

Crossrail East Engineering Support



CASE STUDY

Overview of Deliverables

The Crossrail scheme will introduce a passenger service linking the West of London, and beyond, to the East and South-East of London via dedicated sub-surface infrastructure running through Central London.

Crossrail Ltd have contracted to Network Rail (Network Rail Infrastructure Ltd, NRIL) the responsibility for the alterations required to the existing surface rail network to facilitate proposed Crossrail operations. For East surface works, NRIL have then subcontracted the role of Lead Design Organisation (LDO) to Costain. This role covers design, construction, Systems Integration, Asset Handover and Commissioning (Entry into Service) and assurance for the required enhancements and modifications.

The eastern upgrades to deliver the benefits of Crossrail consist of multi-disciplinary work packages and include:

- Line of Route and Station Works, Platform extensions; and
- Signalling alterations; and
- Track works, including S&C Civils; and
- Electrification upgrades; and
- Alterations to stabling/sidings and turn-back facilities

Costain contracted Vertex Systems Engineering to undertake all CSM assurance works and a number of Systems Engineering deliverables for the scope of its LDO.

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Deliverables Included:

Vertex Systems Engineering, acting on behalf of the LDO; has been involved in ensuring the Crossrail East Anglia project is compliant with the Common Safety Methods (CSM), our core deliverables have included but not exhaustive of the following:

- Liaison with multiple sub-contractors under the umbrella of the Lead Design Organisation to align assurance activities; and
- Providing an extensive array of Hazard Management tools including a Hazard Log; and
- An expertise in a comprehensive understanding and handling of a project scope based on the System Definition provided by Network Rail; and
- Competently identifying and capturing key aspects concerning Hazard Identification and Operation (HAZID/HAZOP); and
- Providing both the focus and platform on key areas of discussion by chairing meetings and constructing briefing notes and summary reports; and
- Convening a quoracy to identify hazards- undertaking many Hazard Workshops consisting of a group of specialists (a number from Vertex Systems Engineering) across various disciplines; and
- Management of many CSM submissions to Network Rail; Scheme Verification and Validation (V&V)

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Vertex Systems Engineering is
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Systems Engineering Ltd.

Registered in the UK,
Number: 04440268.

Completed works include:

- 09/05/17 - Pudding Mill Lane (PML) Risk Assessment - Progress and close out the Form A Risk Assessment based on the entries developed at the 15th March 2017 session; and
- SAR received for Shenfield Infrastructure Week 5. Declaration of Control of Risk signed by NR on 26/04/17; and
- SAR received for Shenfield Infrastructure weeks up to 40. Declaration of Control of Risk signed by NR; and
- SAR received for Relock 1. Declaration of Control of Risk signed by NR; and
- SAR received for Relock 2. Declaration of Control of Risk signed by NR; and
- Relock - Leading Systems Integration between Signalling and Control Systems Contractors;
- Signalling Power Supplies (FSP/PSP) risk assessment complete; and
- Shenfield Station temporary hoardings HAZOP complete; and
- Pudding Mill Lane Week 25; and
- Gidea Park Siding week 45, Stage 3

Hazard Identification Workshops are routinely undertaken, most recently have included:

- ATF Stage 1, Session 2; and
- Pudding Mill Lane, Session 1, Stage 6

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Closeout acceptance activities (Asset Handover and Commissioning), integration of system safety hazard logs, from various disciplines, projects and geographical areas, into a single Programme Hazard Log.

Each individual log item was managed to control, closure or transfer by completion evidence. This included justification of previously supplied mitigations from earlier project stages or, in some cases, new mitigations suggested by Vertex.

The above process management included the gathering of evidence, working with the relevant Discipline Engineers to validate. Administration was then carried out on the completed logs until they were suitable to hand over to Network Rail for formal acceptance. This included handover transfer actions for Network Rail, Operations and Maintainer.

Technical competencies applied in the delivery of the contract:

Vertex Engineers employed the following competencies during these works;

- Technical knowledge of the proposed system in question, incorporating over 20 years' experience in project development; and
- Systems Engineering- appreciating the impact of the proposed solution in terms of its whole-life implementation. This included Project Management, Stakeholder liaison and influence, in order to drive the project forward on the agreed timescales whilst maintaining stakeholder confidence; and
- Safety Engineering; and
- Expertise in imbedding current legislations and regulation practices such as CSM into infrastructure projects; and
- Knowledge of the Technical Specifications for Interoperability (TSI) and Notified National Technical Rules (NNTR); and
- Experience in Risk Assessment and Risk Management such as the (As Low As Reasonably Practicable) ALARP principle

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Programme start and completion dates:

Project duration is from March 2016 onwards. The contract is expected to continue through to late 2018, in alignment with the Crossrail delivery programme.

Resources utilised:

Vertex utilised its team of Railway Systems Engineers and Project Managers for this project. Qualification held includes membership of the Institution of Railway Signalling Engineers, membership to the Association of Project Managers (MAMP), Project Management Professionals (PMP) and professional Chartership (C.Eng.). Combined railway experience of the project team (4 persons) exceeded 80 years.

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