been driven by clear and challenging objectives that have focused the team. It has established a team that has great belief in what is needed and the self-confidence to try to achieve this. Even where performance is excellent, they are still driving for better.

4.1   Collaborative culture

This has been achieved by design not coincidence; however the character and values of the Thameslink Programme team have enabled them to overcome a wide range of complex challenges during the lifecycle through their own internal determination and belief.

There has been a strong internal ethos of collaboration, driven by highly capable people inspired to achieve ambitious targets. This could only be achieved through high levels of integrated individual and team performance.

It has been supported by strong internal programme branding including induction and development processes for the staff. This has created an internal ecosystem of values, collaboration and joint working, for example, within engineering, the assurance design group has avoided wasted development of poor designs through early intervention and assurance throughout the process.

This has extended into demanding greater transparency and higher performance from the supply chain. Lessons from Key Output 0 fed into Key Output 1, and in Key Output 2 the lessons led to a major restructure of the supply chain and the establishment of the London Bridge Management Board which has established ground breaking relationships within Tier 1 in the supply chain, i.e. Costain.

A key message from the programme has been that "collaboration does not mean compromise". This was a lesson learned from the work on Key Output 1 and led to a very different relationship in the work at London Bridge. In Key Output 2 the London Bridge partnership group commissioned management coaching to support the collaboration behaviours.

> Supporting video
>
> 1.   AFC and commercial behaviour
> 2.   Supply chain quality integration

This delivered genuine transparency and trust between Costain and Network Rail, to the point where both parties had access to view each other's management reports and commercial positions, achieving the verification that enabled transparency and trust. The team do not believe that Key Output 2 at London Bridge will be achieved without complete collaboration.

The creation of a culture of collaboration was enacted as a strategic goal during the development of Key Output 2. Formal relationship plans, management systems and forums were established to ensure effective, value-added collaboration. In 2013 Thameslink achieved recognition under BS11000, the first and largest rail sector programme to do so. Collaboration is further supported by an internally resourced Network Rail Partnering Manager.

> **Advice from Thameslink Programme**
>
> 1. Integrated collaboration with the supply chain provides the environment to achieve more. Without the integration of the suppliers the London Bridge re-design would have cost more and taken longer
> 2. Collaboration does not mean compromise; all parties should be aligned on the goals and optimise their achievement to the benefit of all parties
> 3. Internal collaboration has been the primary method for knowledge management but supported by extensive internal communications about developments and changes
> 4. Develop a team ethic and transparent communications to establish a bedrock on which continual improvement has been built
> 5. Consider using a management coach to assist the cultural change required for full, transparent collaboration
> 6. Information that is being used to underpin collaboration should be verifiable

4.2   Developing a programmatic approach

The Thameslink Programme has built on the work of West Coast and PSU and has developed many processes and procedures to manage the complex array of projects and stakeholders within its sphere of influence.

In 2007, Network Rail had no concept, precedence or capability to deliver a large-scale socio economic transformation programme of this nature. The team has effectively invented programme management over the last few years. It has emerged from the Network Rail traditional approach to project management and had to work out how a programme should operate in such a complex stakeholder environment.

The programme team has had to learn tough lessons from its own experience and devise ways to deal with the issues of multiple workstreams and suppliers contributing to the major complex outcomes in their brief.

It has had a single programme business case and overarching budget and has benefited from the flexibility to manage a target cost internally. Various projects and initiatives have overrun, but the ability to offset these losses against gains achieved elsewhere has meant that the overall picture has been stable. This does not infer it has been easy, but it has been within the management control of the programme executive.

The programme business case approach has enabled effective decision making; enhancements to requirements are funded by changes to specifications in other parts of the programme to meet the changing environment, not least, the 50% increase in passenger traffic demand above the 2007 forecasts has been absorbed, with capability to meet this being delivered within the re-authorised budget.

The lack of a defined, detailed approach to many processes when Thameslink commenced in 2007 meant that the team had to internally develop processes that suit them and the talent within the organisation. They therefore work for the Thameslink Programme, but until tried elsewhere their wider benefit will not be known.

The dissemination of knowledge within the members of the team is achieved from widespread respect and trust for each other and their judgement. The processes that work within the Thameslink Programme are tuned to the judgement of the managers. Consequently, the mechanistic elements of the process provide the data on which recommendations are offered up, the actual decisions are based on the judgement and experience of the management teams. The achievement of having current, reliable and trusted data has taken years of development.

After the 2014 P3M3 assessment, the Thameslink team initiated work to create greater awareness and understanding of the benefits of the investment. An information booklet was published that enabled the programme team and external stakeholders to have a greater understanding of the programme outcomes and the socio economic benefits it was bringing.

A new management team may struggle to maintain that level of performance on the data available and there is a perception that the most successful appointments have been internal.

Advice from Thameslink Programme

1. Focus on the programme business case provided the internal decision making authority to make decisions internally to achieve the bigger goals rather than individual projects or schemes
2. Ensure that focus on the benefits and outcomes is maintained throughout the delivery
3. Lack of programme standards and processes has enabled Thameslink Programme to create a framework that is optimised for their use and provides a foundation for others
4. Processes and data do not fix problems, but without reliable data, effective decision making cannot be made. The processes are built to support the judgement and decision making of people with great knowledge of the Thameslink 2018 Programme and its history.
5. Ensure that there is change control of the requirements and an understanding of how they impact on outcomes
6. Generation of reliable and trusted data must be a priority from the outset

4.2.1   Risk management

The Thameslink Programme has had to develop a range of solutions for programmatic management of risk across a number of areas.

The Anticipated Final Cost (AFC) work has been a holistic approach to maintaining focus on the final costs of the programme. It involves bottom up estimation of the programme on a 6-monthly cycle to identify risks to the forecasts and opportunities to reduce costs or increase efficiency, originally it was a 12 month re-forecast cycle. This approach is proven and has given the team and stakeholders the confidence from the increased accuracy to allow Thameslink Programme latitude to manage effectively and use their professional judgement in the determination of the final forecast numbers.

Even though the team is sensitive to budget and requested a re-approval, the anticipated final cost is within 12% of the overall budget in 2007.

Traditional project level risk management tends to focus on time, cost and quality. The reality is that major challenges for programmes tend to come from strategic changes and operational disengagement or lack of preparation to transition operating practices to deliver the ambitious outcomes most programmes have.

As a heavily engineering based programme the focus has largely been on delivery. The work of the Sponsor team has increased their awareness of the criticality of the strategic and operational risks that are so often the cause of failure to achieve benefits and outcomes.

The interface with Routes and their preparedness to achieve the operational changes being delivered by the new technology has come late in the day. There has been a lack of business change management and control around the impact of new rolling stock across multiple routes and the opportunities and impacts of station upgrades.

Recognising that the Thameslink Programme is not a discrete project portfolio but has notable interdependencies, particularly related to successful delivery of its composite parts, the team has implemented a state of the art approach aimed at capture this extra layer of correlation via the introduction of a Correlation Matrix (CAM).

The CAM exposure for the Programme is calculated via an ad-hoc model built with @Risk which takes into account correlation both within and amongst the various areas of the Programme.

In the context of the Thameslink Programme, correlation has been intended as the likelihood that the happening of negative event will have repercussion on the ability of the whole interested area to maintain the time and cost objectives.

In other word it is inversely related with the recovery potential allowed by both the plan and the budget for a given area in the event that a threat will manifest.

This enables an aggregated approach to risk within the programme, so rather than tracking multiple unconnected project risks the programme is able to apply consistency and recognise early warning indicators of threats that will have multiple effects across projects.

As a LOC 1 programme, nearly all work being undertaken on the live infrastructure is by definition, high risk and involves the management of asset transfers. The DWWP process is used extensively and the team are huge advocates of its use. They recognise that even though it is time consuming and difficult, it removes as much of the risk relating to management of the asset as possible prior to the work being done.

Communicating and understanding risk contingency has been helped by the development of graphical representations that show the interdependencies between risks. This has greatly helped with stakeholder engagement and understanding of the overall risk profile and how the contingency accrues across the programme.

Advice from Thameslink Programme

1. Increase the focus on strategic and operational risks from the outset by focusing on the outcomes and what could stop them happening by thinking wider than the project environment
2. There is a proven approach to managing cost forecasts that can be deployed elsewhere
3. DWWP process is proven and works to minimise the risk around asset changes
4. Ensure that adequate time and budget is allocated to Grip 4, to avoid overruns in Grip 5 to 8

The team believes that there is a fundamental risk with the way Network Rail plans projects using GRIP. The approval process from GRIP 3 is often delayed, this erodes time within GRIP 4 to cover design which manifests itself in GRIP 5 during delivery, when inadequate designs lead to delays and cost overruns. A conscious decision was taken to address this in the London Bridge project where significantly more time was spent in design which delivered dividends in delivery.

4.2.2   Programme controls
One of the challenges for Thameslink Programme was developing an integrated schedule for a complex array of over 100 projects during the lifecycle. The traditional approach and knowledge was about creating detailed project schedules and interdependencies with land and possessions which was not adequate for the Thameslink work.

The programme has a dedicated planning team that have evolved an approach which enables the aggregated reporting and management of information from the projects. A key to this development was persuading Network Rail IT to provide a dedicated instance of the P6 database. The version that was developed to support regional project operations simply does not fit the requirements of a major programme such as Thameslink Programme.

A major legacy is a programme specific P6 database. The standard approach to project controls is to view a portfolio of Network Rail related projects. The P6 database model provides the tracking and reporting capability to aggregate information across numerous projects to build a programmatic view.

Reporting demands from a broad range of stakeholders have been challenging throughout. One of the lessons has been that most stakeholders are looking for similar outcomes from the information, namely assurance that the programme is on target and an understanding of the potential problems it may face. The problem was that the stakeholders defined what information they wanted rather than what they needed to know.

The realisation came quite late that they could compound diverse reporting requirements by showing what was available rather than responding to individual demands. This has enabled a flexible approach to reporting that meets stakeholder needs, but has reduced the internal overhead.

An dedicated Thameslink team was established to manage the closure of Key Output 1, this enabled significant efficiency as other teams could move on to KO2. The type and style of a team that would undertake closure had the required 'completer/finisher' skill -set, so this was an excellent approach.

One of the causes of the overruns in KO1 was linked to the use of critical path to manage delivery and the application of EVM ONLY to the critical path. As such, EVM and other measures did not recognise the risks associated with works that were not on the critical path, but still critical to completion. This situation can undermine the management information being generated.

Significant investment has been made in establishing the information management environment. The solution that is in place is based on EB, and originated in West Coast. The Thameslink Programme team have taken that core system and developed it further to enable trusted information on which to make decisions. They have developed a range of solutions that future programmes will face that can be "lifted and shifted" to avoid re-development costs.

Advice from Thameslink Programme

1. Focus on developing an integrated schedule from the outset as it will be much harder to achieve retrospectively
2. Beware of the dangers of using EVM on the critical path when major works are not on the critical path timeline
3. A P6 programme database now exists for new programmes to use
4. Develop reporting models around the outputs stakeholders want from the information, not the input information
5. Use an external organisation to undertake parts of programmes that do not match your team's core strengths
6. Thameslink has a fully built and configured document management system designed for a complex engineering programme

4.3   Establishing and retaining workforce capability.

The opportunity that Thameslink Programme exploited in terms of attracting talent has been at the heart of their success. However, retaining the staff and keeping them motivated is the result of good leadership and management, not luck. There has clearly been a strategy that has enabled this to happen.

It is noticeable that within the Thameslink Programme environment communications is valued. It is extensive and people have time to think and challenge, ideas and feedback are valued. This can be seen through the level of engagement with this lessons learned review which has received extensive support with around 50 people being involved. This only works because there is an energy within the people to improve and they are empowered to take advantage of these opportunities.

One of the achievements of the Thameslink Programme has been the ability to retain good quality people. This has enabled the programme to have sufficient capacity and capability to achieve the target and goals. In effect, the stability of the team has enabled them to develop and share working practices that are leading to high levels of individual and team performance. The lack of people churn (leaving and joining) has meant that the core values have remained within the organisation and there is little requirement to reform or restructure the organogram.

There is a well-developed and proven induction process being used for new starters. This encourages people to absorb the values and performance that is expected from them and helps with establishing them into a complex environment which enables them to move to perform sooner and to a higher standard.

It was noticeable that there are a number of internal channels being used to disseminate and cascade information. One of the best examples of the knowledge sharing culture was evident in the area of safety. The strategy to open up opportunities to communicate concerns through a simple smartphone app rather than the traditional paper reports generated intelligence about hazardous situations so accidents could be avoided.

One of the risks facing Thameslink Programme is that the workforce, which is largely geared to being challenged and innovative, may begin to "drift" away in an uncontrolled manner as the end of the programme comes into sight. They are currently working on a close out plan to mitigate this risk.

Advice from Thameslink Programme

1. Ensure you have a well-developed programme based induction process
2. Effective and regular internal communications with a variety of channels helps build understanding and loyalty
3. Allow talented people time to think and innovate to produce the best and most sustainable results
4. Ensure there is an induction process to ingratiate new starters into the organisation
5. Ensure there is an exit process to understand why people leave

4.4 Management systems and working practices

There are a range of new ways of working and supporting management systems outside of the programme management specific environment that the Thameslink Programme will leave as part of the legacy.

4.4.1 Safety and environment

The leadership of Thameslink Programme have been consistent in their approach to developing a holistic approach to managing staff and the environment around them through the collaboration strategy.

The work by the safety team to reduce the accident levels is a classic example of CMMI Level 4 to 5 maturity. Not satisfied with having a stable accident record, they analysed the data and identified the opportunity to focus on "near misses" rather than accidents.

This required a change of approach to data collection. Rather than looking back over accident trends they moved their focus to accidents that nearly happened and gained an understanding of this area. To gather the data a smart phone app was developed that enabled instant reporting of hazardous situations, this replaced the traditional paper or website logging of near misses and enabled a higher volume of data to be processed with less time lag.

Supporting videos

1. Environmental management system
2. Section 106 panning permission
3. Accident prevention management

Using the new source of data, the team were able to react to situations more quickly, gaining a greater understanding of the level of safety risk and change the approach of the suppliers and approach of staff which delivered an 80% drop in accidents. They are now in a position to analyse work banks and forecast likely accidents and pre-empt these through management actions.

Thameslink Programme was the first part of Network Rail to gain ISO14001 accreditation. Network Rail had little in the way of standards or management commitment when the Thameslink Programme team were put into place; for example, suppliers were expected to deliver to ISO14001, but Network Rail had no methods or system for managing compliance.

Consequently, Thameslink Programme were at the forefront of developing their own approach. They overcame two major challenges - the business case to justify investment of resources and management scepticism. The senior team were convinced of the value for money in terms of value and the wider social economic impacts that Thameslink Programme could have on the environment by reducing its own emissions and those of others.

The team have had extensive influence across wider Network Rail IP, which appears to reflect the willingness of the social benefits discipline to work together, as the profession is relatively new. The team have maintained the ISO14001 and have not had an audit failure for 3 years.

The planning approval for London Bridge included a Section 106 requirement that obliged Network Rail to engage with the local communities to deliver sustainable benefits through jobs and involvement. There was no precedence for this in Network Rail, so the appointed manager was starting from scratch. There were no Section 106 commitments within the suppliers contract that the programme could use as levers. Stakeholder management was at the heart of the strategy along with much patient persuasion. The result has been ground breaking work with local sustainability, including employment for the local community, opportunities for schools to become involved, brand enhancing recognition for Network Rail and exceeding the targets in the Section 106 planning permission.

4.4.2   Engineering, asset and technology

Apart from the visible civil engineering challenges of major station reconstructions through the heart of London and the complexity of London Bridge redesign. Thameslink Programme has pioneered the Network Rail Digital Railway capability. The operational achievements of sustaining services during these changes and meeting throughput targets for Thameslink Programme of 24 trains per hour can easily be overlooked.

There was no precedence for the size and complexity of re-signalling London Bridge station and certainly not for maintaining operational running whilst it was being updated. In addition, the installation of a range of technology and assets underground has meant that normal GPRS systems could not be used, particularly in Snow Hill tunnel.

Supporting videos

1. Asset technology model design
2. Multi discipline Design Project Engineer
3. Computer driven station modelling
4. Compliance to the DWWP process
5. Document management system
6. Information controls standards

The programme has pioneered the use of 3D modelling techniques to manage the location and deployment of asset replacement in the Snow Hill tunnel as it was out of the range of GPRS. This enabled an understanding of the "As Is" position and where new assets should be installed. Post installation, the asset location can be validated and accurate drawing provided as part of acceptance.

A management challenge that was overcome was the traditional approach of having DPEs from different disciplines. This made final authority for the design too difficult. Thameslink Programme have deployed an approach whereby there is a coordination of DPE per work package, this has meant an increase in multiskilling across the engineering disciplines.

This has been supported by establishing a central engineering group that provides peer review assurance of designs as they are evolving. This approach has reduced the need for design reworks, as flaws and opportunities are identified during the evolution. This also supported the role of the coordinating DPE to achieve the right design first time, and helped to impart knowledge around different disciplines to the wider engineering community.

The London Bridge station rebuild was able to take advantage of passenger modelling software pioneered at the Birmingham New Street rebuild. This enabled effective management of thousands of passenger journeys through the ticket hall each day to minimise the inevitable disruption that occurred.

Traditional engineering design templates designed for the traditional railway did not meet the changing needs of the Digital environment. New methods were developed for documenting and illustrating digital designs to a consistent standard with supporting templates being developed.

Technology was further developed to enhance passenger movements in the station modelling, this built on the work at New Street Station and the risks associated with train and trackside technology learned from West Coast upgrade were used to inform the design and commissioning of new rolling stock and signalling. One of the results is the establishment of a dedicated Signalling Design Team inside Network Rail where the expertise needed to manage signalling on the railway is now inside the organisation.

Advice from Thameslink Programme

1. Exploit the in-house Signalling Design Team with knowledge of the foundation of the Digital railway
2. Use the experience of deployment of a range of modelling techniques to enhance outcome design and transition planning
3. Deploy the multi-disciplinary DPE and the central engineering assurance peer review approach
4. Use the revised design management process for technology based solutions
5. The nature of assets is changing, technology is making them more reliable but resolving faults is more complex and knowledge will be difficult to access