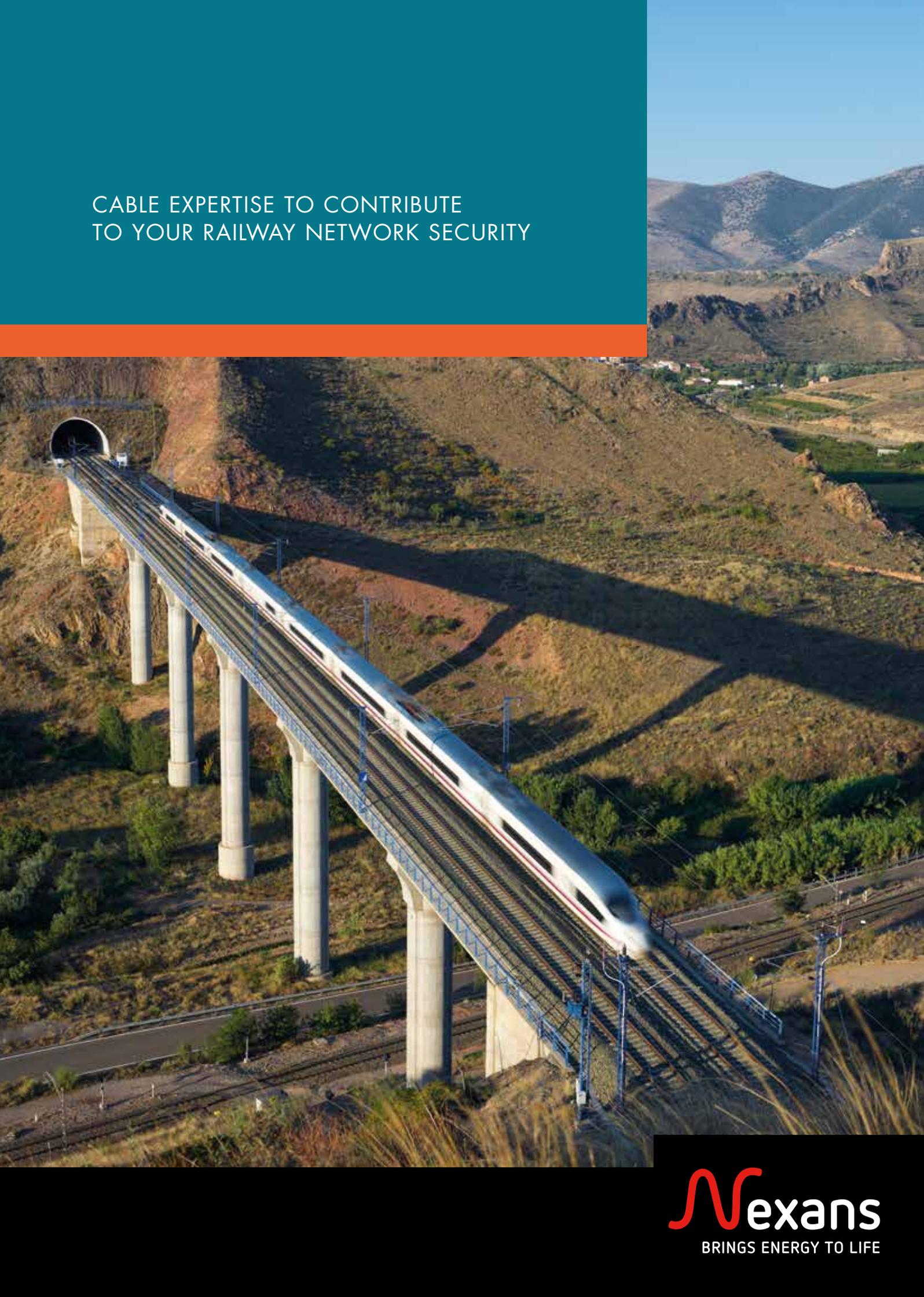


CABLE EXPERTISE TO CONTRIBUTE
TO YOUR RAILWAY NETWORK SECURITY





HIGH-PERFORMANCE TRAINS NEED EFFICIENT INFRASTRUCTURE

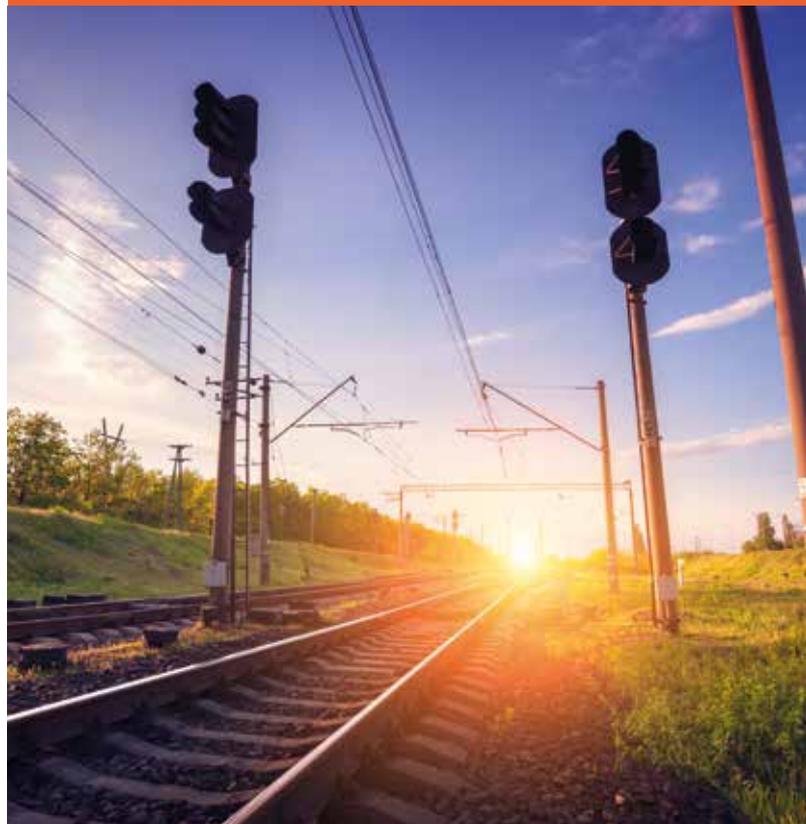
Rail transportation is very dependent on the quality of the infrastructure that supports it, and that includes cables and cabling systems for telecommunications and energy. Modern high-speed trains demand cables with different characteristics in terms of bandwidth, safety, electromagnetic immunity and resistance.

A definite trend is interoperability, which allows trains to move easily across borders and even continents. Here, too, cables must comply with the new consolidated ERTMS/ETCS standards which are progressively integrating GSM-R radio technologies for train control, while continuing to rely on older route control systems (relay interlocking) for safety and redundancy.

Indeed, safety has become a prime concern for the world's rail operators, and there is a demand not only for more reliable operating systems, but also for materials with improved fire-performance characteristics, especially in tunnels, stations and public areas. Urban mass transit, subways, fully-automated metros, light rail suburban lines and trams are experiencing substantial growth, especially in Asia. Each rail mode has its own cable needs.

What railway operators expect of a cable manufacturer:

- Range of high-quality cables from one supplier
- Mastery of energy, data and radio-based technologies
- Installation for mainline, mass transit, tunnels, right-of-ways, etc.
- Enhanced fire performance for public and infrastructure safety
- Interoperability, open standards, and worldwide compliance
- Cable efficiency, compactness, lightness, and resistance
- Low costs, minimum maintenance, easy upgrades





NEXANS HELPS YOU CREATE THE NETWORK YOU NEED FOR GROWTH

Nexans produces a wide choice of power, signalling and telecommunications cables and components, specifically adapted to evolving rail infrastructures.

In public areas and tunnels, virtually all of these cables are halogen-free, as well as flame-retardant, and thus assure low toxicity and minimal smoke to enhance survival, firefighting and emergency operations. For advanced telecommunications and train control, Nexans covers Wide Area Networks (main line); Metropolitan Area Networks for subways, light rail and intercity arrivals/departures; and station range outdoor cables for efficient rail management. Nexans provides trunk line and radio system optical fiber for multileveled analogue and digital railway applications (ERTMS/ETCS). Nexans also advises operators about evolving specifications and standards, and provides customized engineering, turnkey installation and maintenance anywhere in the world. We are engaged in ongoing R&D to keep all products competitive, compatible with modern standards and environmentally-friendly.



Nexans for safety, performance and comfort:

- All power, signalling and telecommunications cables and components for all infrastructure needs
- Advanced characteristics, EM immunity and high fire-performance
- European-based expertise for high-speed trains worldwide
- End-to-end turnkey systems for mainline and mass transit
- Complete train control cabling, from standard solutions to ERTMS/ETCS
- Custom engineering for country-specific challenges
- Innovative installation for trackside, tunnels and stations
- Open standards, interoperability and international delivery logistics
- Presence along the entire value chain, from R&D and design to maintenance and training

NEXANS' CABLE EXPERTISE CONTRIBUTES TO YOUR



RAILWAY NETWORK SECURITY

POWER CABLES AND COMPONENTS

HV and MV feeder cables



HV and MV feeder cables carry power to and from substations along railways and metro lines. Special solutions include EPR or Silicone insulations for

flexibility, and special XLPE insulations to withstand water, oil, heat, stress and extreme temperatures, while meeting Low Fire Hazard requirements thanks to newest sheathing compounds. New designs offer non-hygroscopic characteristics, direct burial for underground-to-surface transitions.

> Nexans is upgrading MV cables for the London Underground to power new vehicles. We power subway systems in Paris, Berlin and Hamburg, and the MAGLEV Transrapid in Shanghai. Recent successes include Athens, Mexico City, Sao Paulo, Santiago, and Istanbul (200 km of 35 KV LFH cables).

MV and LV power cables and accessories



For 50Hz transport and distribution, the regular range of HV, MV and LV cables and components can apply. Nexans produces MV accessories, like joints and

terminations, plug-in connectors and bushings, as well as LV cabinets for aerial and underground applications.

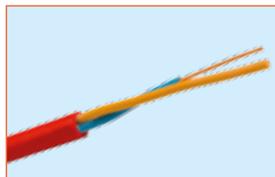
> Nexans has delivered MV and LV connectivity for subways, suburban express lines, and tramways in France and Germany, and supplied cable joints for Shanghai's state-of-the-art Transrapid.

Grounding / earthing cables

Nexans manufactures low-voltage cables for grounding purposes in many sizes, insulation types and fire-behavior specifications.

> To protect persons and material against lightning strikes on Paris' suburban express rail system, the RER, uses Nexans large cross-section LV cables.

Safety cables



These cables are generally halogen-free, low smoke and fire-retardant for subways. They are mainly used for station equipment (lighting, escalator, automatic doors)

and tunnels (ventilation). Cables for emergency equipment are also fire-resistant for circuit integrity, to keep essential services operating during a fire.

> Nexans supplies armored safety cables under a longstanding contract with France's RATP, operator of the Paris Metro, as well as the London Underground.

Fire retardant or fire resistant MV power and feeder cables



In Metro projects, more and more MV feeder cables are now requested with improved Fire retardancy or even with some guarantees of service continuity during

fire, but with application of the operation voltage.

> Nexans has supplied fire resisting MV cables for the subways of Amsterdam and Budapest. Various technologies of insulation can apply, depending upon electrical and environmental requirements.



SIGNALLING CABLES

Multi-core cables



Typically K22 (RATP), A-2Y2YV, A-2Y2YB2Y, A-2Y2YDB2Y. Copper, multi-core signaling and control cables are hybrid energy/telecom cables providing LV

energy and two-way telecom for wayside equipment, vital relays and systems for advanced train control.

> Nexans is involved in the London Underground's Jubilee Northern Upgrade Program which will overhaul, upgrade and refit signalling on key lines. Other subway projects include the Daegu Subway line and Incheon International Airport in Korea, Santiago, Sao Paolo, New Delhi and Hanoi, Reims, and Algiers. In the US, Nexans is a prime supplier to AnsaldoSTS (Pittsburg). In Australia, Nexans has extended its supply contract with Railcorp.

Multi-quad cables



Typically K23 (RATP), ZPAU & ZPFU (SNCF), A-2Y(L)2YV or AJ-2Y(L)2YDB2Y. Copper multi-pair signalling cables are twisted pairs or quad cables providing low

frequency and two-way telecommunications for field equipments.

> For major railway operators, Nexans has developed customized EM-immunity (high-reduction factor) cables which are especially important for high-speed lines. Recent successes include several subway projects, like Santiago (Chile), New Delhi and Hanoi; and subway projects in Reims (France) and Algiers.

Axle counter cables



These cables connect trackside counting points which determine train presence, direction of travel, length, number of wagons and integrity.

> Nexans continues to supply axle counter cables for the London Underground's Thales-based train control system.

Balise cables



Nexans advanced balise cables are flexible, resistant and have Electromagnetic Compatibility (EMC) for HF communications to eventually integrate a fully radio-based

GSM-R traffic management system.

> Recent projects include the Marmaray project (an undersea earthquake-proof tunnel under the Bosphorus, Istanbul), and the New Delhi metro.

DuoTrack® cables



Figure-8 duplex copper/fiber cable, which is securely clamped right on the tracks. It is used to provide routing information with communications and

control functions for regional railway lines, including ETCS capability. DuoTrack® achieves overall ownership cost savings of over 50%.

> In 2009, Nexans received a three-year framework contract from Deutsche Bahn for a DuoTrack® system of about 1,000 km. Nexans not only worked closely with DB, but also with system integrators to achieve a truly unified turnkey solution.



COMMUNICATIONS CABLES AND COMPONENTS

Optical fiber cables



To serve complex signalling and telecommunications for train control, Nexans has developed MANs and LANs optical fiber cables, and is also an expert in GSM-R

technology. To meet the security concerns of tunnels and urban metro systems, we produce metal-armored and all-dielectric OF cables. Increasingly, cost-efficient, compact micro cables are being used in dense subway networks.

> Lisbon's intermodal Gare do Oriente uses Nexans optical-fiber-based LANs to coordinate rail, subway and surface transit, while an all-dielectric cable is used in the London Underground. Recent successes include the ongoing RATP contract (Paris), light rail for the Algiers suburbs, the Caracas subway, and tramways worldwide.

Optical fibre components



Nexans' splicing modules and jointing sleeves optimize fiber routing, thus guaranteeing network integrity. They are easily implemented as an end-to-

end solution in distribution frames, splicing closures and access points. Our modular Optical Distribution Frames provide a complete architecture for main exchange nodes or point-of-presence applications. Splice protection closures are used along the line or at access points to the local loop.

> Nexans has provided special jointing sleeves for many urban rail projects in Europe. Robust closures can handle repeated re-entries and accept a fiber-copper mix. On top of this Nexans can adapt several types of splicing and distribution modules to cover all possible OF installations, including wall mounts or underground chambers while offering water-tightness and superior fire performance.

Copper long distance communications cables



From multi-pair telephone, radioflex and data cables to sophisticated hybrid copper/fiber for train control, control-to-control, voice transmissions for internal telephony or loudspeaker information, video transmission, ticketing machines networking, etc.

> For the London Underground, Nexans has outfitted emergency signal post telephones along the line to provide communications backup for subway drivers.

Radiating cables



These perforated coaxial cables act like antennas in confined environments, like tunnels or subway stations, where conventional antennas cannot operate. They are extremely important for radio-based technologies.

> Nexans provided integral cabling for the 35 kilometer Lötschberg railway tunnel in Switzerland, the longest land tunnel in the world. Along with energy and optical fiber links, radiating cables assure full GSM-R operability. Nexans has also supplied radiating cables to the London Underground for many years.

SERVICE AND SUPPORT ALL ALONG THE LINE

GLOBAL EXPERTISE

The fact that we master all cabling technologies means that we are able to efficiently upgrade old infrastructures and install new ones. Since railways and urban transit systems are faced with enormous cost pressures, Nexans has developed innovative turnkey products, which include system engineering, project management and maintenance.

LOCAL PRESENCE

With our European experience and knowledge of international standards, we can act anywhere on the globe, even on major transnational products, often

providing our customers with local manufacturing capability and fast delivery. Key products have been fully qualified for southeast Asia (including China's CCC).

TECHNICAL LEADERSHIP

Familiar with traditional and new train technologies, like high-speed lines, radio-based train control, and maglev power systems, Nexans has continued to innovate on all levels. It takes an application engineering approach to find customized solutions for tunnels, urban and mainline networks, and stations, always with fire safety in mind.

Nexans brings energy to life through an extensive range of cables and cabling solutions that deliver increased performance for our customers worldwide. Nexans' teams are committed to a partnership approach that supports customers in four main business areas: Power transmission and distribution (submarine and land), Energy resources (Oil & Gas, Mining and Renewables), Transportation (Road, Rail, Air, Sea) and Building (Commercial, Residential and Data Centers). Nexans' strategy is founded on continuous innovation in products, solutions and services, employee development, customer training and the introduction of safe, low-environmental-impact industrial processes. In 2013, Nexans became the first cable player to create a Foundation to introduce sustained initiatives for access to energy for disadvantaged communities worldwide. Nexans is an active member of Europacable, the European Association of Wire & Cable Manufacturers, and a signatory of the Europacable Industry Charter. The Charter expresses its members' commitment to the principles and objectives of developing ethical, sustainable and high-quality cables. We have an industrial presence in 40 countries and commercial activities worldwide, employing close to 26,000 people and generating sales in 2015 of 6.2 billion euros. Nexans is listed on NYSE Euronext Paris, compartement A.

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