FEDERAZIONE NAZIONALE IMPRESE ELETTROTECNICHE ED ELETTRONICHE

CONFINDUSTRIA

EXCELLENCE IN THE ITALIAN RAIL INDUSTRY

The position of the Italian rail industry is illustrated below, with particular emphasis on the levels of excellence achieved in the following three key areas:

- signalling and telecommunications,
- rolling stock
- electrification

Signalling and telecommunications

This sector has been the most advanced in Europe for a long time, as a result of the major innovation achieved by the Italian rail industry in recent years, driven by the Italian State Railways Group (*Gruppo Ferrovie dello Stato Italiane* - FSI).

The success of this programme is reflected first and foremost in the development of the European **ERTMS/ETCS level 2 system (supported by the GSM-R tlc system)** and its installation on the High Speed network as from the end of 2005.

The national industry's completion of the programme within the tight timescales demanded by the FSI Group company Rete Ferroviaria Italiana (RFI) has provided the Italian companies with a workforce endowed with high-level technical resources that can be used in similar projects on foreign markets.

Examples of how this potential has been applied are the orders already placed in various EU countries (Spain, France, Germany, United Kingdom, Holland, Belgium, etc.) and non-EU countries (China, South Korea, Russia, Libya, etc.) In particular the contract signed by the Italian industry in Russia is not only the first time the ERTMS system has been applied in that country, but also a project with a highly innovative content (use of satellite localisation principles).

In addition to the ERTMS level 2 safety system, designed to be used particularly on High Speed lines, the national industry can boast significant success also in **level 1 ERTMS** signalling and safety systems and **in computerised station devices (IXL)**, applied to conventional lines, with numerous acquisitions on European markets (France, Spain, Romania, Greece) and non-European markets (Libya, Turkey, Australia, USA, India, China, South America, etc.).

The ongoing developments are of particular relevance to determine an enhancement of the railway networks in the major urban nodes through targeted implementation of the signalling systems.

Other sectors have also reported major success; the position of the national industry is

gaining in importance also in the **automated metro** market for which a complete system is supplied combining signalling, telecommunications, automation, vehicles and after-sales service or assistance.

In this sector the national industry's references include: Copenhagen, Thessaloniki, Taipei, Riyadh, Honolulu, as well as the projects underway in Italy in Brescia, Milan and Rome.

Rolling stock

The **tilting train**, adopted widely throughout the world as a means of increasing service speed when fully-fledged High-Speed infrastructures cannot be constructed due to low traffic volumes or lack of financial resources, is an area where Italian industry has really made its historical mark. The "Pendolino" is the most highly exported Italian train, with more than 500 units destined for the following countries: Finland, Switzerland, Czech Republic, France, Spain, Portugal, Germany, United Kingdom, Slovenia, China, Russia. This train's numerous foreign destinations have required suitable versions to be designed and produced for virtually all power systems (3 and 1.5 kV in d.c., 25 kV in a.c. 50 Hz and 15 kV in a.c. 16 and 2/3 Hz) and various types of gauge (UIC 1,435 mm. and broad 1,522 mm.).

But it is in the **High-Speed train** field where absolute cutting-edge experiences are now taking place: the **Frecciarossa 1000**, built for Trenitalia, which follows the predecessor **Frecciarossa ETR500**, operating for years in the Italian railways at a speed of 300 km/h, has been realised according to the European standards of interoperability and engineered and tested to travel in maximum comfort at 350 km/h: this train represents the jewel in the crown of High-Speed train technology at European level.

One of the other segments in which the Italian companies have made their mark is the aforementioned automated metro segment, where the national industry occupies a leading market position. Italian driverless vehicles are a substantial part of numerous projects at different levels of completion, nationwide as well on international markets, with diverse vehicle architectures to meet different transport requirements.

The Italian industry is also present in the other market sectors:

- **Regional transport**, in Italy (Regional Service single or double-deck trains for Trenitalia and Trenord, double-deck carriages for Trenitalia; single-deck 2-car electric trains for Metro Campania Nord Est and Sepsa; reduced gauge and partial adhesion 3-car articulated diesel railcars for Ferrovie Appulo Lucane; reduced gauge and partial adhesion 2-car articulated diesel railcars for Ferrovie della Sardegna; single-deck

regional electric train, in 3-car urban and extra-urban versions for MetroRoma/ATAC; E464 locomotives for Trenitalia and others (with about 700 units the soundest homogeneous series ever produced); Morocco (double-deck electric trains) and Norway (electric trains with 4 articulated cars);

- Electric locomotives in Italy (freight locomotives types E403 -24 units- and E405 -42 units- for Trenitalia, TRAXX type freight locomotives for private operators –37 units-), Spain (103 TRAXX type freight locomotives, Spanish gauge) and Poland (13 TRAXX type locomotives in passenger and freight versions);

- **Urban transport – Classic metro systems** in Italy (Milan, Naples, Rome), Spain (Madrid – 6-car sets, single and dual-voltage), Turkey (Ankara – 3-car sets), People's Republic of China (traction systems for the city of Chongqing's transport system), USA (Atlanta, Los Angeles, Washington), Brazil (Fortaleza – 3-car articulated sets);

- **Urban transport – Tramway and light metro** systems in Italy (Bergamo, Florence, Milan, Naples, Sassari), Greece (Athens, 5 articulated cars), USA (Boston, San Francisco, Los Angeles), Sweden (Goteborg, 5 articulated cars), Turkey (Kayseri and Samsun, 5 articulated cars), Norway (Oslo, 3 articulated cars), mostly derived from the Sirio platform; France (Strasbourg) and Portugal (Porto), both similar to Milan's Eurotram sets.

The industry's prominent market position is also illustrated by **diagnostic trains** for infrastructure testing, both for conventional lines (for FSI Archimede and Diamante trains) and High-Speed lines (for FSI train ETR500Y), in which several countries have expressed an interest (Turkey, Spain, China, India, South Korea, etc.). Proof of Italy's leadership in this industry sector is provided by the fact that at the present time as many as 7 out of 9 High-Speed diagnostic trains are fitted with Italian technology.

What is also important, given that many Italian manufacturers currently fall under the auspices of multinational groups, is that the Italian companies have been able to carve a special niche for themselves within these groups, occupying positions of prominence. For example, mention can be made of the allocation to Italy of the centre of excellence for the development and production of DC locomotives for the Italian, Spanish, Polish and Belgian markets (TRAXX series) as well as contracts for the supply of suburban trains (Xtrapolis series), destined for foreign markets as well.

Italian companies also occupy a very prominent position in the area of **subsystems for rolling stock**. Amongst other things, the national industry boasts world leadership in the production of quality axles, wheels and mounted stairs, the only producer in the world to feature an in-house sector dedicated to the research and development of new materials

and products. Other subsystems featuring highly prestigious Italian technologies and products are control benches, pantographs, converters, brakes and other products.

Electrification

The technology in this sector is substantially mature and market accessibility is the result of experience gained in the diverse electrification systems found in the various countries.

However, there are a number of key points of excellence that may be of interest on foreign markets:

- Long-standing collaboration with the Italian Railways Network (RFI) and University sector, which over the years has led to continuous research and the introduction of optimal technical solutions for the applications required;
- Design capability that starts right from the feasibility study;
- Wide range of product types and technical solutions for **contact lines**, with unrivalled performance, reliability and flexibility;
- Experience gained in the construction of compact and modular **substations**, with a sharp reduction in preparation times and increase in maintainability;
- Development of advanced systems for the **centralised management** of line units and for their **diagnostics**;
- Experience gained in the construction of systems for **damping interference** between adjacent alternating current and direct current power supplies.

Italian industry in the sector has gained solid technical experience in the construction of **power supply plant** for 3 kV d.c., 25 kV a.c. (HS networks up to 300 km/h), 1500V and 750V d.c. (urban transport) railway lines, and is also specialised in building contact lines, alternating current and direct current electrical conversion and transformer substations and related centrally-controlled remote control systems.

In addition to the broad experience gained from its achievements on the national rail network (HS and conventional), the Italian industry has been involved in developing various rail projects abroad (first electrifications in India, South Africa, Chile, Australia, Yugoslavia, Greece, Portugal, Venezuela).

The Italian rail electrification industry hence boasts the capacity to produce the most suitable and opportune solutions for the application and the country system where the plant is being developed. It extends far beyond the rigid position normally adopted by

competitors in other countries, where more often than not the unique technical solution established in the country of origin is simply exported as it stands.

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