



ENGINEERING TECHNICIAN APPLICATION

Section 2: Competence & Commitment Evidence

PART B: Competence & Commitment Criteria

A Use engineering knowledge and understanding to apply technical and practical skills.

The Reviewers will be looking for evidence that you have knowledge of the technologies, standards and practices relevant to your area of work, and that you have maintained and applied this knowledge. Aim to provide no more than 700 words.

Give examples to demonstrate you:

A1: review and select appropriate techniques, procedures and methods to undertake engineering tasks

A2: use appropriate scientific, technical or engineering principles.

In my current role as _____ I identified a site at _____ with a high volume of rough ride reports. Rough ride reports usually highlight a deterioration to the asset and track quality. If not inspected, or left untreated, the fault can become more severe and possibly lead to catastrophic failure i.e. rail break/derailment. They also have a detrimental performance impact as the signaller is required to pass all trains through the site at caution (20mph max) until the site has been inspected and either passed fit for traffic (in line with NR/L2/TRK/001/mod13) or other remedial work has taken place.

I reviewed the site condition using the Maintenance Registers used by _____. The site was being maintained in the good/satisfactory SD band. This prompted me to undertake further investigation to find the root cause of the failures as I wouldn't typically expect issues in these SD bands. The On Track Machine (OTM) maintenance frequency for this site was set to 16 weekly tamping, and the output was generally good. I then decided to review previous trace data from the New Measurement Train (NMT) to look for any trends in deterioration. I noticed from the trace reviews that after 4-6 weeks, 70 metre wave length alignment faults would become apparent. This concerned me as I would not expect to see this type of fault so soon after tamping. This prompted me to arrange a site visit with my Track Maintenance Engineer (TME) to investigate the site further. Before this could take place, another rough ride was reported by a train driver. I was Engineer on call at the time and, due to the history of rough ride reports at this location, I decided to arrange for an Emergency Speed Restriction (ESR) of 90mph to be imposed. This would mitigate against any risk to further trains. I then chose to also attend site whilst the ESR was being erected as it would be an opportunity to investigate the site.

I came across badger sets over a 60 metre span of embankment which highlighted to me that there could be some instability in the embankment which could be causing the alignment faults. I took the initiative to contact the Principal Route Engineer (PRE) for geotechnics to report the embankment and my findings. They came out and also inspected the embankment. They reported that this was an embankment that was failing and that imposing an ESR was the right decision.

The site was under 24 hour monitoring and stabilisation work took place over the past 12 months. Following this ending, I then completed Absolute Track Geometry (ATG) site surveys and designs for tamping works to take place, eventually opening the site back to line speed (125mph). This should now stop future rough ride reports and improve safety and performance through the site at Blisworth.

ATG track is designed using a co-ordinate system and allows for tamping works to be restore track to its original as-built position. This helps to comply with the safety case for Enhanced permissible speed (EPS) where tilting vehicles operate on the section. The risk of not reinstating the track is; train collision due to failure in passing clearances, and derailment where overload in lifts and slues are applied.



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Contribute to the design, development, manufacture, construction, commissioning, decommissioning, operation or maintenance of products, equipment, processes, systems or services.

The Reviewers will be looking for evidence that you can apply engineering knowledge effectively and efficiently to the individual tasks which need to be undertaken in your role. Aim to provide no more than 700 words.

Give examples to demonstrate you:

B1: identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions

B2: identify, organise and use resources effectively to complete tasks with consideration for cost, quality, safety, security and environmental impact.

As part of my role as the Switches & Crossings (S&C) on our route, especially at switches on 113lb layout. I am responsible for providing a manual maintenance plan for Junction. This comprises of 16 point ends, all F

Due to the lack of S&C Tamping available to take place on the junction at the time it began to deteriorate into the Very Poor SD band. I arranged a site visit with the Section Manager (SM) for track, along with the SM and Assistant Engineer for S&T to identify challenges both had with the junction.

The existing manual work that took place at the junction was kango/robel packing to eradicate voiding. I knew that this would be insufficient long term and wouldn't improve the underlying track geometry issues, such as cross level and vertical alignment issues which were evident when reviewing trace data. This also wasn't sufficient long term, partly due to the consolidation of ballast from manual work lasting only 25% to that of OTM tamper (estimated). This work was also extremely people resource heavy and time consuming. The increased time of "boots-on-ballast" was also deemed not to be the safest option. I recognised there was an opportunity for an improved OTM plan to be introduced.

I started by completing a top survey and, after plotting the data from it, it became apparent that all the switch lengths at the junction were dipped in comparison to the plain line track and tied crossing areas surrounding them. This was an issue as it was leading to voiding around the stretcher bar areas and point motors, in turn leading to points failures. I first began to introduce design lift and packing work at the junction. I completed top surveys the week prior to the work taking place and would then plot my readings and calculate the lifts to be implemented at each point throughout the switch length. I included small ramps either side to allow for a smooth run in/run out. A smooth run in/run out is important to allow a smooth transition for the train to pass through the section. Without this rough ride reports can occur as there can be a differential of ballast stiffness either side of the site of work. Then, whilst carrying out the work, S&C jacks would be placed throughout the switch length to set the correct baseline and then the kango/robelling of the site would take place, with interim theodolite measurements being taken to ensure correct lifts were being applied and the jacks had not been disturbed. I would also ensure that all point motors were packed too. After the work had been completed a post survey would be carried out and overlaid on to the pre-survey and desired design to review. Once this had been repeated at all of the at risk point ends it enabled me to build a plan prioritising the S&C. I would review trace data and CCQ charts to monitor deterioration rates and undertake regular site visit to place and review void meters to measure the switch under load. I would then plan to action the deteriorating sites accordingly and pro-actively plan these as priority to mitigate against any failures.

The feedback from the track sections and S&T was positive. Track quality was improving, and point failures had decreased significantly. However, a challenge for this project was the robustness of the work being carried out. Whilst the initial results were good, the switch lengths were not maintaining good TQ for longer than 8 weeks. This resulted in the work becoming extremely frequent, and almost each Saturday possession consisted of design lift and packing work taking place. I recognised that to extend the longevity of the asset, I needed to create a new plan which would be more cost effective and less resource heavy.

Sprinter tamping had been working on our area for a couple of years with good results in treating short wavelength faults. I spoke with an On Track Machine Engineer (OTME) regarding the feasibility of sprinter tamping S&C and was advised that it had been trialled on other routes, but on lower track categories and on non-ATG lines. I applied for a temporary variation to deviate from NR/L2/TRK/3260, which does not permit the use of ATG Lite through S&C. This was approved and the work was able to take place. Sprinter tamping works by measuring the track from high spot to high spot, without the need for ramps either side. It also has a maximum chord length of 36 metres, making it perfect for the length of a 'F' Switch. Pre and post ALC measuring runs were done on completion and files merged to check the treatment was adequate. The track geometry improved immediately as I also ensured all crossing areas were

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hardened trough with the tamper to irradiate any voiding. After this success, I now plan for three of our ATG junctions on the TME area to have treatments, averaging 6-9 monthly. This results in less manual work being done, less resources required, it is more cost effective, safer, and more accurate and effective work with greater asset longevity for each S&C unit.

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C Accept and exercise personal responsibility.

The Reviewers will be looking for evidence that you can plan and manage your own work effectively and efficiently, and can consider and identify improvements to maintain quality in your work. Aim to provide no more than 400 words.

Give examples to demonstrate you:

C1: work reliably and effectively without close supervision, to the appropriate codes of practice

C2: accept responsibility for the work of yourself or others

C3: accept, allocate and supervise technical and other tasks.

As _____, and previously when seconded as _____, I am responsible for the management of our S&C measuring and ordering processes and managing strategic spares for the _____ area. This entails significant responsibility and necessitates me to operate autonomously with minimal oversight.

I began to manage this task by referencing the Track Work Instruction NR/GN/TRK/7001/TWI3S073 – How to decide on strategic spares. Using information from this, I designed an internal database. This included all of the S&C on my area with information including such things as switch type, crossing angle, points mechanism (i.e. Hy-Drive, Clamp Lock, HPPS) and a risk scoring. The risk score would comprise of factors such as track category, if a diversionary route is available, access requirements and previous defect history. The scoring was ranked 1-5 with 5 being the most at risk. This then allowed me to design a framework to see where our most at risk assets on the TME area were. I also included the location of all our strategic spares. This is especially important for the section staff in emergency possessions, who need to understand where the location of the spare S&C is. For example, whether the S&C is already on site or on a stillage, which allows them to plan for overhead line isolations or machine lifting plans. This framework has proved especially beneficial when reacting to 1B defects (impose 20mph emergency speed restriction, and replace within 48 hours) as all information of S&C location, weight, size is all available to the lift planner and sections.

I chair regular meetings with Section Managers on the Track Maintenance Engineer (TME) area. We discuss current strategic spares and any additional defects during the last period which will require a unit change, as opposed to repair. Once I have gathered the necessary information of any S&C which is required to be ordered, I assign it to members within the Technical Team, advising on the assets that must be measured and scoped. Once this activity is complete, I then start the ordering process using our ordering system, _____, where I can directly interact with suppliers during the manufacturing stage and ensure that strategic spares are always available.

I have spent a lot of time training my employees to also be proficient with this task and they are now capable of placing orders as well. But, as I am inevitably responsible for this work on the my area, I still reassure myself that the process is followed and I examine all orders before they are sent.



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D Use effective communication and interpersonal skills.

The Reviewers will be looking for evidence that you can work with others constructively, to explain ideas and proposals clearly to discuss issues objectively and constructively. Aim to provide no more than 400 words.

Give examples to demonstrate you:

D1: communicate effectively with others, at all levels, in English

D2: work effectively with colleagues, clients, suppliers or the public

D3: display personal and social skills and awareness of diversity and inclusion issues.

In my current role as _____ and previously as _____ I am responsible with leading S&C renewals on my TME area. With tasks such as this it is extremely important that precise communication and collaboration is exercised, not just during the work but also in the lead up to the renewal. This is why I have introduced robust planning meetings and site visits, which all serve a unique purpose for everyone involved, but enables work to run more efficiently when on site.

Due to failures in the past, such as certain disciplines not being requested for the renewal, work not scoped adequately and incorrect materials/ tools on site leading to over runs of worksites, I decided to engage with teams directly to improve the process.

I initiate site visits once work is planned in Ellipse, usually 6 months prior to work commencing. I invite the relevant Section Manager or Assistant Section Manager to walk through the site with me, where we then discuss the site and identify what departments will be required to complete the work. For example, a switch renewal will need permanent way staff, S&T for disconnection and reconnection, E&P to remove heater strips from rails and a welding team. I ensure that all resource is requested and agreed in writing from each team.

I then invite the relevant teams and chair a white board meeting, which can be held virtually or in person. I lead discussion using a ganntt chart that I create, and invite all disciplines to have their input and give ideas to how the S&C renewal can work smoothly. Following this, one to two weeks prior to the work taking place, I touch base with the site staff which will be working that particular shift to ensure they have an understanding of what is required. I lead these discussions, for example, around what tools are required, the location of welds and the timings with site staff so all are aware of the plan. Finally, at the beginning of the shift, I spend 15- 20 minutes briefing staff on the work and answering any questions. This allows everyone to feel involved and helps us all to work to a common goal.

In my team I also have a Technical Officer who is deaf. I have led changes in the way the team communicate to accommodate and benefit the individual. I wanted to ensure they felt more involved and included within the team, and the feedback from them has been really positive.

Some of the initiatives I introduced are; face to face meetings where possible, videos and teams meetings with subtitles or transcript, using face shields as opposed to face masks during Covid so that the individual could still lip read and, finally, our route health and safety briefings included numerous videos without subtitles, this is something I challenged to our route leadership team to include and which now is present in every briefing that we attend and allows my Technical Officer to feel included and never isolated.



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Demonstrate commitment to the PWI code of professional conduct and safety, recognising obligations to society, the profession and the environment.

The Reviewers will be looking for evidence that you act in a professional manner in your work and in your dealings with others. You should set a standard and example to others with regard to professionalism. Aim to provide no more than 700 words, and we recommend half is used in addressing E2.

This includes the ability to:

E1: understand and comply with relevant codes of conduct

E2: understand the safety implications of your role and apply safe systems of work. **You must clearly explain how you apply learned knowledge and skills to contribute to safety**

E3: understand the principles of sustainable development and apply them in your work

E4: carry out and record Continuing Professional Development (CPD) necessary to maintain and enhance competence in your own area of practice

E5: understand the ethical issues that may arise in your role and carry out your responsibilities in an ethical manner.

As a _____ it is important to recognise the significance of the professional code of conduct and safety in carrying out my duties. The Permanent Way Institute (PWI) professional code of conduct and safety guide outlines the expectations for members of the PWI, including their obligations to society, the profession, and the environment. In my role as a _____, I can demonstrate my commitment to these expectations in several ways.

I personally try to champion diversity and inclusion within my team. For example, one of my Technical Officers is deaf and relies on lip reading to communicate. Whilst this was not an issue before, during COVID it did become a challenge, especially with the mandating of face masks. I took the initiative to source face shields opposed to masks for my direct team to allow the TO to still be able to lip read and allow them to feel included when the team was working collaboratively. Also, during our route health and safety briefings, there are many video briefings played without subtitles, this is something I challenged the route team to provide which I am pleased to say now form a part of our health and safety cascades. I have also worked closely with them to bring in reasonable adjustments to their working week, this allows them to be able to bring their whole self to work each day and work in an environment which is accommodating.

When interviewing for new staff, I always request from HR that I receive blind CV's. This is to ensure full impartiality when I'm reviewing candidates and limits any unconscious bias I might have. Once at the interview stage I then make sure that I have a diverse interview panel that is not made up of people I normally work with. This encourages me to take in fresh points of view and perspective when selecting successful applicants.

I also always keep up to date with any mandatory briefings, eLearning material, or updates from the business about how to improve D&I.

Working within my own engineering judgment and skillset allows me to know, and only work to, the limits of my competence. It is a legal and ethical obligation that I do this. I delegate to other staff within my technical team, for example asking them to completing work on the infrastructure that I am not competent to complete, as it can introduce numerous risks and consequences if I don't know what I'm doing. This is also the same for staff within my team that I am delegating work to. Any work that does require specialist competences will be discussed with my TME prior to the work taking place to ensure that it can be resourced properly. Discussions with my TME also form part of my Annual Capability Conversation (ACC) where I discuss with my line manager my competence, level of expertise and plans to improve. In order to improve my own knowledge and skillset, I put myself forward for, and have recently completed, _____ TME training programme. I am also looking to complete my HNC within the near future. Outside of this I try and support the institution by attending meetings and events.

Safety is something that I hold most important to me within my role. It is how I can ensure my team, and passengers, get home safe every day. Within my team I am the responsible manager for RailHub and reviewing and signing all Safe Systems or Work (SSOW). I take pride in having conversations about every Safe System of Work to be implemented on the infrastructure with all Controller of Site Safety (COSS) in my team. I also complete regular self-assurance site visits with my team to ensure they are working to the highest of safety standards, and create and monitor actions for areas that I find to be improved. By leading by example it has allowed my team to inherit good practices, and encourages them to challenge freely. In the past I have stood individuals and teams down due to unsafe behaviours and practices. I have conducted re-briefs and made sure that a mutual understanding of the acceptable attitudes that are required when working in a safety critical environment. Security safety is also paramount when I am at work. In my previous role as _____ I had access to sensitive information of my team and others that I had



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to make sure was managed and stored compliantly. I also try and keep up to date with ELearning modules such as Data Protection Essentials and Security on the Railway.

I know that there are 3 pillars of sustainability. Financial, environmental and social. When working I need to be conscious of all 3. An example of how I do is, that at a recent rail event, I saw battery powered stressing generators. I knew that these would be kinder to the environment (less emissions than fuel powered generator) and quieter for our lineside neighbours. I initiated these being brought into to the TME area.

I also manage the OTM volumes on my area in accordance with our budget and try to be as pro-active as possible to utilise OTM efficiency and to deliver as much improvement as I can within the budget. I understand that there are restrictions within the budget as a company and I work as efficiently as I can to ensure the most benefit for our customers, and the most improvement in track quality.

I encourage my team to work digitally, to reduce paper requirements, and to share vehicles wherever they can.

In addition to this, I also keep up to date with any new ELearning that is related to environmental sustainability.

I always work with integrity and honesty and adhere to the highest of ethical standards. I have a responsibility, and am trusted, to undertake tasks which can directly affect others both in and out of work. I am always honest and will report any issues that arise or may be seen as a conflict of interests, or stand down teams when I need to.