

# Taiwan High Speed Rail Project

## INTRODUCTION

The Taiwan High Speed Rail project represented one of the largest infrastructure projects ever to be undertaken in Asia. Completed for operation in early 2007 and stretching 345km (220 miles) largely on elevated structures, the line now connects Taipei and Kaohsiung (Taiwan's two largest cities) with the potential to achieve a 90 minute journey time operating at speeds of up to 300kph, compared with the previous 4 hours using conventional routes.

Atkins were appointed by the Japanese Contracting Consortium (Taiwan Shinkansen Corporation [TSC]) and its sub system suppliers to various tasks relating to the delivery of complex railway systems and railway operations requirements for the project over a five year period extending from 2002 to 2007 which included design management of the main Operational Control Centre systems integration and related control systems, construction railway operational readiness planning, and systems assurance for safety critical core systems, including the signalling system, Shinkansen 700T series rolling stock, telecommunication systems, electrification and electrical & mechanical wayside systems.



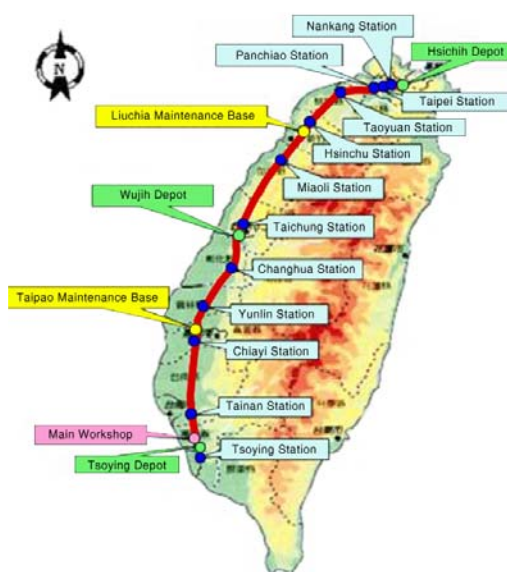


## OUR SOLUTION

Our Systems Assurance solution addressed the Reliability, Availability, Maintainability and Safety (RAMS) of the core systems, including specific focus on their fire safety and in ensuring confidence in the achievement in the design and development of the required Safety Integrity Levels (SILs) of software based systems through assessment and audit processes. Systematic processes were applied in accordance with CENELEC railway standards EN50126, EN50128 and EN50129 and included principal activities such as HAZard and OPERability studies, SIL Assessment, Design Safety Case, and System RAM Apportionment and Prediction. In addition, Atkins undertook Independent Engineering Checking of the entire signalling system interlocking control tables.

A specific task force comprising experienced railway operators, documentation specialists and trainers was assigned to develop and produce the Construction Railway Operating

Manual (CROM) and Electric Traction Power Supply operating rules. Atkins further assisted scoping and delivery of training to Taiwanese, Japanese and Western project staff on site safety access, safe trackside working and arrangements for obtaining emergency isolations. Subsequently, members of the team were assigned to Operational Safety roles supervising safety along the initial 60km test section of the route and during initial trial runs of the first Shinkansen trainsets.



**Plan Design Enable**



Atkins led a task force in overseeing the definitive design, implementation, installation, testing and commissioning of control room systems for the main Operational Control Centre, and Station and Depot Control Rooms. This included the development of engineering and integration aspects of the Operational Control Centre requirements for the line; analysis of operational and functional requirements in relation to the operating plan and Operator rules and procedures, and in ensuring that the integrated design and functionality of the control centre could meet operational requirements. Ergonomic and human factors issues were also addressed.

#### **OUR APPROACH**

Atkins was able to mobilise a substantial team of engineers, operators and safety specialist practitioners to deliver full time committed support to the client in Taiwan, and additionally we were able to provide shorter term specialist support both onshore and offshore from our teams of specialist rail consultants based in Hong Kong, Beijing, United Arab Emirates and the United Kingdom.

#### **OUTCOMES**

Atkins were able to work in an integrated team environment with our TSC and subsystem clients to ensure the satisfactory delivery of crucial management, engineering and assurance tasks as demanded by the ultimate project client. In addition, through Atkins professionalism and international reputation we were able to deliver standalone assessments and reports to support systems solutions being delivered.