High Speed
Hitachi Rail STS is a leader in rail transportation, with over 150 years of experience in pioneering safe and reliable railway signalling applications and transportation solutions.

From turnkey contracts for mass transit, conventional and High Speed railway projects and single station signalling systems, to complete transportation solutions, Hitachi Rail STS is a global, innovative, complete solutions provider.

Hitachi Rail STS has been at the forefront of High Speed rail technology from the beginning. In fact, Hitachi Rail STS designed, installed and commissioned most of the High Speed lines in France, Italy, Belgium, UK and, most recently, China, with lines such as Zhengzhou - X’ian and Shijiazhuang - Taiyuan.

In response to demand for interoperability and increasing speeds above 250 km/h, Hitachi Rail STS was one of the leaders in developing ERTMS, the European Rail Traffic Management System, which is now the preferred solution for new High Speed lines and to upgrade congested ones.

In the current social and political climate, where governments are seeking sustainable forms of transport, it is not by chance that rail is the increasingly preferred solution.

With less carbon emissions than planes and cars, rail transport delivers significant benefits.

Hitachi Rail STS’s technologies are present in over 50% of all High Speed lines in the world (excluding Japan) and are well positioned to meet the growing requirement for integrated transportation solutions.

As Technological System Integrator we optimise delivery and streamline operations and strategies among technologies to deliver an integrated and updated system.
Our capabilities as system integrator

System integrator
System Integrator for projects of any size
Our track record in the Italian High Speed network

Signalling and automation
Pioneer Global Provider of High Speed lines
TrainWaves® - ERTMS
TrackSmiles® - Operation and Traffic Control
TraverSafe® - Computer Based Interlocking systems
TraverSafe® - Wayside Signalling systems and equipment
TrainSmiles® - Operation Support systems

Telecommunications
Security
VigiTracks® - Security
Risk Analysis
Security Management System
Subsystems and Technologies

Risk reduction
Supervision and Management of Safety in Tunnels
TCCS® Train Conformity Check System

Traction power supply
Overhead Contact Line
Electrical Substations and Autotransformer sites
Diagnostics and maintenance

Power Supply and Auxiliary systems
Track-work
Service and Maintenance
In House Manufacturing
System Integrator for projects of any size

General Contractor:
Rome/Naples (IT)*
Genoa (IT) – Naples Line 1 (IT) – Naples Line 6 (IT) – Naples Alifana Line (IT)

Engineering, Procurement, Constructions:
Copenhagen (DK) – Brescia (IT) – Dublin (IE) – Rome Line C (IT) – Riyadh (SA)
Taipei (TW) – Thessaloniki (GR)

Project Financing:
Florence (IT) – Milan line 5 (IT)

Build, Operate and Transfer:
Birmingham (GB) – Manchester (GB)

System Integration and full provider of Technologies:
Rome/Naples (IT)• – Bologna/Florence (IT)• – Milan/Bologna (IT)• – Turin/Milan (IT)•
Copenhagen (DK) – Birmingham (GB) – Brescia (IT) – Dublin (IE) – Florence (IT) – Genoa (IT)
Lima (PE) Manchester (GB) – Milan line 5 (IT) – Naples line 1 (IT) – Naples Line 6 (IT)
Naples Alifana line (IT) – Rome Line C (IT) – Riyadh (SA) – Taipei (TW) – Thessaloniki (GR)

Signalling and Automation, main and recent projects:
Rome/Naples (IT)* – Bologna/Florence (IT)• – Milan/Bologna (IT)• – Turin/Milan (IT)•
Zhengzhou/Xi’an (CN) – Saarbrücken/Mannheim (Pos Nord);
Velaro D Train, On-Board system (DE) – Madrid/Lleida, Atocha bypass, Figueres/Perpignan (ES)
Complete TGV H.S. network (FR) – Ras Ajdir/Tripoli, Al-Hisha/Sabha (LY)
Campina/Predial (RO) – Khosta/Matsesta (RU) – Bogazkopru/Yenice; Mersin/Toprakkale (TR)

Civil Works:
Rome/Naples (IT)*
Copenhagen (DK) – Genoa (IT) – Naples line 1 (IT) – Naples line 6 (IT)
Naples Alifana Line (IT)
Rome line C (IT)

Operation & Maintenance:
Copenhagen (DK) – Brescia (IT) – Milan line 5 (IT) – Thessaloniki (GR) maintenance only

Railway lines
* High Speed lines: Hitachi Rail STS is a member of: IRICA/T consortium acting as General Contractor and
Pegaso consortium, acting as Main Contractor for track-work.
• High Speed lines: Hitachi Rail STS is a member of Saturno consortium acting as Main Contractor for
electro nic equipment, rail devices and power supply.

Metro and LRT lines
Hitachi Rail STS has always played a leading role in High Speed Rail worldwide. In Italy, it defined the detailed specifications of the entire system, beginning with determining line potential in terms of traffic allowed.

Together with the general contractor, Hitachi Rail STS defined and shared options for civil works, permanent way and all auxiliary plants in order to guarantee complete integration with signalling, automation, security and traction power installations.

Hitachi Rail STS also performed the complete integration between the High Speed lines and the existing conventional railway lines, developing both the technologies and the interconnection installations.

This allowed for increased capacity on High Speed lines through maximised train speed when entering or exiting High Speed lines to national conventional speed lines.

Hitachi Rail STS has over 30 years of expertise in High Speed Rail. This includes more than 10 years of integrating railway systems for High Speed and delivering almost 5000 km of lines and thousands of On-board systems worldwide.
Hitachi Rail STS is a leader in the design, construction and service of signalling, automation and control equipment and systems for primary railways. We have a complete and innovative product portfolio that includes the most advanced capabilities in:

- Operation and Traffic Control;
- ERTMS (European Railway Traffic Management System);
- On-board equipment;
- Computer Based Interlocking systems;
- Wayside signalling systems and vital equipment;
- Operation support systems;
Hitachi Rail STS’s High Speed technologies have been installed in more than 50% of all High Speed lines worldwide, Japan excluded. Source: UIC (International Union of Railways).
TrainWaves® - ERTMS is the new European interoperable railway signalling system that combines on-board and trackside equipment, which supervise safe train operation, in real time, according to traffic conditions. The system, configured in various levels of application, can be superimposed onto different signalling systems, providing seamless interoperability and control across the entire European network.

Hitachi Rail STS offers the complete solution to ERTMS levels 1 and 2 (level 3 is currently undergoing international standardisation), having completed major High Speed projects worldwide, including in Austria, China, Czech Republic, France, Germany, Greece, Libya, India, Italy, Romania, South Korea, Spain, Turkey, UK, Belgium and the Netherlands.

Hitachi Rail STS was at the forefront of the Rome-Naples line, the world’s first line in revenue service to run solely on ERTMS level 2 without a fallback system. Similar lines followed, such as Turin-Novara-Milan and Milan-Bologna, in which Hitachi Rail STS again played a predominant role.

ERTMS Wayside equipment

Level 2 - The Radio Block Centre is designed to vitally manage train movements via constant bidirectional radio communication with the ERTMS on-board equipment.

The data exchanged provides the train with a Movement Authority referred to the line status in front of it. Further vital data can be exchanged with the train in predefined locations, mainly placed in the junctions, for entry/exit to the High Speed line, by means of coupled Encoders and Eurobalises®.

Level 1 - Vital data and Movement Authorities can be exchanged with the train using of coupled Encoders and Eurobalises® that are overlayed to the existing signalling system.

ERTMS On-Board equipment is the vital subsystem that is installed on board to communicate data to the Radio Block Centre and presents the driver with the necessary information to take appropriate action. It also makes sure that the driver maintains the correct speeds in any section of the line. Further data is received from the balises installed in the junction areas for trip initialisation and completion.

TrackSmiles®

Operation and Traffic Control

Hitachi Rail STS offers advanced supervision systems that are scalable from the basic command/control functions to large-scale systems, including traffic management according to the timetable, traffic forecasting and optimisation, and even conflict display and solution.

The integration with electrification control systems and auxiliary management services, such as power supply, lighting, security and fire detection has been proven in High Speed railway environments.

Designed under open systems architecture principles, our supervision systems have been interfaced to many different types of Computer Based Interlockings and to ERTMS for managing train operations. Based on the latest commercially available hardware and software platforms, and supported by powerful diagnostic tools, our systems are easily maintainable. Commuters are promptly informed of changes to the traffic schedule by means of voice announcements from the associated passenger information systems. Main functions of operation and traffic control are carried out by: sure that the driver maintains the correct speeds in any section of the line. Further data is received from the balises installed in the junction areas for trip initialisation and completion.

Centralised Traffic Control

Control of train movements throughout the network and fail-safe ERTMS systems (both wayside and on board), guarantee safety. Smooth traffic control is achieved through:

- Real time programming and route control;
- Conflict solutions generated when abnormalities arise and cause variations to the normal timetable;
- Formation and activation of strategies to alleviate traffic disruptions and to return traffic back to normal;
- Interface with high level systems for train circulation management.
Centralised Electric Traction Control

Centralised Electric Traction Control systems allow energy management for train traction at the control centres.

According to circulation scheduling and technical infrastructure conditions, centralised electric traction control guarantees energy availability to trains without the need of operators at remote installations. The main functions are:

- Control of all devices;
- Acquisition and management of alarm conditions and device fault indications;
- Monitoring of all important electrical measurements;
- Management of all substations and autotransformer posts;
- Centralisation of information concerning power supply and distribution and the real time control of devices to reduce the duration of situations that are critical for electric traction system functionality to a few seconds.

Remote Control and Diagnostics

The control centre receives all the diagnostic, electrical equipment and subsystem maintenance information that is generated and organised at remote installations along a line. The availability of this information at the control centre and the power supply status monitoring, as supplied by the Centralised Electric Traction Control, makes it possible to manage emergency situations and line maintenance, thus combining safety and organisational criteria.

The system allows the controls to re-configure installations to be transmitted in order to manage maintenance and safety. Typically, installations and equipment that interface with the system include peripheral post power supply, interlockings, hot box and wheel temperature detection systems, air conditioning systems, antitheft alarms and fire fighting systems.

The control centre also acts as the backbone for these Subsystems:

- Public address system that manages the pre-recorded or live announcements in the passenger stations;
- Passenger information system that controls displays with information about trains scheduling such as time, platform, delays, etc. in the passenger stations;
- Master clock system, platform clocks etc.;
- Ticketing system;
- CCTV and security system;
- Voice recorders to store operational voice communications regarding train management.
TraverSafe® is our technologically advanced Computer Based Interlocking Systems, used for single main stations and in multistation configurations. Integration with centralised traffic control, safe management systems and with automatic train protection systems has also been proven in High Speed applications.

Dispatchers are able to operate with the support of sophisticated diagnostic facilities and user-friendly tools. Maintenance monitoring provides predictive activities as well as scheduled maintenance.

TraverSafe®- WAYSIDE SIGNALLING SYSTEMS AND EQUIPMENT

Hitachi Rail STS specialises in the integration of existing signalling systems with ETCS to improve performance of railway systems, as well as the design and interface of wayside equipment with computer based interlocking to integrate field equipment in any signalling systems.

Command, control, diagnostic and maintenance features are carried out to provide the customer with fully integrated and centralised management of the wayside equipment.

Depending on the specific application, Hitachi Rail STS can provide the main wayside equipment and subsystem, such as Audio frequency track circuits (field equipment and wayside command and control devices), Eurobalises®, Encoders, Hydraulically operated point machines, Electric operated point machines, Hot box detector and Wayside signals.

TrackSmiles® Operation Support Systems

In an environmentally and energy conscious world, Hitachi Rail STS is committed to helping railway administrations improve the safety and efficiency of their passenger and freight services. Our product portfolio includes: decision and coordination support, dispatcher support systems in order to increase quality of service, railway management tools for timetable planning, traffic and capacity management.
In High Speed railway projects, the telecommunications system is the backbone that provides the communication network for the wayside installations and between the wayside and the on-board equipment. It consists of:

- A fibre optic infrastructure, laid along the railway lines to interconnect signalling and telecommunication equipment;
- A synchronous digital network SDH that meets all communication needs - including voice, image or data transmission - throughout the entire railway system;
- A GSM-R network. GSM-R is an enhanced version of public GSM, designed specifically for railway applications. It has already been adopted by various rail administrations around the world and is the only digital radiosystem for railway radio communications that has the backing of the International Union of Railways (UIC).

It provides several functionalities over and above public GSM, such as Group Calls, Broadcast calls, Emergency calls, Functional addressing and Priority calls.

The network provides voice communication, human and train safety and non-critical data services.

- A telephone system provides voice communications to all operational staff to communicate train movement coordination and all operational services.

It is mainly used for voice communication among control centre dispatchers and Station masters, or any other party, for operational and maintenance purposes in the stations, along the tracks, in the maintenance workshops and the control centre.

These communications are managed at dispatching centre level.

- LAN/WAN network for all automation systems’ IP data exchange between the Control Centre and the stations, such as CTC, CEC and SCADA.
In today’s environment, security management of transportation infrastructures is a mandatory requirement. The main purpose of the High Speed railway security is to monitor and protect critical infrastructures, such as stations, tunnels, power substations, bridges, viaducts, depots, etc. against:

- unauthorised access to restricted areas;
- theft and vandalism;
- sabotage and terrorist attacks.

Hitachi Rail STS High Speed railway security solutions are defined, designed and managed through:

- Risk analysis;
- Security management systems (management of security alarms and video in the High-Speed control centre);
- Subsystems and technologies (design of active and passive security measures and integration of existing devices).

**Risk Analysis**

An in-depth risk analysis of the infrastructure to be protected is necessary to evaluate threats and to plan suitable actions to reduce risk, which is represented by the combination of three factors: threat, vulnerability and damage. Risk assessment, performed after a field inspection through site surveys, is aimed at the identification of the significant attack scenarios and of the related risk indexes. Risk management is aimed at the evaluation, in terms of risk reduction, of the impact of the different protective solutions that are applicable to a given situation.

**Security Management System**

Our security management system is the heart of High Speed railway security. Relevant events detected by the local/peripheral subsystems promptly reach the security control centre. The operators receive only the information required for verification purposes, in a format that optimises the response time of countermeasures. The security management system is in charge of the integrated management of any security-related information derived from various sources. Through a user-friendly operator interface, it supplies information concerning activated alarms and the related emergency procedures, allowing for the visualisation of both the video streams associated to the alarms (automatically selected) and the ones selected by the operator.

**Subsystems and Technologies**

While security is enhanced through the careful planning of installations (number of sensors, different technologies, correct position and number of cameras), only powerful software algorithms provide superior security, automatic alarms triggered by high probability of detection (POD) and very low false alarm rate (FAR).

**Intelligent Video Surveillance**

Intelligent video analysis is provided by a sophisticated artificial vision subsystem that is able to produce a realtime elaboration of the pictures captured by the CCTV equipment. Event detection is based on artificial intelligence algorithms and techniques that are able to identify and automatically tabulate (by comparison with the background) objects and individuals detected in the scene.

Spot events detection (unattended luggage, track crossing, abnormal behaviours, overcrowding, etc.) are automatic.

The system sends an alert to the operator, giving information about the kind of event observed and automatically switching to, and displaying, the associated video stream in order to make the system as independent from the operators’ vigilance level as possible.

**Antintrusion and Access Control subsystems**

Antintrusion and access control subsystems detect the violation of restricted areas that should be accessible only to authorised personnel (e.g. equipment rooms). This is achieved by means of personal identification devices (e.g. proximity badges, biometric identification) and sensors based on different technologies (e.g. infrared barriers, magnetic contacts, volumetric detectors, etc.) with dedicated algorithms to link different events. Sensors are managed by peripheral subsystems that are network connected to the supervision and control centre.
To complete our portfolio, we supply technological systems to improve safety in long tunnels and systems to check rolling stock conformity.

Tunnels are critical assets; the High Speed railway tunnels protection comprises:

**TCCS® - Train Conformity Check System**

TCCS®-Train Conformity Check System (TCCS) is a high performance wayside train monitoring system that checks the regular condition of the trains running through a check point along the line. It operates at full train speed (up to 330kph) and does not constrain the operation of regular trains. Basic system functions are:

- Thermographic alarm detection. TCCS® provides a thermal image of the entire train and automatically generates overheating alarms. Alarm generation criteria depend on the type (locomotive, car, wagon) and the zone (top, side, bogie) of the rolling stock. The system also provides to a remote operator alarm and thermal maps of the entire train, including highlighting overheated areas.
- Out of gauge alarm detection. TCCS® provides an accurate measurement of the entire train's geometric three-dimensional profile and automatically generates alarms if gauge rules are violated. Different gauge profiles are applied automatically on the basis of the train type. The system also provides a remote operator with the alarms and a 3D reconstruction of the entire train, including highlighting of violations.
- Train imaging. TCCS® provides a high resolution photographic image of the train. A remote operator can visually check the train's condition by watching the detailed images of the entire train.
- Train weight and wheel defect detection system as well as traditional Hot Box detectors. This can also be integrated in the TCCS® system. Relevant alarms and data are processed and integrated by TCCS® and presented to the remote operator.

Furthermore, the system classifies the alarms and, in case of severe gauge or thermal alarm, automatically stops the train by interfacing with the signalling system.

The modularity of the system provides, when required, installations performing a subset of the functions described above. A Control Centre may be provided to manage several TCCS® check points, allowing the centralisation of remote operators' activities.
The Italian High Speed network’s traction substation distribution, in terms of quantity and power along the line, was determined according to the following specifications:

- Normal traffic with one train (ETR 500, 12 MVA) every five minutes, in both directions;
- Possibility to double the traffic, with doubled train set composition;
- Complete redundancy under normal operating conditions (two transformers in each substation).

Substations are placed every 50 km, and at regular intervals in between there are three parallel posts with autotransformers.

Each of the two transformers installed in the substation provide power for about 25 km of double track line. The two overhead contact lines are connected to the first and second parallel post: the first one is kept with only one autotransformer working; the second parallel post is subdivided between the two different feed sources in order to maintain the neutral section open.

Inserting autotransformers on the line allows for reduced current values through the overhead contact line, with consequent advantages in terms of reduction of both losses and electromagnetic emissions, thus reducing the effects on structures adjacent to the railway line.

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**Overhead Contact Line**

Hitachi Rail STS is a member of the consortium in charge of the turnkey design, realisation, testing and commissioning of the railway system technologies on the Italian High Speed lines. The overhead contact line has been designed to guarantee a high quality energy supply with pantographs and a high overall availability. The result has been obtained through careful component selection and reduced maintenance needs. Every parameter have been extensively analysed through simulators that considered the interactions between the overhead contact line and pantograph in detail. The result was an optimal solution with a contact wire of 150 sqmm, tightened at 20 kN and a copper overhead electrification line of 120 sqmm, tightened at 16.25 kN.

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**Electrical Substations and Autotransformer Sites**

Generally, in Italy, substations are powered by means of a double line at 132/150 kV by the National Electricity Authority (ENEL) and are equipped with two 60 MVA, 132 - 150/2x27.5 kV transformers. Transformers are connecte to different phases and cannot work in parallel. They supply a 27.5 kV bar, with the two semi-bars normally disconnected.

The overhead contact line is protected by distance measuring relays and by maximum current relays as back up. Substations are designed to reach high levels of availability and reliability, which is accomplished through a system configuration that foresees that substations can remain in service even when supplied by only one of the two power lines and with one of the two transformers out of service. Moreover, the double overhead contact line can be supplied through one terminal only, through the by-pass switch. Parallel posts with autotransformers are equipped with two 15 MVA–55/27.5 kV (except the last one of the line, which has one autotransformer) and are equipped for connecting the two overhead contact lines in parallel.

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**Diagnostics and Maintenance**

Hitachi Rail STS has conceived the High Speed traction power main sub-systems with a design approach devoted to ensure the necessary redundancy in order to preserve the correct line operation in case of failure. Through a diagnostic system that continuously monitors the correct functionality of all the sub-systems, it is possible to plan and implement an effective preventive maintenance program. In case of failure, a semi-automatic system re-configuration tool keeps the line in service and performs corrective maintenance. This provides significant advantages in terms of overall availability of the line and quality of the passenger service.
All the power supply systems in wayside signalling and BTS (Base Transceiver Station) installations along the line, which are responsible for the generation and distribution of GSM-R signal that is the basis of the ERTMS signalling system, have been developed by Hitachi Rail STS. The power supply for auxiliary systems can be implemented in two different ways:

- Taking power supply directly from a feeder of the overhead contact line;
- Supplying the BTS through a 1000 V cable laid along the line and powered by a series of cabins MV/LV that take energy from the national network at 20 kV and step down to 1000 V to power wayside installations along the line.

All installations are managed through systems based on software installed in PLC and all the information for diagnostics and maintenance are transferred (through the telecommunications system of the line) to the centralised supervisory system. The diagnostics and maintenance system interfaces with the supervision system and electric traction control equipment on the whole line. Both systems have been developed by Hitachi Rail STS.
Concerning track work, the Hitachi Rail STS involvement ensures:

• An interface between the Civil Works and the Systems Technologies, in terms of engineering and construction activities;
• The respect of the European High Speed network interoperability parameters;
• A particular logistic design for the preventive stock-up of the materials along the line, in order to optimise the construction phases;
• A peak productivity of 864 metres/day;
• A final assembly completed by computerised equipment for the crushed stone compression, rail welding and accurate switch point positioning.

As for the ballast and the track-work of the Milan-Naples - Salerno line, innovative materials and laying down techniques have been used in order to comply with the required high performances of speed, passenger and freight train types and for the strict quality product requirements. Main characteristics of both materials and laying down techniques are as follows:

• Use of pre-stressed concrete monobloc sleepers, designed and homologated, with mass of about 400 kgs to contribute to lateral and longitudinal track stability in the presence of the forces imposed by trains circulating at the maximum allowable speed on the line and of thermic stresses due to temperature variations induced in the rails;
• Utilisation, for the first time in Italy, of type 60E1 rails in single spans of 108 m instead of 36 m as usual, in order to reduce the number of weldings on site and the subsequent risk of failures in the welded joints and therefore improving the regular availability of the line;
• Utilisation of movable monobloc frog points for which Hitachi Rail STS provided both necessary trials and homologation;
• Laying down of materials, again for the first time in Italy, was performed following the “absolute basis” method, consisting of operating within a single topographical reference system, unique for the entire railway line and for all the activities foreseen (civil works, permanent way and technological systems);
• Supply of the site work following the “just in time” system in order to minimise warehousing and the consequent operations of loading/unloading and work resumption;
• Adoption of high productivity track laying train compositions, in order to keep laying activities within the contract implementation timetable;
• Solution to the problem of dynamic interaction between the train under-body and the ballast surface that, at speeds greater than 250 km/h, gave way to crushed stone levitation and consequent problems to train ride and to the environment, through a new ballast-tamping technique. This problem was dealt with for the first time in Italy; the solution found avoided the introduction of structural modification to the ballast, as in the case of adoption of glues or resins, or disturbance to normal maintenance intervention, as in the case of use of nets or sand bags, etc;
• Mean track laying productivity, calculated at works completed, was 760 metres per natural consecutive day.

Finally, Hitachi Rail STS has coordinated the design and realisation of the systems for measurement of axle dynamic forces of rolling stock travelling on the line and of rail temperatures. The data collected is continuously conveyed to the line control and supervision centre through the general telecommunication system.
Service and Maintenance

Hitachi Rail STS operates transportation systems 24 hours a day, 7 days a week and provides complete maintenance to ensure full service availability. Our policy guarantees frequent, fast and efficient service and maintenance for our customers. Hitachi Rail STS provides its customers with comprehensive maintenance services for major contracts, i.e. not merely repair or substitution of faulty equipment, but also analysis and organisation of the full product life cycle, for both hardware and software. We have developed a complete range of tools for diagnosis and predictive maintenance, as well as re-design tools for changing the overall system layout. We assist our customers in dimensioning and structuring maintenance teams and provide comprehensive training to the appropriate levels of responsibility for the various technologies involved.

The most advanced railway networks can only rely on the most sophisticated, high-tech and safest components available in the market.

In House Manufacturing

As well as developing application software for traffic control on rail and metro lines, Hitachi Rail STS has a Standard Product and Platform Unit with a coordinated “manufacturing system,” based on five production facilities, located in Canada, France, Ireland, Italy and the USA. More than 600 specialist engineers (graduates and qualified personnel) are involved in equipment manufacturing and follow up, burn-in, run-in and environmental trials (including vibration and electromagnetic compatibility tests) and functional trials related to the integration of subsystems necessary to ensure vital electronic systems.

These tests relate to the most important products for rail traffic control, including: Computer Based Interlockings, On-board systems, RBC (Radio Block Centres), ZC (Zone Controllers) equipment, automatic block systems, point machines, signals, relays, hot box detectors, level crossings and event recorders.
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Hitachi Rail STS operates with respect to the environment and coordinates with the authorities responsible for protecting our archaeological heritage. Hitachi Rail STS has the following certifications: ISO9001, ISO14001, BS OHSAS18001, CMMI level 2, EN50126, EU directives, EMAS, to ensure high quality, high level of systems availability and customer satisfaction.