Incident Reduction Programme: Nottingham Rail Station

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ABSTRACT

This project involves the investigation, analysis and resolution of train dispatch incidents at Nottingham rail station. The project's main goal was to reduce the number of incidents and introduce a Non-Technical Skills competency framework. The analysis of questionnaires, workshops, observations, documentation and discussions showed a confused train dispatch process, and highlighted dysfunction in and between teams. Therefore, a back to basics principle guided the redesign of both the technical and non-technical aspects of the competency framework; aimed to deliver safe, on time dispatches that provided positive customer experiences. This resulted in the design of a dispatch safety bubble containing multiple layers of defence. Additionally, a Fair Culture shift required a change in error orientation, resulting in the understanding that dispatch failures only occur in technical skills. The complimentary non-technical skills are neither right nor wrong, they are only underdeveloped. The lack of a non-technical skill then manifests itself within a technical failure, which may result in an incident. This mindset also shifted the use of investigations to establishing understanding and make recommendations to prevent future recurrence for similarly qualified and experienced personnel. These mindsets required staff to adopt a coaching style for training, assessments and professional discussions. The project and change in mindsets created engagement from and between the staff. At project start, Nottingham station experienced an average of two incidents per week, by project conclusion this had reduced to two per month. The reduction in incidents has lowered the likelihood of injuries and loss of life and saved hundreds of thousands of pounds in costs and fines, whilst reducing the chance of a catastrophic event.

KEYWORDS

Incident Reduction, Engagement, Safety Bubble.

Introduction

To reduce dispatching incidents at Nottingham station a project was requested by East Midlands Trains (EMT). The project's remit included the development of a Non-Technical Skills (NTS) (RSSB, 2012), competency framework and supporting documents to their competency management system (CMS). Nottingham is a seven-platform station with bi-directional working, over-night stabling, supplemented by the Eastcroft depot. An extended operating hours timetable serves several Train Operating Companies (TOCs) with four different types of rolling stock. The East-West platforms are exposed to the weather and low angled sunlight. To ensure effective and safe handling of normal, out of course and emergency operations, dispatch staff are required to be flexible and employ both technical and non-technical skill sets to dynamically risk assess and mitigate.

To ensure appropriate and enduring use of the dispatch competency framework; a two-way communication process was established, aimed at involving the Nottingham Station staff from project start to finish. Through questionnaires, interviews, discussions and workshops, a 2-way communication process was established. The project consisted of four-stages. 1. Preparation, 2. Data gathering and collation, 3. Analysis and competency framework construction and 4. Rehearsals, refinement and implementation. Additional recommendations were made to the Nottingham Station environs and wider to other EMT departments and third parties. Oversight from training, standards and senior management through to the Managing Director (MD) was established, resulting in the release of resources. The final stages were reviewed, prior to the embedding of new documentation into EMT policy, the CMS and mentoring training packages. This included a day of facilitated coaching for training, assessing, supervising and mentoring staff.

The Problem

Since 2013, when compared to other EMT stations, Nottingham has experienced a higher rate of incidents. A significant increase during 2017 triggered the project. The five-year rolling average had increased to two incidents per week. Management were overloaded with investigations and too few training support personnel were unable to handle the re-training. This had resulted in limited competency development plans (CDPs), focused on assessment and disciplinary actions. CDPs were jokingly referred to as 'Crime Deserves Punishment'. This had resulted in strained relationships between station and senior management, and with front-line staff. Nottingham had been labelled as a 'problem' station. Staff turnover had increased, and trainees were disillusioned with their new job. The station team had become dysfunctional (Lencioni, 2005).

The responsibility of a dispatcher is to support the train crew and passengers in train arrival, the disembarkation and boarding of passengers, and train departure. All duties must be safe, on time and provide a positive customer experience. During the initial stages, it was reported that each one of the 56 potential dispatches were different. GERT 8000 – SS1, Station duties and train dispatch (RSSB, 2017) and EMT dispatch documentation were consulted, aimed at establishing what was required to dispatch a train. These documents contained a technical focus on what to do and contained few Nottingham station specifics nor many explanatory 'whys' and 'hows' of dispatch. It appeared that over time, EMT documentation had been amended based on post-investigation recommendations, not germane to Nottingham. Additional recommendations had been aimed at covering issues with third parties that had gone unaddressed.

Deviance of practice from EMT documentation was observed, which often went unchallenged by peers, supervisors and management. Technically, a dispatch may have been safe, based on the outcome; but several behavioural errors eroded the safety bubble, with their root cause residing in underdeveloped NTS, (RSSB, 2008). On about half of the observed dispatches, passenger interference occurred, often with passengers reaching for handles as trains were moving. Gate line and station staff regularly hurried passengers or ignored those who required assistance. Analysis of the timetable revealed several conflicting train movements, which prevented dispatchers from arriving at platforms with sufficient time to carry out their dispatch duties.

Whilst normal operations were ill defined and poorly understood; there was additional confusion over what would constitute degraded, out of course or emergency working. The management and staff had lost sight of their 'normal' everyday sub-optimal conditions. That is degraded, and out-of-course working had become the accepted norm, which had further eroded the safety system and layers of defence. What people thought they did, what they said they did and what they did, were all

different. Dispatchers seemed unclear on certain technical aspects and on the priority of safety over performance or customer experience. A lack of corporate knowledge, plus change fatigue and learnt helplessness had resulted in a cadre of front-line staff confused over their role and responsibilities. Changes to process were inadequately briefed and underperforming individuals were left to continue in their role with minimal support.

Investigation and Analysis

Stage 1 – Preparation

A Competency Framework Team was formed, consisting of a PPWD Senior Manager, EMT Business Continuity Manager, Customer Experience Manager (CEM), Dispatch Mentor and a Dispatcher. A review was undertaken of the rail industry dispatch paperwork, followed by analysis of the dispatch role from a generic, and Nottingham station specific perspective. The project's key messages were then communicated to the wider organisation and specifically, the Nottingham dispatch staff, including: the project aims and objectives, plus the purpose of the competency framework and how it would be used.

Critique *- A significant amount of learning for the consultants took place on this project. Future projects would benefit from a greater time investment during the initial project stages; in particular, the briefing of senior management and operational focus groups. These briefings would cover the project's remit, aims and include requests for additional support. There would be benefit in spending additional time with the senior dispatchers and the mentor team. Initially, the lack of dispatch knowledge and understanding made it difficult to ask appropriate questions. Fortunately, good rapport was built with several dispatchers which provided enough support in getting the project started and building momentum at the station level. To put the incident rate at Nottingham Station into context, it would be expected of a human operator working independently to have an error rate of between 1 in 1000 and 1 in 10,000 actions (Kirwan, 1994). However, several high reliability organisations within safety critical systems have achieved lower failure rates by employing the recommendations as in this document. Legislation, technology and rules, need to be supported by appropriate behaviours as developed through NTS to ensure that the always conditions do not result in never events.*

Stage 2 – Data Gathering and Collation

This was the main piece of work and accurate data collection was crucial to the subsequent design phases. Observations of dispatches and station working were undertaken:

- **Overt** – Observer introduced themselves and explained what they were doing and the aims of the project. A discussion often took place after the dispatch which resulted in dispatchers explaining the challenges of dispatch. Observations took place during am and pm peak, weekend and bank holiday periods. In total 18.
- **Covert** – Observer remained out of sight of the dispatcher and did not introduce themselves either before or after the observed dispatch. Dispatches were observed during the am peak, afternoons, weekend and bank holiday periods. In total 12.

Interviews and Workshops – Dispatchers were interviewed in groups and on a 1-to-1 basis. This included personnel from operations, supervision, assessment, management and dispatch. A total of 6 interviews and 4 workshops each with 6 dispatchers were undertaken.

Questionnaires – The first questionnaire consisted of 24 questions on technical, non-technical and cultural aspects. It used a three-point scale. This was completed by 32 out of 39 (82%) dispatchers. The second questionnaire employed an appreciative inquiry methodology, in the form of gaining ideas on best practice and for improvements to the dispatch role and dispatchers' environment. This consisted of two questions and was completed by 18 out of 39 dispatchers (46%), although an additional 6 dispatchers provided responses in interviews and workshops.

Analysis - The dispatch role was analysed as follows:

- Which behaviours are used to perform the role.
- Strategies and Objectives for task completion.
- Organizational principles followed.
- Regulatory or other compliance issues.
- Deviance from EMT documentation.
- Customer service and experience provision.
- Job descriptions.
- Performance indicators.
- Task analysis.

Critique *- The release of frontline staff and coordinating attendees for meetings was difficult. Often short notice leave, roster changes, sickness and operational requirements resulted in different attendees for each workshop. Therefore, time was required at the start of each workshop to ensure those who participated understood why they were in the room. Depth of analysis was offset by gaining a wider viewpoint on station operations. The project was greeted with significant cynicism and the decision was taken to undertake the interviews and workshops in a conversational style to facilitate rapport building and maximise disclosure. This potentially resulted in lost information and the encroachment of the facilitator's personal biases. However, conversations with the mentors and managers provided an alternate observation source which reinforced the observations of the external facilitator. The scope of the project and supporting budget did not permit engagement with onboard crew, nor the follow up of the project by the consultants at some future date. It is planned for EMT to undertake an internal audit in 12 months' time.*

Stage 3 – Analysis and Competency Framework Construction

This involved grouping the observed and reported behaviours and skills into technical and non-technical competency sets. This stage involved significant debate and constructive challenges. Past ideas were challenged with new concepts in a 'back to basics' format. Current and past policies and procedures were cross referenced. During this time, confusion often preceded clarity. It was during this stage that a realisation grew that the dispatch process had become overly complicated and required simplifying. Additionally, a significant number of recommendations were made. The following steps were undertaken:

a. **Grouping the statements** – Questionnaires, workshops, discussions and meetings were reviewed to establish themes, which were grouped to form a non-technical framework.
b. **Create subgroups** – Each theme was analysed into related behaviours and supporting skills. This provided the basic structure of the competency framework.
c. **Refine the subgroups** – The 'how' and 'why' of each of the key behaviours and skills were identified, plus how they related to each other. This analysis and the specific actions, tools, tips and techniques went forwards to develop the mentor package.
d. **Identify and name the competencies** – The Team then identified specific technical and non-technical skills, which formed the final framework and supporting documents.

A Back to Basics Approach – Effective Safe Dispatching

Back to Basics – During the competency construction stage, a 'Back to Basics' ethos was evolved. The following definition was used to ground the project to ensure that the dispatch competency framework and recommendations remained both relevant and valid:

'A competent dispatch is an effective dispatch which is safe in all respects, on-time and creates a positive customer experience. To do this, Dispatchers are required to be competent in their Functional, Technical and Non-Technical Skills (NTS).'

Technical Skill - These are practical skills, combined with the knowledge needed to practice them.

Functional Skill - These are core practical skills in English, numeracy, and information and communications technology.

Non-Technical Skill (NTS) – NTS are complimentary to technical skills and are the human performance skills that enable operators to undertake technical tasks. NTS assist in self-management, the management of relationships with others, how to relate to hardware and software, and manage environmental and cultural factors (RSSB, 2008).

Communicate – Well established EMT communication channels were used to direct key messages and project milestones. Nottingham station staff received local briefings and updates, and the EMT business continuity manager ensured that Training, Standards, Operational and Senior management were kept appraised at all stages and sort further support as required. The upfront and periodic communications were crucial in overall project success.

Relevance – Whilst all 7 NTS categories and 26 skills (RSSB, 2008) are pertinent to the dispatch role, the competency framework highlighted and focused on those that are most likely to impact on each specific technical task, whilst permitting wider coaching discussions as required. This assists those using the framework by making the framework relevant and easier to facilitate.

Safety Bubble - Dispatchers work within a safety envelope (Rasmussen, 1997). The envelope has boundaries of acceptable performance, workload and economics. Remaining within the envelope ought to result in safe operations, crossing a boundary probably results in an incident. Dispatchers must work proactively on each dispatch to ensure that they do not drift to the safety envelope boundaries. Therefore, to protect themselves, dispatchers ought to build around them a safety bubble (Flin, 2008) with multiple layers of defence with in-built redundancy. The safety bubble ought to be designed with failure in mind and incorporate redundancies to ensure that if the system fails, it does so safely.

Critique *- This proved to be the most rewarding stage of the project. However, a co-facilitator would have been of great benefit in analysing what was being said during discussions and workshops. It is likely that a significant amount of information and the details of conversations were missed. In addition to contemporaneous notes, the recording of conversations would have been beneficial, although this may not have been welcomed by the participants. The questionnaires were extremely useful. The appreciative inquiry version permitted insight to best practice and confirmed several observations, although it had a lower completion rate of 18 out of 39 (46%) of staff. Although a further 6 staff who did not complete this questionnaire provided their feedback in*

interviews and workshops. However, subsequent analysis of the more detailed 24 item questionnaire identified its short comings. It fitted neatly onto two sides of A4, 32 out of 39 rostered dispatchers (82%) completed it. Its scope covered several areas, which may have diluted the results. It used a three-point scale, which a number of staff reported frustrating. Perhaps the use of a five-point Likert scale would have generated better information. Some of the questions relied on Human Factors or NTS knowledge that some staff may not have had. The focus was on attitudes and perception of organisational factors. Alternates may have been the Rail Safety and Standards Board's Culture toolkit (RSSB, 2011) or the Safety Attitudes Questionnaire (SAQ) (derived from the Flight Management Attitude Questionnaire-FMAQ). Having the survey on line would have both saved time and made result analysis easier. A more coherent presentation of the data would have made the questionnaire outcomes more easily understood and impactful on senior management.

Stage 4 – Rehearsal, Refinement and Implementation

The following steps were undertaken to assist in the implementation of the competency framework and its embedding into day-to-day dispatching:

a. Connections were made to ensure staff understood that each dispatch must be safe, on-time and provide a positive customer experience.
b. The development of local policies and practices were made to support and reward the dispatch framework competencies. 'Solo' time and Stop, Talk, Inform (STI).
c. Provisions were made for the coaching, mentoring and training of staff with the development of a mentor's pack.
d. A straight forwards framework was designed to ensure that it was effectively used.
e. The competency framework and guidance documents were reviewed and refined by a wide range of staff. This included a series of dispatch practices and rehearsals.
f. Key senior managers were briefed and signed-off the outcomes and recommendations.
g. The framework and guidance documents were incorporated into EMT policies.
h. Briefings were delivered to the Operational Focus Group (OFG) and the Board of Safety Sub-Group (BSSC).
i. A 1-Day train-the-trainer course for Nottingham assessors, managers, trainers, supervisors and mentors was facilitated. This covered the documentation and principles of CMS integration, and how the framework could be used in practical and classroom settings to cover training interventions; supported by the N-gauge model railway and CCTV.

Critique *- This stage of the project brought together the previous stages and identified the learning. The concerns here revolved around the 'stickiness' of the learning identified. That is, were the consultants the change agents and had they created a 'demand effect' by taking an interest in and focussing on the dispatch process and the staff? Had this resulted in the staff 'upping their game' and carrying out more effective and less error prone dispatches? Would the project outcomes and recommendations be implemented and followed? Would the report, recommendations and new thinking gather dust, or will they become embedded into the day-to-day business at Nottingham station? The aim in rolling out the tasks a to i above was to embed into the day-to-day operations of Nottingham station, the project's new methodologies of dispatch, coaching and competency management. The true measure of project success would be to return to Nottingham station in 12 months and undertake observations, questionnaires and analyse the incident statistics to see which project initiatives were still in use and had proven to be successful.*

Resolution of the problem

The removal of confusion by simplifying the dispatch process and clarifying key messages has achieved standardisation through the training of managers, supervisors and mentors. Dispatchers and trainees have been able to acquire and maintain dispatch standards faster and more easily.

The empowering of Staff and management to provide suggestions and appropriately challenge has resulted in a greater level of job ownership and personal responsibility. Examples of staff being prepared and organised, whilst proactively building and maintaining situation awareness. New procedures and equipment (e.g. LED baton) are now critically evaluated for their suitability. The technical and NTS training of dispatch staff, combined with their empowering to take command of platforms, to proactively manage dispatching, has improved morale and increased performance. These developments have provided additional layers of defence to their safety bubble.

The provision of management and supervisors on platform during the am and pm peaks, and during degraded, out of course and emergency situations; has further reinforced the defences. This oversight has provided invaluable support and facilitated routine contact between management and staff. This has promoted ad hoc conversations and further developed staff relations.

The refinement of Nottingham signage and realignment of staff to assist passenger movements, has reduced the number of late passengers arriving at trains and interfering with the dispatch process; adding another layer to the dispatch safety bubble. Liaising with third parties to resolve timetabling and operational movements, has resulted in decompressing train movements at Nottingham station. This has resulted in dispatchers having enough time to safely move between dispatches in accordance with the policies.

Implications

A shift has taken place in post-incident investigations to establish understanding and make recommendations to prevent future recurrence for similarly qualified and experienced personnel (Dekker, 2014). Also, a better understanding of a systems approach to failure has resulted in recommendations which go deeper into the organisation. The subsequent discipline, administration and training plans are now handled by a manager other than the investigator. There has been a shift in mindset to better understand that dispatch failures only occur in technical skills.

A shift in assessment mindset has started to be actioned, from examiner to coach. Assessments are starting to be used for coaching conversations on the underpinning ‘Whys’ and ‘Hows’. With the NTS categories and skills, the competency framework is used to expand knowledge and understanding on how to manage normal, degraded, service disruption, out-of-course and emergency situations. Additionally, the dispatcher can assess their own performance using these forms, with or without mentor observation, resulting in a coaching conversation around areas for development. To reduce form filling, the use of comment by exception, focusing development on 2 or 3 aspects or noting examples of good practice. Also, once a dispatcher has demonstrated that technically they can dispatch, which often only requires the observing of one of two dispatches, the rest of the assessment can be spent coaching and having a professional discussion. By not grading NTS in reports, it was assessed that a performance view of competency management, through NTS development, would in time help to replace the blame culture.

A significant outcome of such discussions is the exchange of ideas, tools, tips and techniques for safe and timely dispatches. These are almost limitless in their scope and form the practical

outcomes of NTS in supporting the technical tasks. Such techniques are personal and require each dispatcher to build their own toolbox. These techniques are the essence of safely and effectively linking NTS theory to practice. Another outcome was the development of the dispatcher's mindset, to possess a chronic unease or healthy paranoia to their safety critical role, aimed at prompting a healthy inbuilt critique to their decisions and actions both before, during and after each dispatch.

To aid facilitation the construction of a Nottingham station N-gauge model railway took place. Permission was sort and granted by EMT's parent company, Stagecoach, to use CCTV for training purposes. The personnel who undertake assessments and professional discussions have been encouraged to use coaching questions within the GROW (Whitmore, 2014) model to facilitate further learning. That is, coaches do not provide answers, they provide great questions:

G for Goal: setting: define the short- and long-term goals
R for Reality: explore the current situation
O for Options: identify and evaluate different action strategies
W for Will: what will you do by when?

This project has been a success due to a collaborative approach, and the establishment of mutual respect and safe learning environments. Ideas have been appropriately challenged between front-line staff and management. This report, supporting documentation and changes to EMT procedures and policies, only form the tip of the developmental pyramid experienced at Nottingham. It is within the project process, underpinning knowledge and generated understanding, where the learning has taken place. This project's success has been down to the engagement created between organisational levels and an appreciative enquiry approach, resulting in deeper mutual respect. The dispatch staff are the subject matter experts and they must have ownership of future projects to ensure their effectiveness and long-lasting success.

Impact

The results in figure 1 ought to be seen in the context of several significant operational changes to Nottingham station through 2018. These included the May 2018 timetable changes, an extension to station operating hours and to the number, and frequency of services to/from and through Nottingham station. These changes necessitated an increase in staff numbers and roster realignments. Additionally, major engineering and construction works took place throughout the project period as the station recovered from the catastrophic fire of January 2018. Going from two incidents per week to two per month, is a significant change. The business case for which is due to be calculated. However, based on our figures from other rail projects we estimate an ROI of 500%. For thousands invested hundreds of thousands have been saved. The reduction in incidents has lowered the likelihood of injuries and loss of life and saved hundreds of thousands of pounds in costs and fines, whilst reducing the chance of a catastrophic incident.

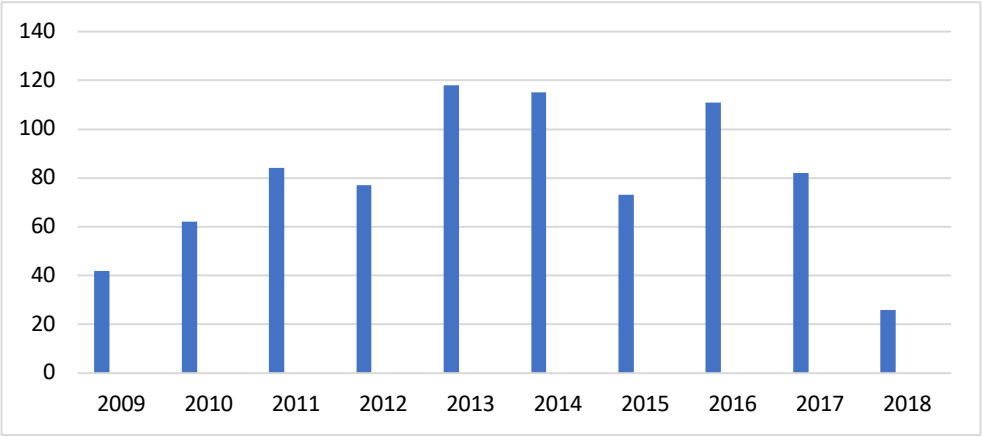

Figure 1. Dispatch Incidents - Nottingham Rail Station - 2009-2018

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