

Introduction

We have a total capability across the whole spectrum of activities related to designing, developing, constructing, operating and managing a main line railway, metro or light rail system. We consider that the breadth of experience that Halcrow can offer is almost unique. Our capability is not limited to particular aspects of railway operations, or railway engineering but covers all the activities required to build and operate a railway. Halcrow understands the needs of different cultures, terrains and climates. We have experts for every aspect of a commission, from the initial planning process through to maintenance and management of the completed works.

The company is able to offer a comprehensive service in all aspects of rail development, from economic analysis and route planning, through the evaluation of alternative technologies, system specification and design, construction supervision, to testing & commissioning and handover. Halcrow also offers, a full staff competence and safety accreditation service, including an IRSE licensing agency.

The range of services offered by Halcrow for transportation projects, in particular Rail is indicated below. These services are backed up by a capability in all the major civil engineering disciplines and by the support services to be expected from a major multi-disciplinary consultancy.

Close attention to the needs of the client, and an appreciation of time and cost constraints, ensures an efficient and cost-effective service.

Services

Halcrow provides a full range of engineering, planning and environmental consultancy services for the development, operation and maintenance of rail projects. These services include:

Pre-Investment Planning

- initial surveys, inventory and analysis
- site reconnaissance and selection
- technical and engineering feasibility
- financial and economic evaluation
- advice on funding

Civil and Structural Engineering Design

- site investigation and materials testing
- conceptual design
- layout and master planning

- facilities planning
- seismic analysis and seismic safety evaluation
- physical and numerical modelling
- preliminary and detailed design
- environmental impact assessment
- design safety reviews
- cost estimation
- preparation of contract documents
- selection of tenderers, invitation and evaluation of bids
- inspection, investigation and rehabilitation of existing works
- monitoring and instrumentation
- transfer of technology

Project Management

- computer analysis of financial and project options
- project scheduling and contract packaging
- contract administration
- quality assurance
- interface management
- supervision of construction, fabrication and equipment installation
- technical inspection of civil works
- construction records and drawings
- cost and budget control
- advisory services during operation and maintenance
- total project management.

Our world-class resources are developed through skill groups, from which dedicated project-specific teams are created within our market areas:

Rail System

- ✓ Condition Surveys, Modernisation and Development of all Transit Systems
- ✓ Detailed Design for Model Integration of Railway Infrastructure
- ✓ Integrated Design for Multi-Disciplinary Projects
- ✓ Development of Procurement Strategy and Funding Packages, Specifications and Tender



Documentation

- ✓ Whole-Life Assessment Investigation and Associated Design Applications
- ✓ Development of System Extensions, Upgrades and Re-equipment Packages

Management Information Systems

- ✓ Worldwide Systems Reviews and Benchmarks
- ✓ Strategic Planning
- ✓ Systems Specification
- ✓ System Development
- ✓ Organisation Review

Safety and Risk

- ✓ Rail Safety and Mishap Management Systems, Plans and Procedures
- ✓ Standards for Railway Infrastructure, Operations and Projects
- ✓ Driver and SPAD Management System Development and Review
- ✓ Quantitative and Qualitative Risk Assessment/Mitigation
- ✓ Accident and Incident Investigation
- ✓ Independent Safety Audits and Development of Audit Systems

Business Analysis and Economics

- ✓ Railway Restructuring, Commercialisation and Privatisation and Due Diligence
- ✓ Railway Economics, Business Analysis and Planning
- ✓ Rail Retailing and Revenue Settlement Arrangements
- ✓ Management Science
- ✓ Performance Management

Civil Infrastructure

- ✓ Track Design
- ✓ Track Realignment for Speed Improvements
- ✓ Bridge Design and Refurbishment for Optimisation for Whole-Life Costs
- ✓ Materials and Equipment Procurement
- ✓ Asset Management

Signalling

- ✓ Outline Project Specifications, Tender

Evaluations and Implementation Management

- ✓ Comprehensive Design Services
- ✓ Testing and Commissioning
- ✓ Safety Cases, Specialist and Expert Witness Studies
- ✓ Immunization Studies

Telecommunications

- ✓ Train Radio System Design, Testing and Implementation Management
- ✓ Lineside and Railway System
- ✓ Immunisation Studies
- ✓ SCADA and Remote Control System Specification, Design and Testing
- ✓ Train Describer and Associated Systems Design and Testing

Power Supply and Electrification

- ✓ Performance Based and Technical Detail Specifications
- ✓ Assistance in Negotiations with Power Supply Utilities for Electricity Bulk Supply
- ✓ Design Approval for AC and DC Systems and Commissioning/Testing
- ✓ Electrical Operating and Maintenance Instructions and Procedures

Tunnels and Underground Spaces

- ✓ Design and Specification of Bored and Cut and Cover Structures
- ✓ Two and Three Dimensional Numerical Modelling (3D CAD capability)
- ✓ Assessment of Effects of Underground Construction on Adjacent Structures
- ✓ Construction Techniques
- ✓ Value Engineering

Traction and Rolling Stock

- ✓ Maintenance Services
- ✓ Fiscal Studies (residual value/cost benefit analysis)
- ✓ Auditing and Training
- ✓ Vehicle Acceptance
- ✓ Product Improvement



Details of Projects

PMC for track works, civil works, ballast supply, signalling & telecom and electrical works in connection with gauge conversion of Samdari – Bhildi section (Km 223) over North Western Railway

Assist Rail Vikas Nigam Limited (RVNL) for gauge conversion (MG to BG) of railway section from Samdari to Bhildi including track works, civil works; ballast supply, electrical works, supply and replacement of existing signalling system. The objective of the consulting services is to assist the RVNL to implement the project in conformity with Railway rules and regulations and local laws, byelaws, regulations etc. Halcrow is providing PMC services for this project.

PMC for Gauge Conversion (MG to BG) of Railway Track in Rewari - Ringus - Phulera - Ajmer (294.56 km) section including electrical works, supply & replacement of existing signalling system of N W Railway

Halcrow in joint venture with SOWIL is providing the PMC services for gauge conversion (MG to BG) in Rewari – Ringus – Phulera – Ajmer (294.56 km) including electrical works, supply and replacement of existing signalling system.



Proof Check of the designs and drawings for construction of major bridges & technical guidance at site between km 62-km120 on Katra-Laole section of Udhampur-Srinagar-Baramulla Rail Link Project

Konkan Railway Corporation Limited (KRCL) is retained by the Ministry of Railways through Northern Railway for design and construction of broad gauge single line railway line from km30 to km120 between Katra-Laole under Udhampur-Srinagar-Baramullah Rail Link (USBRL) project in J&K state.

Halcrow carrying out independent design analysis to confirm/cross check the design submitted by the detailed design consultant for the steel and composite bridges. A comparison report shall be prepared between design done by detailed design consultant and independent analysis.

Railway Sector Improvement Project - Management Consultancy Services (RVNL)

Halcrow in joint venture with SOWIL has won management consultancy for railway projects - package no. 1 with Rail Vikas Nigam Limited for management consultancy services for railway projects as part of National Rail Vikas Yojana (NRVY) scheme launched on December 26, 2002, which are being implemented as Subprojects under ADB Loan No. 1981, for the 'Railway Sector Improvement Project'. The Consultancy Package 1 comprises of following components:

- (i) Supply and installation of Track and signaling : Keonjhar – Tomka Section (96.355 km) of Banspani – Daitari new railway line; Cost of works : US\$ 37.7 million; Period of completion : 12 months
- (ii) Construction of 2nd Bridge across river Mahanadi (32x65.4 m) on Cuttack – Nergundi Section of East Coast Mainline with 60 m approaches on either side. Cost of works- US\$ 20.5 million; Period of completion- 36 months

Alleviation of Line Capacity Constraints (ADB)

Comprehensive study on problems occurring on two major routes of the Indian railways with the objective of improving services. This comprised analysis of causes of operational delays, track layout at key sites and definition of structures and systems to ensure effective operational performance. Also developed of new timetables.

Training of Indian Railway Staff (Indian Railways)

Halcrow designed and developed a training programme on all aspects of electrification, including both rolling stock and fixed installations.

