MAFEX

Mafex corporate magazine
Spanish Railway Association

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INDIA

Great improvements in railway.

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MAFEX INFORMS:
New Mafex trade delegation to Mexico.

Mafex continues its intense activity by the end of the year

Dear friends,

At the end of the year, Mafex continues its intense activity. During these months, the Association had organized a new Trade Delegation *to Mexico, a country full of opportunities where the Spanish railway industry has been collaborating for years and where there is a great harmony with the sector. We also inform you that works are already being done on the participation to the next edition of Innotrans 2018. At the end of the registration period, this time 50 companies will be present at the Spanish Official Pavilion with the group participation coordinated by Mafex for seven editions. The fair to be held during September 18th - September 21st will bring together more than 135,000 professionals and 2,700 exhibitors from 55 countries. Undoubtedly, a showcase of the first order aimed at presenting the latest developments and technological breakthroughs of our companies.*

The Association also anticipates that the preparations for the "14th World Metro & Light Rail Bilbao 2018" are being carried out at a good pace. Representatives from the railway sector (operators, manufacturers, providers), managers and industry delegates will meet so as to establish alliances with the major players in the market. As you know, besides the collaboration with Adif and Renfe, the event is also supported by institutions such as the Basque Government, the SPRI Group, ETS, Euskotren and Metro de Bilbao.

On the other hand, in this issue you will find news about 16 Mafex companies and that indicate the weight that the sector has inside and outside our borders. The section "Destination" includes an extensive report on India; a country where transport, in particular the railway transport, is an ideal alternative both for the long distance freight trade and for mitigating the urban mobility problems in big cities. The country has designed a road map to achieve modern and efficient infrastructures in the long term. This is reflected in the "IR Vision 2020-Indian Railway" Program. The initiatives include high-speed lines, modernization of existing networks as well as a great impetus given to the metro throughout the country.

On the other hand, the "In Depth" section also dedicates a vision to Egypt. The Ministry of Transport has drafted a list of proposals until 2030. These proposals include the construction of new high-speed kilometers, improvements to the national network, more metro extensions and links to other communication means. A country where the railway has a great future.

Finally, the "Innovation" section presents you new advances and technological projects carried out by some of the Mafex partners.

We hope that you will find this information of your interest and that it will serve to know firsthand the progress of a powerful sector where the Spanish industry plays a very prominent role.

MANAGEMENT: MAFEX.
MAFEX STRATEGY AND COMMUNICATION COMMITTEE: Albatros, Alstom Transporte, ArcelorMittal, Bombardier España, CAF Signalling, Idom, Indra Sistemas, Ingeteam, La Farga Lacambra, Patentes Talgo, Siemens España, Thales España and Stadler Rail Valencia S.A.U. **ADMINISTRATION:** comunicacion@mafex.es. **ADVERTISING:** comunicacion@mafex.es. **SUBSCRIPTIONS:** comunicacion@mafex.es **.** Mafex magazine is not responsible for the opinions, images, texts and works of authors and readers that will be legally responsible for their content. It is understood that the signing authors have given their consent to be included, for which he or she will be responsible. Also, the magazine is not responsible for typographical errors contained in the original documents submitted by the authors.

Mafex trade delegation to Mexico

MAFEX HAS ORGANISED A NEW DELEGATION IN MEXICO IN WHICH THEY HAVE HELD MEETINGS WITH TRANSPORT REPRESENTATIVES, SUCH AS THE COLLECTIVE TRANSPORT SYSTEM OF MEXICO CITY.

A representation of six Mafex affiliate companies have taken part in a new Trade Delegation to Mexico. During their stay, an intense round of activities and meetings have been undertaken, amongst which and worthy of special mention are the meetings with the authorities of the Secretariat for Transport and Communications, of the Collective Transport System of the Mexico City Metropolitan Railway (STC) and Banobras, a banking institution fostering Mexican development that finances public works and whose involvement is essential for the development of railway projects.

The mission's purpose has been to show the interest the Spanish sector has in participating in the development of the new projects announced by the Mexican Government, as well as bringing to the fore its undisputed levels of capacity, technology and time-served experience in this field.

At the present time, in Mexico the "National Infrastructures Plan 2014-2018" is underway, awarded a budget of 4.745 billion euros (95 billion pesos). With these funds, the aim is to undertake prioritised projects, both in the sphere of passenger rail as well as freight transport. Amongst the projected improvements, work is being carried out on the modernisation of signalling on the current network, along with the new connections and inter-city train between Mexico-Toluca or the "Express Train" that will link the new airport in the city with the station at Observatorio. Added to these are the expansion and improvement of underground lines in cities such as Guadalajara, amongst others.

Freight transport has also been prioritised as part of this plan. For this purpose, work is being undertaken on the improvement on those sections with the greatest demand levels. Notably, Aguascalientes-Guadalajara (Encarnación) and the Coatzacoalcos and Celaya Lines.

Likewise, it is worth mentioning the investor efforts made by companies such as Erromex, Ferrosur and Kansas City Southern de México (KCSM). Conversely, Metrorrey, the Collective Transport System for Monterrey, has its own plans to expand and improve its fleet, safety systems and ticketing. It is also worth highlighting the meeting between civil servants of the Suburban Railways, the tender which joins the capital with the State of Mexico and which is carrying out relevant studies for the expansion of its operation through the construction of three new branch lines.

Mafex has included in this delegation within the plan for activities in 2017 the current railway projects underway in the country, the reason why the strengthening of bilateral relations is of the utmost importance.

During their stay, an intense round of activities have been undertaken.

Mr. Carlos Álvarez, new President of AGEX

THE PRESIDENT OF SIDEREX TAKES UP THIS NEW POST TO LEAD AGEX, THE GROUP OF ASSOCIATIONS OF THE FOUR MAIN INDUSTRIAL SECTORS.

Mr. Carlos Álvarez, CEO of ACEROS INOXIDABLES OLARRA, S.A. has been chosen as the new President of the AGEX Group, formed by the four main entrepreneurial associations of some of the sectors at the fore of Spanish industry: agricultural machinery (Agragex), smelting (Fundigex), products and installations steelworks (Siderex) and the railways (Mafex). With this new appointment, he replaces Mr. Rafael de la Peña Bengoecha, from the company GUIVISA, S.A. who has held the chairmanship for the last five years in the group and to whom we are extremely grateful for the work he has undertaken.

Mr. Álvarez will continue along the group's working lines, geared especially towards external promotion and support for the internationalisation of these four sectors.

To achieve these aims, from within the Agex Group diverse activities are carried out, along with collaboration with Public Sector Administrations to disseminate these topics relating to internationalisation. Currently, the Group is formed by 315 companies.

Mr. Carlos Álvarez.

Mafex oversees the participation of 50 companies at Innotrans 2018

ONCE THE ENROLMENT PERIOD FOR INNOTRANS 2018 ENDED, IT COULD BE SEEN ONCE AGAIN THE SIZEABLE NUMBER OF COMPANIES THAT WILL SHARE WITH MAFEX THIS RENOWNED PROFESSIONAL TRADE FAIR.

50 companies will be present at the Official Spanish Exhibition Hall in the InnoTrans 2018 Trade Fair, which has been organised by the association for the past seven editions. This important business appointment will be held in Berlin from the 18th to the 21st of September next year. During the 4 days the fair will last, more than 135,000 professionals and 2,700 exhibitors from 55 countries will come together with the aim of presenting the latest developments in the fields of railway engineering, interior design, infrastructures and public transport.
In this new editions, the following companies will be grouped together under the auspice of Mafex: Amurrio, Aquafrisch, Arcelormittal, Ardanuy Ingeniería, Electrotécnica Arteche Smartgrid, CAF, CAF Turnkey & Engineering, Caf Power & Automation, CAF Signalling, Ceit, CETEST, COMSA, Colway Ferroviaria, Duró Felguera, Funor, Gamarra, Goal Systems, Goratu Máquinas Herramienta, GMV, Hawke Transit System, Ingeteam Power Technology, Ikusi, Indra, Industrial de Transformados, Ineco, Jez Sistemas Ferroviarios, La Farga Lacambra, Lander Simulation and Training Solutions, MB Sistemas S. Coop, MGN Transformaciones del

Mafex stand and co-exhibitors, 2016 edition.

Caucho, NEM Solutions, Newtek Sólidos, Patentes Talgo, Premium, Sice, Revenga Smart Solutions, Talleres Alegría, Talleres Corral Mecanizados, Teltronic, Thales Spain, Ute Ogi, Virlab Testing Laboratory, Xubi Engranajes and Uromac Systems amongst others, and more than 2,400 m^2 will be set aside for the presentation of their products and services.

The "14th World Metro & Light Rail Bilbao 2018" is moving forward at a good pace

ENROLMENT IN THIS TRADE FAIR AND CONGRESS TO BE HELD ON THE 18TH AND 19TH OF APRIL 2018 AT THE BEC (BILBAO EXHIBITION CENTER) CONTINUES TO GROW.

The "14th World Metro & Light Rail Bilbao 2018" is still enjoying a favourable reception and enrolment moves at a startling pace. 34 different nations are already represented, as well as 62 international speakers confirmed at the present date and who will form the bill for the simultaneous conferences. Therein, agents from the railway sector (operators, manufacturers, suppliers), senior management and delegates from the industry to establish "bonds between the major agents operating in the market".
Amongst the institutions that support this event are the Basque Regional Government, the SPRI Group,

ETS, Euskotren and Bilbao Metro, as well as enjoying the collaboration of Adif and Renfe.
In 2018, the event will be organised in Bilbao for the first time, in collaboration with Mafex, the Spanish Railway Association and will represent a major opportunity to showcase the dynamic urban railway market in Spain. Conversely, the congress programme will adress current railway issues from the outlook of urban public transport: new technology and solutions, intermodality and network integration, the environment and sustainability, project financing, maintenance, etc. The complete programme, the list of addresses and collaborators, technical visits and other details and information of interest will be announced in the coming weeks and will be available on the web: http://www.terrapinn.com/conference/metrorail/index.stm

25 years of high speed: making progress in Renfe is energy efficiency

THE COMPANY HAS ALREADY REDUCED ITS CARBON FOOTPRINT BY 56% SINCE 1990 TO 24.2 G OF CO2 PER TRANSPORTED UNIT AND IT MAINTAINS A SUSTAINABILITY AND ENERGY EFFICIENCY STRATEGY.

Renfe has already reduced its carbon footprint by 56% since 1990.

Renfe's transport activity in the high-speed services between 1992-2016, has allowed the company to make savings estimated to € 4.286 million if the impact on climate change.

Railway is one of the central elements for a low-carbon economy and the impact of high-speed services in Spain during the first 25 years shows it. Renfe's transport activity in the high-speed services between 1992-2016, both on long-distance and medium-distance (346 million passengers), has allowed the company to make savings estimated to € 4.286 million if the impact on climate change, the pollution and the accident rate are economically assessed, savings that this transport would have had to achieve by other means.

Carbon Footprint Saving

This would also have led to an increase in CO2 emissions (greenhouse gas) caused by the transport in Spain of more than 12.9 million tons and an increase in energy consumption of more than 2.6 million tons of oil (Teps).

These are external cost savings, carbon footprint savings and energy consumption savings generated by Renfe services according to the modal replacement methodology contained in the "Carbon Footprint of Railway Infrastructure (UIC)" 2 study and the assessment performed by externalities in the "External Transport Costs in Europe" (Ce Delft, November 2011) 3 study. The main contribution of this study is to prove with standardized and scientifically accepted measurement procedures that the railway is the means that generates less external costs, especially compared to other hydrocarbon-dependent means.

Zero-emission railway transport

89% of Renfe's passenger and freight transport volume is achieved by electrified networks and it is, therefore, partially de-carbonized based on the current electricity mix (53% without emissions and 33% renewable). The company has already reduced its carbon footprint by 56% since 1990 (base year of the Kyoto Protocol) to 24.2 g of CO2 per transported unit and it maintains a sustainability and energy efficiency strategy that includes a new agreement concluded with Adif to deepen several areas of the railway system, to improve energy consumption and saving practices or innovation projects to analyze traction using liquefied natural gas or hydrogen batteries as potential substitutes for fossil fuels.

Compared to 1990, the energy consumption in the railway sector (final energy consumed per transported unit) has decreased by 33% worldwide. More than a third of the energy used in the railways is electric and a quarter of the lines are electrified worldwide.

According to data provided by the International Energy Agency (IEA) and the International Railway Union (UIC) 4, the transport accounts for 23% of greenhouse gases (GHG) due to fuel consumption and the demand for global mobility of passengers and freight is expected to double between 2010 and 2050, as a result of economic globalization and the buoyant markets. While 8% of global transport is performed by railway, the GHG volume generated represents 3.5% because the CO2 (carbon dioxide) emissions generated by the railway are substantially lower than those generated by other transport means. Railway-specific CO2 emissions have been reduced by 63% in the case of passengers and by 48% in the case of freight between 1975 and 2013.

CETEST provides test & engineering services also to components suppliers and consultancy firms

CETEST

The railways test laboratory usually helps big manufacturing companies (Alstom, Bombardier, CAF, Kawasaki…) with its accredited test services. Nevertheless, CETEST also provides these services to the suppliers of components installed on the train. In the different test benches in its facilities, axle box and bearing tests are performed on a recurring basis. Its customers include SKF, NTN, SCHAEFFLER-FAG or KINEX. Apart from that, CETEST has special test benches for other rolling stock components tests, as axle, wheels, spherical joints, couplers and gear boxes. They can even design specific test benches for some special components as the last test for the variable gauge axlebox design by OGI consortium.

CETEST also works with engineering firms, providing test services as well as consultancy works within its expertise areas. During last two years, they have performed several tests for Notified Body Belgorail during the Regio 2N homologation test campaign in France, consulting in EMC and structural certification processes for Belgium M7 project and EMU in Luxemburg. Similar works have been made for Bureau Veritas and in the coming months, extensiometric test will be performed for Toronto Transit Commission (TTC) through engineering firm CH2M. This way, CETEST covers the entire value chain, from the components suppliers, train manufacturers, engineering companies and final train operators.

The infrastructure subsidiary of COMSA in Portugal takes on new track maintenance contracts

COMSA

Fergrupo, the infrastructure subsidiary of COMSA in Portugal, has recently been awarded three new projects for the track and electrical modernisation of different sections of the country's national rail network. On the one hand, the company will carry out the renovation of the track superstructure between the towns of Valadares and Gaia belonging to the northern line of the country in order to improve its safety and reliability. The works, valued at more than 4 million euros, include the replacement of sleepers, the installation of 8.6 kilometres of track and the reinforcement of 3 level crossings.

Infraestructuras de Portugal has also entrusted Fergrupo to carry out the maintenance of catenary and track equipment and systems in branches of 10 lines of the national network. For a total of nearly 2 million euros, the company will apply different preventive and corrective procedures to guarantee functionality and prevent anomalies.

Finally, COMSA's subsidiary in Portugal will undertake a project to rehabilitate the section of track between Válega and Gaia, also on the northern line, in order to mitigate the risks of deterioration that currently threaten the infrastructure.

New contrat for Kelox in USA

KELOX

Kelox IRT USA, a US subsidiary of Kelox S.A., has been selected by Alstom USA to design and supply the catering onboard equipment for 28 new high-speed trains to be run on the Northeast Corridor between Boston and Washington D.C.The value of this contract, which was signed at the offices of Alstom USA in Philadelphia on Tuesday, July 11, 2,017 for 15 million dollars is the largest contract signed so far by Kelox. Amtrak decided to purchase new trains to replace existing Acela ones, increasing passenger capacity, offering higher frequencies, minimizing travel times, and improving operating costs and energy consumption. The train model acquired by Amtrak is an Avelia Liberty, the latest evolution of Alstom's high-speed train range, Avelia. The equipment that has been awarded to Kelox consists of the integral catering equipment of a Cafe car and a first class galley for each of the 28 compositions.

The first trainset should be delivered at the end of the year 2018 and the remaining units between 2019 and 2020. With this award, Kelox consolidates its presence in the United States, and shows success sample on its strategy of proximity and customer service. "At Kelox we have received the notice with great enthusiasm, because it is not only recognition for our company, but to the effort and devotion of all those people who form our team" says Mariano Vega, Commercial Manager. For Luis Azorin, CEO of Kelox, "It is a pride that a company with the goals of Kelox could contribute in the development of such a key and strategic project for passenger transportation improvement at the USA, like the NEC one between Boston and Washington D.C."The award of this project reinforces our company position like a technological reference in our product at a global level."

New tramway contracts for CAF in United States

CAF

The Seattle Department of Transport (SDOT) has awarded CAF with a contract for the supply of 10x 3-module streetcars based on the Urbos platform and 100% low floor.

This agreement is comprehensive of spare parts, special tools and testing equipment. SDOT also reserves the right to purchase up to an additional ten vehicles and their relevant spare parts during the valid term of the Contract. The Contract amount exceeds $50M.

The new vehicles will be equipped with the Onboard Energy Storage System, which is supplied by CAF Power & Automation, allowing them to run on the catenary-free sections of the network.

The Kansas City Transport Authority has also received approval to purchase two additional streetcars from CAF to add to the four streetcars previously supplied which are in revenue service since last year.

Icon Multimedia installs its passenger information system in Satiago´s Metro in Chile

ICON MULTIMEDIA

ICON Multimedia, in collaboration with SICE the systems integration integration techonology company, has installed DENEVA, its Passenger Information Software, in the new 3 and 6 lines of Santiago's Metro in Chile.

The stations on both lines show information on large format screens located in the main accesses, thanks to a tool that includes, in a single web platform, all the communication needs of a terminal.

The new DENEVA also has interactive points in which intermodal information is presented, and where travelers are able to search interesting information about destinations or services. In addition, DENEVA connects to the traffic management and incidence systems of Metro to offer real-time information to passengers.

TYPSA to design Níjar - Almería section of High Speed Mediterranean Corridor

TYPSA

ADIF- Alta Velocidad has awarded TYPSA the contract for the detailed design of the Níjar - Almería section of the High Speed Mediterranean Corridor for EUR 962,566 and an 8-month term for completion. The 28 km-long section awarded runs through the municipalities of Níjar and Almería and is one of four contracts tendered out by ADIF to upgrade the Murcia - Almería section of the High Speed Mediterranean Corridor.

Having worked with every Spanish state-owned railway company since the beginning of high speed rail, TYPSA is widely experienced in railway infrastructure design, especially high speed railway trackbeds.

This wealth of experience has allowed it to expand its sphere of action to other countries such as Sweden or the United Kingdom, where TYPSA is currently working on high-speed projects such as the HS2 railway linking London and Birmingham.

SENER receives 'The European' award for best infrastructure and transport company

SENER

SENER has won the prestigious 'The European' award for best infrastructure and transport company, as part of the British publication's annual awards programme for innovation and excellence in organisations.

This year, 'The European' has chosen to acknowledge the work of SENER in the area of infrastructure and transport with this award, which, in the 2017 edition, rewards the company's work carried out in the MENA region (Middle East and North Africa).

Every year, 'The European' gives recognition to organisations and individuals that stand out from the rest for initiatives related to good governance, innovation and know-how, as well as for the quality of their products and services.

At present, SENER is carrying out infrastructure, transportation, energy and construction projects in the MENA region, in countries such as Qatar, United Arab Emirates, Algeria and Morocco.

La Farga reinforces its international position and its development of technology sales by signing an agreement with the Italian company Danieli

LA FARGA LACAMBRA

La Farga signed an agreement with Danieli, the Italian company that is a leader in the manufacture of equipment and plants for the ferrous metals industry, to reinforce one of the company's strategic lines - the sale of technology.

Signing this agreement allows both companies to strengthen their competitiveness and their global positioning. With a global and ethically responsible mindset, La Farga is positioned as a leading company in the copper industry in the transfer of technological knowledge.

Inka Guixà, La Farga's Managing Director, insists that "with the signing of this agreement, La Farga will offer a new service in the copper plant market, transferring its know-how, its technological process and its experience at the hands of a highly trained team with extensive experience worldwide". The company headed by Mr. Oriol Guixà will accompany the new clients in this line of business in their process of implementing and launching onto the market. For Danieli, the agreement comes as they are experiencing a process of expansion in the sub-sector of non-ferrous metals (aluminium and copper), and allows the company to take advantage of La Farga's extensive knowledge to adapt their technological offer to the specialities involved in working with copper.

Siemens technology increases the capacity of the new Line 5 of the Madrid Metro by 44%

SIEMENS SPAIN

Since September, Line 5 of the Madrid Metro has been using new rail signalling technologies developed by Siemens. Siemens' Mobility Division has renewed the signalling between the Casa de Campo and Alameda de Osuna stations along a 23.2-km section of double track with 32 stations. It has installed automatic train operation and protection equipment both along the track and on-board for 21 six-carriage trains, all 2000-series. In the first phase of the project, an automatic train protection and operation (ATP/ATO) system based on speed codes was installed. The new signalling system, which replaces the old one installed in the 1950s and 60s, also has 12 Trackguard Westrace Mk II electronic interlockings, as well as Clearguard FS2550 track circuits, MD2000 electronic point machines and signals.

In the second phase, the signalling system will be developed towards the TBS 500 Distance-to-Go (DTG) automatic operation and protection system. Siemens has also carried out the work to integrate Line 5 into the Alto del Arenal Control Traffic Center, which uses Controlguide Rail 9000 technology, also developed by Siemens.

Indra makes further inroads into the Indian market via a new contract for the Delhi Metro

INDRA

Indra has made further inroads into the Indian transport market, having been awarded a contract to deploy all technology used for access control, validation, ticket sales and card top-ups its contactless ticketing technology at 14 new stations on the Delhi and Noida Metro system. This also sees it further strengthen relations with the Delhi Metro Rail Corporation (DMRC), a public company that is involved in the design planning and running of other major Metro, monorail in the country, where Indra has already deployed technology on the Metro's airport line and provided portable validation terminals to the same client. Indra will update the ticketing systems already in place in the Delhi Metro to include its technology based on smart contactless cards and tokens, and will modernize the current control center to encompass the new stations and new services, including payments via cell phone SMS messaging, with the possibility of incorporating payments via NFC or QR technology in future. Passengers will also be able to top-up their contactless cards or buy electronic tokens for single journeys at any of the 14 new stations, either using the automatic dispensing machines or at the customer service/ticket offices at each station. Meanwhile, access control systems will allow users to validate their cards by simply passing them over the scanner.

The Indra solution is set to improve the services provided to the public, making it easier and faster to access the Metro, through contactless technology and reversible steps, which can cater to different levels of demand at different times of day. Furthermore, the new system will allow shared fare management with other operators, thus opening the possibility of commuters making combined use of various modes of transport, while using different fares to cater to the needs of different users, and allowing discount fares for seniors, students, etc. Additionally, the system generates major value in terms of data, helping to optimize decision-making based on demand information at specific stations and during certain time periods. All of these benefits will help to drive use of the Metro and public transportation in Delhi, a mega-city where pollution represents a major problem, demanding more sustainable and environmentally friendly mobility solutions.

Stadler's CITYLINK family successes

STADLER RAIL VALENCIA

On September 14, CITYLINK vehicles made their first passenger trip on the Supertram tramway network in Sheffield (South Yorkshire, UK) after an official launch event hold by the Tram-Train project partners and attended by Transport Minister Paul Maynard MP. South Yorkshire Passenger Transport Executive (SYPTE) acquired seven CITYLINK vehicles in June 2013 to operate the UK's first tram-train system, connecting the Supertram tram network and the national rail network between Sheffield and Rotherham. These vehicles have been designed and manufactured by Stadler Rail Valencia

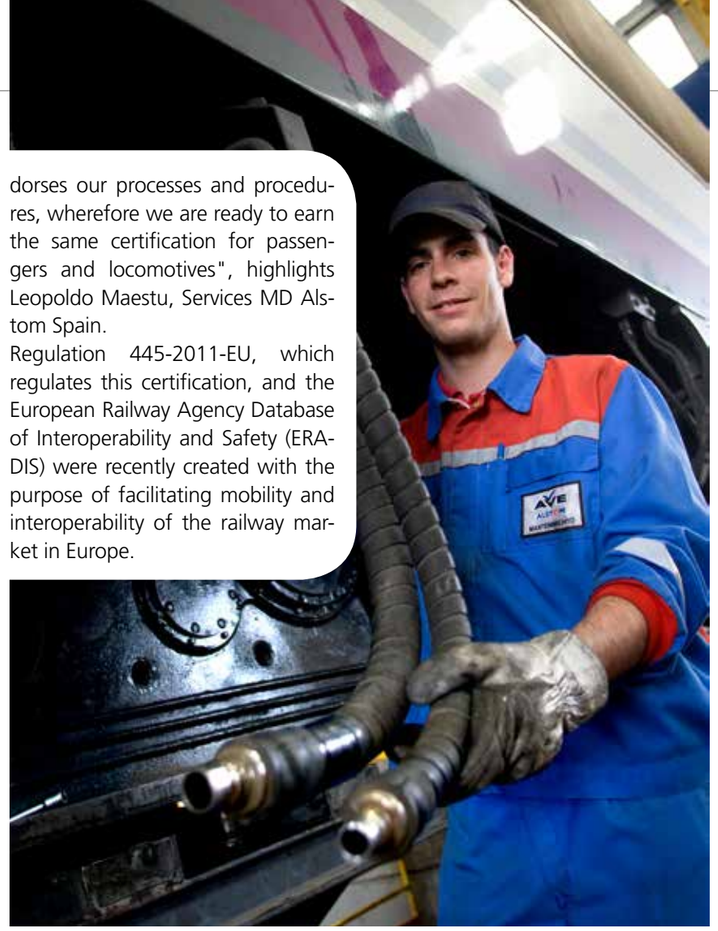
In addition, Stadler has recently signed a new contract with Ferrocarriles de la Generalitat Valenciana (FGV) for the supply of six bimodal tram-trains type CITYLINK within the modernization plan of Line 9 of the TRAM of Alicante between Benidorm and Denia. These will join the existing fleet of 9 CITYLINK vehicles that have been circulating since 2006 in Alicante. CITYLINK is a family of lightweight modular vehicles, fully accessible, low floor and specially designed to connect the city centre with its metropolitan area with no transfers, providing a comfortable, quiet and safe ride. Stadler has become an European benchmark in the tram-train segment, with over 120 fully-outfitted vehicles which have covered more than 15 million kilometres.

Bombardier Transportation Spain Relocates Selected Divisions to Single Madrid Office

BOMBARDIER TRANSPORTATION SPAIN

Bombardier Transportation in Spain has relocated some its divisions (Propulsion and Services, as well as Bombardier Transportation's Marketing, Communication and Presidency departments) to a single office space at La Moraleja Miniparc in Alcobendas near Madrid. Previously home to Bombardier's Maintenance Services division, relocating addition teams to the recently renovated Alcobendas offices will enable the various Bombardier functions to benefit from a shared space concept. The new facilities are ideally-suited to the continued development of rail engineering work and further support Bombardier Transportation in providing innovative mobility solutions to Spain and beyond.

Improving office locations will deepen collaboration between Bombardier's various teams and divisions in Spain while improving project management and customer relations in the region.



Alstom in Spain gets the highest maintenance European certification

ALSTOM SPAIN

Alstom is Spain has earned the highest certification level in railway maintenance from the European Railways Agency for Safety. This level 1 certification authorizes Spanish Services teams to operate throughout Europe as an "Entity in Charge of Maintenance" (EEM). With this level 1 certification, Alstom can not only offer services as a supplier of maintenance activities, as it has up to now, it can also manage the complete maintenance of the fleets of any operator, therefore assuming overall responsibility in the entire process.

"Initially, the regulation certifies maintenance tasks for freight equipment, which is the only deregulated market in all Europe so far. But it is a very important step with in the scope of future liberalization: the European Railways Agency now endorses our processes and procedures, wherefore we are ready to earn the same certification for passengers and locomotives", highlights Leopoldo Maestu, Services MD Alstom Spain.

Regulation 445-2011-EU, which regulates this certification, and the European Railway Agency Database of Interoperability and Safety (ERADIS) were recently created with the purpose of facilitating mobility and interoperability of the railway market in Europe.

Thales launches a new station in the rail project Cairo-Alejandria

THALES SPAIN

Thales has undertaken the operational launch of the Berket el Sabaa station following intense months of work and tests with the client, Egyptian National Railways (ENR) and the consultancy SYSTRA. To mark the inauguration, on 26 August this year the Egyptian Minister of Transport, Hisham Arafat, and senior ENR management, visited the station along with Rufino Ortega, Thales' project manager. The meeting enjoyed considerable media coverage from the major Egyptian TV channels.

During his visit, the Minister gave a detailed description of the works carried out by Thales following the completion of the Berket el Sabaa section, also enumerating the remaining stations, announcing that Etay El Barood, and subsequently Kafr el Zayat, would soon be launched with Thales technology. The works are progressing and software testing with the client at the first of the stations will commence in September 2017.The Minister estimates that the Cairo-Alexandria project will be concluded between the end of 2018 and the beginning of 2019, and predicts that the entire line up to Aswan will be modernised by 2022.

The geographical area of the Berket el Sabaa station comprises a length of approximately 15km, with 8 automatic level crossings, and one of the main challenges of this new launch has been the complexity of the electrical wiring across the section, which had to traverse the bottom of the basin of the Nile river over a length of some 750m, crossing an existing swinging bridge through so-called horizontal directional drilling (HDD), implemented to this end.

CAF Signalling awarded the refurbishment of the control centre on the Roca Line in Argentina

CAF SIGNALLING

The Argentine Railway Infrastructure Manager, State Company (ADIF SE) has awarded to CAF Signalling the refurbishment of the control centre on the Roca Line, located in the metropolitan area of Buenos Aires. With this project, the current system of train monitoring trains and command tables forming the network will be replaced. The contract value amounts to 111,719,647.50 Argentine pesos, approximately six million euros, and final handover will take place in 18 months.

CAF Signalling will be entrusted with the supply and installation of a control centre that will be integrated with the existing signalling in place, based on relay locks. This system will control and represent the railroad traffic that starts from the main station "Constitución," one of the most important in Buenos Aires, reaching the sectors of Ezeia and Alejandro Korn. The new centre will control 22 command tables (local control posts) along the Roca line, one of the ones with the most densely distributed rail traffic in the country.

NAOS Platform

The company will implement in Argentina one of its most state-of-the-art technological features, the NAOS solution for integrated multifunction control centres. NAOS makes rail operations more user friendly by having the ability to integrate the different operational responsibilities under a single operating position under the assumptions of safety, reliability, quality and availability.

NEM Solutions'CEO Alberto Conde Mellado awarded as the GAMECHANGER of the years

NEM SOLUTIONS

ACQ5 has recently selected Alberto Conde Mellado as the Spanish Gamechanger of 2017 due to his contribution to the industry with his technological and disruptive business approach in NEM Solutions all around the world.

The jury defined Alberto as synonym of energy, enthusiasm and passion for innovation and technology. He has clear visions of the future and shows great dedication to improve the world we will leave for our children. He believes in perseverance and strong determination to achieve goals.

"We have spent 10 years being gamechangers, mouldbreakers and comfortscapers and our intention is to keep going. I have been awarded with this prize but I would like to share it with all the team, those who were part of it and those who will be." (Alberto Conde Mellado)

NEM Data Challenge

On the other hand, NEM Data Challenge has gathered talent of gathered talent of 14 countries 14 countries Last July NEM Solutions launched the first "NEM DATA Challenge", a digital competition to find the best worldwide data processing profiles. Siemens-Gamesa Renewable Energy, Tecnalia, ieTam and Diputación de Gipuzkoa are the partners in this initiative. More than 100 people from 14 countries have participated in the challenge.

It has focused on the wind energy sector and in the business oriented data. What NEM Solutions has valued the most is the participants' capability to manage their everyday problems.

The challenge was divided in three phases, focused on data processing, machine learning, and a last one that is ongoing, in which participants receive a week-training in their facilities as a prize. In that way, NEM Solutions has tried to capture talent in a unique, revolutionary and memorable way.

India: A railway with intense activity on significantly improved tracks

THE "IR VISION 2020-INDIAN RAILWAY" DOCUMENT COMPILES THE OBJECTIVES FOR THE NEXT YEARS. AMONG THEM, THE REDUCTION OF TRAVEL TIMES, THE CONSTRUCTION OF MORE KILOMETERS OF TRACKS AND THE ARRIVAL OF HIGH SPEED LINES.

An investment in the amount of € 81,166 M has been approved within the twelfth five-year plan (2012-2017).

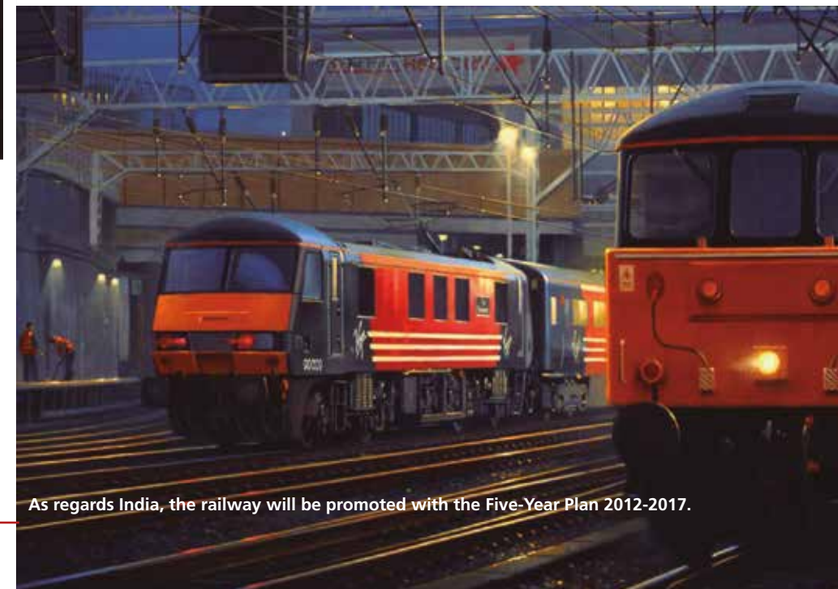
INDIA

India's railway network is one of the largest in the world and is very busy. With more than 110,000 kilometers and 7,421 stations, its lines transport 23 million passengers and three million tons of freight per day. Although it is the fourth largest, only after the United States, Russia and China, 80% of the existing links date back from the British colonial era, before 1947, therefore its infrastructure is very old and requires major improvement works. India is the second most populous state, after China, with more than 1.236 million inhabitants and it is the seventh largest with more than 3.28 million square kilometers.

An extension that highlights the importance of internal and external links. The country has a multiple traction system and numerous routes, almost 40% of the networks being electrified. Although there are three types of tracks, the most widely used is the track gauge of 1676 mm that is slightly larger than the standard track of 1435 mm, being installed along 89.771 kilometers of route. The narrowest gauge is residual, with a total of 3,350 kilometers, and it is mainly present in mountainous areas (Himalaya and Darjeeling railway) and also in certain private networks. Under the unification project, Indian Railways is converting all routes into wide-gauge routes, except for historic heritage lines.

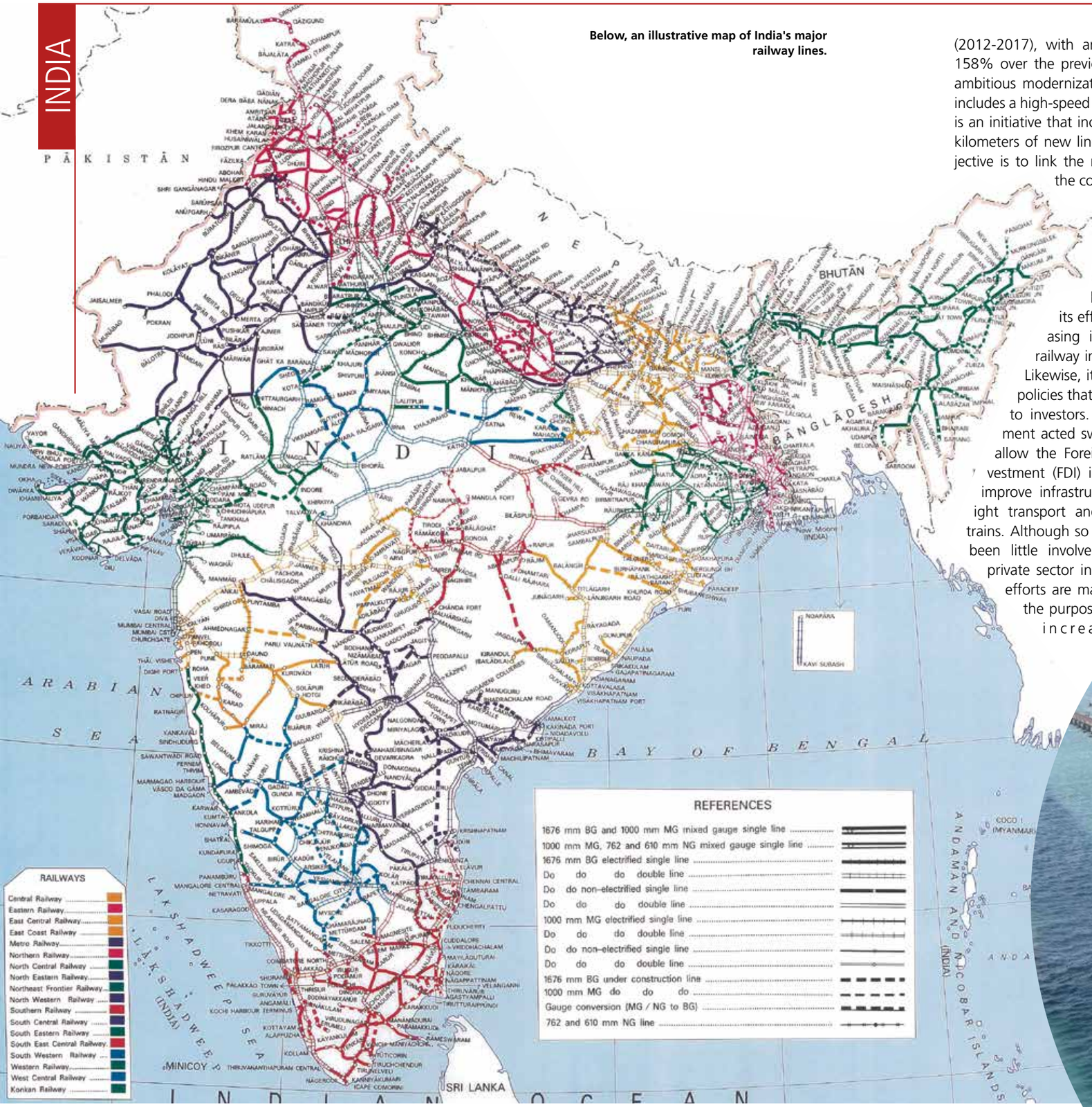
At present, there are more than 7,146 stations and 19,139 trains are daily running due to the frantic activity. But it is not distributed in the same way. For example, several states, especially those from North-East, such as Uttarakhand, Jammu & Kashmir and the Himalayan region lack railway links. In the last 60 years, the expansion of this medium has been further encouraged in the states of Jharkhand, Orissa, Madhya Pradesh and Rajasthan.

In general terms, these are outdated lines and services, which need improvement, modernization, new stations, systems and services expansion projects. Therefore, the Government has already begun to address this challenge for several years. To this end, the items are channeled into five-year programs. A railway investment of 95.445 million dollars has been approved within the twelfth five-year plan



As regards India, the railway will be promoted with the Five-Year Plan 2012-2017.

INDIA



Below, an illustrative map of India's major railway lines.

(2012-2017), with an increase of 158% over the previous one. This ambitious modernization plan also includes a high-speed network. This is an initiative that includes 10,000 kilometers of new lines whose objective is to link the main cities of the country.

Given its importance in the economy, the Government has focused its efforts on increasing investment in railway infrastructures. Likewise, it has adopted policies that are favorable to investors. The Government acted swiftly so as to allow the Foreign Direct Investment (FDI) in railways to improve infrastructure for freight transport and high-speed trains. Although so far, there has been little involvement of the private sector in this area, efforts are made for the purpose of increasing this collaboration through the PPP (Public Private Partnership) model in order to successfully carry out the necessary improvement works.

The infrastructure modernization plan also includes high-speed lines.

Structure

The railway sector accounts for 1.2% of the country's gross domestic product, although this figure is expected to increase to 3% by 2020, following large government and foreign investments in recent years. The main railway company in the country, Indian Railways, under the authority of the Ministry of Railways, is one of the largest in the world. It has about 1.3 million employees. The company's links cover twenty-eight states and three territories of the union and provide also small services to Nepal, Bangladesh and Pakistan. At present, it is still formed, in its great majority, by public or semi public entities. RITES LTD. (design, operation and maintenance), IRCON International LTD. (Infrastructure construction), Centre for Railway Information Systems CRIS (Consultancy and Information Systems). Other companies, such as Indian Railway Finance Corporation Ltd. (IRFC), Container Corpora-

El ferrocarril en La India tiene gran peso en las conexiones entre estados.

INDIA

tion of India (CONCOR), Konkan Railway Corporation (KRCL), Railtel Corporation of India (RCIL), Indian Railway Catering and Tourism Corporation (IRCTC) and Rail Vikas Nigam Limited (RVNL), are also worth mentioning.

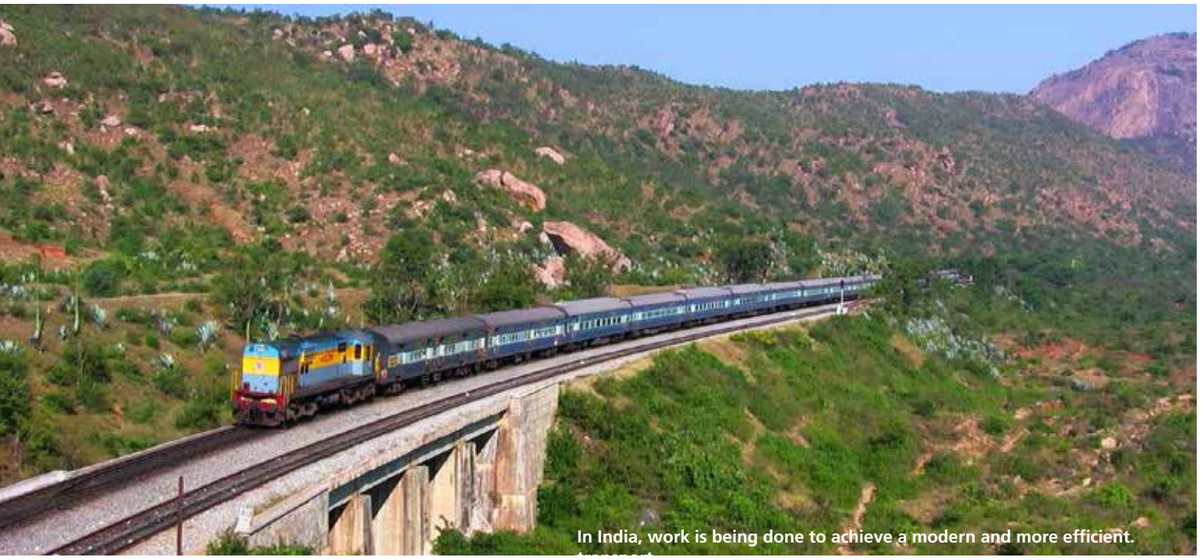
The "High Speed Corporation" has been created for high speed projects and the "Research Designs & Standard Organization (RDSO)" for the manufacture of rolling stock.

Objectives of the investments

The country has designed a road map to achieve modern and efficient infrastructures on long term. This is reflected in the "IR Vision 2020-Indian Railway" document which mentions the key objectives for the coming years. Among them, increasing the average speed of trains (55 km / h), installing some 2,500 kilometers of new tracks every year and electrifying another 2,000, removing by 2020 all unattended level crossings and expanding passenger trains up to 17,500 and the freight trains up to 62,000. In turn, this year ends the Five-Year Plan 2012-2017, which has been focused on creating a greater capacity in the network, both in passenger and freight traffic.

DATA ON RAILWAY SECTOR IN INDIA

TRACKS	Total kilometers
Wide-gauge (1676 mm)	86,526
Metric gauge (1000 mm)	18,529
Narrow-gauge (762/610 mm)	3,651
Electrified lines	16,001
ROLLING STOCK	
Locomotives	7,566
Passenger cars	37,840
Freight wagons	222,147
STATIONS	
Number	6,853
Areas (17)	Central Railway
	East Central Railway
	East Coast Railway
	Eastern Railway
	Metro Railway Kolkata
	North Central Railway
	North Eastern Railway
	North Western Railway
	North East Frontier Railway
	Northern Railway
	South Central Railway
	South East Central Railway
	South Eastern Railway
	South Western Railway
	Southern Railway
	West Central Railway
	Western Railway
INVESTMENTS	
12th FIVE-YEAR PLAN	81,166 M€



In India, work is being done to achieve a modern and more efficient. transport

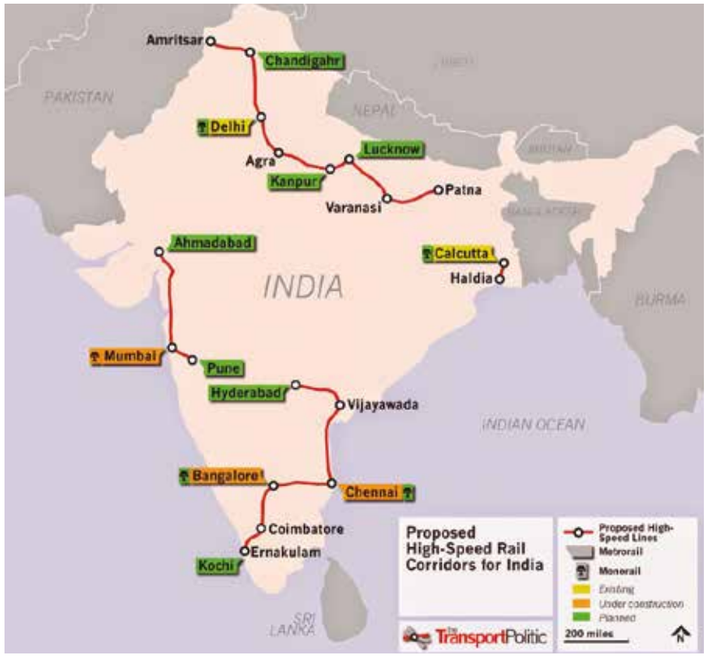
INDIA

HIGH SPEED IN INDIA

India is carrying out an ambitious railway modernization project, which also includes a high-speed network, under the responsibility of the "High Speed Rail Corporation of India LTD" company. A program to develop a high-speed network has been specifically designed. On the one hand, the denominated "Diamond Quadrilateral of High Speed Rail Network", whose objective is to link the main cities of the country, would have the following branches: Delhi-Mumbai; Mumbai-Chennai and Delhi-Calcutta. The following lines are also being added: Delhi-Chandigarh-Aamritsar; Delhi-Chennai; Chennai-Bangaluru-Mysore and Mumbai-Ahmedabad. The idea is to develop these projects in two phases. The objective is to have at least four corridors of 2,000 km by 2020 and another eight in different progress stages.

India's first high-speed line between Mumbai and Ahmedabad is already under way. To this end, India's Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe recently established the foundations for this new 508 kilometer route with 12 stations, which includes Bandra Kurla, Thane, Virar, Boisar, Vapl, Billmora, Surat, Bharuch, Vadodara, Anand, Ahmedabad and Sabarmati. 92% of the line will be above ground, with 460 kilometers of viaducts and 13 of embankments.

According to the project, a seven-kilometer submarine tunnel will be built at Thane Creek and another 21-km long tunnel, which will be the longest in India. The Japan International Cooperation Agency (JICA) funds 81% of the 18,900 million dollars project. The rolling stock will be manufactured by Kawasaki Heavy Industries and Bharat Heavy Electricals Limited (BHEL), an Indian state-owned company. The trains will run at speeds up to 320 km / h. The project is expected to be completed by 2022 and it will reduce travel time between the two cities from seven hours to two hours.



ROLLING STOCK

The rolling stock renewal is another of the priorities highlighted in the last investment plan.

Locomotives, cars, wagons for freight traffic, as well as new equipment for the growing number of metro networks in commercial operation makes this segment be of major importance in the modernization programs and investments.

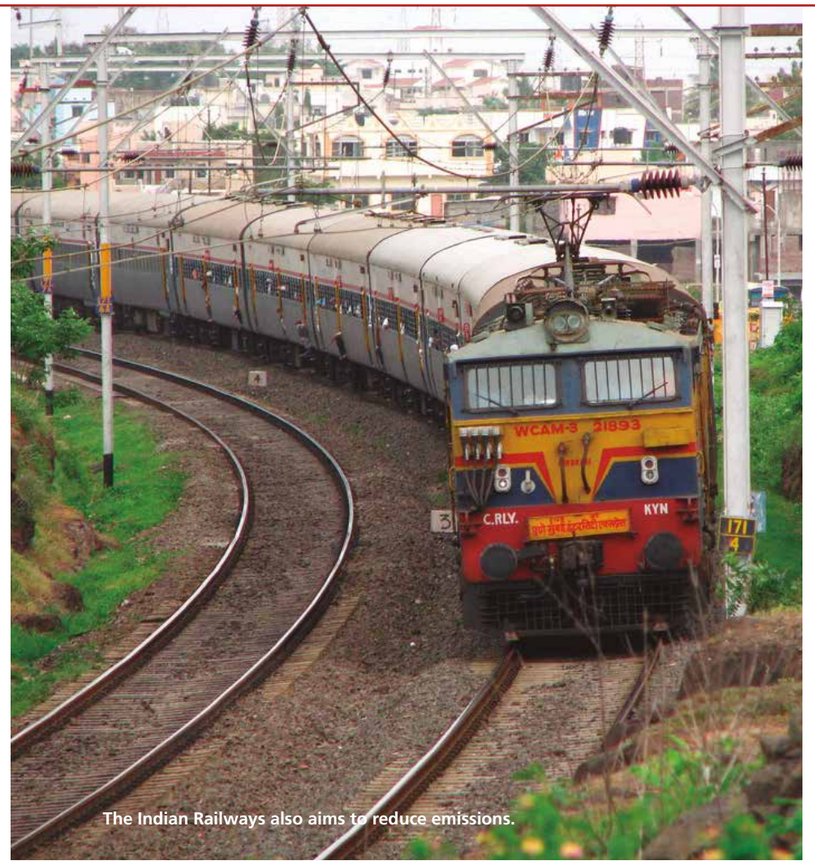
ROLLING STOCK: 12TH FIVE-YEAR PLAN (REQUIREMENTS IN NO. OF UNITS)

Type of stock	Units required	Requirement to replace existing units	Total
Diesel locomotives	1.500	500	2.000
Electric locomotives	1.800	210	2.010
Passenger cars (Including: EMUs, MEMUs,DEMUs)	25.440	7.626	33.066
Freight wagons	76.896	29.263	105.659

STATION REDEVELOPMENT

India's Minister of Railways has launched the first phase of the station redevelopment program, which comprises 23 of 400 of A1 and A category in the entire country. To this end, a Memorandum of Understanding has been signed with the Ministry of Urban Development, according to which the railway stations from every city included in the SMART Cities and AMRUT plans will be rebuilt so as to create a public integrated transport hub around these facilities and thus to promote the development oriented to passenger transport.

Among the works planned, the renovation of Arunachal Pradesh has just been approved and it requires an initial investment of around Rs 50,000 - 70,000 crore (6,289-8,839 M€).



The Indian Railways also aims to reduce emissions.

OBJECTIVES PROPOSED IN THE 12TH 2012-2017 FIVE-YEAR PLAN

Concept	Objectives in Km.	Required Disbursement (ME)
New lines	4,000	18,200
Dedicated freight corridor	3,338	15,000
Conversion of track gauges	5,500	2,600
Duplication	7,653	4,800
Electrification	6,500	1,100

DUPLICATION AND ELECTRIFICATION: MAU-SHAHGANJ AND PHEPHANA-INDARA

The 2012-2017 Five-Year Plan includes electrification works of 6,500 kilometers and works aimed at doubling the route in another 7,653 kilometers.

Among the planned works, three railway projects have been approved by the Indian Economy Committee (CCEA) in May 2017. On the one hand, the doubling and electrification of 150km of the Mau-Shahganj and Phephana-Indara lines in Uttar Pradesh. It would be completed in five years and would cost 169.63 million EUR. The second project aims to implement 160 kilometers of third line in the Manmad-Jagaon link, as well as to electrify it. The last project aims to double and electrify the Guntur-Guntakal section of 401.47 kilometers in Andhra Pradesh.

The 42,000 million EUR project would improve traffic to Amravati.

The objectives proposed in this plan also include the construction of new lines, the maximum unification of the track gauge or the lines' duplication.

GREEN INITIATIVES

Indian Railways also aims to be a company committed to the environment. Its objective is to obtain 25% of electricity from renewable power sources by 2025.

The greatest possible use of renewable sources is sought under the coordination of "Indian Railways Green Energy Initiatives".

At present, India is the first country where machines that work with compressed natural gas and hybrid diesel locomotives, which obtain a part of the electricity they consume from the solar power, have already been implemented. In addition, it has wagons with in-built solar panels on the roof, as result of its research with the Indian Institute of Technology, which operate lighting and air conditioning in passenger cars, thus reducing diesel consumption.

Another advancement in favor of the environment are the cars that incorporate ecological dry toilets, that do not use water, with water recycling mechanisms for the lavabos, measures for the waste management and systems for the utilization of energy.

According to the plans, by 2020, the Indian Railways' electricity production capacity will be of 1 GW via solar panels (five GW by 2025) and of 130 MW via wind turbines.

INFRASTRUCTURES AND BRIDGES

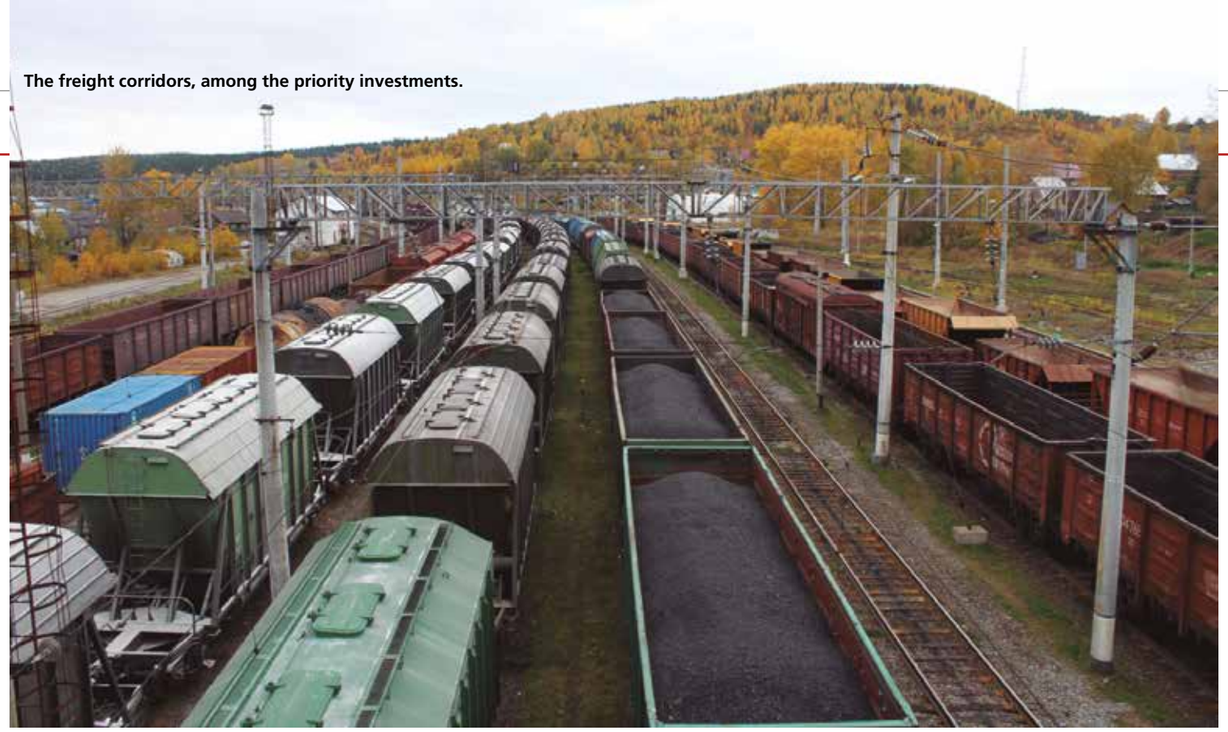
Among the many improvements that are made in terms of infrastructure, there is the noteworthy construction of a railway bridge, which will be the highest bridge in the world. It will be built over the Chenab River in Jammu and Kashmir.

The 1,315-meter bridge will link Baramulla to Jammu in the Himalayan state with a travel time of six hours and a half, almost half the travel time currently registered. It has a budget of 1,100 million rupees (144.4 million EUR) and it is under the responsibility of the Konkan Railway Corporation. It will be 359 meters above the riverbed, 35 meters higher than the Eiffel Tower.

INDIA

Freight: better routes and traffic exclusivity

INDIA IS CURRENTLY UNDERTAKING ONE OF THE MOST AMBITIOUS RAILWAY PROJECTS: THE DEDICATED FREIGHT CORRIDOR.



The freight corridors, among the priority investments.

India's railway network accounts for 30% of freight traffic. This is the preferred medium for the "bulk" movement on long distances. It should be noted that a major change was registered in 2006 following the opening of container operations to private sector. This measure increased its volume by 68% in just three years. The "IR Vision 2020-Indian Railway" includes projects for the development of this type of infrastructure, such as bypasses in large cities and the opening of alternative routes to those that are saturated. Therefore, terminals will be promoted for multimodal transport and information services. In addition, Indian Railways will be focused on strengthening its presence through agreements with private carriers.

In India, 30% of freight traffic is carried out by railway.

DEDICATED FREIGHT CORRIDOR

The idea is to unite the well-known "Golden Quadrilateral", composed by the four cities of Delhi, Mumbai, Chennai and Howrah. It involves two diagonals (Delhi-Chennai and Chennai-Mumbai) through which some of the busiest routes are linked.

After completion, this will cross a total number of nine states of the country.

The conceptual plan of the dedicated freight corridor includes 10,122 kilometers, although for the present, only the East corridor (Ludhiana-Mughalsarai-Dankuni) of 1,839 km and the West corridor (Dadri-Jaharawal Nerhu Port Trust, Navi Mumbai) of 1,534 km have been approved. Both will be completed by 2020. The works are carried out on a distance of 3,338 kilometers. This aspect will generate an additional freight capacity of 2,400 Mt. In addition, the train speed will increase to 60 Km / h on average compared to the current speed of 25 Km / h. The other sections, totalizing 6,200 kilometers from North, South, Western Coast and South-East, are planned for 2025.

The average train speed will be increased to more than 50 km / h and the axle load will be also increased from 23-24t to 32,5t due to this new corridor. Progress continues with agreements, such as the one recently signed with the World Bank for a 552.4 million EUR loan for the third Eastern section (EDFC-III).

LINKS TO PORTS

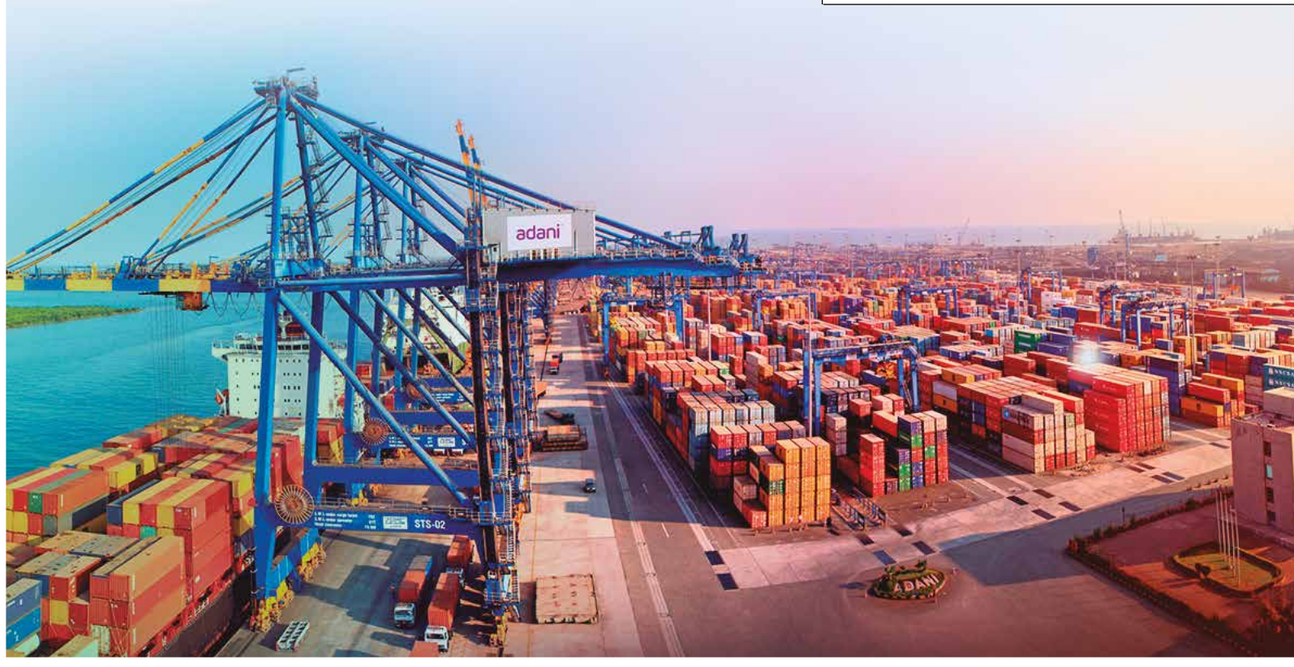
Improvements in the freight network include an increased railway link to ports. At present, work is being done in the conversion of track gauge linking the ports of Kandla and Mundhra, North of India.

Work is also being done on the Haridaspur-Paradeep line of 82 kilometers. This is an extension of the BG branch of Daitari / Tomka-Banspani, under construction, and which aims to link the iron ore areas of the sectors of the State of Orissa to the port of Paradeep. Obulavaripalli-Krishnapatnam is another ongoing project, which will link the Krishnapatnam port in Andhra Pradesh with that of Dahej Bharuch in the state of Gujarat.

LOGISTICS PARKS

The development of a dedicated freight corridor will be accompanied by the creation of ten logistics parks, in collaboration with the private sector.

According to the planning program, one or two of them will be in the state of Gujarat, two in Maharashtra and four or five in the National Capital Region (NRC).



INDIA

Metro in India:

Great response to population growth

AT PRESENT, ALMOST 316 KM OF METRO ARE BEING COMMISSIONED AND MORE THAN 500 ARE BEING BUILT IN OTHERS 13 CITIES IN INDIA. A TRANSPORT MEANS THAT HAS GREAT FUTURE IN THE COUNTRY.

The increased number of the inhabitants in the main cities is one of the reasons on which the transport plans of the Government of India are based. The Ministry of Housing and Urban Affairs is working to promote new infrastructures to respond to growing mobility demands, since 60% of the population is expected to live in urban areas by 2050. The investments are focused on improving metropolitan railway systems and offering high-capacity solutions to meet the needs of those cities with longer travel distances and with inhabitants concentrated along the high-demand corridors.

The metro networks will significantly increase in India.

The network advances

India begins a new stage where the commitment to public transport is clear. The first network, in Calcutta, opened in 1984, while the second was opened in 2002, in New Delhi. Afterwards, many other cities began to implement metropolitan railway projects. According to the data provided by the Ministry of Housing and Urban Affairs (MoHUA), at present, there are almost 316 kilometers of metro commissioned and more than 500 kilometers under construction in other 13 cities of the country, including certain second phases within the existing systems.

Currently India eight operational networks: New Delhi (217 kilometers), Bangalore (42.30 kilometers), Kolkata (27.39 kilometers), Chennai (27.36 kilometers), Kochi (13.30 kilometers), Mumbai (Line 1-11.40 kilometers) Jaipur-9.00 kilometers and Gurugram (Rapid Metro-1.60 kilometers).

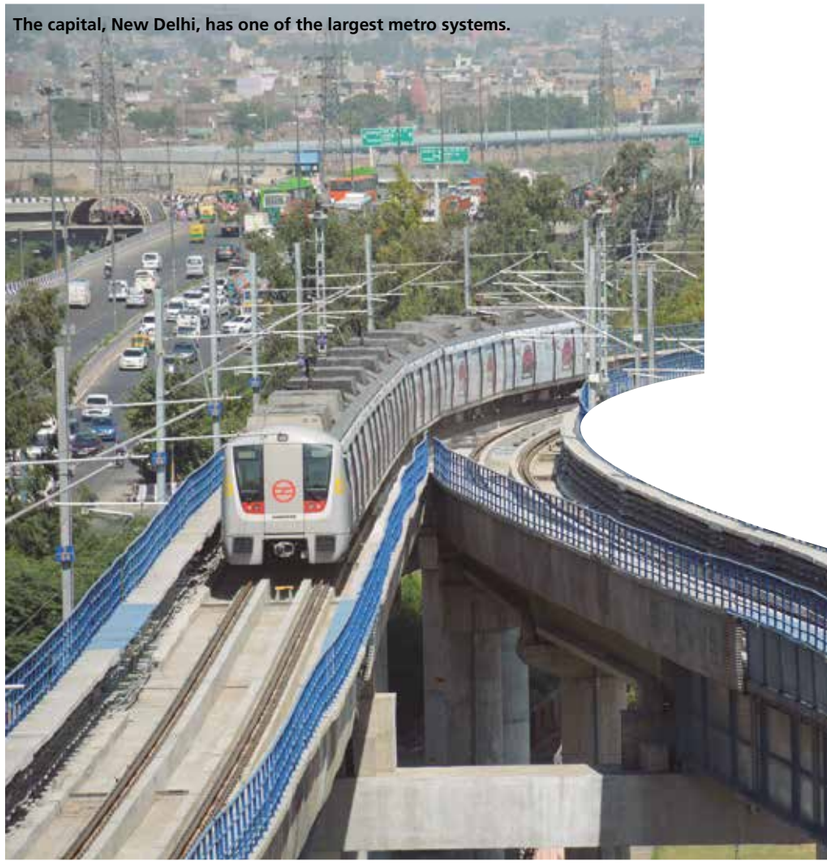
The new cities that acquire metro services are: Hyderabad (71 kilometers), Nagpur (38 kilometers), Ahmedabad (36 kilometers), Pune (31.25 kilometers) and Lucknow (23 kilometers).

METRO OF NEW DELHI

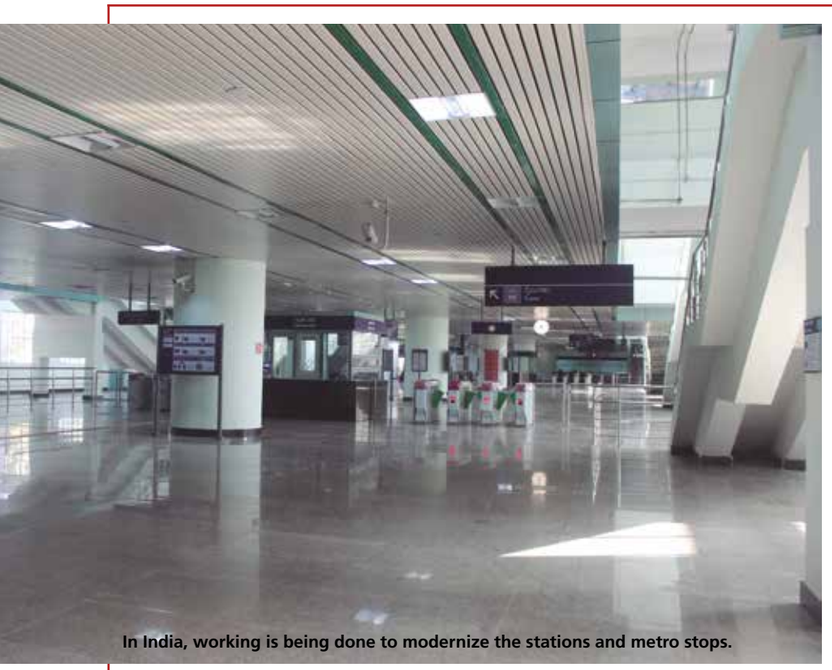
This network, which began operating in 2020, has 193 kilometers, 145 stations and six lines (red, yellow, blue, green, violet, and orange or Airport Express). It covers the cities of Delhi, Gurgaon, Noida, and Ghaziabad and transports 1.8 million travelers per day. Its services are expected to reach most neighborhoods and adjacent areas by 2020. To this end, Delhi Metro Rail Corporation (DMRC) has undertaken several extension projects, which have been divided into phases. The "Phase III" lines will start operating in a phased manner until almost fully

operational in March 2018. The two new sections of the pink and violet branches will have more than 90 kilometers and 61 stations. The first line of 58 kilometers will serve densely populated Eastern areas such as Mayur Vihar, Vinodnagar and Karkardooma. The violet line of 34 kilometers, will link the West of Delhi to Noida through the national terminal of the IGI airport. In Phase III, 15 interchange stations will also be added to the existing nine.

In addition, the Government of Delhi has approved "Phase IV" for the construction of six corridors, which will measure 103 kilometers. The majority of the route will be built above-ground, with 66.92 kilometers, while the underground section will have 37.01 kilometers. The bidding process will begin following the approval of the Ministry of Urban Development. Works are scheduled to be completed in six years. The six corridors of the next phase are: Rakala-Narela (21.73 kilometers), Inderlok-Indraprastha (12.58 kilometers), AerocityTughlakabad (20.20 kilometers), Lajpat Nagar-Saket G-Block (7.96 kilometers), Janakpuri (west) RK Ashram (28.92 kilometers) and Mukundpur-Maujpur (12.54 kilometers). Once completed, the total length of the network will be of 450 kilometers.



The capital, New Delhi, has one of the largest metro systems.



In India, working is being done to modernize the stations and metro stops.

METRO OF CHENNAI

Chennai is the fourth most populous city in India, with eight million inhabitants. The first phase of this network includes two lines (green and blue) covering 45.1 kilometers and 32 stations.

The above-ground section entered into commercial operation between 2015 and 2016.

Once completed, it will be one of the largest metro systems in India, along with the Metros of Delhi, Namma and Calcutta. In the second phase, the construction of three new lines, with more than 80% of the underground route has been approved, which is estimated to be completed by 2024.

They will have 104 kilometers and 104 stations.

The original cost of this project phase amounting to 850.470 million EUR. This will involve the extension of line 4 to Poonamallee, with the Madhavaram-Sholinganallur lines, among others.

Official opening of the Chennai metro.

METRO OF BANGALORE

The European Investment Bank (EIB) has signed a financing agreement with the Government, in the amount of 300 million EUR for the first section of the second phase of the Metro of Bangalore.

These funds also include the acquisition of 96 new trains. This stage will also be supported by Asian Infrastructure Investment Bank.

The project takes into consideration the extension of the East-West and North-South lines, including a total of 72,095 kilometers and 61 stations. The project's implementation period is five years.

METRO OF NOIDA

The project will have a total of 22 stations,13 on land and seven above-ground. The project, which is implemented by Noida's Metropolitan Railways Corporation (NMRC) will be completed in April 2018. The two routes are a line of 29.7 km between the city center (Sector 32) to Greater Noida and a 6.7 km section from the city center to Sector 62. In September 2016, a consortium formed by Ansaldo STS and ZTE was awarded the contract in the amount of 38.8 million EUR, including signaling, control of trains and telecommunications.

METRO OF KOCHI

The construction of the Metro of Kochi, which will cover 100% of the surface, will begin in June 2013. One line that is already in operation, another under construction and the third already has approval for its future development. It is the eighth inter-urban railway project in India. At present, it has 13 km.

It will be extended to 25.6 kilometers via 22 stations. In addition, it is the first metro service in the country that will use solar power to supply a quarter of its electricity needs.

One in 23 stations will have solar panels, which will generate 2.3 megawatts (MW). Alstom has been awarded a contract of 85 million EUR to build 25 trains that will be included within this network.

INDIA

METRO OF BOMBAY

Bombay, with more than 10 million inhabitants, has a metro network whose first section (L1) was inaugurated in 2014. At present, progress is registered with works divided into three phases, which will be completed between 2021 and 2022. On that date, according to the planned program, it will have eight lines, 200 kilometers and 169 stations. 20% of the route will be underground, the remaining ratio being above-ground. L2 will have 17 stations. This section is performed in two phases 2A and 2B. Corridor 2A of 18,589 km has 17 stations and will cost 99.50 million dollars. Corridor 2B will have 23,643 km and it is estimated to cost 86,6 million EUR. This section, whose construction will commence this year, will have 22 stations. L3 will be mostly underground, with 33.50 km and 27 stations and a cost of 3.6100 million dollars.

METRO OF NAGPUR

The Nagpur metro is a system under construction that will cost 1,190 million EUR. The works began on May 31st, 2015, the trial beginning on September 30th, 2017 and an early partial commercial operation anticipated for December 2017. The project will consist of a corridor of 38,215 km, 37 stations and 2 depots. The route will be divided into two alignments: north-south corridor of 19.6 kilometers and 18 stations; and east-west corridor of 18.5 kilometers and 19 stations. Siemens has been selected by the developer, Maharashtra Metro Rail Corp, to provide signaling for the first phase.

Below, one of Nagpur's state-of-the-art metro units.

METRO OF JAIPUR

The Metro of Jaipur was scheduled to be built in several phases. Phase I and Phase II will be completed in 2018 and 2021, respectively.

At present, the line has 9.6 kilometers in operation and nine stations. The estimated cost of the East-West section is of 416 million EUR. The State Government finances a part of the works with a fund of 79,8 million EUR.

METRO OF AHMEDABAD

The project known as MEGA (Metro-Link Express for Gandhinagar and Ahmedabad) or the Metro of Ahmedabad is a system under construction for both cities. Works began on March 14th, 2015 and the first phase of 39.2 kilometers, will be completed in 2020. In total, the network will have two lines and 32 stations. The north-south corridor, with a length of 18,522 km, will be completely above-ground, with 15 stations.

METRO OF LUCKNOW

The Lucknow Metro will have 2 lines, the red line (north-south) and the blue line (east-west). At present, the initial phase of the first line is in operation and the second section is under construction. The total cost of both lines is in the amount of 1,659 million EUR.

The North-South corridor begins at the airport and goes to Munshi Pulia, having a total of 22,878 kilometers. The east-west branch begins at the Charbagh railway station and ends at Vasant Kunj. Both lines will cross the Charbagh railway station.

On September 5th, 2017, the Minister of the Interior and Member of Parliament for Lucknow, Rajnath Singh, attended the opening of the branch between Transport Nagar and Charbagh station. 50% of this project benefits from external financing from the EIB (European Investment Bank). Regarding the rolling stock, two years ago, Alstom was awarded the contract for the supply of 20 Metropolis units for the first phase.

METRO OF CALCUTTA

The first metro system in the country, opened in 1984, was the Metro of Calcutta. The operation line links the city and districts of South 24 Parganas and North 24 Parganas, and will soon reach Howrah in the state of West Bengal. In addition, there are plans involves the extension of this L1 to North and of another five lines. The construction of the L2 began in 2009. It will run from Salt Lake (Bidhannagar) Sector 5 (in the East) to the Howrah station (in the West). Unlike L1, operated by Indian Railways, L2 will be under the responsibility of a new company: Kolkata Metro Rail Corporation (KMRC) and will run East to West (East-West Metro). This is a 637 million EUR project to link the city to Howrah via an underground line, under the Hooghly River. For its part, L3 will have 16.72 kilometers along Joka, in the South and Esplanade, in the center, and 12 stations. The construction of the 18.5-km L4 from Noapara to Barasat via the Netaji Subhas Chandra Bose International Airport has also begun. The Baranagar-Barrackpore Metro, L5, of 12,40 km, was designed to allow a faster travel from the northern suburbs to South Kolkata. Finally, a L6 link has been initiated between New Garia and the airport (29.1 km).

The country's first metro was that of the City of Calcutta.

METRO OF NAMMA

The Metro of Namma, also known as Bengaluru, is the Bangalore City's network, which entered into commercial operation in October 2011. It is currently the second-longest operating network in India. It has two lines (purple and green), with a total length of 42.3 kilometers and 41 stations and an average of 315,000 passengers per day.

Phase II of its expansion includes the extension of the current lines and the construction of three new branches: L3, L4 and ORR Metro of 17 kilometers. These new kilometers are expected to be incorporated between December 2018 and March 2023.

SOME MAFEX MEMBERS WITH PROJECTS IN INDIA

CAF

CAF trains in Metro Delhi airport rail link. CAF is the supplier of the metro units running in Airport Metro Express Line. In 2008 Delhi Metro Rail Corp awarded CAF the rolling stock for the Metro Delhi Airport Rail Link. These are 8 electric train units composed of 6 cars each. The trains were set into passenger service in August 2010 and connect the Indira Ghandi International Airport with New Delhi central station, providing a reliable and comfortable transport service to passengers.

ARTECHE

Following the first supply record of Arteche´s high performance auxiliary relays at the Airport Link project in New Delhi few years ago, the business development activity of Arteche in this country has been continuously increasing. The supply of spare parts to the railway operator DMRC, after their acquisition of the above mentioned line to Reliance, as well as its relay approval to use the relays in future projects, the retrofit of several obsolete relays in MRVC trains, subsidiary of Indian Railways, and the first relays supplies for the train control systems of new diesel locomotives manufactured by DLW, with the approval of RDSO, make India a key potential market for the sales activity of the auxiliary relays for railway applications of Arteche group.

Having a subsidiary (Arteche Smartgrid India Pvt Ltd) in Bangalore as well as a local sales team allows Arteche to closely monitor a market which is continuously growing, with the possibility of supporting the "made in India" policy strategized by the government by importing and assembling the auxiliary relays in electrical control boards locally manufactured by our partners.

LA FARGA LACAMBRA

La Farga has signed an accord with ALSTOM for one of the most important railway electrification projects in India. The project, which is part of the EASTERN DEDICATED FREIGHT CORRIDOR, is 343 km of double-track railway electrification from Bhaupur to Khurja. La Farga will supply the copper conductors, mainly alloys, which will be installed in the catenary.

This is one of the world's major rail corridors, and will substantially improve the transport of goods in India. This project is part of a programme that is expected to create a total of 7 corridors with more than 10,000 km of electrification, making it the most important goods network in the world.

CETEST

During the last years, CETEST has been actively participating in the certification test campaigns for the new Metro projects in India.

CETEST collaborated with local manufacturer BEML (Bangalore) in the electromagnetic compatibility (EMC) and safety against derailment tests for Delhi and Jaipur Metros. In the coming months, several tests will be performed for the new Calcutta Metro. CETEST will send its portable carbody test bench for the structural resistance test of the new cars. After that, some static tests will be done over the units for the suspension characterization (soupplese, gauge, bogie rotational resistance evaluation).

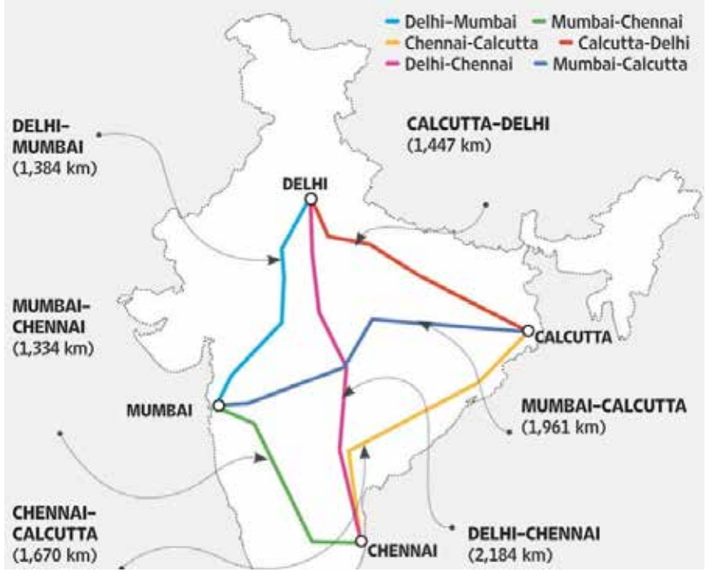
Furthermore, in ALSTOM's facility in Sri City (close to Chennai), CETEST has been testing units for the Lucknow and Kochi Metro projects, as well as for Sydney Metro that is also manufactured there.

CETEST provides test services all over the world. Test team as well as the required instrumentation, acquisition equipment and portable test benches if needed go to the client or the final operator facilities to perform the tests. Anywhere. Anytime.

TYPSA

The Government of India is developing a series of ambitious projects to improve passenger and freight rail transport in which TYPSA has an active role.

The first of these strategic plans is called Diamond Quadrilateral Network. Its objective is to build a high-speed rail network with an average speed range of 160 to 200 km/h to connect India's major cities: New Delhi, Mumbai, Kolkata and Chennai. Feasibility studies are already under way for the nearly 10,000 km-long new network, with TYPSA taking part in the study for the Delhi-Kolkata line (1,500 km).



An extensive large-capacity freight rail corridor is also under construction (Dedicated Freight Corridor, DFC) for which TYPSA is providing construction engineering services. The corridor, totalling 3,338 km and with an estimated investment of € 10,000, is set to become one of the biggest freight transport infrastructures in the world.

The Dedicated Freight Corridor (DFC) project is divided into two main interconnected corridors: the East Corridor, which runs from Ludhiana to Sonenagar/Dankuni (1,839 km), and the West Corridor, which runs from Jawaharlal Nehru Port (Mumbai) to Tughlakabad/Mizoram (1,499 km). With an average design speed of 100 km/h (compared to the current average speed of 25 km/h), these new freight transport rail lines will make freight transport faster, cheaper and more reliable than ever; a great leap forward in the operational performance of India's railway network. The plan, considered to be of great strategic importance, will have a strong impact on the Indian economy. TYPSA is providing consultancy services for the design review and construction supervision of the East Corridor lines.

SOME MAFEX MEMBERS WITH PROJECTS IN INDIA

SIEMENS

Siemens is installing its railway signalling technology on the first two lines of the Nagpur Metro, in India, on its North-South and East-West Corridors. The project includes the development and installation of its CBTC (Communications Based Train Control) solution – Trainguard MT – for 38 kilometres of double track, 36 stations and two depots, the on-board equipment for 23 three-cars trains, as well as Trackguard Westrace Mk II electronic interlockings and Rail 9000 Centralized Traffic Control.

The award of this project by Maharashtra Metro Rail Corporation Limited (MAHA-METRO) is an important milestone for Siemens, as it represents its first installation of a CBTC in India, and comes as reward for a collaborative effort made by the Siemens Mobility divisions in Spain, India and Germany. In addition it serves to demonstrate Siemens' high level of commitment in this country.

Trainguard MT is Siemens' system for automatic control and operation of metropolitan railway lines where varying levels of automation are required, a solution very capable of adapting to the Indian city's urban rail transport requirements. The East-West Corridor will have 19 stations, while the North-South Corridor will have 17 stations and will connect the Airport with Automotive Square, in the north of the city.

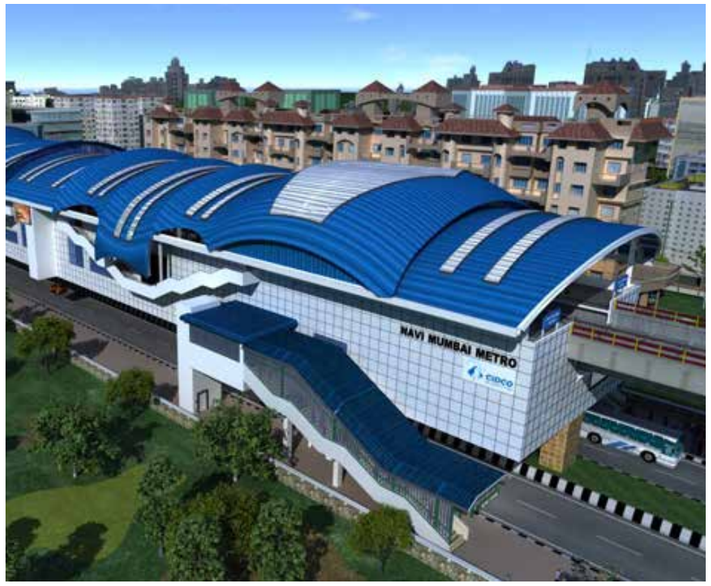
The installation of Siemens' CBTC technology will allow Nagpur Metro to achieve intervals between trains of 90 seconds or shorter, as well as precise localisation of trains at all times. All of this amounts to an optimisation of the metropolitan system that will benefit passengers and the operator alike.

INDRA

Indra has established itself as the leading provider of ticketing systems to the city of Mumbai, where it has rolled out technology on the first, and as yet only, subway line in the city, as well as the Mumbai monorail, which is also the country's first ever monorail; and it will likewise equip the new Navi Mumbai subway line with access control and ticketing systems, once the line is built in the southwest of the country's financial capital.

In Delhi, Indra has been awarded a contract to deploy its contactless ticketing technology at 14 new stations on the Delhi and Noida Metro system. Indra is also deploying more than 1,000 portable terminals that will allow payments to be made in cash or using the smart transport card, as well as to top-up cards at parking lots and on Delhi subway feeder buses. This solution allows commuters to pay for parking lots and feeder buses operated by Delhi Metro with their contactless smart card, while also benefitting from discounts and promotions.Indra has already supplied DMRC with a complete ticketing management system on the Airport Metro line, which links the Indira Gandhi International Airport with New Delhi, and features the first check-in desk outside an airport anywhere in South Asia.

The Kolkata subway also operates Indra's technology. Indra supplied an integral ticketing system for Metro Railway Kolkata, the India's oldest metro line wich crosses Calcutta from North to South, covering over 25 km.



TPF GETINSA EUROESTUDIOS

Improving Infrastructures in India. TPF Getinsa Euroestudios entered the Indian market in 2011 by securing a contract to supervise works on NH-1A Chenani – Nashri under a concession scheme, whose cost is over €350 million and included the construction of a 9-km long tunnel through the young Himalayas.

This major contract has provided us with the opportunity to make our presence known and expand our footprint in India. Currently, 28 transport infrastructure projects are being managed through our branch office in Delhi and our subsidiary in Mumbai. Besides being involved in the supervision of highway works, we are in charge of highway operation and management activities and have also undertaken the detailed design of a number of road projects. Furthermore, in the railway sector, we are providing site supervision services for the construction of the Mughalsarai - New Bhaupur section of the Eastern Dedicated Freight Corridor. The stretch covers a length of 400 km of double-track rail freight line. The contract comprises supervision services for civil works, signalling, electrification and communications.

Egypt invests in the modernization of its railway infrastructure

THE EGYPTIAN RAILWAY COMPANY IS CARRYING OUT AN INVESTMENT PROGRAM, UNTIL 2023, WHICH IS AIMED AT MODERNIZING THIS TRANSPORT MEANS. IN ADDITION TO THE MAIN INITIATIVES, SUCH AS THE RENEWAL OF ROLLING STOCK, REHABILITATION OF OVER 2,000 KILOMETERS OF TRACKS AND CONSTRUCTION OF HIGH SPEED LINES.

Egypt is the third most inhabited country in Africa and the Arab world, accounting for 26% of this population. Its economy ranks fourth in the area in terms of GDP, due to its strength and diversification. The railway in this area is considered the backbone of passenger transport, with a volume reaching up to 500 million per year (about 1.4 million per day) due to the high number of residents. This means is also essential in terms of freight, with an average of six million tons per year. The network has a total length of 9,570 kilometers, with 1,466 kilometers of double track, representing a third of the total, and another 3,667 kilometers of single track, with more than 820 stations. Most of the route links the area of the densely populated Nile Delta to Cairo and Alexandria and the main hubs. Most of the lines precisely start from the Ramses station, in the capital of the country or Misr, in Alexandria to Marsa Matruh, Suez Ismailia (Said Port), Mansoura, Damietta and Giza. The tourist routes play an important role and are the protagonists of the links between Cairo, Alexandria, Matrouh, Hurghada, Sham El Sheikh, Arish, Seawa, Luxor and Aswan.

Fully aware of the new challenges and the importance of the railway in the future of the country, the Government has implemented

an investment plan to develop a strong, modern and multimodal transport.

To this end, together with the items, work is being done to achieve an external financing in order to increase collaboration in this type of initiatives.

Ministry of Transport has drawn up a list of national investment proposals in the amount of € 13.500 million dollars (€ 11.400 M) until 2030 aimed at highlighting the megaprojects and opportunities available in all sectors. These include high speed, improvements in national lines, metro networks and connections with other communication means.

The modernization has been pursued in Egypt for several years with the support of international institutions. In 2009, the World Bank approved a multiannual funding for the "Egypt National Railways Restructuring Project (ENRRP)". The objective is to assist the Government in improving the reliability, efficiency and safety of the railways' services through signaling and track renewal funds, mainly in terms of safety, and for management and operating practices in order to enhance its responsiveness to economic and social needs and to strengthen the financial viability of the entity.

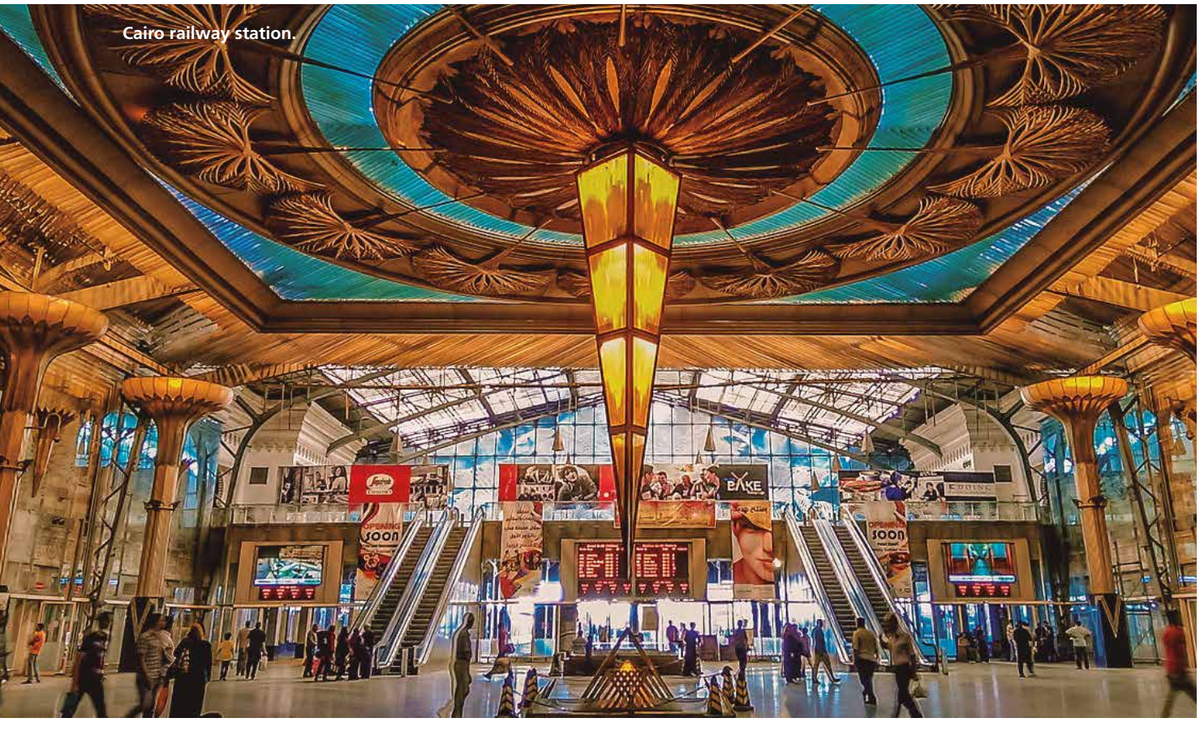
The corresponding Minister, Saad Mohamed Elgioshy, has recently ensured that Egypt is a "pro-business" country that offers a stable investment regime, with a new law that is very favorable to international business collaboration and protection, being especially suitable for large infrastructure projects such as those defined for the coming years.

In this future route, the Egyptian National Railway (ENR) company will play a priority role. This company took over the entire network and it is the first to be created in Africa and the second largest in the world of these features. ENR's vision is to have the largest railway system in Africa and the Middle East and the best passenger service on the continent by 2050. In order to fulfill its objectives, a great deal of work is being done to modernize both infrastructures and rolling stock, as well as of the control systems. In this context, the ENR authorities approved in the fiscal year 2015-2016 a long-term plan, until 2029/2030, endowed with 11,300 million US dollars (9,6 M€). The new projects are designed to improve the efficiency and safety of the existing railway network through automation, improved signaling and communications.

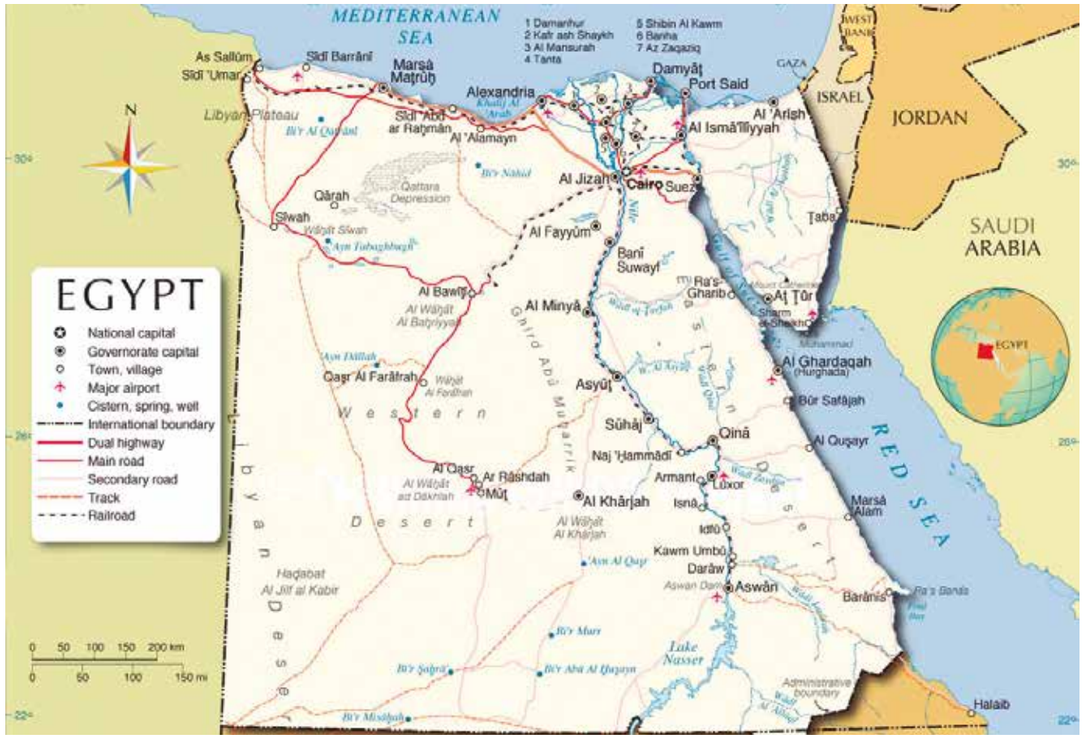
In large cities, such as Cairo, the railway plays an essential role in the field of urban mobility.

ENR's vision is to have the largest railway system in Africa and the Middle East.

The new projects aim to improve safety and efficiency.



Cairo railway station.



NEW ROLLING STOCK: MODERN TRAINS AND LOCOMOTIVES

Together with the support from the World Bank, Egypt has the support of the European Bank (EBRD) for transport modernization plans. In June 2017, this entity approved a financing in the amount of 290 million EUR for the expansion of the fleet and the improvement of the services of the Egyptian railway company, ENR. As part of the renewal program, the EBRD will provide funding for the purchase of up to 100 new diesel locomotives. This will change an old fleet that has an average age of 30 years. This will help to reduce carbon emissions and improve the reliability of the service. In addition, EBRD will provide technical assistance to ENR to develop and implement a comprehensive freight reform program and a marketing plan for the sector.

As regards the passenger trains, improvement plans are also included. Among them, the Semaf Company, with a factory in Cairo, will be in charge of 212 cars equipped with air conditioning. A project that has a budget of 2,086 billion Egyptian pounds (€ 100 M). This company will also build another 145 cars.

The renewal of existing rolling stock also has a very prominent role in ENR's projects. In fact, works are being done on the rehabilitation of 1,350 cars, in addition to the works of the Qader factory which will be in charge of the improvement of another 450 units and the manufacture of 39 sleeping cars and six other club cars. In June 2017, ENR also signed an agreement with GE for the supply of 100 locomotives of the "GE ES30ACi Light Evolution" series for an amount of 575 million EUR, which can be used for both passenger and freight traffic. Alongside the ongoing projects, the expansion of the Cairo metro network, as well as the future construction of the new high-speed sections and the track renewal are expected to provide for future acquisitions of new rolling stock in the country.

INTERNATIONAL LINKS: RECEPTIVENESS TO NEW MARKETS

The country's transport authorities are working on expanding the external links, such as the railway link to Libya through a line that will have the same gauge of 1,435 mm. Egypt is also part of the ambitious "Arab Mashreq International Railway" project.

This includes an extensive international railway network for the Middle East. It is planned to create the north-south and east-west axes, and 16 different routes that would cover 19,500 kilometers. By July 2016, the agreement to carry out the project had already been ratified by 12 states: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Palestine, Sudan, Syria, United Arab Emirates and Yemen.

Locomotive in commercial operation in Egypt.

RENEWAL OF TRACKS AND SIGNALING SYSTEMS

The Egyptian railways work on the renovation of 2,000 kilometers of track, belonging to different lines of the country.

In terms of infrastructure, it is also necessary to replace the current mechanical signaling system, which represents around 85% of the total, by the new electronic interlocking system (EIS) in several networks. It also includes the "Cairo-Alexandria"-"Beni Suief-Assyut"-Banha-Port Said" and"Assyut -Nagah Hammadi / Luxor" lines. branches for a budget of 607 million EUR. In addition, the current ACS (ZUB) automatic control systems will be replaced by the ETCS-Level 1 control systems. 886 level crossings will be also enabled and the mechanical interlocking system will be replaced by the new electronic interlocking system (EIS) on the Tanta-El Mansura-Damietta lines.

HIGH SPEED ARRIVES IN EGYPT

High speed is one of the most important aspects in Egypt's plans. This was recently explained by the Minister of Transport, Hesham Arafat, who anticipated that they are planning to invest up to 14,400 million EUR in new railway projects. Most of these funds will go to three lines of these features going from Luxor and Alexandria to Cairo and from Luxor to Hurghada.

The investment for these three routes is estimated to an amount of 13,000 million EUR. The main objective is to promote tourism that is expected to reach more than 30 million visitors by 2025.

The largest of these three will be the Cairo-Luxor link for which around 6,000 million EUR should be invested. This is a line of 700 kilometers requiring up to five years of work. It is estimated to register about 3.4 million passengers per year.

Regarding its financing, alternatives such as the BOT (build, operate, transfer) model are discussed among others. The section going from Luxor to Hurghada is expected to have a length of 300 kilometers and a transport volume of 1.5 million passengers.

A budget of 4,000 million EUR is estimated for this link. In turn, the line going from Alexandria to Cairo, with an estimated cost of 3,000 million EUR, will have 210 kilometers and a capacity of 2.3 million passengers per year. In this case, works will be carried out in three years.

As regards the development of these new lines, it is worthy to mention the Memorandum of Understanding (MOU) between the governments of Egypt and Spain, signed in March 2015. This agreement was promoted to cooperate in the study of future lines (Cairo / Luxor) and (Luxor / Hurghada).

In Egypt, high-speed is one of the initiatives that gains more weight in infrastructure investment plans.

FREIGHTS: A MORE COMPETITIVE NETWORK

As regards the freight transport, various improvements are required throughout the network. On the one hand, the transport authorities anticipate an investment of 82 million EUR, while looking for partners and financing for a line going from Mansoura to Damietta, which would also serve for passengers.

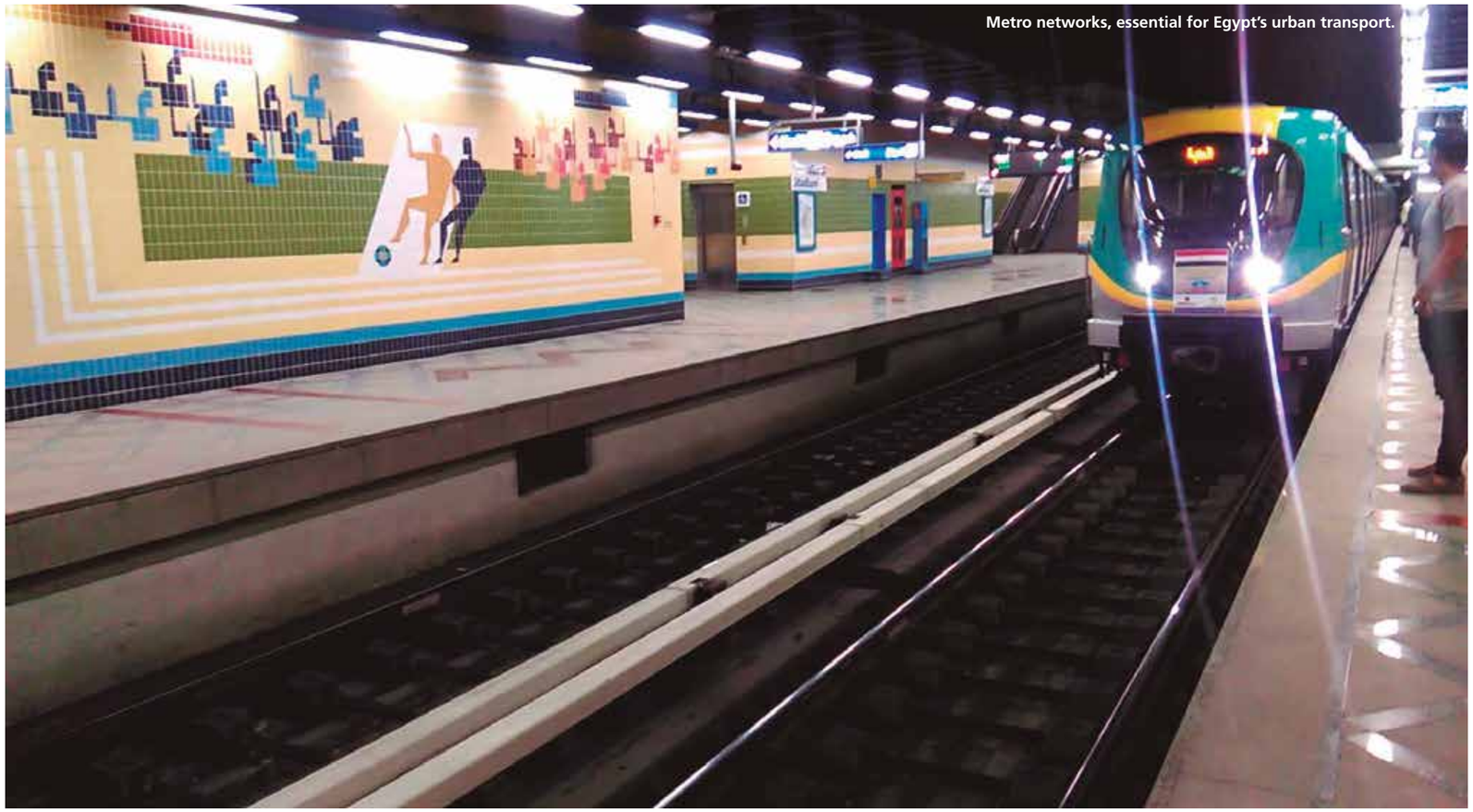
Another network to be built is the one that will link the country's largest phosphate mine in Abu Tartur to the Safaga Port. There is an effort to strengthen this type of communications, especially at distances of between 200 and 300 kilometers.

Above, an aerial view of the capital, Cairo, where several railway projects are carried out. Below, one of the freight ships depicting the importance of the impetus given to multimodal transport in the country.

Urban transport is strengthened in big cities

THE INVESTMENTS IN URBAN TRANSPORT WILL BE FOCUSED IN THE NEXT YEARS ON THE EXTENSION OF METRO, LIGHT METRO AND NEW LINES, SUCH AS THE MONORAIL OF CAIRO. THE OBJECTIVE IS TO OPT FOR THE RAILWAY INSTEAD OF THE CONGESTIONED ROAD TRAFFIC.

The population growth, especially in areas such as Cairo, where 20 million people live, and its periphery (Greater Cairo), has made the Government to prioritize investments in urban transport. The aim is to reduce the congested road traffic and to improve urban mobility conditions. The main projects supported by institutions such as the European Investment Bank (EIB) include the expansion of the Cairo metro, the construction of a monorail and a light rail network. Other cities, such as Alexandria, also opt for this transport means.



Metro networks, essential for Egypt's urban transport.

LIGHT METRO IN THE CAPITAL

The Temporary Union of Companies formed by Avic International and China Railway Group was awarded the works for the construction of an interurban light metro in the Eastern Cairo.

This section will link the satellite cities of the capital to the underground network. In August 2017, the Prime Minister of Egypt, Sherif Ismail, presided over this contract's signing ceremony.

This is a US $ 1,241 M (1,056 M€) project under the responsibility of the Egyptian National Tunnel Authority, aimed at commissioning a 66-kilometer line, with 11 stations that will link Cairo to the adjacent districts, such as El Obour, El Shorouk and Badr. The line is expected to transport around 340,000 passengers per day, reducing traffic on the Cairo-Ismailia highway by 30%. It is estimated to be completed by mid-2018.

Cairo continues to expand lines so as to reach adjacent areas.

MONORAIL IN CAIRO

The consortium of Canada formed by Bombardier Orascom Construcción from Egypt and the Arab contractors, works on the first monorail of Cairo, which will be commissioned in 2018.

Since October 6th, the section will go from Sheikh Zayed, Giza and the city. This initiative covers the "Greater Cairo" area where there is a population of 19.6 million people, one of the largest in the country.

The monorail will also reach the capital.

CAIRO METRO

The Cairo metro has made history for being the first network of these features of the continent. At present, it has two operating lines, the L1 (red) and the L2 (yellow). In addition, the expansion with four new sections is planned. The objective is to have six lines by 2020. This way, the current number of passengers per day would go from four million to six.

The works of the future L3 (green) are already in progress. This is a route that will link the neighborhood of Imbaba to the University of al-Azhar. In addition, it will be later extended up to the airport, in Heliópolis. Regarding its financing, in November 2014, 1.2 billion dollars (1,021 M€) will be granted for the extension up to the airport and another 954,1 million (811 M€) for the purchase of new trains. Likewise, an agreement with the European Investment Bank (EIB) was signed in 2015 for an amount of 200 million EUR to finance Phase 3 of this line. This loan is aimed at promoting the "Master Plan of Transport of the Greater Cairo". The item included investments in infrastructure, civil works, rolling stock and a new workshop area. This also includes L4 that will link the Pyramids of Giza, in the Southwest, to the peripheral district of Nasr City, in the East. On the other hand, the L5, with a circular route, will link several stations of other lines, while the L6 will go from North to South in the East side of the capital. This line is funded by the Japanese International Cooperation Agency and the Egyptian Government.

The metro links to the Airport of Cairo are provided in the future plans.

Below, one of Cairo network's metro trains.

Akram Shalaby, General Manager for Research and Development of Egyptian National Railways (ENG) during the last Mafex's 6th International Railway Convention held last June in Valencia.

"Egypt has a railway vision for the future"

AKRAM SHALABY, GENERAL MANAGER OF RESEACH AND DEVELOPMENT OF EGYPTIAN NATIONAL RAILWAYS (ENR), EXPLAINS THE COMPANY'S FUTURE PLANS FOR A STATE-OF-THE-ART NETWORK THROUGHOUT THE COUNTRY.

Mafex: Egypt makes progress towards a modern railway provided with state-of-the-art infrastructure. What are your company's plans in this field?

Akram Shalaby: ENG has prepared a sustainable development strategy to implement rolling stock and infrastructure development plans with a future vision. This objective is reflected in the long term plan until 2029/2030 for a total amount of 174 EGP BN (8,5 million EUR). This amount also includes co-financing projects, such as high speed and freight lines.

Mafex: Which are the main actions highlighted in this long term plan in terms of infrastructure?

A.S.: On the one hand, 2000 km of track will be renewed along the Egyptian railway lines. In addition, the current mechanical signaling will be replaced by a new electronic interlocking system (EIS) in the "Cairo-Alexandria"-"Beni Suief-Assyut"-Banha-Port Said" and "Assyut -Nagah Hammadi / Luxor" lines. The item for these works is in the amount of 715 million dollars (617 (8,5 million EUR). In addition, the existing ATC Automatic Train Control Systems (ZUBs) will be replaced by the modern ETCS-Level 1. This also includes the development of 886 level crossings, with civil works and implementation of control systems, for which we have a budget of 1.8 EGP BN (87.9 million EUR).

Mafex: Are there more plans in this field? What is the role of high speed?

A.S.: The current program also includes replacing the mechanical interlocking system with the new electronic one (EIS) in the Tanta-El Mansura-Damietta lines. The construction of the Cairo-Aswan-Luxor-Hurghada branches is planned for high speed. In this regard, it is noteworthy to mention that a Memorandum of Understanding (MOU) was signed in March 2015 between the Governments of Egypt and Spain, for the study of future lines (Cairo/Luxor) and (Luxor/Hurghada). In April this year, INECO consultancy drafted a feasibility study that is being studied by ENR.

Mafex: Along with the great advances in infrastructure, the rolling stock plans are also highlighted. Can you give us more details on this matter?

A.S.: The rolling stock is another key aspect of ENR's plans. There will be a large number of improvement actions, such as the supply by Semaf Factory of 212 cars (VIP) provided with air conditioning for an amount of 2,086 EGP BN (101 million EUR). 145 Mumaiaza cars will be also developed within this system. It also aims to renovate and repair miscellaneous damages of another 1350 cars.
On the other hand, the Qader factory will be in charge of the improvement of another 450 units and of the development of 39 sleeping cars and other six club cars.

The construction of the Cairo-Aswan-Luxor-Hurghada branches is planned for high speed.

SOME MAFEX MEMBERS WITH FREIGHT PROJECTS IN EGYPT

TPF GETINSA-EUROESTUDIOS

TPF Getinsa Euroestudios started operating in Egypt in 2013 after winning a major contract to conduct the feasibility study and the detailed design of tunnels under the Suez Canal. The assignment entailed the design of 3.25 km of rail tunnels and 3.6 km of double-tube road tunnels. Since then, the company has secured new contracts in the railway sector: the upgrade design of the signalling systems for the railway section Tanta - El Mansoura – Damietta; the modernisation of the electrification system of Line 1 of the Cairo Metro; and in September this year, we received notification of the award of the contract for design review and supervision services for the construction of a new electrified light rail line between Cairo and 10th of Ramadan City, in the outskirts of Cairo.

TECNIVIAL

-TECNIVIAL is present in the renovation of the "Cairo-Alexandria" railway line in Egypt, being in charge of the design and supply of signaling plates.

The customization to the requirements and design including Arabic characters has made a difference for this project compared to others, besides offering technical advice based on our European experience.

With this action, TECNIVIAL is once again present in an international project, thus contributing to the improvement of railway lines, providing them with more information and increasing their safety.

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SOME MAFEX MEMBERS WITH PROJECTS IN EGYPT

JEZ SISTEMAS FERROVIARIOS

JEZ SISTEMAS FERROVIARIOS, S.L. is suppling for more than 20 years manganese steel pieces to the tramway of Alexandria "Alexandria Passenger Transportation Authority, A.P.T.A.", pieces like monoblock crossings in rail S180 and S49 and switches in rail Ri60. JEZ supplies crossings to be used as spare parts in the tramway and has developed special projects for the terminals of Moustafa Kamel, Ramlh and San Stefano.

INDRA

Ticketing solution for the Cairo's Subway. Indra implemented in 2103 a new control and ticket sales system with contact-less technology in Cairo's Subway, the first network to be built on the African continent, in order to reduce operating costs, provide an information technology platform that streamlines and improves the efficiency of its administrative, front office and back office processes, and offer improvements to its passengers.

SIEMENS SPAIN

Siemens Spain is executing the signalling project for the 260 kilometers of rail corridors from Zagazig to Abu Kebir in the north of Cairo and from Benha to Port Said, a port situated to the north-east of the capital city.

Egyptian rail company (ENR) awarded Siemens this project at the end of 2015 and its commissioning is scheduled for 2020. Siemens is supplying the electronic interlocking systems, point mechanisms, level-crossing technology and communication technology for the routes, which include around 21 stations. The contract also includes equipping the operations control center located in Zagazig. Modifications to the signaling equipment enable the maximum speed to be increased from 140 to 160 km/h.

The existing signalling systems are being replaced by more modern, centrally controlled electronic systems. This will enable both the safety and throughput of passenger trains to be increased, as well as the freight volume on the routes.

THALES SPAIN

Thales signed in 2013 with the Egyptian National Railways a contract valued at over €109 million for the modernisation of the signalling systems on the Cairo-Alexandria corridor.

The Cairo-Alexandria railway line is approximately 220 km long and is the busiest section of the Egyptian Railways network, carrying more than 25 million passengers per year.

Thales signed a turnkey contract including design, supply, construction, phasing, commissioning and maintenance services. It covers the modernisation of the signalling as well as the telecommunication system and the centralised traffic control. The Thales signalling solution will enhance the safety and the capacity of the line, allowing an expected 32 million passengers to use it every year. The speeds of the trains will increase from 140 km/h to 160 km/h, the headways between trains will decrease from 10 to 5 minutes.

This is the first contract obtained by Thales in the Egyptian Country. This major main line award confirms Thales's worldwide leadership in the Transport Systems business with the capacity to both deliver greenfield projects and upgrade existing infrastructures with minimum service disruptions for optimised performance and safety.

Thales in Spain is present with different international contracts in Turkey, Algeria, Morroco, Mexico and Malaysia, among others.

CAF SIGNALLING

CAF Signalling now has a consolidated presence in Egypt. The company has been the first to implant an electronic interlocking signalling system in the country. The aforesaid project consisted of the entire modernisation of a part of the railway line running between Cairo and Damietta.

The modernisation of the signalisation and telecommunications for the railway line to the north of Cairo has led to an improvement of the service, as well as a rise in safety and punctuality of the trains.

In this project, CAF undertook the design, engineering and supply, installation and service start-up of the S3e electronic interlocking signalling system. Along with a CTC system for the line, the railway signalling to north of Cairo, and the energy tele-control system for the entire electrified section.

Mastria: Smart Management for multimodal operations

ALSTOM DIGITAL MOBILITY GLOBAL INNOVATION CENTER LOCATED IN MADRID HAS DEVELOPED A PIONEERING TECHNOLOGY TO MANAGE MULTIMODAL OPERATIONS FROM A SINGLE MANAGEMENT CENTER.

Alstom Digital Mobility global innovation center located in Madrid has developed Mastria, a multimodal supervision solution, which, through planned predictive and automated data analysis is able to generate quick and reliable reports, allowing operators to rapidly offer alternative mobility solutions to commuters.

Mastria optimizes traffic fluidity for all means of transportation (buses, trams, metros, taxis…). The information on the best routes at any given time is available for transport authorities to dispatch to passengers. This optimizes the duration of the trip thanks to an orchestration of the modes and flows in the transport system. In case of technical failures, other incidents or special events such as sports matches, bad weather, and public demonstrations, Mastria is able to anticipate the impact that the incident will have on the network and ensures that various operators collaborate in order to adapt the transport service accordingly and to offer alternative itineraries for passengers to reach their final destinations.

Mastria's benefits go beyond the optimization of the traffic and minimization of commuting time. It also enables an increase in transport capacity and reduces the energy needed to operate the mobility system.

Mastria is based on four main standard functions which are: multimodal supervision, traffic management, operations orchestration and predictive analytics. These functions are highly configurable and can be combined together according to operators' needs and to the transport network environment. It communicates over secure network connections with external control and information systems. It is flexible and designed to be scalable as to adapt to different transport networks, from local transport nodes to larger ones. It can be expanded to accommodate the inclusion of new lines and additional transportation means.

European experts meet in Donostia to discuss the train of the future

THE PROJECTS THAT ARE CURRENTLY UNDERWAY INCLUDE INSTALLING ON-BOARD 5G COMMUNICATION TECHNOLOGY AND DETERMINING THE LOCATION AND STATUS OF RAIL CARS AND THE FREIGHT THEY CARRY VIA THE CLOUD

This past 12-15 September, about fifty researchers and railway industry experts, representing companies, research centers and EU administrations, gathered at Ceit-IK4 to explore and discuss the train of the future. A number of European projects are laying the foundations for the train of the future, prioritizing the safety, reliability and compatibility of its systems.

Several Ceit-IK4 research teams are working on various European projects that are part of the Shift2Rail program. The goals of this EU-backed initiative are to: cut the cost of rail construction in half by 2021, double the capacity of European rail lines, and improve the reliability and punctuality of trains by 50%.

Attaining these goals requires the creation of a Single European Railway Area (SERA), which will promote more efficient and safer railways for the transportation of passengers and goods within the borders of the European Union (including Switzerland). These undertakings will also help solve some of the major environmental challenges that need to be addressed in the coming years: increased traffic and climate change.

The EU's Shift2Rail initiative, currently the world's largest railway research initiative, consists of five lines of research. Under the leadership of researcher Jaizki Mendizabal, Ceit-IK4 investigators are carrying out projects within two of the five lines: Advanced Traffic Management and Control Systems, and Technologies for Sustainable and Attractive European Rail Freight.

The projects that fall under the first line of research address railway management and safety and include work on communications, safe positioning and train reliability. The 'X2Rail-1' project seeks to install 5G wireless technology in trains in order to improve the speed and security of communication between trains and between trains and the control center. Installing communication technologies like 5G will, among other benefits, eliminate the lag time that exists in current systems and that can jeopardize rail safety. This project will establish the communications backbone of the train of the future. Another project, 'X2Rail-2', is developing an autonomous on-board system that can monitor the state of rail cars and their engines without relying on external elements.

The second line of research that Ceit-IK4 is involved in is geared toward freight transport and increasing the quality and capacity of freight cars. The FR8RAIL project seeks to monitor the location of freight cars at all times and determine the status of the load being transported. A related project, FR8HUB, is developing a system for monitoring rail infrastructure and detecting the status of both rail cars and the rails that they travel on.

Spanish Rail Engineering at EXPO Ferroviaria 2017

BOMBARDIER TRANSPORTATION TOOK PART IN ITALY'S EXPO FERROVIARIA 2017 EXHIBITION IN MILAN. HELD BETWEEN OCTOBER 3 AND 5.

EXPO Ferroviaria is Italy's showcase event for railway equipment, products and services. At the exposition, Bombardier Transportation presented its entire range of Bombardier Transportation rail solutions products.

Key products taking centre stage at Expo Ferroviaria include the high power BOMBARDIER TRAXX DC3 locomotive, whose prototype will be manufactured in the Bombardier's factory in Trápaga (Vizcaya), the medium-capacity BOMBARDIER TALENT 3 whose development of the traction converter has also been developed in the Basque Country factory, and the BOMBARDIER FLEXITY tram, of the same platform as the Bombardier trams for Valencia and Alicante.

The high capacity BOMBARDIER OMNEO train also was on display at EXPO Ferroviaria. Another perfect example of exceptional Spanish engineering, Bombardier's Trapaga site also manufactures the traction and auxiliary converters for this electric multiple unit platform, which is being produced for the French region of Normandy.

Bombardier's rail control offering was also on display. Attendees to the event were also able to explore the BOMBARDIER INTERFLO signaling solution and the BOMBARDIER INNOVIA APM 100 automated passenger system, operated using the BOMBARDIER CITYFLO 650 Communications-Based Train Control (CBTC).

These signalling solutions are already in operation on a range of Spanish railway lines. be The BOMBARDIER CITYFLO 650 (CBTC) protection and control system has been installed on Madrid's Metro Lines 1 and 6 and its development was carried out at the Bombardier Signalling Center of Excellence in San Sebastián de los Reyes. The systemis in operation on the BOMBARDIER INNOVIA APM which connects Terminal 4 to the satellite building at the Madrid-Barajas airport.

The Bombardier INTERFLO 450 (ERTMS 2) solution is also present in the Spanish market, specifically in the high-speed line on the North-Northwest Corridor. The project includes the Valladolid-León and Venta de Baños-Burgos lines. Bombardier's Level 2 ERTMS system has also been implemented in the commuter network of Barcelona (Rodalies), along the 56 kilometers connecting L'Hospitalet de Llobregat and Mataró.

MEMBERS DIRECTORY

INFRASTRUCTURE

Engineering and consultancy
- Aquafrisch, S.L.
- Ardanuy Ingeniería, S.A.
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- Pretensados del Norte

Electrification
- Alstom Transporte, S.A.
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- Typsa

Fixed material: components and equipment
- Alstom Transporte, S.A.
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- Aquafrisch, S.L.
- Arteche
- Duro Felguera Rail, S.A.U.
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- Talleres Alegría, S.A.
- Thales España GRP, S.A.U.
- Valdepinto, S.L.

Security
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- DSAF. Dinámicas de Seguridad
- Ecocomputer S.L.
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Ineco
- Manusa Door Systems
- SICE
- Siemens Rail Automation, S.A.U.
- Telice
- Tecnivial Infraestructuras
- Thales España GRP, S.A.U.

Signaling and traffic control
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Bombardier España
- Cables y Comunicaciones Zaragoza S.A.
- CAF Signalling
- DSAF. Dinámicas de Seguridad
- GMV Sistemas S.A.U.
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Indra Sistemas, S.A.
- Ineco
- Luznor
- P4Q Electronics, S.L.
- SEMI, S.A.
- SICE
- Siemens Rail Automation, S.A.U.
- Telice
- Tecnivial Infraestructuras
- Thales España GRP, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa

Maintenance
- Alstom Transporte, S.A.
- Amurrio Ferrocarriles y Equipos, S.A.
- Azvi
- COMSA
- Danobat
- Duro Felguera Rail, S.A.U.
- Idom
- Ikusi
- Ineco
- Instalaciones Inabensa
- Parrós Obras, S.L.
- Siemens Rail Automation, S.A.U.
- Telice
- Thales España GRP, S.A.U.

Stations
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Idom
- Ikusi
- Ineco
- Luznor
- Manusa Door Systems
- Parrós Obras, S.L.
- Thales España GRP, S.A.U.
- Typsa

INFORMATION AND DATA SYSTEMS

Systems and equipment for collection and ticketing
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Calmell Group
- Ecocomputer
- Idom
- Ikusi
- Indra Sistemas, S.A.
- Manusa Door Systems
- SICE
- Thales España GRP, S.A.U.

Communications, Information systems and passenger information equipment
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Cables de comunicaciones Zaragoza, S.L.
- CAF Power & Automation
- Ecocomputer
- Icon Sistemas de Información y Datos
- Idom
- Ikusi
- Indra
- Ineco
- P4Q Electronics, S.L.
- SICE
- Siemens Rail Automation, S.A.U.
- Telice, S.A.
- Thales España GRP, S.A.U.
- TPF Getinsa-Euroestudios
- Typsa

ROLLING STOCK

Passenger car manufacturers
- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Cetest
- Patentes Talgo, S.L.
- Stadler Rail Valencia S.A.U.

Manufacturers of freight wagons
- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Talleres Alegría, S.A.
- Stadler Rail Valencia S.A.U.

Locomotive manufacturers
- Alstom Transporte, S.A.
- Bombardier España
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Patentes Talgo, S.L.

EQUIPMENT AND COMPONENTS ROLLING STOCK

Traction and control systems
- Alstom Transporte, S.A.
- CAF Power & Automation
- Cetest
- Ingeteam Power Technology, S.A.
- P4Q Electronics, S.L.
- Patentes Talgo, S.L.

Components
- Albatros, S.L.
- AL-KO Record
- Alstom Transporte, S.A.
- Arteche (Electrotécnica Arteche Smartgrid, S.L.)
- CAF Power & Automation
- Cetest
- Elektra
- Faiveley
- Fundiciones Garbi, S.A.
- Funor, S.A.
- Gamarra, S.A.
- Hispacold
- Ikusi
- Indra
- Ingeteam Power Technology, S.A.
- Metalocaucho, S.L.
- MGN Transformaciones del Caucho, S.A.
- P4Q Electronics, S.L.
- Siemens Rail Automation, S.A.U.
- Teknorail Systems, S.A.
- Valdepinto, S.L.

Equipment and machinery for the manufacture of rolling stock
- Aquafrisch, S.L.
- Cetest
- Danobat
- MB Sistemas, S.Coop.

Interiors
- Alstom Transporte, S.A.
- Colway Ferroviaria, S.L.
- Idom
- Kelox, S.A.
- Teknorail Systems, S.A.
- Valdepinto, S.L.

Security
- Albatros, S.L.
- Alstom Transporte, S.A.
- Ardanuy Ingeniería, S.A.
- Cetest
- DSAF. Dinámicas de Seguridad
- Idom
- Ikusi
- Implaser 99, S.L.L.
- Indra
- Luznor
- Siemens Rail Automation, S.A.U.
- Tecnatom
- Thales España GRP, S.A.U.

Maintenance
- Albatros, S.L.
- Alstom Transporte, S.A.
- Aquafrisch, S.L.
- CAF - Construcciones y Auxiliar de Ferrocarriles, S.A.
- Cetest
- Danobat
- Faiveley
- Goratu
- Ikusi
- Ingeteam Power Technology, S.A.
- Kelox, S.A.
- Luznor
- Metalocaucho, S.L.
- NEM Solutions, S.L.
- Patentes Talgo, S.L.
- Siemens Rail Automation, S.A.U.
- Talleres Alegría, S.A.
- Teknorail Systems, S.A.
- Stadler Rail Valencia S.A.U.

Quality control, inspection and certification
- Tecnatom

MEMBERS DIRECTORY PER SECTOR

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Albatros Corporation is specialised in the design, manufacture, commercialization, and maintenance of equipment for the railway industry.

Albatros is formed by various units of engineering and manufacture in Spain as other countries.

We have a team of over 500 employees, selling over 100 million Euros a year, specially on export markets, with over 27,000 static converters, 35,000 passenger information systems, 6,000 HVAC systems, 10,000 WC modules and a variety of designs for the exterior as the interior of the trains, metros and tramways all over the world.

AL-KO

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AL-KO, a pioneer in the manufacture of shock absorbers in Spain, offers wide range of shock absorbers and suspension elements, backed by its engineering versatility that provides innovative technical solutions to meet the needs of its customers.

This fact has lead AL-KO, to carry out -in all its plants- major investments in research and testing facilities, as well as in expansions and refurbishments with the objective of implementing a flexible, efficient and profitable production, also in small series.

All this serves to make AL-KO a competent party in developing effective solutions in the field of suspension.

ALSTOM TRANSPORTE, S.A.

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As a promoter of sustainable mobility, Alstom Transport is the only railway manufacturer present in the full spectrum of transport systems, equipment and services. The company offers a complete range of high performance products: rolling stock, signalling, maintenance and modernisation, infrastructure and integrated solutions. In Spain, Alstom Transport employs around 2000 people in 19 working sites, has a manufacturing site in Barcelona and develops R&D programmes both for rolling stock and railway signalling and safety projects.

The technological laboratory located in Madrid has become a benchmark for signalling projects throughout the world.

AMURRIO FERROCARRIL Y EQUIPOS, S.A.

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Amurrio Ferrocarril y Equipos, S.A. is one of the international market leaders in the design, production and installation of railway materials. Our rolling stock interchanges and crossings are installed in high-speed rail lines, underground lines, tram lines, and conventional railways throughout Europe, Asia, America and Africa. In the area of metal foundry, we have the experience, the knowledge and the people to produce, process and mechanize machine tool parts and sets of great technical complexity in carbon steel manganese steel and other steel alloys.

AQUAFRISCH, S.L.

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Aquafrisch is a service oriented company. Our task is to provide our customers needs with reliable results.

Aquafrisch provides a wide offer in equipment and services in both working fields for the company:

1. Aquafrisch Rail: solutions for railway equipment in depots and workshops.
2. Aquafrisch Agua: solutions for water treatment both in consumption and waste waters.

ARCELORMITTAL ESPAÑA, S.A.

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ArcelorMittal is the world's leading steel and mining company and it is part of a small group of rail manufactures whose production has developed notably in the specialized high-speed, heavy- haul, metro, conventional lines and other applications are light rail and tram in the different qualities of normal carbon steel, micro alloyed and head hardened rails.

ArcelorMittal quality has been recognized by customers around the world, from Europe through Asia to Oceania, America and Africa.

Next time you travel by train, no matter the continent where you are, you may be doing it on rails manufactured by ArcelorMittal.

ARDANUY INGENIERÍA, S.A.

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Ardanuy is a consultancy company that specializes in studies, designs, works management and technical consultancy pertaining to Rail, Metro, Tram and Cable Transport.

The company was founded in December 1992 and is made up of a team of over 100 Engineers and Architects. Other experts also act as consultants to Ardanuy staff on specific projects.

In Spain, Ardanuy carries out work from offices in Madrid, Barcelona, Valencia, Seville and Tenerife. It also has offices in Lithuania, Poland, India, Colombia, Algeria and USA. Ardanuy has always had a marked international vocation. Currently over 90% of new contracts are won on the international market, in Western Europe: United Kingdom, Ireland and France; Central and Eastern Europe: Poland, Bulgaria, Latvia, Lithuania; America: Bolivia, Chile, Colombia, Mexico, Peru, USA; Africa: Morocco, Mozambique, Algeria, Egypt, South Africa; and Asia: India, Vietnam, Kazakhstan.

ARTECHE (ELECTROTÉCNICA ARTECHE SMARTGRID, S.L.)

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Arteche Group's business is focused on providing equipment, applications and solutions for the electricity and railway sector worldwide. In power generation, transmission, distribution, industry, and railway technologies, the group has become a key player in the search for answers to new challenges. A position maintained by a deep knowledge of the different international electricity systems, efficient client-oriented organization and remarkable investment in research and development.

This is shown by over 50% increase in the brand references in the past five years. Arteche's decisions over the years made our group a symbol of reliability, quality and trust, both in solutions and in corporate relations. Corporate alliances have taken a key role in Arteches's history, becoming and asset which has contributed to our international growth and to the development of innovative solutions.

AZVI

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Azvi is a hundred-year-old Company specialised in Civil Works whose origins are in railways, forming part of the history and evolution of the railways and its infrastructures in Spain and abroad.Throughout these years, Azvi has participated in numerous construction, rehabilitation, conservation and maintenance projects over more than 1,000 kilometres of track, of which almost 450 km have been High-Speed Rail built within the last 25 years.Azvi also has a large and modern machinery park which allows the company to carry out works with its own machines and a Logistics Centre equipped with modern facilities and state of the art resources in order to centralize a variety of support services to railway activity, such as MachineryPark, materials, maintenance, checking and repairing shops.

Research and Development is also an important issue for Azvi.

Through its own R&D department, Azvi invests in railway research and development, in collaboration with various public and private entities and investigation groups.

BOMBARDIER ESPAÑA

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Bombardier Transportation, a global leader in rail technology, offers the broadest portfolio in the rail industry.

Bombardier Transportation Spain is one of the leading exporters of the Spanish railway industry, employing more than 750 people in its plants and offices in Trápaga (Biscay), San Sebastian de los Reyes and Alcobendas (Madrid), Madrid and Barcelona, and taking part in some of the major railway projects in the country. Its Propulsion Systems plant located in Trápaga (Biscay) and its Centre of Excellence in Rail Signalling Engineering located in San Sebastian de los Reyes (Madrid) are world top technological centres, leading the requests for Bombardier's propulsion and signalling systems for Spain and for the rest of the world. Exports represent already more than 85% of its activity.

CABLES DE COMUNICACIONES ZARAGOZA

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Founded in 1971, Cables de Comunicaciones has been steadily building its reputation as a respected business in the field of communications cables. Cables de Comunicaciones has cemented its position and its products are now used in over 50 countries around the world.

The company has a wide range of products that are certified according to the standards of the leading telecomm and railway operators in the majority of countries in Europe. It is dedicated to designing and developing excellent telecommunications, signalling, instrumentation, data and fibre optic cables.

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

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CAF is a firm focused on investigation, development, design, production and maintenance of Rolling stocks for the railway industry. Our product range include from High Speed, to regional and suburban trains, articulated units, underground trains, LRVs, light underground trains and locomotives. Maintenance of the whole range. It boasts production premises throughout Spain (Beasain, Irun, Zaragoza, Castejón and Linares), as well as in the USA (Elmira NY), France (Bagnères de Bigorre), Mexico (Mexico Df) and Brazil (Sao Paulo) and Rail Technological Centres in Beasain and Zaragoza. CAF's projects are distributed in over 25 countries around the world in the five continents.

CAF POWER & AUTOMATION

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CAF P&A is a global manufacturer of electric power solutions as well as information and communications systems for the rail industry. CAF P&A have equipped more than 5,000 vehicles world wide including, metros, light rail, locomotives and high-speed trains.

One of the main strategic lines is the development of its own technology. To do so, as a major asset, CAF P&A has a team of experienced, competent and dynamic specialists. CAF P&A develops, manufactures and deliver high reliability solutions adapted to each and every client's specific needs in compliance with railway standards.

CAF SIGNALLING

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- **www.cafsignalling.com**

CAF Signalling, the technological subsidiary of the CAF Group, provides rail traffic signalling, both in Spain and abroad.

As such, it offers railway signalling solutions and remote control for Railway infrastructures.

CAF Signalling, boats the Company's own in-house engineering and expertise to take on "turn-key" railway signalling projects with recognition from several Railway Administrations in Spain and other countries in Europe, America, Africa, Middle East and Asia.

CAF TURNKEY & ENGINEERING

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- **comercial@cafte.com**
- **www.cafte.com**

CAF Turnkey & Engineering was created in 2007 with its head office is in the Technological and Scientific Park of Biscay (Zamudio). It began its business in Integrated Engineering of Transport Services and in 2015, after merging with the company CMFS (Mexico), it increased its portfolio of services with the inclusion of EPC projects for both civil works and subsystems.

Following solid and constant growth, the company currently has a workforce of 200 with offices in Zamudio, Madrid and Mexico, providing service to both companies within the CAF Group and national and international private and public customers.

CALMELL GROUP

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- **F: +34 93 564 58 22**
- **calmell@calmell.net**
- **www.calmell.com**

The first company of the group, Calmell, S.A. was founded in 1970, focusing its activity on the manufacture or graphic products. Currently, the Calmell Group is the leader in access control and identification, through its companies Calmell S.A., Affix S.L., Idoneum S.A., which are respectively engaged in producing the supports (tickets, cards,…), developing specific software and hardware, personalization and security.

In the public transport sector it works for integrators and operators supplying any kind of support for ticketing and reader/writer systems. With a strong international presence through its network of representatives and distributors, the Calmell Group is able to satisfy your needs on a global level.

CETEST

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- **cetest@cetestgroup.com**
- **www.cetestgroup.com**

Test and analysis services for:

- Design verification and validation.
- Full homologation of new products and vehicles.
- Failure analysis and optimization.

Fully accredited test lab with more than 40 years of experience in railway testing.

Test services cover the following areas:

- Structural components.
- Running gear.
- Suspension systems.
- Vehicle dynamics.
- Noise and vibrations.
- Aerodynamics.
- EMC and energy consumption.
- Mechatronics.
- Special instrumentation (Instrumented wheelsets, instrumented pantograph).

COLWAY FERROVIARIA, S.L.

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- **acolomerf@colway-08.com**
- **www.colway-08.com**

Colway Ferroviaria,S.L., company belonging to the COLWAY Group, specializes in the design, engineering, manufacture, supply, installation and commissioning of turnkey railway vehicle interiors. Through the integrated management of modular supplies, based on experience, knowledge, research and innovation, the company achieves the satisfaction of the needs and expectations of its customers: railway manufacturers and public administrations. Colway capabilities include Modular System solutions for Rail Interiors as Toilet Modules, Front hoods, saloons, walls, Buffet, Restaurant areas, vestibules.

COMSA CORPORACIÓN

- **C/ Julián Camarillo 6A, 2ª planta**
  28037 (MADRID)
- **P: +34 913 532 120**
- **F: +34 913 504 954**
- **jalvarez@comsa.com**
- **www.comsa.com**

COMSA is the company of COMSA Corporación specialised in the construction of railway infrastructures. Founded in 1891, the company provides a comprehensive service in the field of railway construction and maintenance, electrification, and control and communication systems of high speed rails, conventional rails, metros and tramways.

In this business activity, it is leader in Spain, where has been involved in the construction of all high speed lines, and has permanent operations in Argentina, Brazil, Lithuania, Mexico, Poland, Portugal and Turkey. It has also taken part in a large number of projects in other markets such as Italy, the Philippines, Taiwan, Malaysia, India, etc. This extensive experience has been the key for its consolidation in the railway sector and has enabled it to become the leader in the railway construction industry.

DANOBAT

- **Arriaga Kalea, 21**
  20870 Elgoibar (GIPUZKOA)
- **P: +34 943 748 044**
- **F: +34 943 743 138**
- **danobat@danobat.com**
- **www.danobat.com**

Danobat Railways business unit focuses its activity in the supply of turnkey solutions for the manufacturing and maintenance of railways rolling stock, incorporating own products of leading technology, together with those manufactured by specialized companies. It gathers extensive experience and qualification in the rendering of services such as engineering services, equipment integration, complex project management, and collaboration with the customer all along the life of the project. Danobat has a strong international presence and references in the most relevant customers.

DSAF – DINÁMICAS DE SEGURIDAD, S.L.

- **Avda. de San Blas nº 13 -**
  Polígono Industrial de Gojain
  01170 Legutiano (ARABA)
- **P: +34 945 466 314**
- **F: +34 945 466 314**
- **info@dsaf.es**
- **www.dsaf.es**

DSAF is a company structure devoted to People's Movement Safety. It is committed to providing new technologies applied to design and project implementation, as well as initiatives that guarantee an approved evacuation safety level in this generalized risk society.

Emergency signalling is DSAF's main application area; it develops photoluminescent, electroluminescent and LED signalling systems for people evacuation in risk situations and environments: tunnel evacuation safety, vessel evacuation safety, building evacuation safety…

DSAF safety applications are developed in three big areas: tunnel safety (road / railway), safety in vessels, and buildings.

DURO FELGUERA RAIL, S.A.U.

- **Pol. Ind. Fábrica de Mieres s/n**
  33600 Mieres (ASTURIAS)
- **P: +34 985 45 63 31**
- **F: +34 985 45 61 64**
- **dfrail@durofelguera.com**
- **www.durofelguera.com**

DF Rail is a Spanish company specialized at the design, manufacturing and supply of turnout systems and components for Metro, Conventional, Heavy Haul or High Speed Lines. Turnouts, single and double crossovers, diamond crossings, single and double slip crossings, single and double junctions, switch expansion joints, ..., on wooden or concrete sleepers; for ballasted or unballasted tracks; for single or combined gauges; with monobloc Mn steel crossings or with swing nose crossings; insulated glued joints; transition rails.

ECOCOMPUTER S.L.

- **C/ María Zambrano 5 - Bajo ·**

33401 Avilés (ASTURIAS)
- P: +34 985 52 50 46
- F: 34 985 56 83 17
- sales@ecocomputer.com
- www.ecocomputer.com

Ecocomputer S.L. is a technology firm based on North Spain (Asturias and Cantabria) and focused on the design, development and implementation of IT solutions on the railways industry (ie: ticketing, booking, passenger information system) and access control and time&attendance business. Founded on 1999, it holds a wide portfolio of own products as a result of years of evolution and adaptation to customer needs. Ecocomputer provides as well onsite IT maintenance services for the railways operators and administrator infrastructure companies (Railway Control and Regulation Centres, security infrastructure, IT equipment).

ELEKTRA-GRUPO ELEKTRA, S.A.

- C/ Apostolado, 34
  20014 San Sebastián
  (GIPUZKOA)
- P: +34 607 94 29 73
- railway@elektra-sa.es
- www.grupoelektra.es

Grupo Elektra is a market leader in the field of electrical and electronic equipment distribution for manufacturers of rolling stock, maintenance and railway equipment manufacturers.
Being the leading company in the railway sector in the supply of electrical equipment. Your solution provider in electrical products for railway, with specific tecnical support.
Elektra Group is composed of an extensive Spanish national network and has companies in Romania, India and USA.

FAIVELEY TRANSPORT IBERICA, S.A

- Pol. Ind La Drecera – C/ Mecánica, 23 – 43470 La Selva del Camp (TARRAGONA)
- C/Antonio Cabezón s/n (complejo Renfe) – 28034 Madrid (MADRID)
- P: +34 917282159
- F: +34 917282157
- patricia.gil@wabtec.com
- sergio.munoz@faiveleytransport.com
- www.faiveleytransport.com

Faiveley Transport Ibérica, S.A. is a firm focused on design, production, and maintenance of auxiliary equipments for railway industry (locomotives, rolling stocks, trams and metros). Our product range include also the design, production, installation and maintenance of Platform Screen Doors (PSD). FT Ibérica is the branch for Spain, Portugal and Mexico market of International Group Faiveley Transport. Our main facilities are in La Selva del Camp (Tarragona –Spain) and Commercial offices in Madrid.

FUNDICIONES GARBI, S.A.

- Bº Munsaratz, 33
  48220 Abadiano (BIZKAIA)
- P: +34 94 621 54 80
- F: +34 94 681 73 86
- garbi@fundicionesgarbi.es
- www.fundicionesgarbi.es

Founded back in 1972, Fundiciones Garbi has evolved from a traditional foundy to a Global Service Company for industry.
We offer a full catalogue of services starting from the casting or other materials till delivery of "ready to use" parts or assembly sets. With this aim, we have developed an organization oriented towards solid and competitive processes, ensuring quality from design phase using APQP tools. Well aware of customer satisfaction, we offer to our clients additional global services including a full range of heat treatments, machining, product inspection and testing (NDT's, etc), protection and finishing surface treatment (Painting, Metallization, Others...), including final assembly of different parts. For the Railway industry we are specialized on production of rolling stock material.

FUNOR, S.A.

- Pol. Ind. de Villalonquejar
  C/ Condado de Treviño, 41
  09001 Burgos
  (BURGOS)
- P: +34 947 29 84 80
- F: +34 947 29 82 93
- info@funorsa. es
- www.funorsa.es

Castings in carbon steel, alloy steel and stainles steel.
Our products:
- Steel casting.
- Raw castings or fully machined.

Examples:
- Bogie components.
- Pivots.
- Motor housings.
- Pressure rings.
- Axle boxes.
- Links.

GAMARRA, S.A.

- Portal de Vergara, 6
  01013 Vitoria
  (ARABA)
- P: +34 945 25 16 77
- F: +34 945 27 49 48
- gamarra@gamarrasa.es
- www.gamarrasa.es

Gamarra, S.A. at a glance: Spanish steel foundry -located at Vitoria Gasteiz- annual production: 4,000 tons - customers: European State Railways, - producers of rolling stock and their subsuppliers - as foundry and supplier homologated by DB AG (HPQ), ÖBB, SBB, SNCF (AFQ) (extract) as well as according to DIN EN ISO 9001: 2000 + DIN 6700 - 2.
Products: brake discs, brake block shoe holders, buffers, spigots and essential steel castings for bogies.

GANTREX, S.A.

- Pol. Ind. Izarza 4N –
  48115 Sondika – Vizcaya
- P: +34 944 53 50 84
- info.bilbao@gantrex.com
- www.gantrex.com

Gantrex Spain, S.A. is the global market leader in specialty rail tracks fixation including design, production, supply of goods and installation of turnkey contracts.
Rail fixation at train workshops, embedded rails accesses for Ports or logistic terminals and private rail installations together with other Subway´s and Tram´s required instalations are some of Gantrex Spain´s main activities.
Products:
- All sections of rails
- Metallic railway sleepers
- Rail fixing Clips
- Rubber pads for rails
- Steel columns for trains maintenance
- Embedded rail fixation systems (recycled rubber)
- Embedded rail fixation systems (polyurethane)
- Hydraulic buffers

GMV SISTEMAS, S.A.U.

- Juan de Herrera, 17 - P.T.B. Boecillo
  47151 Valladolid (VALLADOLID)
- P: +34 983 54 65 54
- F: +34 983 54 65 53
- ahernandez@gmv.com
- aags@gmv.com
- www.gmv.com

Since 1994 GMV provides Intelligent Transport Systems, offering turnkey solutions and specific products. GMV develops applications adapted to sector needs, including satellite navigation, mobile communications, passenger information, fare collection systems and monitoring-and-control centers.
GMV's railway portfolio includes fleet management system, SAE-R®, providing operators with an all-in system for planning and management, and other products like CCTV, PA-Intercomm and Passengers Video Information, as well as electronic fare collection systems for railway sector.

GORATU

- PLerun Kalea, 1, 20870 Elgoibar, Gipuzkoa
- P: +34 943 74 80 60
- sales@goratu.com
- http://www.goratu.com

Under the trademark of the prestigious market leader GEMINIS, Goratu develops horizontal and multiprocess lathes of the highest technology.
We offer customized solutions for high specialization technologies.
60 years of experience and specialized knowledge in the Railway Sector have let us to the design and manufacture of lathes for manufacture and maintenance of axles, wheels and wheelsets.

HICASA - HIERROS Y CARBONES, S.A.

- Polígono de Asipo, P48
  33428 Cayés-Llanera (ASTURIAS)
- P: +34 985 26 04 73
- F: +34 985 26 09 05
- info@hicasa.com
- www.hicasa.com

HICASA specialises in the storage, transformation, distribution and commercialisation of railway materials, rails and railway accessories of all types in accordance with both European (UNE EN), as well as American (ASTM) Standards, not to mention others such as AREMA, etc. HICASA belongs to a private group of companies, GEVIR, which is made up of four enterprises in Spain, and is special in the sense that it combines its role of distributor with that of manufacturer, given that it possesses its own specialist light rail factory, a fact which endows it with a unique market profile.
We can boast of a roofed surface area at our installations of over 13,000 m2, where we dispose of modern cutting and drilling machines that enable us to transform iron and steel and to supply orders of any format and measurement, in accordance with the specifications requested by our clients. We export over 50% of our products abroad.

ICON SISTEMAS DE INFORMACIÓN Y DATOS

- Avd. Santiago Amón, 3-52-
  34005 (Palencia)
- P: +34 979 70 29 06
- F: +34 979 70 20 21
- ehornos@iconmm.com
- www.iconmm.com
- www.denevads.com

Software development company specialized in passenger information systems, digital signage and advertising schedules, covering all areas of transport, either rail/metro, airports, bus or port. ICON Multimedia also has a significant presence in the world of commerce/retail, menuboards, and the banking sector, with worlwide reference clients with more than 40.000 points deployed around the world.
It stands out for the wide degree of customization of your product to suit the needs or requirements of any client or that may be contained in a statement of technical conditions.

IDOM

- Zarandoa 23
  48015 Bilbao (VIZCAYA)
- P: +34 944 79 76 00
- F: +34 944 75 93 64
- cortega@idom.com
- oscar.rico@idom.com
- www.idom.es

IDOM is one of the european leading companies in the field of professional services in engineering, architecture and consultancy. It is an independent company established in 1957 and it has participated in over 30.000 projects in five continents.

In 20 countries with 39 offices throughout regions (America: Argentina, Brazil, Canada, Chile, Colombia, USA, Mexico, Perú), Asia (India), Africa (Argelia,Lybia, Morocco), Middle East (Saudi Arabia, UAE), Europe (Belgium, Slovenian, Spain, Poland, Portugal, United Kingdom). More than 3.000 staff posseses the expertise and experience to cover all the phases of a railway project (high speed, conventional, freight, metro, light rail, tramway, stations, depot and workshops), from conception to commissioning and beyond. IDOM will accompany the client by providing the correct technical assistance required for the decision-making process: technical specifications for design, alternatives studies, demand and traffic studies, financial and socioeconomical analysis,basic and detailed design, operational and maintenance plans,works supervision, testing and commissioning.

IKUSI

- **Paseo Miramón, 170**
  20014 San Sebastián
  (GIPUZKOA)
- **P: +34 943 44 88 00**
- **F: +34 943 44 88 20**
- **movilidad@ikusi.com**
- **www.ikusi.com**

Ikusi offers integral solutions for exploiting the diverse means of urban public transport (Bus/BRT/Tramway/Light Rail/ Metro/Suburban), as well as in intermodal transport hubs. One proposal, backed up with a track record reaching back more than 20 years in the sector, has the main goal of improving passenger experience, guaranteeing safety, increasing revenue from secondary sources independent from the main activity, and streamlining operational efficiency.

IK4 RESEARCH ALLIANCE

- **Pol. Azitain 3K, 2ºG**
  20600 Eibar (GIPUZKOA)
- **P: +34 94 382 03 50**
- **otegi@ik4.es**
- **www.ik4.es**

IK4 Research Alliance is a private and independent alliance of R&D centres, a benchmark in the European R&D context. It comprises 9 organisations in the Basque Country: AZTERLAN, CEIT, CIDETEC, GAIKER, IDEKO, IKERLAN, LORTEK, TEKNIKER and VICOMTECH.
The IK4 Research Alliance sets out to generate, capture and transfer scientific and technological knowledge mainly to the business framework. This way it contributes towards improving the competitiveness of companies and the progress of society. Nowadays it gathers a staff of 1275 and an income of 102M€ in 2014.

IMPLASER 99, S.L.L.

- **Pol. Ind. Borao Norte, Nave 5A**
  50172 Alfajarín (ZARAGOZA)
- **P: +34 902 18 20 22**
- **F: +34 902 18 20 22**
- **international@implaser.com**
- **www.implaser.com**

Implaser is a Spanish company focused in developing innovative security signs for railway projects. Innovation and quality are our mainstays, as we were the first SME being certified in R+D+I in Spain. Implaser has all the range of products certified by AENOR with photoluminescent values of 150, 300, 580 and 720 mcd/m^2.
We are also specialized in the manufacturing of informative, security and accessibility stickers for coaches, to be used both indoor and outdoor. Hard work and great concern for innovation has allowed us to develop new products, such as photoluminescent systems combined with electroluminescent and guiding systems by LEDs.

INDRA

- **Avda. de Bruselas, 35**
  28108 Alcobendas (MADRID)
- **P: +34 91 627 38 77**
- **F: +34 91 626 88 68**
- **enavarroj@indra.es**
- **www.indra.es**

Indra is a world leader and pioneer in the supply of technological platforms for railway operations management, control and supervision, having specific solutions already tested on high speed and conventional lines and metropolitan operations. Indra is also a leader in ticketing systems for transport operators and has facilities and projects all over the world. Furthermore, Indra develops high-precision safety and signalling systems. At this moment in time, Indra's solutions are completely unique because of their high level of integration and adaptation to the current and future necessities of the railway environment whatever may be the most state of the art technological and operative options. Indra has managed to open a competitive market for the first time based on technological and economical competitiveness.

INECO

- **Paseo de la Habana, 138**
  28036 Madrid (MADRID)
- **P: + 34 91 452 12 00**
- **eva.pulido@ineco.com**
- **www.ineco.com**
- **www.ineco.com**

Global leader in transport engineering and consultancy, it has contributed to the development of transport infrastructures for over 45 years in more than 45 countries. Its high level technical specialisation allows its activity to diversify into new markets and reinforce its presence in those where it is already established.
Its participation in the whole railway system in Spain has led the company to develop important international projects like the Makkah-Madinah high speed in Saudi Arabia, the Ankara-Istanbul line in Turkey and the HS2 project in the United Kingdom.

INGETEAM POWER TECHNOLOGY, S.A.

- **Edificio 702.**
  Parque Tecnológico de Bizkaia
  48160 Derio (BIZKAIA)
- **T: +34 94 655 90 00**
- **F: +34 94 403 98 37**
- **traction@ingeteam.com**
- **www.ingeteam.com**

Ingeteam is an expert leader in the development of electrotechnical and power electronics systems providing involving energy exchanges at large.
Our capacities and the experience on the railways sector allow us to offer technological solutions that significantly contribute to reach our customers strategic objectives, leading to maximize operational efficiency. We strive towards on offering in-house/ state-of-the-art developments for:
- Rolling Stock: Traction Systems and TCMS
- Infrastructure: Energy Recovery Systems.

INTERNACIONAL HISPACOLD, S.A

- **Avda. Hacienda San Antonio,1**
  Pol. Ind. El Pino
  41016 Sevilla (SEVILLA)
- **P: +34 954 677 480**
- **F: +34 954 999 728**
- **hispacold@hispacold.es**
- **www.hispacold.es**

Hispacold is a World leader company for climate systems specialized in comfort for people with more than 30 years' experience. Hispacold designs and manufactures HVAC solutions for all rail vehicles: trams, metros, EMUs, DMUs, LRVs… with proven and reliable technology solutions.In Hispacold each activity is based on a solid quality culture and on a real commitment with the environment. Quality certifications ISO 9001, ISO 14001, OSHAS 18001 are only the smallest part of this working way.
Hispacold is a company of Irizar Group SC, which employees more than 3.000 people in the five continents and has a global turnover of more than 550 Million €. This gives Hispacold the benefits from a multinational organization while maintaining an individual company spirit.
Hispacold's presence in the five continents guarantees the best technical assistance at any place of the world.

JEZ SISTEMAS FERROVIARIOS, S.L.

- **Arantzar, s/n**
  01400 Llodio
  (ARABA)
- **P: +34 94 672 12 00**
- **F: +34 94 672 00 92**
- **infor@jez.es**
- **www.jez.es**

JEZ Sistemas Ferroviarios, S.L. is committed to designing, manufacturing, supplying and maintenance of all types of manganese steel switches and railway track systems, in addition to moulded cast steel parts for the general industry.
Our Technical Department (Department of R&D) ensures we have the capability of designing and producing points and crossings (turnouts, crossovers, scissor crossovers and diamond crossings) or parts for them, such as hard steel manganese crossings or spare tongues.
At JEZ Sistemas Ferroviarios, S.L. we fit our developments to meet clients needs.

KELOX, S.A.

- **Isla de Jamaica, 8**
  28034 Madrid
  (MADRID)
- **P: +34 91 334 15 90**
- **F: +34 91 358 05 64**
- **marketing@kelox.es**
- **www.kelox.es**

Kelox launched its railway activity in 1977, manufacturing catering equipment for dining cars on longdistance lines. The experience and knowledge acquired over the years have become Kelox specialist in the design and full supply of galleys and catering equipment for high-speed, shuttle and regional trains.
Our style of design is characterised by harmony; it is beautiful, ergonomic and functional, always according to the customer specifications.

LA FARGA LACAMBRA, S.A.U.

- **Ctra. C-17z - Km. 73,5 08508**
  Les Masies de Voltregà
  (BARCELONA)
- **P: +34 93 850 41 00**
- **F: +34 93 859 55 30**
- **gustau.castellana@lafarga.es**
  jordi.vilaro@lafarga.es
- **www.lafarga.es**

La Farga Lacambra is a model company in the railway sector, with more than 200 years' experience in the copper industry. A solid international presence and continuous innovation in the search for new alloys have enabled it to produce high-service materials.
La Farga Lacambra provides global solutions for copper materials and its alloys such as CuMg, CuSn or CuAg, integrating the whole productive process and ensuring the maximum technical qualities.
These products satisfy the needs of the market for all kind of lines and speeds around the world.

LUZNOR

- **Paduleta, 47 01015 Vitoria**
  (ARABA)
- **P: 945 200 961**
- **F: 945 200 971**
- **iarbeloa@luznor.com**
- **www.luznor.com**

Luznor Company is specialized in the design, manufacture and commercialization of professional torches (for railway industry), emergency lighting (for industry and architecture) and other Electronic devices.
Luznor offers you (in its factory in Vitoria) highly qualified technicians, a high standard of quality, an effective system development, manufacture and testing, and above all, a philosophy of commitment to our customers allowing us to offer innovative products equipped with advanced technology and recognized prestige.

MANUSA DOOR SYSTEMS

- **Avda. Via Augusta, 85-87 - 6ª planta. 08174 Sant Cugat del Vallès (BARCELONA)**
- **P: + 34 902 321 400**
- **T: +34 935 915 700**
- **F: +34 902 321 450**
- **F: +34 932 185 610**
- **manusa@manusa.com**
- **www.manusa.com**

Manusa is the Spanish market leader in design, production, installation and maintenance of automatic door systems. Established in 1966, it has 12 delegations in Spain, branches in Portugal, Brazil, Singapore and India and international presence in more than 70 countries around the world. Manusa develops specific products for public transport, such as platform screen doors (PSD) and ticket gates for access control, as well as one-way corridors, onboard doors and tunnel partitioning doors, always with the Manusa technology support.

MB SISTEMAS, S. COOP.

- **Pol. Ind. Igeltzera - C/ Igeltzera, 8 48610 Urduliz (BIZKAIA)**
- **P: + 34 94 403 06 26**
- **F: + 34 94 403 06 27**
- **amacias@mbsistemas.es**
- **www.mbsistemas.es**

MB SISTEMAS is part of MONDRAGON CORPORATION. We develop turnkey "World Class" engineering projects, implementing automation solutions into the Assembly and welding phases of manufacture process for car body structures of railroad passenger cars.

We give "ad hoc" solutions for the customer's needs; having implanted successfully our facilities around the world. As engineering we develop both, robotic installations and special machines for any assembly process.

METALOCAUCHO, S.L.

- **Polígono Erratzu, 253 20130 Urnieta (GIPUZKOA)**
- **P: +34 943 33 37 55**
- **F: +34 943 33 37 51**
- **info@metalocaucho.com**
- **www.metalocaucho.com**

MTC specialises in the design and manufacture of anti-vibration and suspension solutions for Rolling stock.

The Company was established in 1982 and currently has three manufacturing sites, located in Spain (HQ), China and India. In 2009 the company was awarded IRIS Certification. MTC, being among the leading companies in its sector, supplies to the main Rolling stock Constructors worldwide, including Alstom, Bombardier, CAF, CSR, CNR, Hyundai Rotem, Siemens, Talgo, Vossloh). We also collaborate with Operators for the supply of spare components for their overhaul projects. Our main products are rubber-metal primary and secondary suspensions, focusing on primary springs (conical or chevron type), guiding bushes, guiding links, secondary air springs and emergency springs, traction rods, elastic bushings, buffers, layer springs as well as a diverse range of associated rubber-metal solutions.

MGN TRANSFORMACIONES DEL CAUCHO, S.A.

- **C/ Candelaria, 9 - Pol. Ind. Camino del Calvario 28864 Ajalvir (MADRID)**
- **P: +34 91 887 40 35**
- **F: +34 91 884 45 84**
- **enp@mgncaucho.com**
- **www.mgncaucho.com**

MGN was established in 1957 and since then it has been developing its activity both designing and manufacturing rubber-metal components, mainly for the railway industry.

MGN invests in research and innovation as a basis for the development of elements to be adapted in the new understanding of passenger and fright trains, taking the lastest technological advances of the rubber world, vibration control and damping systems.

NEWTEK SOLIDOS S.L

- **Pol. Abendaño. Urdaneta bidea, 3B. Zarautz - (GIPUZKOA)**
- **P: +34 943 835942**
- **F: +34 943 894441**
- **comercial@newteksolidos.com**
- **www.newteksolidos.com**

NEWTEK SOLIDOS, S.L. manufactures sand filling systems for the railway equipment industry, sand feeders, storage silos, pneumatic transport, dust return systems, sand loading equipment and facilities maintenance.

NEM. NUEVAS ESTRATEGIAS DE MANTENIMIENTO, S.L.

- **Paseo Mikeletegi, nº 54 - 1ª planta 20009 Donostia (GIPUZKOA)**
- **P: +34 943 30 93 28**
- **F: +34 943 30 93 26**
- **info@nemsolutions.com**
- **www.nemsolutions.com**

At NEM Solutions we offer total control of business operations and maintenances for the railway industry. Our products and services project the assets' future from data generated daily. The objective is to give our client the possibility to control his/her own business and to avoid surprises. Thanks to our expert knowledge we provide wheel life management, productivity improvement and O&M cost reduction.

P4Q ELECTRONICS, S.L.

- **Ctra. Bilbao-Balmaseda, Km. 9 48810 Alonsotegi (BIZKAIA)**
- **P: +34 94 498 20 28**
- **ialberdi@p4q.com**
- **www.p4q.com**

At P4Q we are involved in the complete development of electronic devices and lean production services. We are structured as an integral supplier of electronics solutions, focused in flexibility and quick development. We design under customer specs and approval. Being a partner of our customers giving global support attending local production demands. Is the basis of our strategy. We have facilities in Albuquerque (NM), USA as well as in Spain.

PARRÓS OBRAS, S.L.

- **Ctra. Virgen del Monte, 1 13260 Bolaños de Calatrava (CIUDAD REAL)**
- **P: +34 926 88 47 05**
- **F: +34 926 88 47 06**
- **rocio@parros.es**
- **www.parros.es**

Family business with over 25 years experience in civil construction and iron and steel industry for the railway sector. Parros Group which is specialized in pile driving and catenary foundations, has implemented the 80% of the foundations of the entire Spanish High Speed Network. Whether conventional railway network or Highspeed Railway (AVE), PARROS GROUP is distinguished by the versatility of our machines adapted "Ad hoc" for auxiliary civil works from the railway, with automatic switching to the three Spanish gauges. Also innovative is our implementing system of noise barriers from the railway track and its foundations. Generic activities of building and general construction.

PRETENSADOS DEL NORTE S.L.

- **Miravalles, 4 (Zona Industrial de Betoño) 01013 Vitoria (ALAVA)**
- **P: +34 945 258 431**
- **F: +34 945 261 400**
- **pretenorte@pretenorte.com**
- **www.pretenorte.com**

PRETENSADOS DEL NORTE produces the best prestressed wire for railway sleepers in the world. More than 30 years' experience, PRETENORTE only uses the best raw materials and we can supply any need required by the client.

We have supplied prestressed steel for several projects around the world and our material is considered the one with the best quality in prestressed WIRE world. We have the best and most modern machinery and a highly qualified team of experts and engineers. We also produce prestressed steel used in precast concrete parts and structures.

PATENTES TALGO, S.L.

- **C/ Paseo del Tren Talgo, 2 28290 Madrid (MADRID)**
- **P: +34 91 631 38 00**
- **F: +34 91 631 38 93**
- **marketing@talgo.com**
- **www.talgo.com**

Talgo, leading High Speed rolling stock manufacturer in Spain, has over 70 years of experience manufacturing very high speed, high speed, intercity and regional trains, tilting passenger coaches and locomotives.

The company is also a pioneer in providing complete maintenance solutions to railway operators worldwide, and is specialized in the design and manufacture of maintenance equipment for any type of rail vehicles.

PRECON; PREFABRICACIONES Y CONTRATAS, S.A.U.

- **C/ Espronceda, 38, local 3 28003 Madrid (MADRID)**
- **P: +34 91 343 03 48**
- **F: +34 91 359 12 46**
- **fsanchez@precon.cemolins.es**
- **ferroviario@precon.cemolins.es**
- **www.cemolins.es**

PRECON is the Spanish leader in design and supply of precast concrete products for railway tracks, either ballasted and ballastless tracks.

PRECON has supplied solutions based on monoblock, twinblock, block, slabs and sleepers for switches and crossings. Either for high speed, conventional lines, heavy haul, subways and tramways. PRECON from its two Spanish factories has supplied more than 15 millions twinblock sleepers, 5 millions monoblock sleepers, 500,000 ml sleepers for switches and crossings and currently manufacture most of the slab track systems in use in Spain.

REDALSA, S.A.

- **General Solchaga, s/n P. I. de Argales, Apdo. 719 47008 Valladolid (VALLADOLID)**
- **P: +34 983 27 13 16**
- **F: +34 983 27 37 68**
- **redalsa@redalsa.com**
- **www.redalsa.com**

■ Rail electrical welding LBS are arranged to form 288 meters for high-speed train strecht and convencional rail network.

■ Engeneering services and integral management for electrical welding factories and management of rail stockpiles.

■ Regeneration of used rails to make LBS.

■ Providing fastening complet systems. Manufacture of metalic elements for diferents fastening systems. Iron sheets J2.L1 or P50 for J2 and Elastic fastening clips SKL-1, SKL14, SKL12 and new variant to "Fast-Clip".

■ Rail ultrasonic inspection, using hand-held equipment and self-propelled movil equipment until 90 Km/h.

■ Maintenance and repair work of train coaches in our factory. Our facilities are equipped with 3 Km of railway and 3 railway access to RFIG. We have all the necessary traction resources of 1668 track width.

■ Thermal aluminium welding kits distribution.

SEMI, S.A. (GRUPO ACS)

- **Avda. de Manoteras, 6 2ª Planta 28050 Madrid (MADRID)**
- **P: +34 91 308 93 35**
- **F: +34 915 218 597**
- **ferrocar@semi.es**
- **www.semi.es**
- **www.grupoacs.com**

A society in international expansion. With the adaptability of a small business, the infrastructure of a big company and the financial backing of a large group. SEMI is encompassed in the major companies of Industrial Services sector of the ACS group.

Focused in the industrial field, SEMI build infrastructures for energy, transport, communication, environment and non-residential building. Activity in the railway area: Electrification and Traction Substations for AC and DC, Auxiliary Electrical Equipment, Engineering and Consulting, Maintenance of Catenary and Substations, Infrastructure for Railway Signaling and Communications.

SEGULA

- **Oquendo 23, 1ª planta 28006 Madrid**
- **T: +34 917 991 112**
- **F:+34 917 991 113**
- **www.segula.es**

SEGULA Technologies is an international engineering consultancy group specialised in cutting-edge innovation.

Since 2002, SEGULA Technologies is present in Spain. We are an engineering services company with more than 1.000 professionals working in Staffing, Consultancy, PLM and Fixed Price Projects.

It is based in 12 locations in Spain: Madrid, Barcelona, Vitoria, Zaragoza, Bilbao, Pamplona, Vigo, Valladolid, Vigo, Valencia, Sevilla and Cartagena close to the main customers.

In 2016, SEGULA Technologies turnover in Spain was more than 54 million Euros. More than 60% of our collaborators are university graduates. Our customers include leading companies in leading sectors: aeronautical, automotive, energy, industry, IT, rail, etc…

SENER INGENIERÍA Y SISTEMAS, S.A.

- **Severo Ochoa, 4 (PTM) 28760 Tres Cantos (MADRID)**
- **P: +34 91 807 70 68 / 71 74**
- **F:+34 91 807 87 32**
- **dep.infra@sener.es**
- **www.sener.es**

Sener is one of the leading engineering and technology groups in Europe with over one billion euros of annual turnover, more than 5,000 professionals and a continuously growing international presence with offices in more than 15 countries.

In the field of railway engineering, Sener count on an extensive experience in metros, light rail trains systems and tramways, conventional railway line, freight transport and High Speed Lines. Sener's activities range from preliminary, conceptual and feasibility studies, basic and detailed engineering to project management services, supervision of works, value engineering or ICE services.

SICE TECNOLOGÍA Y SISTEMAS

- **C/ Sepúlveda, 6 - Pol. Ind.Alcobendas 28108 Alcobendas (MADRID)**
- **P: +34 916232200**
- **F: +34 916232201**
- **sice@sice.com**
- **www.sice.com**

SICE Tecnología y Sistemas, (SICE TyS) is a multinational group of Companies, technology and systems integrators operating in the fields of traffic and transport, environment and energy, telecommunications and all types of industrial processes.

SICE TyS's transport activities are focused on meeting the needs of users, operators and transport operation concessionaires in the transport sector. As a systems integrators and systems suppliers, they offer unique technological solutions tailored to all kind of installations.

Design of the Centralized management of all services that complement any form of public or private transport and integrates different solutions and systems:

- Security&Safety Systems for Metros and Railways
- Telecommunications Systems for Metros and Railways
- Signaling: (Interlocking, Level Crossing, CTC)
- Electric BRTs
- Ticketing
- Public transport prioritization
- Consulting Engineering (OFITECO): Railways lines, Tunnels, Load test (railways bridges).

SIEMENS RAIL AUTOMATION S.A.U.

- **Ronda de Europa, 5 28760 Tres Cantos. (MADRID)**
- **P: +34 91 514 80 00**
- **www.siemens.es/railautomation**

Siemens Rail Automation is the resulting Company after the acquisition of the Invensys Rail Dimetronic group by Siemens. The new division offers integrated mobility solutions through the most advanced technologies for railway signalling and train control.

Our main purpose is the supply of "turn-key" projects, including all the phases of design, development, supply, manufacturing, installing, testing, commissioning and maintenance of railway signalling systems and automatic train control systems for either mass transit applications as main line and high speed lines.

The solutions and systems of Siemens Rail Automation allow railways and metropolitan networks to improve the safety of their railway application; increase the capacity of the lines; reduce operating costs; optimize maintenance works; obtain a better usage of its rolling stock, having at the same time lower energy consumptions rates and to decrease energy consumption.

STADLER RAIL VALENCIA S.A.U.

- **Pol. Ind. del Mediterráneo C/ Mitjera, 6 – 46550 Albuixech (VALENCIA)**
- **P: +34 96 141 50 00**
- **F: +34 96 141 50 02**
- **info@stadlerrail.es**
- **www.stadlerrail.com**

The new Spanish División of Stadler has a long history as rail vehicles provider. Stadler Rail Group completed the purchase from the Vossloh Group of its Spanish business unit of manufacture of locomotives and light rail vehicles at the end of 2015. This acquisition falls within the long term growth strategy of the Stadler and reinforces its position as one of the leading manufacturers of railway vehicles with new products and the access to new markets.

Technology and quality are the key points of the entire range of products developed and produced in the Valencia plant. Closely linked with the industrial heritage of railways and with the benefit of more than a century of experience, Stadler Rail Valencia designs and manufactures state-of-the-art locomotives as well as passenger trains and provides a comprehensive range of services such as the maintenance of the vehicles, spare parts logistics, technical support or training.

TALLERES ALEGRÍA, S.A.

- **C/ Peña Santa, 7 - P.I. Silvota 33192 Llanera (ASTURIAS)**
- **P: +34 985 26 32 95**
- **F: +34 985 26 60 1**
- **talegria@talegria.com**
- **www.talegria.com**

Talleres Alegría with more than 100 years at the service of railway´s networks, offers to its customers a wide range of fixed track equipment with the best quality and service conditions. Following its own technical design or its customer's, Talleres Alegría manufactures among other turnouts for High Speed Lines, conventional Lines, subway and Tramway lines, as well as End Forged Switch Points and Track Vehicles.

Being aware of the relevance of comfort within the railway sector, Talleres Alegría has collaborated with leading companies developing and applying technical solutions for mitigating noise and vibrations during the crossing over the turnouts.

TECTATOM

- **Avda. Montes de Oca, 1 San Sebastián de los Reyes 28703 Madrid (MADRID)**
- **P: +34 91 659 8600**
- **F: +34 91 659 8677**
- **correo@tecnatom.es**
- **www.tecnatom.es**

Tecnatom has more than 50 years of experience in the application of Non Destructive Testing (NDT) to the inspection of components. It also offers its high technological level in the development and application of inspection systems and techniques to the railway market, where security and quality control are increasing required. Tecnatom can provide its depth knowledge on materials currently used or tested in the railway sector (metals or new materials carbon-fiber based), taken advantage of its activities in the nuclear and aerospace sectors.

The main fields where it is carrying out activities in the railway sector are:

- Inspection services for infrastructures and rolling stock
- Development of inspection techniques and procedures
- Development of inspection equipment and systems (ultrasonics, eddy currents) for rail transport components (track, axles, bogies, wheels)
- Training of operators on Non-Destructive Testing (NDT) techniques
- Development of training simulators for train drivers.

TECNIVIAL

- **C/ Livorno nº59 CP 19004 Marchamalo (GUADALAJARA)**
- **P: +34 949 32 50 00**
- **F:+34 949 25 20 80**
- **export@tecnivial.es**
- **www.tecnivial.es**

Created in 1973, Tecnivial is the Spanish reference in traffic safety. It contributes giving solutions regarding Airport, Railways, and Road Signaling and marking. The challenge for a permanent evolution, technological innovation, and customer´s satisfaction are our identity signs. In Tecnivial we specialize in all types of fixed signalling for roads, both conventional and high speed lines; in this last section are one of the companies approved by the Railway Infrastructure Administrator (ADIF).

We have extensive experience in railway stations signalling, carefully following the specifications of the corporate identity manuals. We develop comprehensive and customised signage projects, from project design to final installation and maintenance service. Tecnivial has always been committed to the I+D+i, which has allowed it to be a reference in the fixed railway signaling, high-speed and conventional network, while being present in the most relevant projects at the national level; this is the case of the Madrid-Figueras or Olmedo-Orense sections, and internationally, Ave Medina-La Meca.

TEKNORAIL SYSTEMS, S.A.

- **Paseo de la Castellana, 91 28046 Madrid (MADRID)**
- **P: + 34 91 515 60 00**
- **F:+ 34 91 564 72 86**
- **info@teknorail.com**
- **www.teknorail.com**

Teknorail Systems, S.A. is a company

belonging to the EUROFINSA Group, whose activity focuses on the development of railway interior projects, aimed both for the refurbishment of existing vehicles and also for new rolling stock, with a scope of supply that ranges from the design and engineering to the industrialization and material supply, including the technical assistance to the car commissioning.Teknorail's main goal is to provide its customers with high-quality solutions for railway interiors by means of innovation, global project management, modular supply and flexible solutions.

TELICE

- **Pol. Ind. Onzonilla, 2ª fase**
  24391 Ribaseca
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- **P: +34 987 22 10 04**
- **F: +34 987 26 44 07**
- **telice@telice.es**
- **www.telice.es**

Telice is a Spanish company with 39 years of experience in several fields of technology installation, especially for the railway sector.
Our activities cover design, installation and maintenance for Railway Electrification Systems, Railways Safety and Signalling, Optical Fiber, Industrial Automation and Electrical Installations Our extensive experience has made Telice a preferred partner for carrying out work and providing services for important railroad administrations and major construction and technology companies in the railroad industry.

THALES ESPAÑA GRP, S.A.U.

- **Serrano Galvache, 56 Edificio**
  Álamo 4º, Planta Sur.
  28033 Madrid
  (MADRID)
- **P: +34 91 273 72 00**
- **F: +34 91 273 78 67**
- **jose.villalpando@thalesgroup.com**
- **www.thalesgroup.com**

Thales is a World leader in Mission Critical Solutions for Land Transportation. Thales Spain, with more tha 60 years of experience, has been pioneer and leader in the technological development of the Spanish railways, beein one of the main suppliers of safety and telecommunication systems for the Spanish Railways Administrations and present in countries as Turkey, Mexico, Algeria, Malaysia, Egypt and Morocco. Its activity goes from the development, manufacturing installation, commissioning to the maintenance of equipments and systems for railway signalling, train control, Telecommunication, Supervision ticketing and critical infrastructures security.

TPF GETINSA-EUROESTUDIOS,

- **C/ Ramón de Aguinaga, 8**
  28028 Madrid (MADRID)
- **P +34 91 456 09 82**
- **F: +34 91 456 09 83**
- **internacional@getinsa.es**
- **www.getinsa.es**

With more than 50 years of experience, TPF GETINSA EUROESTUDIOS has grown into a leading business group in Spain and an international benchmark in the engineering sector of transportation infrastructures and the environment. The projects and studies required to develop public works and linear infrastructures are achieved thanks to our human and material resources.
We are experts on the comprehensive management of infrastructure in all its phases, starting from the preliminary design up to the operation and maintenance, including all the intermediary steps as profitability analysis, studies, projects, works control and supervision, as well as financial management.
These activities are developed both in Spain and abroad. Our international delegations have been established in different countries and our experience extends over 40 countries in Europe, Asia, America, Middle East and Africa. We are currently working international projects in 30 countries.
At present, the TPF Getinsa-Euroestudios employs more than 1200 professionals, two thirds of whom are university graduates.

TYPSA

- **C/ Gomera, 9. 28703**
  San Sebastián de los Reyes
  (MADRID)
- **P: +34 91 722 73 00**
- **F: +34 91 651 75 88**
- **madrid@typsa.es**
- **www.typsa.com**

Typsa Group is one of the most important European consulting groups and leader in the fields of civil engineering, architecture and the environment. Since its creation, in 1966, Typsa Group's ever-increasing activities, having focused both on preliminary assessment and on design, as well as supervision and/or management of construction projects in Europe, the Americas, Africa and the Middle East. Typsa is one of the most experienced Spanish consulting firms in the field of railways and metro systems. We have been involved in more than 4,700 km of High Speed lines (HSL), 2,600 km of conventional lines, 390 km of conventional metro and 450 km of tram and light-rail transits.

VALDEPINTO, S.L.

- **Calle Águilas, 9 - Nave 11**
  28320 Valdepinto
  (MADRID)
- **P: +34 91 691 42 68**
- **F: +34 91 691 57 03**
- **lauraparra@valdepinto.net**
- **www.valdepinto.com**

Valdepinto, S.L. was established in 1986 and focuses its activities in the Railway sector.
We have four main product lines:
- All types of machining (specialists in electrical insulation).
- Screen printing, Signs and Engraving low-relief.
- Metal transformation and welding.
- Design and fabrication of transformers and coils of high/low voltage. Our philosophy is to always offer all our clients an unbeatable value for Money, combined with an excellent service.

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