

Stockton Engineering Management Limited offers:

## **Assurance Planning**

Assurance Planning is an important step in any project as it provides all project stakeholders, including the approval authorities, with comprehensive details of the safety activities to be carried out, the deliverables to be provided and clarifies the safety roles and responsibilities of everyone involved in the project. This is key to controlling costs and reducing delivery risk.

Stockton associates produced the overall project assurance plan for the Jubilee and Northern lines Upgrade Project. This set out the assurance requirements and activities for the whole of this 7-year project. Stockton continues to work with the project providing subsidiary project plans and also monitoring deliverables against the plan.

## **Feasibility Studies**

Stockton associates have experience in the preparation of feasibility studies, such as the study for the introduction of a new signalling track circuit system and the introduction of a new type of axle counting system.

## **Systems Engineering**

Systems engineering encompasses requirements management, as well as reviewing industry and national standards.

Stockton associates have extensive experience in systems engineering activities. For example, production of the new suite of London Underground signalling and signalling control category 1 standards, setting the requirements for a new type of level crossing for Network Rail and establishing the safety requirements for the new signalling system on the Jubilee and Northern lines Upgrade Project for Tube Lines. System product and process requirements are captured using tools such as DOORS.

## **Hazard Management**

Legislation requires that the risk to which people are exposed is reduced to a level that is as low as reasonably practicable. Hazard Management, Risk Assessment and Safety Analysis are used to provide the evidence necessary to demonstrate this has been done.

Stockton associates have extensive experience in hazard management for major projects, including the Jubilee and Northern lines Upgrade Project and Network Rail's West Coast Route Modernisation project.

## **Risk Assessment**

Risk assessment is the process of evaluating the likelihood and consequences (or severity) of injury that may result from a hazard. A risk assessment will incorporate identification of the hazard, what the level of risk is and what can be done to control the hazard.

Stockton associates have extensive experience of the use of quantitative and qualitative risk assessment techniques for entire railways or lower-level assessments for railway systems.

## **Safety Analysis**

Safety analysis encompasses the identification of failure mechanisms and their effects.

Stockton associates have been responsible for providing safety analysis for major projects, including the Jubilee Line Extension project signalling and also for products. Stockton associates have also reviewed numerous supplier safety analyses in support of technology acceptance with systems including signalling interlockings, ATP/ATO systems, moving block signalling, train operator displays and train detection sub-systems.

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## **RAM Analysis**

Reliability and cost effective maintenance in operation are key objectives for any railway project.

Stockton associates have been doing RAM analysis for railway projects for many years, including the development of the initial reliability models for the Jubilee Line Extension and the Jubilee and Northern Line Upgrade projects.

## **Cross Acceptance**

Cross acceptance has the potential to reduce both costs and risks on a project by re-using design and analysis work that has already been applied in a similar context.

Stockton associates have been involved in many product cross-acceptance activities. For example, gaining approval of an axle counting system new to London Underground based on its previous use on Deutsche Bahn.

## **Safety Cases**

Stockton associates have produced many system and product safety cases and have performed acceptance reviews of suppliers' safety cases for major signalling upgrade projects.

We have also produced operational safety case papers to support staged introduction and final revenue service of new signalling systems.

## **Project Engineering**

Stockton associates have experience of project engineering for signalling systems on London Underground.

## **Peer Review**

Peer review is a process of self-regulation by a profession, or a process of evaluation involving qualified individuals within the relevant field. Peer review can be used to maintain standards, improve performance, and provide credibility.

Stockton associates have supported this process for major rail projects.

## **Audit**

Stockton associates have performed safety audits of signalling system and software development against the requirements of the CENELEC standards.

## **Approval of safety documentation**

Stockton associates have extensive experience in gaining approval of safety documentation ranging from assurance plans, safety plans and systems engineering management plans through to complete product and/or system safety cases.

## **Technical Authoring**

Stockton associates have produced a wide variety of documents, systems safety and technical documents. We have produced plans, standards, proposals, specifications, technical presentations, professional papers, operational notices, maintenance bulletins, safety reports and safety cases for major rail projects.



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