

SECTION 2: Competence and Commitment Evidence



PART B: Professional competence and commitment

A	Use engineering knowledge and understanding to apply technical and practical skills.
The reviewers will be looking for evidence that you have the know-how to do the job, and were able to go beyond the immediate requirements and use your initiative and experience to solve a problem or improve a process. Aim to provide 300 words. A1: Give an example of work you did that went well, the choices you made and the outcome; or something in your work that you were involved in which didn't quite work and explain why; or a technique, procedure or method you improved upon and explain why. A2: Drawing from your direct experience, explain how a piece of equipment, system or mechanism works. Since 2012 I have been the Contractors Responsible Engineer (CRE) for the track design element of the Remodelling Project (see Appendix A for my CRE approval forms). This considerable project has seen the entire infrastructure rebuilt and over 40km of life-expired track renewed and remodelled. As CRE I was responsible for the technical track designs delivered by those working under my supervision, with my signature providing design approval. The majority of the track in the area of is on brick arch viaducts, but at several major roads the brick arch has been previously removed and a steel deck bridge installed to span the road below. During construction it became apparent that the construction of the steel deck bridges did not always allow for sufficient ballast beneath the sleepers, I discovered instances where ballast depth can be as little as 80-90mm when the minimum requirement (in the Network Rail standards for Category 2 track) is 250mm. A ballasted track system with so little ballast will not allow for the ballast to interlock nor will it sufficiently dissipate the load imparted by a train leading to rapid ballast degradation, which will result in ongoing maintenance issues. Upon my initial discovery of a sub-standard ballast depth location I investigate the problem and advise the construction team that a review is required and the current design will be subject to change. I then arranged for the site team to undertake a survey of the bridge deck and with this information I created a 3D model of the bridge deck in our track design software (Bentley Rail Track), with this information I review and locally amend the vertical alignment of the track to achieve minimum the ballast depths, whilst still ensuring the alignment is compliant to NWR Standards (see Appendix B for an extract of a design drawing amended to resolve this). In the example provided, the bridge deck survey has been imported, I then calculated the required track level over the structure by taking depth of the track components (rail, rail pad, baseplates, sleeper and ballast) and offsetting this from the deck. Now the minimum rail height is known I adjust the vertical alignment, in this example I amended the grade over the structure and re-calculated the adjoining vertical curve to produce an amended vertical profile (achieving compliant ballast depths of 250mm, which will ensure longevity of the ballast and the track alignment on the bridge).	
B	Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services in one or more Permanent Way engineering activity areas.
Explain how you contribute to one or more of these activities. Aim to provide 300 words. B1: Give an example of how you have used measurement, monitoring and assessment to identify a source of a problem or to identify an opportunity or to propose a solution. B2: Explain how you make decisions about what information, material, component, people or plant to use; or how to introduce a new method or working and what precautions you took; or describe how you have contributed to best practice methods of continuous improvement, e.g. ISO 9001. I am responsible for a team that regularly undertakes is the checking of clearances between rolling stock and the many varied items of infrastructure located in the railway corridor. These checks are safety critical to ensure the passage of rail traffic without striking the surrounding infrastructure. Our clearance analysis is completed using specialist software ClearRoute2 and can only be done by qualified & certified users. In order to gain certification you must undertake and pass the required training course and renew your license every two years, I am a certified user having last passed the training course in October 2017. When I undertake these checks myself I review the data provided and confirm it is sufficient to undertake the clearance check (location, track geometry, CAD drawing of the structure etc.), should any key information be absent I raise this with the customer for this to be obtained/supplied. I then create the structure within ClearRoute. Using the CAD data provided I measure a series of lateral and vertical offsets from the rail (measurements are taken from the running edge of the left-hand rail) to points on the structure, these values I then input into ClearRoute to accurately create the outline of the structure relative to the track. I then input details of the track geometry and the linespeed, and then using the Sectional Appendix document select (from the ClearRoute Vehicle Library) all the route cleared stock that are permitted to run in this location. Once I have inputted all this data into a ClearRoute database a clearance run is performed and I export the results into Microsoft Excel, this data then forms the basis of the clearance report I then produce. Cross sections are also produced. In most cases when a specific clearance check is undertaken compliant clearances are achieved (Network Rail standard GC/RT2512 specifies fully compliant as achieving a minimum of 100mm clearance between all relevant vehicles and the structure) however one structure I checked recently (OLE gantry SWM/233/016/LC, positioned between two running lines) did not and returned a clearance (to the W12 freight gauge) of 76mm to the nearest track. Upon discovery of this I did not continue to produce a report and arranged a conference call with the customer to discuss my findings. During this I was able to demonstrate the problem and show the current design would not provide compliant structural clearance. We collectively reviewed the location and by using my expertise of ClearRoute I was quickly able to show a move of the structure of 40mm could be accommodated without impacting clearances to the adjacent track and it was agreed the structure should be adjusted by this amount to resolve the issue, the customer was then able to amend his design using the data I provided. Once the new design was available I updated ClearRoute data and was able to produce a clearance report for a fully compliant (116mm clear) structure, this enabled the customer to submit a compliant design first time.	



SECTION 2: Competence and Commitment Evidence

PART B: Professional competence and commitment



C	Accept and exercise personal responsibility in one or more Permanent Way engineering activity areas.
Describe an experience or instance where you have had to accept personal responsibility for seeing a process through to completion within agreed targets. Aim to provide 300 words. C1: Describe how you identified and agreed what had to be done and to what standards on a typical project. C2: Describe a situation where you accepted responsibility for the work of yourself or others, providing suitable evidence of this. C3: Describe a situation where you allocated and supervised technical and other tasks, providing suitable evidence of this. Suitable evidence could include minutes of meetings, site notes and instructions, variation orders, programmes of work, specifications, drawings and reports or appraisals. NB: activity not associated with your job can contribute as evidence. As CRE I played lead role in the track design team responsible for the delivery of the remodelling project. As am experienced CRE I am aware of the key Network Rail standards applicable to track design (e.g. NR/L2/TRK049, NR/L2/TRK2102, GC/RT5212) and I also reviewed the specific contract requirements as set out in the CR-T document. My responsibilities included: - coordination and organisation of a 6 man design team, where I managed the design programme to ensure timely delivery and to meet construction programme deadlines, - Managing the production of compliant, safe, constructible, and maintainable designs, - Checking and approval of design submissions to provide technical assurance for safety and compliance. As part of this role I supervised my design team and I reported to the Contractors Engineering Manager (CEM), I also worked closely with the Construction CRE and Site Engineers. I developed an excellent working relationship with the Network Rail Engineering team; this greatly benefitted the project ensuring that we were all working towards the same engineering focused goals and facilitated quick resolution of engineering issues. The complex nature of the project meant designs evolved and changed throughout their development and this was controlled using a four stage design approval process I helped to established at the beginning of the project, these stages are: - PDR (Preliminary Design Review) – I initiated this first review of a design to track construction and NWR's engineers an initial review of a design. I recorded actions at these meetings and they were closed via the meeting minutes (see Appendix C for an example) - CEM Inter-Disciplinary Review (IDR) – this is the first official review of a design, giving other disciplines an opportunity to review and comment. At this meeting I complete a CEM IDR certificate; this captures actions on the design, which are then addressed and the certificate closed, the completed certificate is then part of the Form B submission (see Appendix D for an example) - Client Inter-Disciplinary Check (IDC) – this review is led by NWR and I have to present our design for approval. Actions at these meetings are captured on the IDC certificate. I then am responsible for the closing of any actions and signing off the track design section of the certificate (see Appendix E for an example) - Client IDR – this is the final review of a design, where NWR give approval for a design to be issued for construction. I attend these meetings to show all actions on track designs are closed.	
D	Use effective communication and interpersonal skills.
You will need to show you can: contribute to discussions; make a presentation; read and synthesise information or write different types of documents. Aim to provide 200 words. D1: Describe how and when you have used oral, written and electronic methods for communication of technical and other information. Provide suitable evidence of this, such as letters, reports, drawings, emails, work instructions. Your application itself will be relevant. D2: Give an example of how you have worked effectively with colleagues, clients, suppliers or the public and needed to be aware of the needs and concerns of others, especially where related to diversity and equality. As the Design Office Manager I am required to do regular presentations and briefings to my team. Upon my promotion to the position I instigated a monthly team meeting where I can update the team on several key items, these include (but are not limited to); - Changes in personnel or reporting structure, - Change and updates to NWR and LU standards and requirements, - Progress updates on our live projects and our current tenders, - Any safety issues (this will include an update on any incidents, near misses and close calls etc.), - A feedback and issues section, giving everyone in the team a chance to share any issues or concerns, - We are also provided with a Safety Cascade Briefing from the SHEQ department, this I will brief out to the office either as part of the regular monthly meeting or as a separate briefing. For this meeting I created a PowerPoint presentation to provide visual focus to the briefing, but the majority is verbal communication. Although I lead the meeting and ensure all information provided from senior management, other parts of our company, and the SHEQ department is communicated and understood, I also expect my team to contribute to the meeting and I encourage debate and discussion on technical issues, the rail industry in general, and thoughts on what went well in the month - and indeed not so well. As part of the ongoing development of my team I arrange 1-to-1 meetings with each member of staff, which gives me chance to review each month how they are doing and feeling. This meeting gives me opportunity to identify any areas for personal development and add this onto their annual performance reviews or development action plan. I record the 1-to-1 meeting notes from our discussions including any actions raised, which we then review the following month. I also enjoy the opportunity to take some time to sit with each member of my team to talk about how they are and to establish that they are happy with their work, their current workload and also discuss their own health & wellbeing. For the past five years I have given a lecture to the first year Civil Engineers students at University, the 3 hour talk and presentation that I deliver covers the development of the railway system and its componentry, the role of a track design department, and the challenges of developing, renewing, and maintaining track infrastructure.	



SECTION 2: Competence and Commitment Evidence



PART B: Professional competence and commitment

E	Make a personal commitment to the PWI code of professional conduct, recognising obligations to society, the profession and the environment.
---	---

Your commitment will be to become part of the profession and uphold the standards to which all members subscribe. You need to show that you have read and understood the PWI's Code of Professional Conduct. Aim to provide 300 words.

E1: Describe how you comply with the PWI Code of Professional Conduct.

E2: Describe how you manage and supply safe systems of work and deliver your engineering work making and utilising risk assessments.

E3: Give an example of how you undertake engineering work in a way that contributes to sustainable development and observes good practice with regards to society and the environment.

E4: Describe how you actively seek to keep yourself up to date with developments in your technical area and how you continue to develop your knowledge and skills.

E5: Give an example of where you apply ethical principles* (which could include those defined by your organisation or company).

*E.g. accuracy and rigour, honesty and integrity, respect for life, law and the public good, or responsible leadership.

Since I joined I have continuously sought to develop myself initially technically and more recently professionally. Also I am eager to share my knowledge and experience with the junior members of the team I now lead. I gained a HNC qualification in Civil Engineering Studies during my first four years of employment and have progressed from a Trainee Designer to Principal Engineer & Design Office Manager in a career now spanning 25 years and I have created designs that contribute to the sustainable development of the railway, as good track alignment design provide smooth ride quality, and minimises wear which maximises the life of the componentry.

For the majority of these years I held a PTS certificate and while working as Assistant Project Manager on the I was responsible for the production of Work Package Plans & Site Briefing Sheets. I took personal responsibility for ensuring safe systems of works were in place for surveyors and specialist contractors (such as Noise & Vibration consultants from) and would always be in attendance and give the briefings myself when these teams, often not so used to the railway environment, came to undertake work on the project.

I have attended training on updates to the CDM regulations and ensure both myself and my team receive regular updates to any changes to NWR and LU Standards. I as CRE (and under CDM in the role of the Designer), am responsible for the supervision of the production of the Designers Risk Assessments produced for every design package issued. The format followed is the industry recognised ERIC (Eliminate, Reduce, Inform, Control) process, no design can be issued without a risk assessment being completed and then reviewed and signed off by myself or other senior engineers (see Appendix F for an example of a completed ERIC form) and communicated to the construction team (under CDM the Contractor) so they understood their responsibility.

I am a member of the PWI and as such am fortunate to receive the quarterly journal, to have access to the information on the website, and receive the invites to attend the various meetings, seminars and conferences. One event of particular note is the bi-annual Track Engineering Conference arranged by Network Rail and the PWI and held at one of the engineering institutions in London, these always provide an excellent opportunity for me to hear from several highly regarded Track Engineers and provides incentive for me to continue my own personal development and education. (Appendix G provides a download of my 2018 CPD log as recorded on the PWI website).

I have in my time in the railway industry seen great improvements the safety record of my industry and we now, I am certain, are procedurally putting safety as the first priority to all we design, build and maintain. However there are still incidents and the next step is to ensure safety first behaviours are intrinsically embedded into everyone working in the railway. As a manager of a team and part of several design teams I feel I have the opportunity, and the responsibility, to push the safety message until we are 100% confident everyone will get home safe every day.

Within my office I introduced a regular monthly office meeting upon which safety is the first item on the agenda; this provides not only a briefing opportunity but a chance for knowledge sharing, learning, feedback and analysis.

Within any design department the greatest way we can improve the safety of others is by consideration of how our designs will be actually built and thinking about the workforce doing it, to make this 'real' for the designers in my office I have ensured all the team have spent time on site and at the project offices speaking with the site engineers, surveyors, trackmen etc. who will be there during the possession, not only does this provide great insight into the build process it puts names and faces to the people we will be sending out each weekend and doing this I have felt we have made safety more personal even from the comfort of our office.

I also have reinforced assurance that safety critical information is passed on and understood by all relevant parties, one example of this is where upon completing a ERIC risk assessment form I modified our internal procedure and form to include an initial signature box so I knew the construction team would be made aware of the identified risk as part of their site briefings (see Appendix F for an example of a ERIC form signed by the CEM).

Part of the track design process includes the consideration and checking of clearances (passing clearance between two vehicles and the clearance of vehicles to the many structures and features that surround the track), I recently was working with a colleague to investigate a signal gantry that, due to its location on a structure, was recording very limited clearance values and it was proposed to include as part of an existing night shift to visit the structure and make some amendments to it. I reviewed the plans and requested before undertaking this additional work I be allowed to do some further assessments of the problem and its underlying causes. We spent two days reviewing the data and discovered the clearance issues were caused by only one classification of vehicle and that this vehicle had two variants both of which were route cleared and therefore subject to clearance assessment. Further investigation revealed it was a modification to the vehicle step that was the issue and this was on the variant only used on the Mersey Rail system, we were therefore able to have that classification variant removed from the route cleared list and removed from the checking analysis, this meant there was no requirement to send a team back to the signal nor add any additional work to the already busy night shift.

