

# I Am a Systems Engineer and I Do...

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### Why did you choose to be a Systems Engineer?

Systems Engineering in the railway industry has not previously been well-established, unlike more precision-engineering industries such as aviation. This was partly the reason for my decision to become a Systems Engineer, I recognised the benefits of a 'Systems Approach' to engineering and project delivery. I found that I connected very quickly with the Systems Engineering philosophy.

To me, Systems Engineering provides an approach to project delivery that ensures we provide an integrated, safe and assured product or system, with the lowest lifecycle cost and lowest risk. I was interested in WHY we were undertaking these projects in the first place, the rationale behind the business case, and high level decisions.

In my view, traditional methods of project and engineering management will no longer suffice, because of the lack of 'Systems Thinking'. This is in part, due to the railway industry and associated projects becoming more complex; newer technology and enhanced functionality introduce increased complexity, as such, I see Systems Engineering as an established part of railway project delivery.

Being a Systems Engineer is something that I'm excited to be a part of, and a fantastic opportunity for me to involve myself within an industry movement, that will provide me with great career opportunities in the future.

### What education/qualifications do you have for Systems Engineering?

Qualifications are very important, but I believe that it is more about your ability to maintain a broader perspective or holistic approach to projects. This will ensure that you can understand a system context, decompose client requirements, identify determinants of system complexity and avoid concluding what the system solution will be before exploring all other candidate solutions.

However, it is still important to validate your knowledge and understanding through qualifications. I formalised my Systems Engineering knowledge initially when I undertook a part-time MSc in Railway Systems Engineering and Integration at the University of Birmingham back in 2012.

I have subsequently pursued Certification through INCOSE, having attained ASEP status, and I'm currently preparing to submit my CSEP application in the next couple of weeks. I'm confident I will achieve CSEP having demonstrated over five years' experience in the field, and I look forward to being able to call myself a Certified Systems Engineering Professional.

### What is it about Systems Engineering that you find so compelling?

The railway sector presents many challenges for a Systems Engineer; it is a complex, socio-technical system within a wider inter modal transportation network. This ensures that every project offers many unique challenges, and why Systems Engineering or a 'systems-led' approach within the railway industry has now become a recognised contribution to effective project delivery.

As an Engineer, I love problem solving. As a Systems Engineer I am exposed to a range of complex challenges. I'm always asking questions, getting people to provide their rationale behind decision making is often a good way of identifying omissions when evaluating alternative candidate solutions; this makes every day diverse and interesting. What's more, the role requires lots of research and learning to remain informed when taking part in technical discussions.

I interact with most members of the project team, including the Client, which means I need to stay on top of all project-related issues. I'm constantly tracking technical risks, system interfaces, ensuring robust verification and

validation, and identifying and managing dependencies and assumptions, while integrating specialist engineering teams, which means I've no time to be bored.

## What advice would you give a Systems Engineer just starting out in their career?

Issues faced by Systems Engineers will vary from industry to industry, and country to country. Speaking to other System Engineers with experience in different sectors is invaluable; there is much to learn. Where possible, I would recommend shadowing experienced Systems Engineering practitioners, this can help expand your knowledge and demonstrate how to apply systems concepts in real projects.

Reading about Systems Engineering through INCOSE and attending industry related events and talks are always beneficial. New Systems Engineers should aim to broaden their own experience of their practical knowledge of Systems Engineering in different industries too. I have spent all my career in Railway Engineering, I feel that to have had a diverse range of experience from other sectors would have been beneficial.

However, it is worth noting that it can be a difficult field to work in, especially when working with people who may not know much about Systems Engineering, don't underestimate the importance of your soft skills such as communication and leadership qualities.

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