Evolving Transport Requirements

Today’s rail challenge is to meet passenger needs, and freight user requirements, to guarantee revenue streams, and to control costs. Freight clients and passengers expect trains to be safe, clean, reliable, and on time.

Punctual and safe services give rail transport a competitive edge, making it the ideal way to combine short travel times with easy accessibility to leisure and business hubs. Key to achieving this challenge is technology, interoperability, and integration of assets, allowing for seamless operation, high integrity, resilience, and responsiveness to the needs of users.

Arup is able to take rail projects, large or small, through their complete life cycle, with sustainable solutions considered at every stage:
A sample of our rail projects around the world

**Metrolinx Electrification, Canada**
Study of the electrification of the Ontario provinces to provide client with a range of options for train power systems and an effective methodology to implement electrification across the network.

**Spadina Metro Stations, Canada**
A new 8.6km line that will include both tunnelled and cut and cover sections with 6 new passenger stations on the Toronto-York Spadina Subway Extension.

**Transbay Transit Centre, USA**
Arup’s state-of-the-art design for this multi-modal hub. It will have three 1,300-foot long train platforms, providing four terminal tracks for the new High Speed Rail service and two tracks for the commuter rail service.

**California High Speed Rail Project, USA**
Linking all the major cities in California with a state-of-the-art new high-speed line. The project comprises the design and environmental studies for 408km of the 1100km project, linking Los Angeles and San Francisco.

**Fulton Street Transit Centre, USA**
A transit orientated development to improve existing connections between 4 stations, plus new links to 2 others, serving a total of 9 subway lines.

**Second Avenue Subway, USA**
The 13km subway will be the first major new subway development in New York City for 60 years, incorporating 16 new underground stations.

**High Speed Rail, Portugal**
To provide technical advice/data diligence to the lenders on the successful bidding concession companies proposals during the development period of Portugal’s first high speed line.

**LUAS Metro, Ireland**
A new extension involving 7.8km of new line, 11 stops, depot track remodelling and full E&M and Control Centre systems supply.

**Zal Prat, Barcelona, Spain**
Planning for a new rail freight terminal in the Port of Barcelona, allowing for the integration of port activity into the transport network.

**Trans Africa Rail Pre-feasibility study, South Africa**
Arup was engaged to establish possible routes and the financial case for rail based coal export from South Africa and Botswana to a port in Namibia.

**Sao Paulo Metro, Brazil**
Serving as Lenders Independent Engineer for the operating and maintenance concession on this 13km subway with 11 stations in Sao Paulo, Brazil. System currently carrying over 675,000 passengers daily, with patronage expected to grow to over one million passengers per day.

**Metro de Santiago, Chile**
Arup leads the concept design of 11 stations in Santiago. The scope covers some of the most challenging stations on two new lines being built and involves creating interchanges with existing lines on the metro network.

**High Speed 1, London-Kent, UK**
108km high-speed line (300kph) between London St. Pancras and the Channel Tunnel at Folkestone. The project also included the complete renovation of the High Speed terminal, St. Pancras International.

**High Speed 2, UK**
Design for a new High Speed Railway line from London to West Midlands and Northern England. Examination of route options, service patterns, environmental impact, costs and business case.

**King’s Cross Station and Underground, UK**
Redevelopment to create new interchange facilities with London Underground and St. Pancras Station, including a new award winning concourse, associated facilities and refurbishment of historic buildings.
Gautrain, South Africa
Independent Certifier for the Gautrain Rapid Rail Link which connects O.R. Tambo International Airport to the cities of Johannesburg and Pretoria.

Crossrail, UK
Crossrail is the new high frequency, convenient and accessible railway for London and the South East. From 2017 Crossrail will link Heathrow Airport, the West End, the City of London and Canary Wharf.

Heathrow PRT, UK
Infrastructure design for the 3.9km long, world-first personal rapid transit system linking Terminal 5, with a car park, travelling on an elevated, twin-guide way.

Switch and Crossings, UK
Switches and crossings unit renewals in the UK covering complexities from simple turnouts to multiple unit layouts for Network Rail. Services included Pway, Signalling, OLE, (E&P) and civil designs including site surveys.

Tyne & Wear Metro, UK
Over 20 years, our work has included Byker Viaduct, Environmental Assessment for new routes, Interface management for Sunderland Extension and advice on privatisation.

Cambridgeshire Guided Bus, UK
28km of segregated bus route between St. Ives and the northern fringe of Cambridge, making it the longest guided busway in the world.

Docklands Light Railway (DLR), UK
Increasing the capacity on the Docklands Light Railway ahead of the 2012 Olympic Games through refurbishment of stations and platform extensions to accommodate 3-car trains.

PRASA Strategic Rail Plan, South Africa
Transport and rail strategic planning consultancy for the future of Passenger Rail in South Africa. The review and subsequent report established what is needed for the future of multi-modal passenger systems in South Africa until 2050.

Florence TAV Station, Italy
The new 47,000m² Subterranean railway station is an open box with platforms 25m below ground to serve the Italian High Speed Rail Network.

Copenhagen Cityringen, Denmark
A new metro, intersecting and providing passenger connections to existing metro and heavy rail systems. The 16km metro is a driverless system with twin tunnels and 17 underground stations, forming a circle line around the centre of Copenhagen.

TGV Mediterranee, France
Technical evaluation of the 6 alternative routes for the extension of the French High Speed Rail System (TGV) from Valence, south of Lyons, to Marseille and Montpellier on the Mediterranean coast.

Etihad Rail, UAE
New 1200km mixed traffic railway in the UAE, connecting to Saudi Arabia and Oman. Designed to AREMA double stack container gauge and 32.5 ton axle load, in a variety of terrains, including desert, mountains, urban and coastal.

Abu Dhabi Integrated Public Transport Network, UAE
Planning, environmental and engineering support to assist Abu Dhabi Department of Transport with managing the execution of the Integrated Public Transport Network - passenger rail, metro, light rail, bus & water transport.

New Delhi Railway Station, India
Redevelopment of the station and adjacent railway yard and sidings. The railway land surrounding the station is approximately 96 hectares and is proposed to be used under a PPP model to fund the station redevelopment.

Tyne & Wear Metro, UK
Crossrail is the new high frequency, convenient and accessible railway for London and the South East. From 2017 Crossrail will link Heathrow Airport, the West End, the City of London and Canary Wharf.

Integrated Railway Project, Qatar
High level review of the project to assess the revenue, operational and capital programme risks that need to be addressed in order to deliver the projects with private investment.

Cambridgeshire Guided Bus, UK
28km of segregated bus route between St. Ives and the northern fringe of Cambridge, making it the longest guided busway in the world.
Beijing South High Speed Rail Station, China
The multi-modal transport hub is located half a kilometre from the city’s existing station. The oval structure is 500m by 380m in size, spanning 17 platforms, with a lightweight elegant roof providing a column-free shelter for the platforms.

Shenyang Metro Forecast, China
Arup prepared a patronage and revenue forecast using innovative state-of-the-art methodology and techniques, and helped devise a 4-stage strategic transport model for Shenyang.

Shenzhen Metro Line 4, China
Line 4 is the first Build-Operate-Transfer (BOT) metro project in China. The project comprises 3 underground and 6 elevated stations, 6km of tunnel and 10km of viaduct, as well as a depot with a future topside property development.

Westrail, Hong Kong
The Yuen Long section of Westrail, including stations at Yuen Long, Long Ping and Tin Shui Wai, 9km of twin railway viaducts, 3 elevated stations each 400m long and 3 km light rail system and interface with the LRT system.

Express Rail Link, Hong Kong
28km of new tunnel from a new terminus station in West Kowloon to the boundary at Huanggang. Ultimately the XRL will provide high speed rail services from Hong Kong to Guangzhou.

Kowloon Line YMT to Whampoa, Hong Kong
Lead consultant for the multi-disciplinary detailed design, for existing and new stations. Arup is also providing detail design services for the tunnels for the Kowloon Tong Line extension, a 2.5km wholly underground extension of the existing line.

West Island Line, Hong Kong
Multi-disciplinary consultancy, in joint venture with Atkins China Ltd for two deep cavern stations at Sai Ying Pun and University, each with significant lengths of pedestrian subway connections and 1.8km of twin track.

South Island Line, Hong Kong
Detailed design of an extension to Admiralty Station to accommodate the new South Island Line (East) (SIL(E)) terminus and the enabling works for the Shatin-Central link station.

MTR Knowledge Management, Hong Kong
Supported the development and implementation of a Knowledge & Information Management (K&IM) strategy, sharing philosophy and process within MTR projects division.

STAR LRT, Malaysia
15km of Build-Operate-Transfer (BOT) light rail transit system including at grade works, 7.5km of viaduct and twelve stations, some at grade and some elevated.

Bangkok MRTA, Thailand
10km of mass rapid transit railway, 9 underground stations, 8.5km of twin bored tunnel with access tunnels and surface structures.

North East Line Metro, Singapore
The 20km North East Line incorporates 16 stations, line maintenance shops and heavy repair workshops.

Singapore Metro Downtown Line (DTL), Singapore
The 40km DTL with 33 stations is Singapore’s 5th Mass Rapid Transit (MRT) line and will be implemented in three stages – DTL 1, DTL 2 and DTL 3.

Gold Coast, Rapid Transit, Australia
The new signalling system on the Hunter Valley coal network rail line allows trains to run continually, even throughout annual maintenance.

North West Rail Link Options Study, Australia
Arup undertook an extensive feasibility study involving multi-disciplinary engineering design, and identified the opportunities and constraints to construct an operational rail link to improve the transportation networks for one of Sydney’s highest population growth areas.

Regional Rail Link, Australia
This is the largest rail project in Victoria and comprises 49km of twin track, two new stations and three refurbished stations, and 25 new road/rail bridges. Arup in a JV undertook appraisal options, concept and preliminary design and site investigation.

Regional Rail Link, Australia
Transportation consultancy for the Public Transport Authority to conduct a series of surveys designed to quantify current pedestrian flows at train stations along the Perth to Mandurah rail line.

Wiggins Island Rail Australia
The duplication of the North Coast railway line will link the new Wiggins Island Coal Terminal with the Port of Gladstone, ensuring the transport needs of Queensland’s mining industry are met.
Multi-Disciplinary Approach

Arup provide a comprehensive consultancy service for all aspects of rail infrastructure design. Our permanent way, bridges, tunnelling, station planning, civil engineering and earthworks designs are integrated with our signalling, telecommunications and traction power designs, into multi-disciplinary projects to produce optimum and economic solutions.

An in-depth knowledge of the industry, and a reputation for working at the cutting edge, enables us to deliver appropriate solutions to clients, addressing whole-life issues, and including safety, reliability, operability, and maintenance.

Critical interfaces between the engineered solution and the human element for operators of the system, users, and third parties are always considered.

Our rail experience covers all forms of guided transport systems and associated facilities including:

- High Speed Rail
- Heavy Rail
- Mass Transit & Metros
- Light Rail
- Guided Bus
- Monorail
- Freight

Projects undertaken by Arup range in scope from master/strategic planning and total rail infrastructure improvement programmes requiring multi-disciplinary teams, to the application of singular, specialist skills such as operations, planning, permanent way, traction power, signalling, communications, acoustics, station design and tunnelling.

About Arup

Arup is one of the world’s leading global brands in the provision of professional consultancy services. We are the creative force behind many of the world’s most innovative projects with contributions to fields as diverse as transportation, energy, social infrastructure, urban regeneration, architecture and manufacturing.

Our reputation stands on our unparalleled record of understanding client needs, creating solutions and delivering results. Established more than 60 years ago, the firm has offices in all time zones of the world and has many projects running concurrently.

Our ability to integrate business and technical services is the key to our distinctive brand. Few can match our breadth of experience and proven ability to deliver on programmes as diverse as technical development, organisational change, operational improvement and planning and design of new and upgraded assets.

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