company profile

Transport System Solutions

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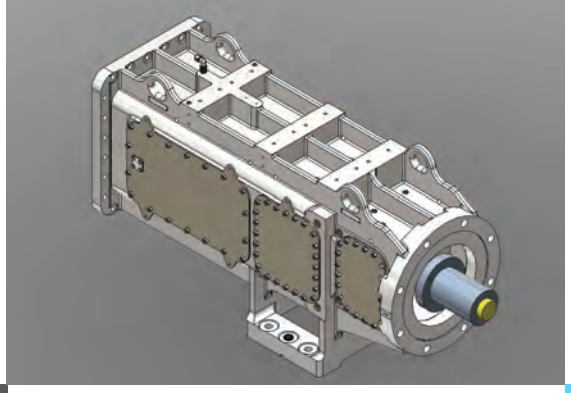
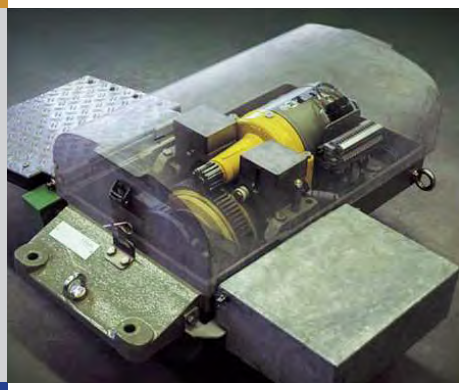
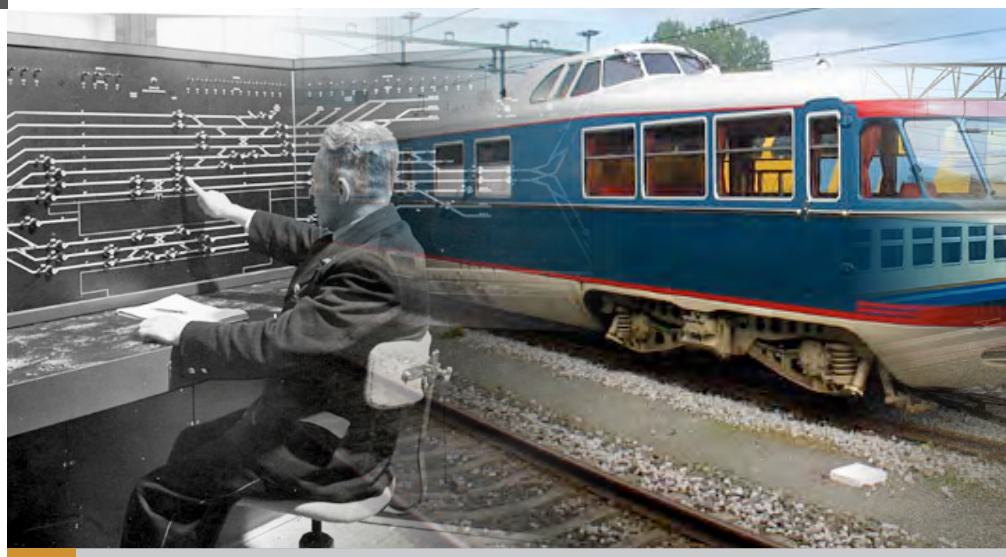
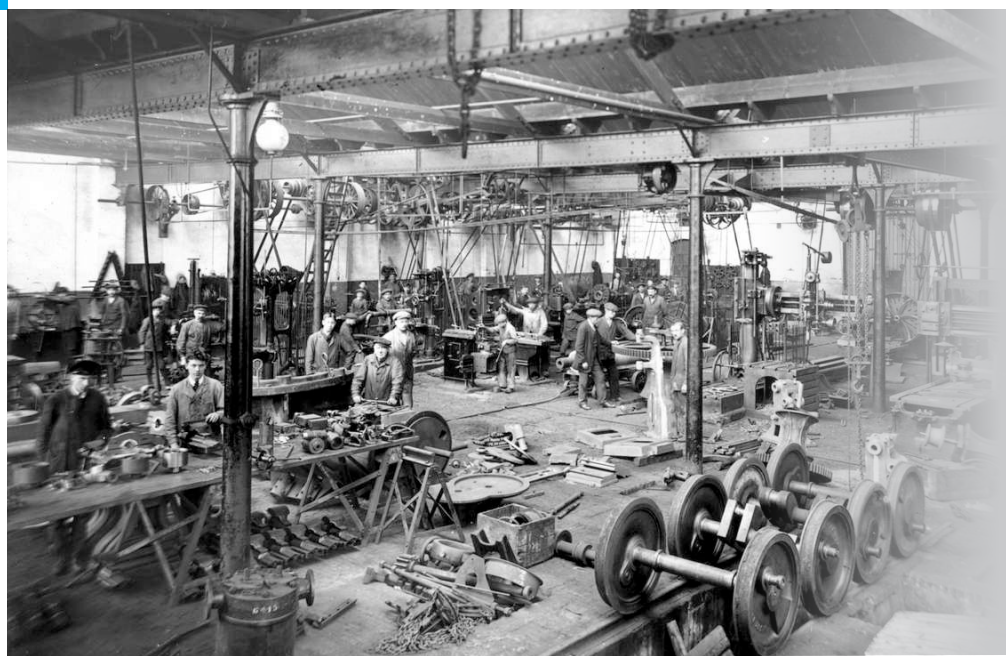




01 history





Transport System Solutions (TSS) have over 120 years of experience in railway technology. TSS specialises in converting functional specifications to practical solutions.

Our many years of experience in projects worldwide have made us expert in all the stages of a project, from planning to design, from project management to implementation.

1879

1960

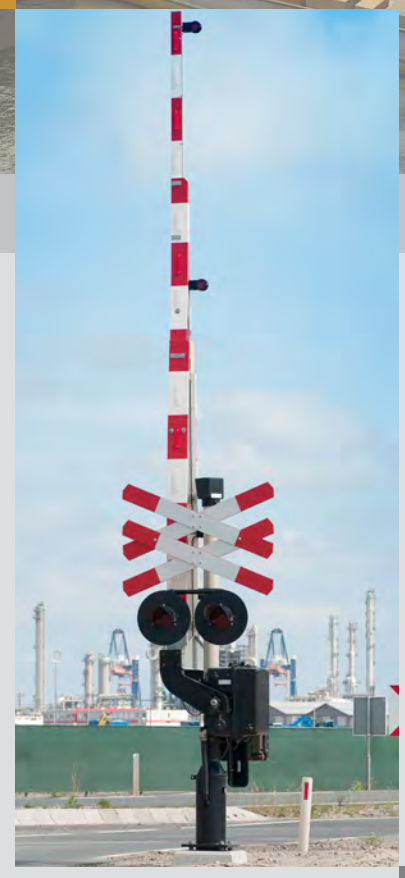
1991

2001

2006

2010

02 company overview



quality in motion

Transport System Solutions (TSS) is a multinational company specialising globally in transportation, especially in the areas of train control, railway signalling and road traffic management systems.

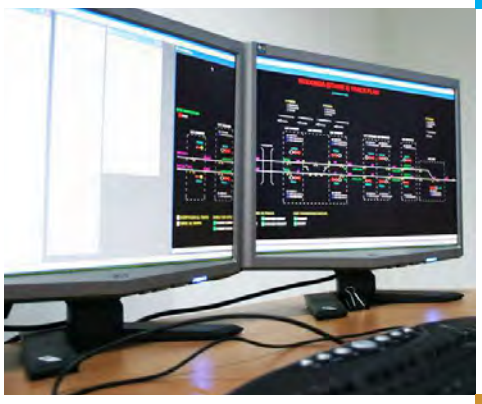
TSS provides a full range of services, from consultancy to engineering for detailed design projects, equipment supply, installation and testing and commissioning services.

TSS has the rights to various railway signalling products, including point machines, signals and level crossings and has successfully installed these products in various countries throughout Asia, UEA and Africa.

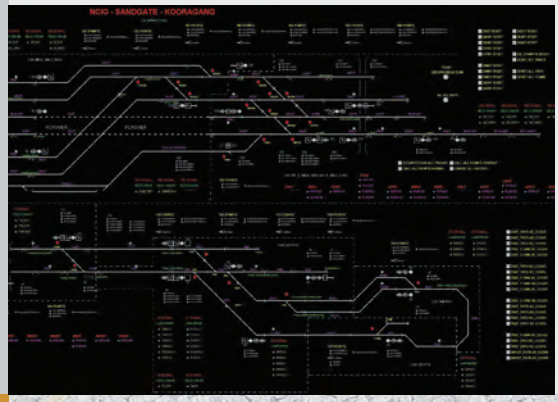
TSS provides engineering solutions to railway operators and has partnered with numerous contractors and local authorities, in particular Australia, Sri Lanka, The Netherlands, Tanzania, Bangladesh, Indonesia and Malaysia.

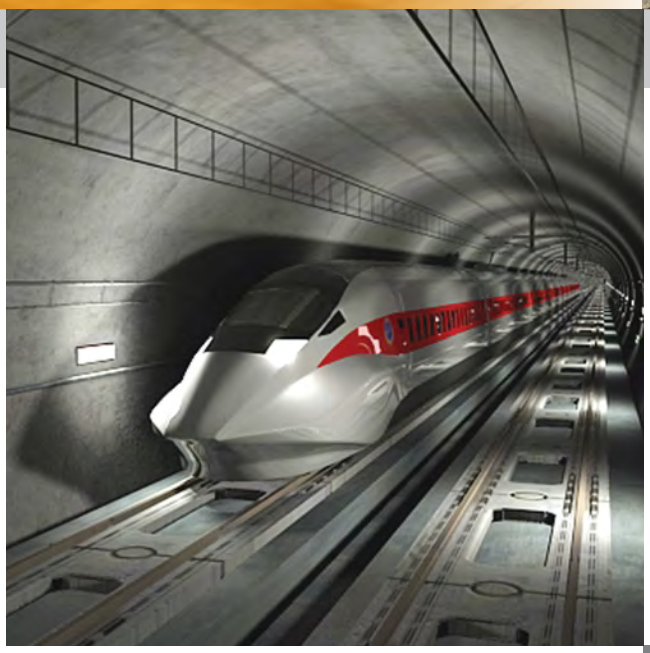
TSS is also a global engineering partner of GE Transportation and is currently carrying out engineering activities for the Rotterdam Metro, Hong Kong MTR and the Stockholm Tram Projects.

03 engineering services

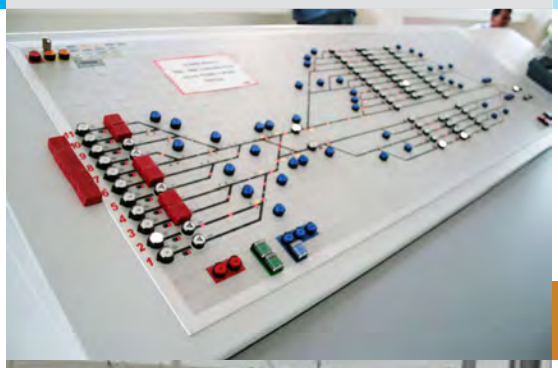


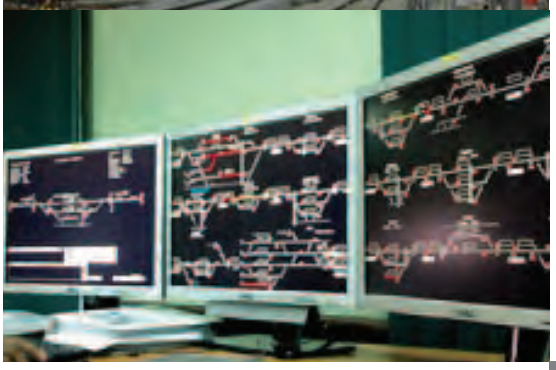
03 engineering services





- SIGNALLING ENGINEERING
- MECHANICAL ENGINEERING
- CIVIL ENGINEERING
- 3D VISUALISATION





signalling engineering

Hardware and Software Services

Signalling Circuit Design
We can design interface circuits and location cases in accordance with the various railway standards used in Indonesia, Europe, Australia and the Asia Pacific regions.

CBI Data Preparation
We can perform vital electronic interlocking data preparation, simulation and testing for VPI, Microlok, VHLC and PLC-based interlockings. We have also developed support tools for Microlok that auto-generate the initial data population, reducing the time required for data entry.

Control Systems
Our experienced staff can design, modify and deliver simple or complex central control systems based on SCADA control software, specialising in PcVue and Phoenix.

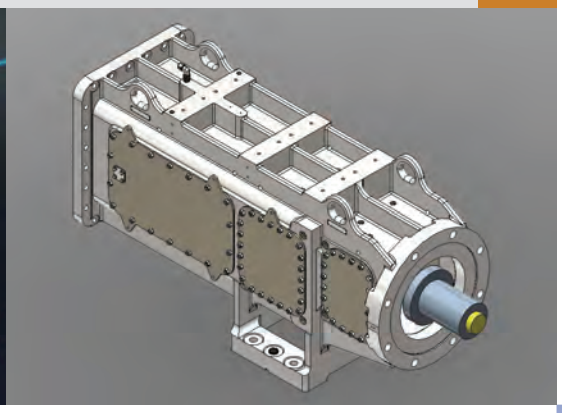
Power Calculations
We carry out power calculations according to customer requirements, including maximum and minimum determinations, cable length voltage drops and equipment loadings.

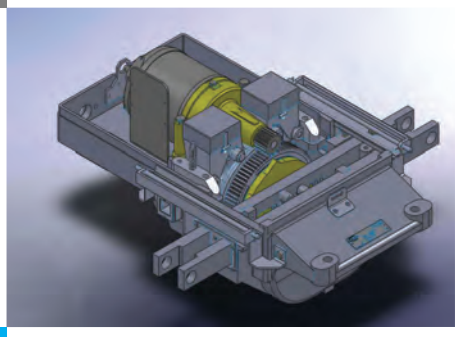
Computer Aided Design (CAD)
Transport System Solutions has a specialised Design and Drawing department that can perform a range of services for the road and railway sectors. These services include:

Drawing Digitisation
We can digitise your hard copy drawings into electronic drawings using benchmark tools and techniques.

Drawing Conversion
Our skilled operators can convert between AutoCAD and MicroStation and from Quickdraw to AutoCAD and MicroStation. Additionally, we can convert between AutoCAD Electrical and MicroStation EED or Bentley Electric.

mechanical engineering

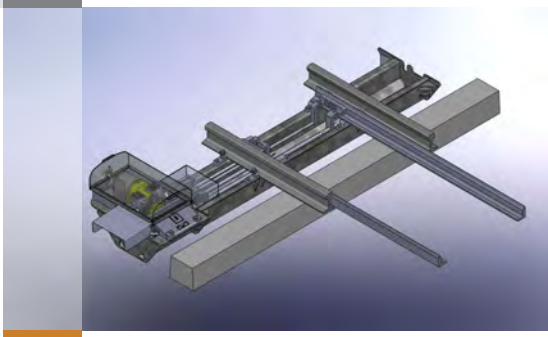




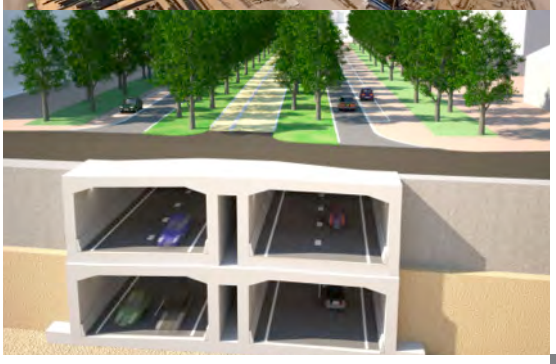
Mechanical Engineering Services

Besides providing mechanical design and drafting services in both 2D and 3D, we also engineer, supply and install the following products:

- **Point Machines including Rodding**
- **Point Locks and Detectors**
- **Colour Light Signals, LED and Incandescent**
- **Level Crossing Protection Systems**
- **Electronic Bells**



civil engineering



Civil Engineering Services

Large and complicated constructions such as tunnels, viaducts, underpasses or stations require exact calculations, precise design and detailed drawings. Our Civil Engineering Department, established in 2006, is staffed by experienced drafters and engineers who are able to produce high quality products in accordance with the timelines set by the customer.

Since its formation, our Civil Engineering Department has successfully executed over fifteen projects. One of the largest projects is the Maastricht A2 Tunnel, divided into sixty-five tunnel sections, with more than 20,000 hours spent and 975 drawings produced (dimensioning and reinforcement).

We can provide the following services:

- Detailed AutoCAD drawings of viaducts, underpasses, tunnels, buildings, etc.
- Project calculation using SAP, ETABS and ESA-Prima
- 3D model construction using Allplan and Revit

3D visualisation

3D Visualisation Services

Our 3D Visualisation Department can provide 3D images from your sketches, drawings or photographs.

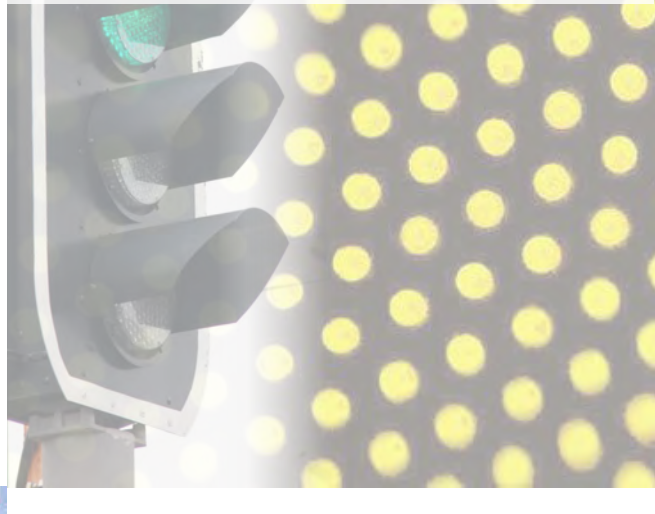
Transport System Solutions provided 3D visualisations to Japanese transportation consultants in connection with various projects across the Asia Pacific region.

We can accommodate customers who are looking for:

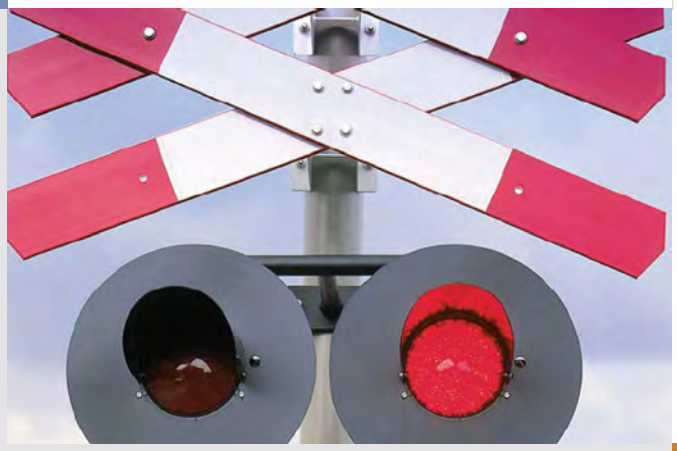
- 3D realistic images
- 3D animation
- 3D interactive
- 3D step-by-step construction / assembling processes

We can incorporate 3D virtual reality into our design process, enabling easy understanding of ideas and design conflict resolutions prior to production.

04 products



signals



Transport System Solutions sheds new light on signals. We can supply various configurations of signals and functions, customised to your specifications. Transport System Solutions signals can be used with:

- Incandescent lamps
- Single or double filament lamps
- Halogen lamps with fibre-optic technology (remotely installed lamps for easy access and maintenance-free fibre optics)
- LED technology: unprecedented long lifespan, maintenance-free, energy efficient

Transport System Solutions can develop customised signals to meet rail operator requirements and supply coloured LEDs and coloured incandescent bulb lights for use in railway signals.

point machines

There may be serious consequences when a point is not properly closed or not closed at all. With Transport System Solutions point machines, there is no need for concern. Transport System Solutions point machines are reliable, safe and low maintenance. We have supplied a large number of point machines to many countries in the world.

Transport System Solutions point machines are available in various configurations:

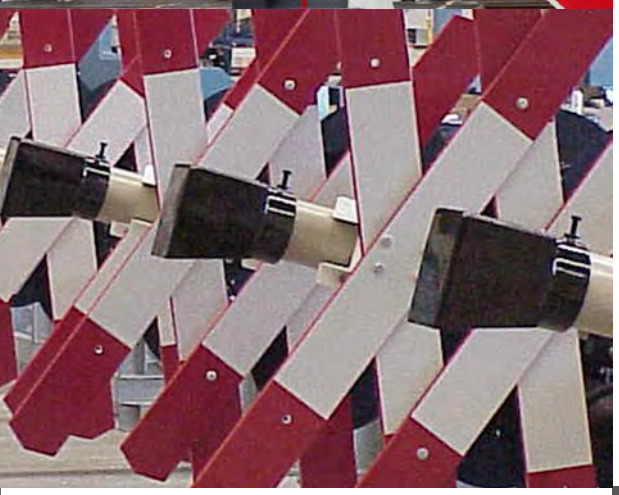
- AC or DC
- Various strokes
- Trailable or non-trailable
- Customised rodding sets, according to individual customer requirements

Maintenance and servicing:

In addition to supplying NSE2 point machines, Transport System Solutions also provides point machine maintenance. Our service operates on a national level and is available 24 hours a day. We can also service, maintain and supply spare parts for your point machines.

Transport System Solutions point machines are reliable, safe and low maintenance.

level crossings



At intersections between rail and road, barrier mechanisms are used to visually and physically close off the crossing.

Smooth functioning under all circumstances, reliability, a long lifespan and minimal maintenance are the core qualities of the Transport System Solutions Indonesia level crossing system, guaranteeing the safety of road users, train passengers, personnel and goods.

Level crossing signals
Especially for level crossing protection systems, Transport System Solutions has developed the LED crossing control signal. Using LEDs guarantees maximum reliability and safety: even if one LED group fails, the signal will remain lit and visible. Moreover, LEDs rapidly reach their maximum brightness and switch off quickly, resulting in flashing signals with much higher visibility.

Electronic bells
The level crossing protection system is equipped with an electronic bell assembly (EBA). This unique bell has adjustable sound pressure and a day/night switch function. The bell is available for numerous connection voltages and with a number of different tones.

Barriers
The aluminium level crossing barrier with integrated LED modules provides maximum safety. The barrier is designed to break off at a given point in case of a collision, thus preventing damage to the mechanism. A cable tethers the arm to the support, preventing further damage due to flying parts. LED lighting modules and retro-reflecting foil in white and red are both featured on the arm, maximising visibility. Both sides of the barrier have a permanent anti-graffiti coating.

The Transport System Solutions level crossing system functions smoothly under all circumstances, is reliable, has a long lifespan and requires only minimal maintenance.

05 projects

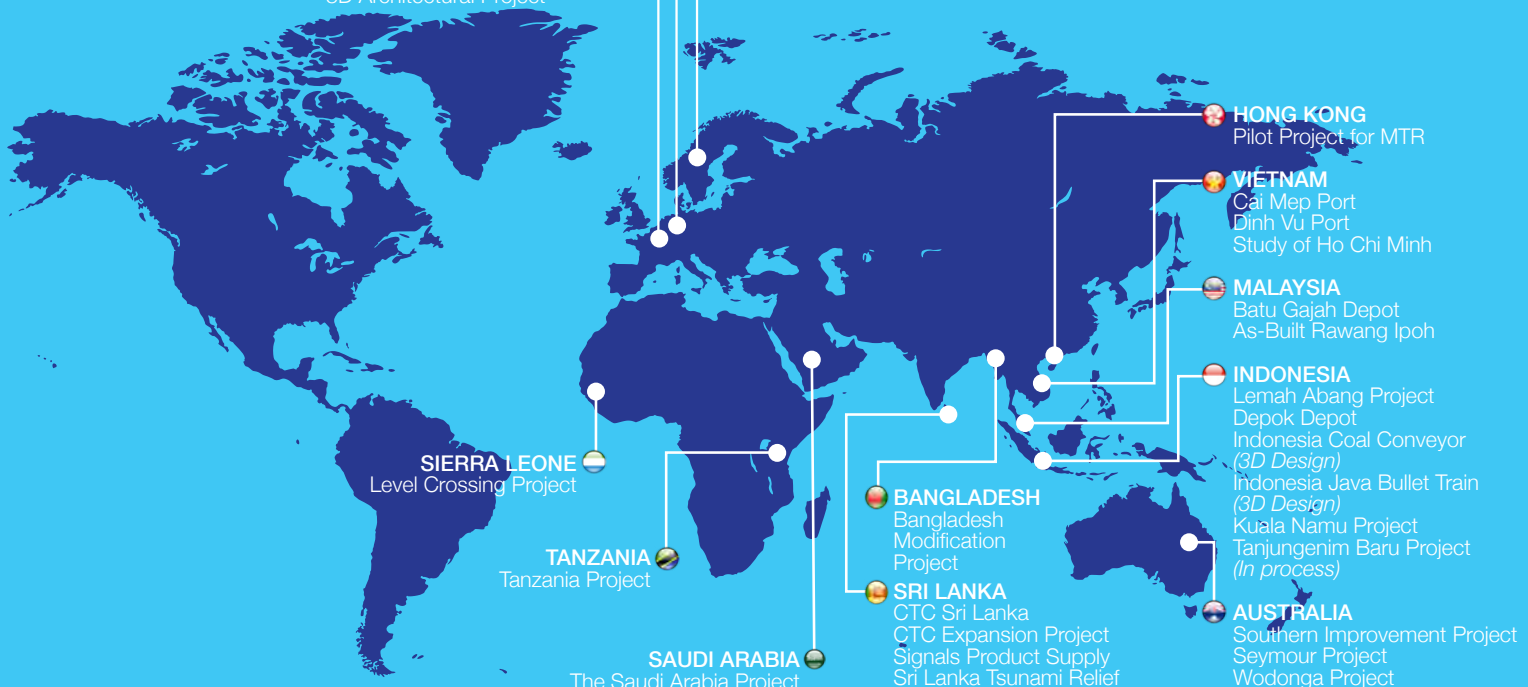
Transport System Solutions works with customers across Australia, Asia, Africa and Europe.
Our highly skilled staff and our years of experience in the fields of engineering services, contracting and procurement enable us to tailor solutions for a wide range of customers.

worldwide project experience

SWEDEN
Stockholm Tram

THE NETHERLANDS
Rotterdam Metro
Roertunnel & Tunnel Swalmen
GuideTrac Parking Guidance System
ATMS Message Server
RSC Noordwest and Zuidwest

BELGIUM
3D Architectural Project



HONG KONG
Pilot Project for MTR

VIETNAM
Cai Mep Port
Dinh Vu Port
Study of Ho Chi Minh

MALAYSIA
Batu Gajah Depot
As-Built Rawang Ipoh

INDONESIA
Lemah Abang Project
Depok Depot
Indonesia Coal Conveyor
(3D Design)
Indonesia Java Bullet Train
(3D Design)
Kuala Namu Project
Tanjungenim Baru Project
(In process)

AUSTRALIA
Southern Improvement Project
Seymour Project
Wodonga Project
NEDT LX
Mablebar Road LX
Wendouree Station Project
Trans Adelaide

SIERRA LEONE
Level Crossing Project

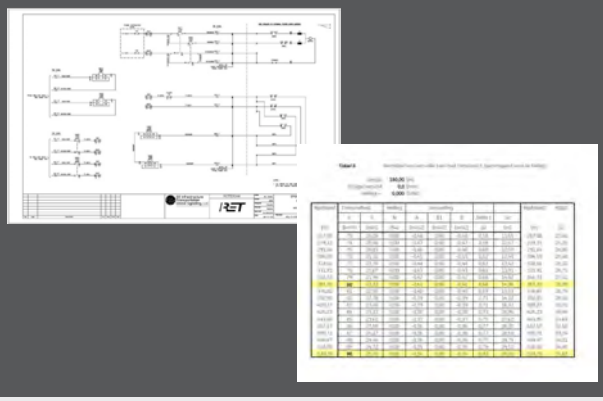
TANZANIA
Tanzania Project

SAUDI ARABIA
The Saudi Arabia Project

BANGLADESH
Bangladesh
Modification
Project

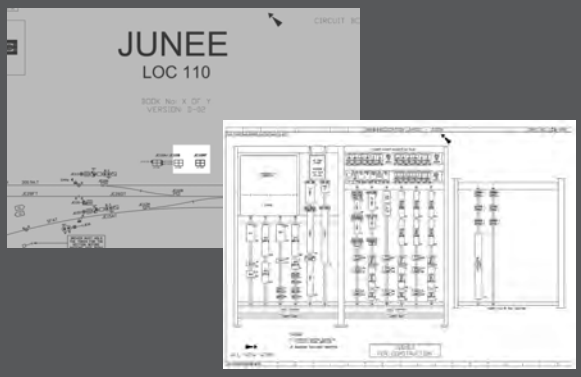
SRI LANKA
CTC Sri Lanka
CTC Expansion Project
Signals Product Supply
Sri Lanka Tsunami Relief
SLR Coast Line Upgrade Project
Level Crossing Protection Project

signalling **projects**



Rotterdam Metro (the Netherlands)
This project involves the renewal of the existing Siemens Relay Interlocking and Alstom CBI with General Electric VHLC interlocking for 38 stations in the Rotterdam RET Metro Project. Our activities for this project include signalling plans, safe braking calculations, ATP code charts, drafting, location hardware design and verification, location system design and verification, interlocking software preparation and verification, software simulation and delivery of as-built documentation.

Stockholm Tram (Sweden)
Located in Stockholm, this General Electric project includes interlocking, ATC / ATP wayside, ATC / ATP on-board (31 type A32 tramcars + 52 new tramcars), wayside track equipment (signals, track circuits, axle counters, point machines), level crossings, cabling, communications, insulated rail joints, interfaces, training and spares. The project covers four mandatory lines (Solna branch, the existing Tvärbanan, Saltsjöbanan and Tvärbanan East) and three optional lines (Tvärbanan Kista, Nockebybanan and Lidingöbanan).

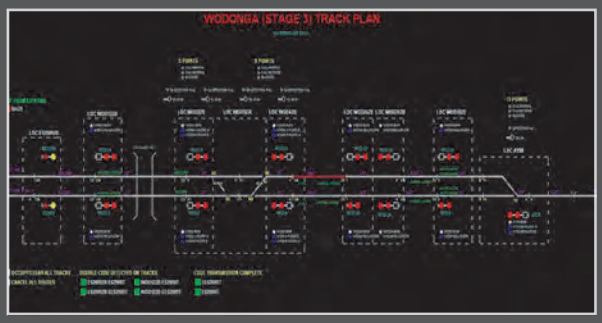


Southern Improvement Project (Australia)
System and application engineering services were provided for the modernisation of railway signalling systems from Bomen in New South Wales to Donnybrook in Victoria. This also included the modification of relay interlocking, the design of new Microlok interlocking and level crossing design (relay and GCP, HXP predictor).

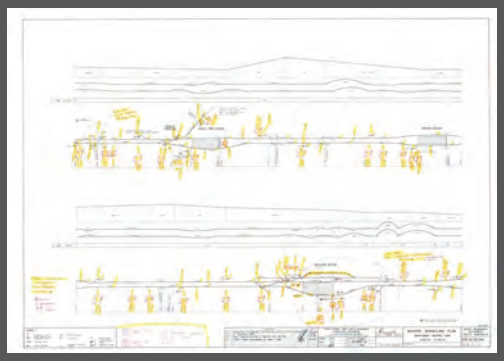
signalling **projects**

Seymour Project (Australia)
We carried out system engineering activities for staged level crossing designs (relay and HXP predictor) and drafted signalling arrangements and locations.

Wodonga Project (Australia)
We provided staged system and application engineering for the double tracking at Wodonga.

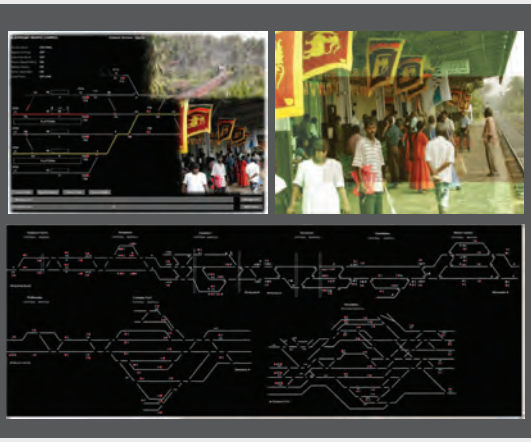


North East Double Tracking Level Crossing (Australia)
We provided system engineering services for staged level crossing designs (relay and HXP predictor) and drafted signalling arrangements and locations.



signalling **projects**

CTC Expansion (Sri Lanka)
This Centralised Traffic Control (CTC) expansion project was completed in conjunction with Sri Lanka Railways. The project entailed expanding the VDU (Visual Display Unit) based control system to cover six stations between Wellawatte and Wadduwa as well as Colombo Fort, Maradana and Loco Junction.



CTC Modification (Sri Lanka)
This project saw the modification of multiple stations on the Coastal Line between Colombo and Matara. Seven stations had Vital Relay Interlocking introduced, and a further sixteen stations were outfitted with VPI, Centralised Traffic Control (CTC) and Train Dispatching System (TDS). A CTC system with a PcVue platform was built at Maradana station in Colombo to handle normal operation of the station interlocking systems along the Kalutara North to Katugoda line. The total railway line under CTC control now consists of sixteen stations. The CTC system is connected to each VPI system via two multi-drop serial lines (glass fibre connections). In addition to normal operations such as route setting, the CTC system has capabilities for train number indication and tracking, as well as logging, reporting and diagnostic functions.

Signals Supply (Sri Lanka)
Ninety signals were supplied to Sri Lanka Railways, ranging from one aspect to two and three aspects. The supplied products were customised for the Sri Lanka climatic conditions and thoroughly tested to ensure longevity of the wayside equipment in a hostile environment.

signalling **projects**

Station Modernisation (Bangladesh)
At seven train stations, outdated mechanical interlocking systems were replaced by VPI interlocking. In addition, wayside equipment was replaced with Transport System Solutions signals and point machines.

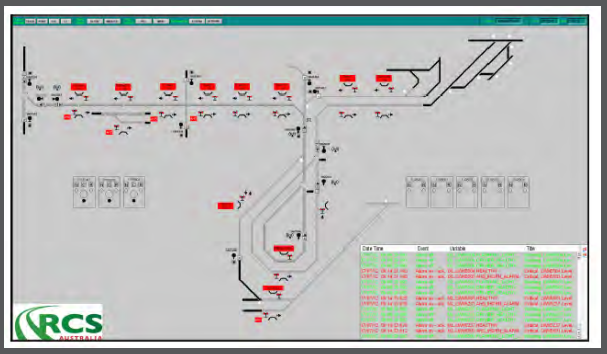
Batu Gajah Depot (Malaysia)
We successfully supplied the Batu Gajah Depot with twenty-five point machines, custom rodding and accessories designed for turnouts to be installed on concrete sleepers.

Depok Depot (Indonesia)
Transport System Solutions supplied and installed four double-rail AC track circuits, seventy-two single-rail AC track circuits, forty-five point machines, fifty-eight gantry signals and seventeen pole-mounted signals to the Depok Depot in Jakarta.

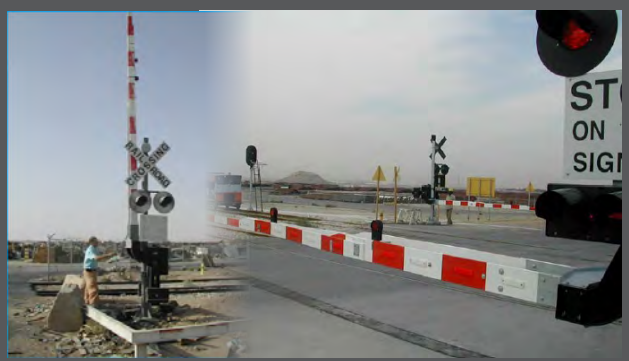
signalling **projects**

Regional Rail Link (Australia)
For this project we digitised a large amount of PDF drawings to Bentley MicroStation format in accordance with the VRIOGS standard, including signal control, point control, indications and location layout. The drawings are for a project concerning fifty kilometres of dual-track rail link from West Werribee, via Sunshine, to the Southern Cross Station in central Melbourne. The project includes a new set of dedicated tracks which will allow regional services to run directly into Melbourne, two new platforms at Southern Cross Station, two new stations at Wyndham Vale and Tarneit and the construction of a new rail bridge over the Maribyrnong River.

Whyalla CTC (Australia)
Together with our partner RCS Australia, we designed a new Centralised Traffic Control system for GWA's Whyalla Operations Control Centre.



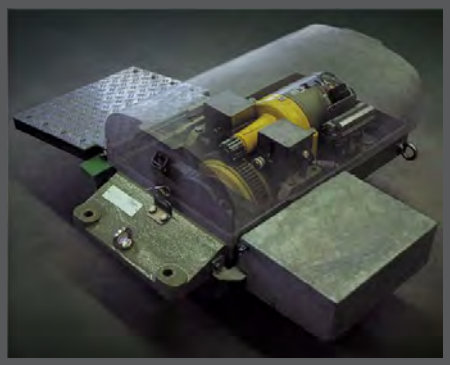
Level Crossing Project (Saudi Arabia)
Transport System Solutions were asked to design and supervise the installation of a level crossing safety system, complete with lights, barriers, signals, bells, relay boxes, rail treadles and signs, to replace unprotected level crossings.



signalling **projects**

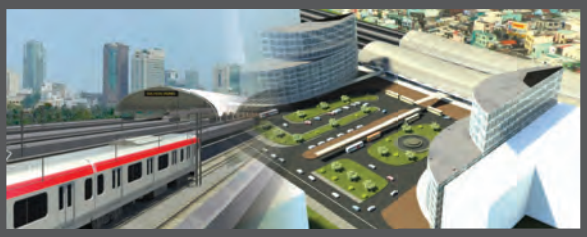
Level Crossing (Sierra Leone)
Transport System Solutions engineered and installed a complete level crossing, including signalling and control equipment and supporting systems such as power supplies, a control building and street lights. In addition, we supplied operation and maintenance training and technical documentation.

Point Machines (Indonesia)
We supplied, tested and commissioned seven trailable point machines (120 mm stroke with 120V DC motors) in and around Medan, Sumatra. One was installed in the Kuala Namu International Airport station, the others in Medan itself.

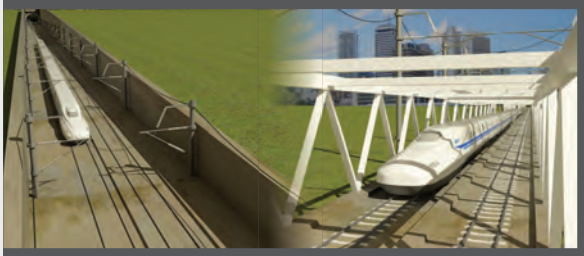


GE RET CTC (the Netherlands)
For this project, we designed a backup Centralised Traffic Control system, which, when fully deployed, will control the entire RET signalling system. The RET system is comprised of the Erasmuslijn and the Calandlijn. The RET signalling system is divided into thirty-eight wayside locations, including two depots.

3D projects



Ho Chi Minh Elevated Railway (Vietnam)
A project study in Vietnam comprising of a 3D visualisation and animation video of an elevated railway. This project also introduced dual gauge technology to Vietnam, where narrow gauge is used for diesel trains and wide gauge for electric trains.



Java Bullet Train (Indonesia)
For this project, we created a 3D visualisation for a bullet train across Java in accordance with guidelines provided by the Indonesian government. The animation showed the Java Bullet Train travelling through the country and arriving at its destinations on schedule.

Manggarai - Cikarang Double Track (Indonesia)
For this project we created an animation simulating a double-double track between the stations of Manggarai and Cikarang on Java.

Jakarta MRT (Indonesia)
We developed a 3D visualisation and animation video for the MRT project in the Indonesian capital Jakarta.

quality
in motion

Transport
System
Solutions

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