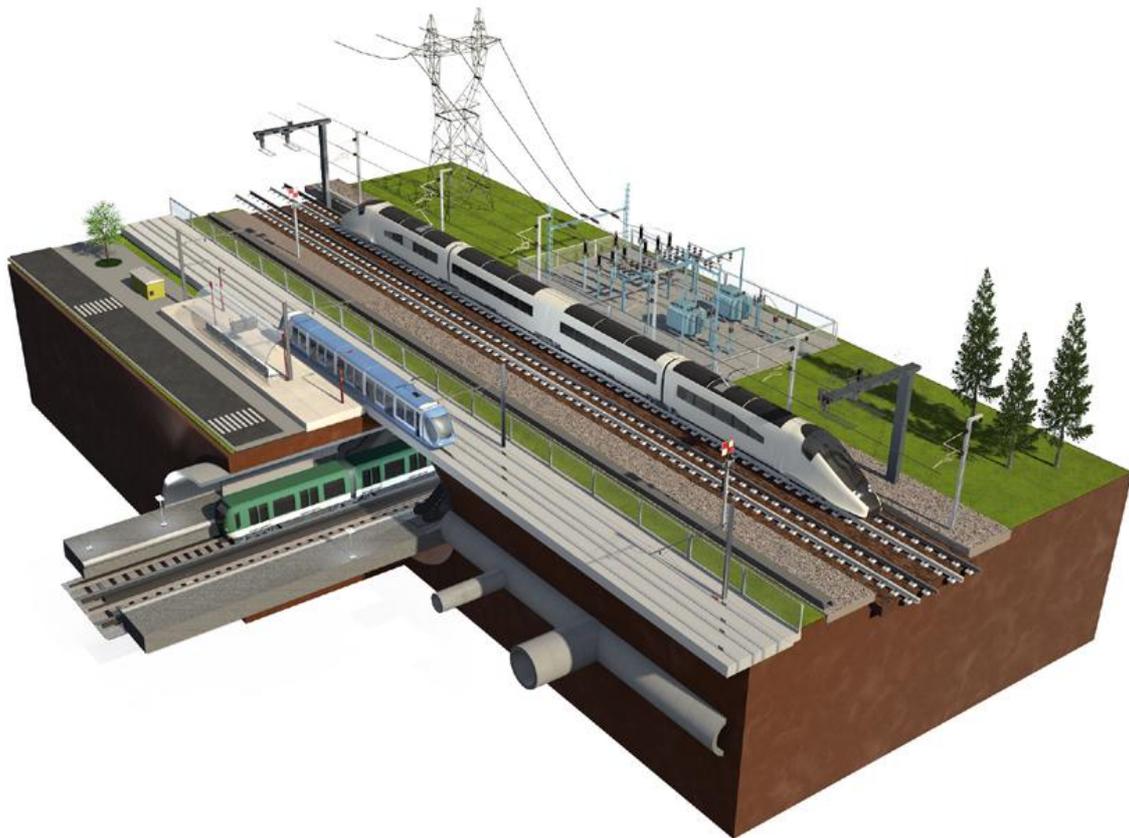




Rail infrastructure shapes the mobility of tomorrow

Railway Infrastructure White Paper



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Synopsis

This report is intended to give a general overview of the global Railway Network market and provide information about how Nexans is continuing to provide new products, solutions and services to serve that market.

It opens with a broad description of the world Railway Industry and how it is affected by global transportation requirements, the cost of energy, climate change, customer demand, geographical constraints and recent technical developments. Both sides of the rail equation – infrastructure and rolling stock – are affected by these major trends, and both in turn affect each other. They are highly symbiotic.

Then the paper briefly examines current trends in Railway Infrastructure, itself. Some developments are demand-driven; others are related to government policy, technological changes, the public demand for information as part of the travel experience, and operator needs, like predictive maintenance. This concludes with a brief list of customer expectations.

The third section explains Nexans’ involvement in three basic areas of Infrastructure: Main Lines, Main Stations, and Urban Mass Transit (although these three areas contain subcategories: Regional lines fall under Main Lines, Main Stations are also Buildings, as well; and Urban Mass Transit includes several kinds of rail vehicles, like Suburban Light Rail, Metros, and Tramways, etc. each with its own infrastructure needs.

Next it reviews some diverse but basic products for all of the basic areas, and concentrates on four innovations, concluding that such a broad scope of infrastructure solutions requires a generalist cable supplier deeply involved in services, research and constant innovation.

INTRODUCTION: BROAD INDUSTRY TRENDS

“Infrastructure shapes mobility. No major change in transport will be possible without the support of an adequate network and more intelligence in using it. Overall, transport infrastructure investments have a positive impact on economic growth, create wealth and jobs, and enhance trade, geographical accessibility and the mobility of people.” **EU Roadmap to a Single European Transport Area – 2011**

World population growth is expected to increase to nearly 10 billion by 2050, with most people living in or near cities, a fact that impacts the movement of people and goods, especially in areas of high congestion.¹ Already, every year the planet’s rail lines carry 10 billion tons of freight and 21 billion people. Demand for rail is outpacing current capacity and creating bottlenecks.

Energy dependency, climate change, speed, etc.

Since rail is two to five times more energy-efficient than road or air, the EU’s Roadmap (quoted above) foresees cutting oil dependency and reducing greenhouse gases in transport by 60% by 2050, with 50% of road freight over 300 km shifted to rail by mid-century. Today, High Speed Rail (HSR) accounts for about a third of total long-distance passenger rail traffic in Europe overall, while in France and Germany, HSR accounts for nearly two-thirds of domestic long-distance service. The EC roadmap calls for tripling the HSR network by 2030, which means that by 2050 most medium-distance passengers will opt for rail over road and air travel.

Multimodal hubs and standardization

Demand currently outstrips capacity at many of Europe’s airports. In fact only about a dozen airports are connected to long-distance main lines or HSR. Under the EU’s TEN-T program, multimodal hubs will be introduced at 37 key airports.

At present, 20 different signaling and speed control systems are operating in Europe. They use various frequencies and voltages to handle rail traffic. That is why the European Rail Traffic Management System (ERTMS) is striving to create a unique signaling and communication standard throughout Europe, which will increase efficiency and reduce costs.

Standardization is also an IT issue. Introducing new interoperable and integrated standards will make processing easier, and simplify ticketing, especially where interlining with other rail carriers is involved. This will allow rail companies to compete more efficiently with air travel, and will make life easier for travelers wishing to book a complex cross-border journey. As one analyst expressed it: “We must never again forget that the passenger (and one might add, the shipping agent) is King!”

¹ For many of these trends, consult: <http://ec.europa.eu/digital-agenda/futurium/en/content/trends-rail-transport>

Geographical development

Approximately 90% of all railway traffic (freight and passenger) is concentrated in six major networks: North America, China, India, Russia, Japan and the EU 25.

The U.S. rail freight demand is expected to increase by 88% by 2035 and China is poised to quintuple its traffic by 2020. In fact, both China and India show sustained and rapid growth for passengers and freight. China, whose vast network of HSR lines average speeds of 350 km/hr, is even planning to create a two-day high-speed rail link between Beijing and London via India, Pakistan and the Middle East!² Russia is set to invest in electric locomotives and trams/light rail, while Japan is planning an innovative superconductive Maglev 286 km route between Tokyo and Nagoya, which will reach the incredible speed of 500 km/h.³

Meanwhile, Europe, which has been a market leader and seen steady growth over decades, will see a series of transformations, driven by congestion and policy concerns. The UK and France are already investing heavily, and ERTMS is continuing to be rolled-out in three levels of implementation, with interoperability and standardization as prime concerns.

As for new areas of development in what has become a truly global industry, a recent UNIFE study signals that outside of the incumbents, the highest rate of growth in the coming years will be in Africa, the Middle East and in Latin America (from +7.5% to +10%).⁴

Railway innovation

Innovations are creating smarter rail systems around the world. They will become increasingly instrumented, interconnected and intelligent. The global explosion in the use of Radio Frequency Identification (RFID) tags and remote sensors can track the location of cargo, operational status, and the movement of people through urban networks and regional and mainline railway systems.

In 2013, UNIFE'S **Shift2Rail** initiative proposed doubling capacity, increasing reliability by 50% and halving life-cycle costs by encouraging "step-change innovation in all aspects of the rail system."⁵ But what is on the more distant horizon? According to "A Vision for Railways in 2050":

If technological change continues or quickens (which is more likely) we can expect trains without crews (done today in some Metros); real-time system management of all trains without wayside signals throughout the US and the EU; real-time monitoring of all equipment condition and maintenance planning (already done by many airlines and some US freight railways); and even tighter integration of rail services into logistics chains.

² "Back on Track: Making the shift to a 21st century rail network," Amadeus, 2012

³ Railway Gazette International, December 2013, p. 26.

⁴ UNIFE Worldwide Rail Market Study 2012 at https://www.rolandberger.com/media/pdf/Roland_Berger_UNIFE_European_Rail_Industry_20120919.pdf

⁵ Railway Gazette International, June 2013, p. 3

Key drivers

The railway world is not monolithic, due to geographical, historical, economic, political, and cultural differences. However, among key factors likely to transform the rail industry:

- a growing public concern for safety
- a wish for improved comfort, quality, and information access
- greater service frequency and more high-speed networks
- reduction of congestion through multimodality and hubs
- seamless travel through pre-ticketing and air-rail, rail-rail integration
- operational efficiency to control costs and fund future expansion

CURRENT TRENDS IN RAILWAY INFRASTRUCTURE

Customer expectations

Infrastructure shapes mobility in numerous ways, and has an influence on rolling stock, in much the same way that better highways, and new expressways had an impact on automobile design.

Driven by customer-demand for cheaper, safer, more comfortable and efficient rail travel, and national policy objectives for carbon reduction and transportation efficiency for urban populations, railway infrastructures are undergoing significant changes, many of which require advanced cabling solutions.

1. More electrical power in the rail network

Increased rail passenger traffic and higher operating speeds for both urban mass transit systems and High Speed Rail requires more power in the network: for traction, catenaries, switches, onboard systems, customer services, and train management and control.

As the amount of energy circulates through the system, safety requirements increase, and PVC is increasingly replaced with halogen-free cables at several points within the system (including underground access tunnels, structures and station platforms), to reduce the danger of smoke and hazardous fumes. Also, fire-retardant power cables are sometimes replaced by fire-resistant cables to allow vital systems linked to warning, exit, and fire-fighting equipment to continue functioning under fire conditions.

As copper prices rise, so does their attractiveness to thieves, and consequently copper theft has become a serious problem in Europe and worldwide, posing a threat not only to daily operations and scheduling, but also to passenger safety.

There are three solutions to the problem: find a way to better protect the copper in rail side infrastructure, make it harder for thieves to dispose of their copper booty, or find a way to replace copper with aluminum, steel, Copper-Clad Steel (CCS) or Copper-Clad Aluminum (CCA) or other metal combinations.

2. A single railway area

Unlike highways and airlines today, railways have inherited six different gauges, which are in common operation around the world. In fact some countries have several gauges in their networks (Argentina, Brazil, Japan and Spain).

In an age of high-volume international travel, standardizing gauges is definitely a costly and difficult challenge. Once again, a patchwork network not only limits productivity and potential traffic, it provides a considerable impediment to train set manufacturers who would like to sell standard units internationally.

Of course, rail gauge is not the only problem. There are also various voltages and frequencies used as one moves from one country to another, and various signaling and train control systems that require layered onboard systems. There are also various infrastructure management issues that touch everything from hardware renewal to daily maintenance and safety issues.

This requires an intelligent and cost-efficient integration of power cables with signaling cables to make cross-border travel a reality.

3. The European Rail Traffic Management System (ERTMS) + ETCS + GSM-R

Thirty-four countries have now signed up to phase-in Rail Traffic Management technology, making it a prime tool for international “interoperability.”

ERTMS implementation is the backbone of the revised **TEN-T** program, which was adopted by European institutions in December 2013. It would see core routes equipped with ETCS (European Train Control Systems) by 2030.

The ETCS is a signaling, control and train protection system designed to replace the many incompatible safety systems currently used by European railways, especially on high-speed lines. It requires standard trackside equipment and a standard controller within the train cab. In its final form, all line-side information is sent to the driver electronically instead of visually, which would be impossible to decipher at high speeds.

In many countries, we are now at Level 2 implementation whereby voice communications and data transmission is continuous via GSM-R, which is now operational on 70,000 route-km in Europe, with a further 84,000 route-km to be rolled out in coming years. Upgrades in 2015 would allow additional functionality such as automatic train operation, or the use of satellite navigation systems.⁶

An entirely new generation of signaling cables has to meet this challenge, not only for balise or point machine cables, but also for the heavier demands of trackside data communications. It also demands better installation techniques.

⁶ “The long march to interoperability” in Railway Gazette International, January 2014. See: http://www.unife.org/uploads/RG_0114_The_Long_March_to_Interoperability.pdf

4. Enhanced information and communication systems

In parallel to ERTMS, a real-time closed loop of information and communications will optimize networks, improving productivity, energy efficiency and quality of service to passengers.

By and large, today's railways have a rear-view mirror element in their operational structure, determined by timetables. Experienced drivers largely follow a working timetable controlled by trackside signals for safety information. Signalers and controllers also manage the network via timetables, often saying only "stop" or "go." In short, timetable designers often work in their own silos, meeting pre-set service criteria.

Seldom do they make use of modern data communications, which could bring all network operations together in an integrated seamless system that could deliver a higher quality of service and reduce energy use by up to 33% (according to a recent Japanese railway study).⁷

Passengers also desire enhanced communications, especially comprehensive IP services which include Internet access, travel information, dynamic route maps and entertainment, whether waiting in train stations or in movement. In a world where the Internet is enriching so many of our leisure and work activities, it should come as no surprise that train travel, whether urban mass transit, suburban, regional or main line will have to make information access an important part of the travel experience, if growth is to be assured.

What this means is that railway operators have much to gain by upgrading their Local Area Networks (LANs), their Metropolitan Area Networks (MANs) and their Wide Area Networks (WANs) to get the most out of what modern technology has to offer in terms of information, communication and analysis, which translates into operational efficiency and enhanced public safety. That requires an upgrade of station and trackside telecommunications, including latest generation optical fiber technology to handle heavier data traffic and GSM-R demands.

5. Predictive and proactive condition-based network maintenance

Unlike machinery on the factory floor, trains move long distances, and need to be managed remotely. That also applies to tunnels and the physical network, including power supply, drainage channels, and even components like bridges and piers.

Maintenance is complicated because the object is a "moving target" both in terms of space and time, subject to local conditions and events, and daily wear and tear.

What is needed is a "data spine" across an entire network to allow an infrastructure manager to introduce route-based maintenance management assessment that can model failure patterns and identify high and low risk components for whole-life asset management, especially for power supply equipment and line-side signal cabinets.⁸

This "smart maintenance" concept which will shift from time-based to condition-based maintenance will require sophisticated information and communication technology based

⁷ For more information, consult "Exploiting rail's full potential" by Oskar Stalder in Railway Gazette International, January 2013, p 66.

⁸ See "Develop a data spine to optimize maintenance" by Ted Stephans in Railway Gazette International, March 2013 for further detail.

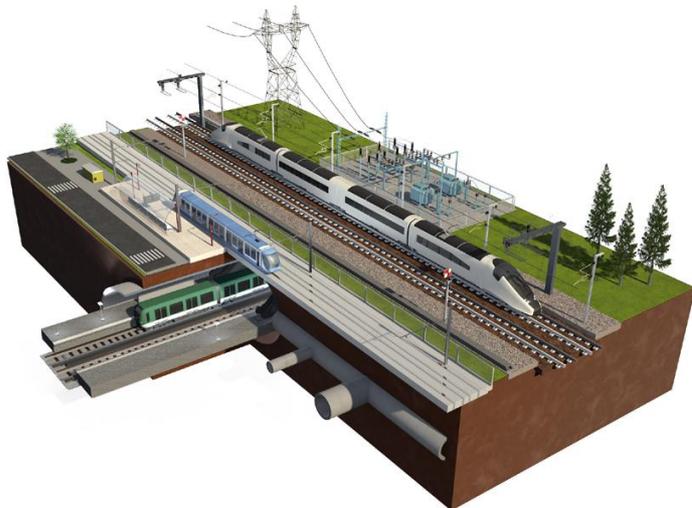
on a track-side cable systems which could even incorporate an Automatic Track Warning System (ATWS) to protect staff working on repairs.

Expectations of a cable manufacturer

- A full range of power, signaling and communication cables and solutions to meet all current and future infrastructure needs, both trackside and at stations, control centers, etc.
- Because of the international nature of railway expansion worldwide, a regional supply base, with firm guarantees that a certain percentage of supply will be locally manufactured or easily available.
- Innovation to ensure faster and easier installation of key elements like axle counters, and, if required, full compliance of cables with national standards, and also the ability to evolve and adapt to changing infrastructures (including backward compatibility with existing networks).
- Solutions to problems like copper theft, and advanced safety assurances in terms of fire-resistance, not only for safety cables, but also for medium-voltage and telecom cables.
- New installation methods that can reduce time and cut costs.
- Optical fiber universality in the IP world, coupled with ruggedness in the field.
- Reduction of complexity in cable and system procurement, a simplification of references for buried cables, and a harmonization of specifications and designs.
- Advanced technical knowledge from a trusted supplier, since in many cases operators are losing their long-acquired expertise through generational attrition of their own in-house experts.
- Special services, like inventory management and e-services.

NEXANS: A GLOBAL LEADER IN THE INDUSTRY

Three basic areas



As a leading international cable manufacturer, Nexans produces a wide choice of power, signaling and telecommunications cables and components, specifically adapted railway infrastructure. This not only serves intercity lines, both mainline and regional, but also Urban Mass Transit infrastructures for subways, light rail, tramways and automated people movers.

Nexans also advises operators about evolving specifications and standards, provides customized engineering, ensures local content and technology transfers, and has a long tradition of working with preferred suppliers and prime contractors on international megaprojects. It is engaged in ongoing R&D to keep all products competitive, compatible and environmentally-friendly.

Main Lines: Nexans produces infrastructure cables for electrified High Speed Lines, as well as for conventional or regional lines in accordance with international, local or specific Engineering, Procurement and Construction (EPC) company standards. One of its prime areas of research is not only to safely upgrade energy and communications for main line operations, which are increasingly High Speed Rail in many countries, but to help traditional operators to find safe new ways to electrify their regional networks (see DuoTrack® below).

Main Stations: Today's central and main stations are quickly becoming as complex and multifunctional as major airports, with many of the same operational, informational, and security needs. They are also preparing for important upgrades to accommodate the trend towards multimodal hubs, which will integrate the movement of people and goods by seamlessly interconnecting with buses, tramways, subways, people movers, commuter trains, road transport shippers, and international airports. Nexans' wide range of building cables for power distribution, and integrated network solutions for signaling, control and telecommunications meet the challenge of this new reality

Urban Mass Transit: As urban and suburban transport evolves, infrastructure must evolve as well. Nexans produces a wide choice of cables, components and solutions specifically adapted to all urban mass transit infrastructures. This global offer includes medium and low-voltage power and feeder cables and vital accessories. In addition to signaling and control cables, it offers the latest solutions for communications-based train control, onboard surveillance, and video and Internet capability

High-performance railway infrastructure cables and components

- 1. Traction-feeder cables:** For MV and HV energy transmission to and from transformer substations and for powering catenaries and systems; installed along the tracks; a new generation with non-hygroscopic characteristics can be directly buried.
- 2. Power distribution cables and components:** For 16.7/50/60 Hz current, these standard cables can be installed as easily as traditional energy networks; there exists a wide range of earthing cables available with optional anti-theft markings or metal-hybrid constructions.
- 3. Signaling cables:** These energy and telecommunication copper cables provide LV power and bidirectional communications for trackside equipment and vital relay stations; they come in multi-conductor or multi-pair/quad versions.
- 4. Axel counter cables:** Armored and unarmored 90 kHz multi-conductor cables provide information on train position, circulation path, length, number of cars and train integrity.
- 5. Optical-fiber cables:** To handle data exchange for Automatic Train Control, they come in LAN, MAN, and WAN versions with special protection in tunnels and against fire; also new solutions using micro-bundles which are compact and cost-effective.
- 6. Radiating cables:** Perforated coaxial cables which function as antennas in confined areas, like tunnels, subway stations, etc. where traditional antennas do not work; vital for radio technologies.
- 7. Optical IP switches:** To interconnect Ethernet-based track devices used for communication and monitoring. With 3 fiber optic uplink ports and 8 copper ports supply IP cameras, phones, WLAN access point with Power over Ethernet (PoE). Innovative solutions for cost-effective upgrades and safety

1. All-in-one DuoTrack® for easy electrification:

Back in 2007, Nexans launched DuoTrack®, a breakthrough in train control and communication network technology. By combining copper-based functions and fiber-optic transmission in a single rail-attached cable it gave non-electrified regional lines the same security guarantees as main lines in terms of signaling, train control, telecommunications and advanced ETCS and GSM-R.

This hybrid cable is clamped directly to the rail, and allows operators to save 30-40% of cable installation time, while achieving cost savings of over 50% for their complete system. This innovation also discourages copper theft since stealing cable requires the painstaking removal of the clamps placed at short distances from each other, which is not feasible for thieves, and is even quite dangerous.

DuoTrack® is a complete cabling system which includes cable, hybrid closures, custom-built clamps and branches and advanced laying equipment. It has been rigorously tested



by Germany's Deutsche Bahn over a nine-year period on the main transit line between Germany and Scandinavia, and is now approved by the German Federal Railway Authority (EBA). Recently, Nexans was awarded a first export pilot in Croatia to be installed in October 2014 which provides an important precedent for the revitalization of long-existing railway networks in Europe and elsewhere.

2. Eurobalise cables for interoperability

These fully compliant ERTMS cables combine reliability, mechanical strength and electromagnetic compatibility for carrying HF signals for the overall traffic control system. Phased in with GPS, ERTMS will improve safety and efficiency, and promote standardization and interoperability.



Nexans originally developed halogen-free signaling cables for Level 1 ETCS Eurobalise applications to connect trackside signaling equipment to radio beacons which transmit vital data to the train's onboard computer. They are now fully operative on Level 2 installations, as well.

Eurobalise cable has a low mutual capacity of around 42.3nF per kilometer, which is low enough to transfer data and energy over long distances (up to several kilometers). It is also designed to survive between and along the tracks. Halogen-free insulations make it safe for people and equipment. It can operate in -30° to $+70^{\circ}$ temperatures, and is protected against rodents and water.

3. Flame-retardant, fire-retardant, fire-resistant cables for protection



Along with special designs, which include easy-strippability, armoring for safe pulling operations and protection against EMI, Nexans has a line of Low Fire Hazard (LFH) cables to meet public and material safety concerns.

Nexans has developed, for safety powering in substations, fire Resistant Medium-Voltage Cables up to 20kV in two different technologies.



Flame-retardant cables use synthetic fillers that are self-extinguishing, generating low smoke and gas; fire-retardant cables do not propagate fire; and fire-resistant cables ensure that vital equipment will continue to operate during a fire to keep exit lights and exit signs lit, signaling information flowing, and fire-fighting equipment operating.

Note that all safety cables are LSOH, i.e. halogen-free, meaning low-smoke, and minimal corrosive and toxic gas emission in the case of a fire to protect travelers, infrastructure and equipment.

4. Rheyrail® and Coretag® to discourage copper theft

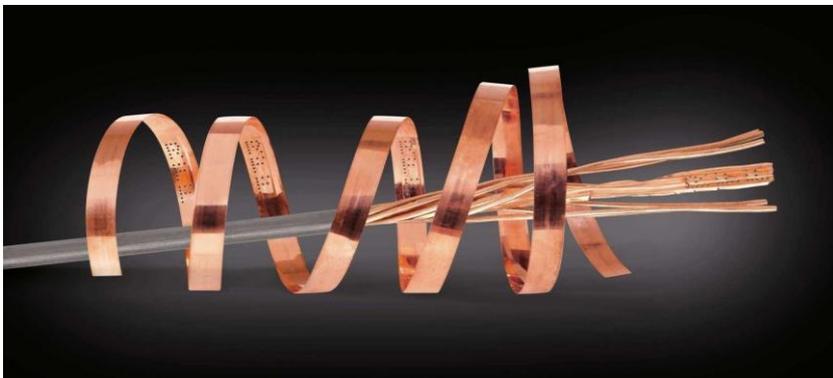
Since copper reached record values, stealing copper cables along railway tracks has become a lucrative business for organized criminal gangs. Across Europe, hundreds of incidents occur both night and day, adding up to thousands of tons of lost conductors (primarily copper) and a replacement bill which runs into hundreds of millions of Euros.

Also, copper theft causes service disruptions that can greatly exceed the replacement costs of cables. Moreover, degradation of vital infrastructure is a threat to achieving the highest standards of public safety.



For surface-installed grounding wires (between power poles and rails) Nexans has developed RHEYRAIL®, a standard-sized copper-core conductor. This cable discourages copper theft through hard-to-cut, fine steel wire strands at the core and outer layer; integrated and insulated monitoring wires for fast detection; rugged steel-tape armoring to protect conductor and cable survey; and a heavy-duty polyurethane halogen-free sheath jacket to hamper sheath removal. Also its conductor size and capacity fully complies with standard connectors, lugs and ampacity.

In parallel, Nexans also created the CORETAG® solution. Since thieves burn off cable insulation to remove recognizable markings ("fingerprints" or cable "DNA"), the solution intertwines a fire-resistant copper tape within the strands of copper conductor. A perforated code clearly identifies who owns (or once owned) the copper, thus discouraging resale. Apart from being impossible to remove and nearly indestructible by fire, the tape maintains the conductivity of the cable.



CONCLUSION

Nexans: a global expert in infrastructure solutions

As this paper shows, Nexans produces a wide choice of cables, components, and solutions adapted to all railway infrastructures. This global offer includes medium and low-voltage power and feeder cables and vital accessories. In addition to signaling and control cables, Nexans also produces axle counter and latest-generation balise cables.

For advanced and interoperable Rail Traffic Management and Train Control Systems (which are now a growing world phenomenon), it offers multiple solutions, including radiating and data cables and optical fiber/copper cables to support LANs, MANs and WANs. In public areas and tunnels, virtually all cables are Low Fire Hazard (LFH), and this in itself is making a real contribution to improving public safety.

Research & Development and innovation

The fact that Nexans masters all cabling technologies means that it can play an important role in upgrading old infrastructure (including recycling) and help install new ones, often with special solutions to meet challenges like water ingress, cable burial, ultra-cold conditions, resistance to oil, chemicals and rodents.

Familiar with traditional and new train technologies, like radio-based control systems for metros, trains and tramways, Nexans research centers are continuing to innovate in terms of raw materials, compounds, cable designs, processes, and advanced network solutions.

Nexans continues to make the dream of seamless mass urban transit and an interoperable "single railway area" a real possibility.



APPENDIX: Some Nexans rail headlines and milestones

2014

After extensive testing of DuoTrack® by Germany's Deutsche Bahn over nearly a decade, Nexans obtained approval for the innovative rail-attached control and communication network technology from the German Federal Railway Authority. Nexans was recently awarded a first export pilot in Croatia to be installed in October 2014.

At the same time, Nexans reinforced its position with main operators all over the world, and especially in Western and Northern Europe.

2012

Nexans' anti-theft CORETAG® was specified for new installations in four French regions vulnerable to cable theft: northern France, the Greater Paris region, the southwest and Languedoc. Fifty kilometers will be used on the high-speed TGV Nord.

2010

Nexans was involved in the London Underground's Jubilee Northern Upgrade Program to overhaul, upgrade and refit signaling on key lines for the London 2012 Olympics. Other subway projects include Daegu and Incheon (Korea), Santiago (Chile), Sao Paolo, New Delhi, Hanoi, Reims, and the Marmaray project in Turkey to link the European and Anatolian halves of Istanbul by an undersea earthquake-proof tunnel under the Bosphorus.

Before 2010

- Delivered MV power cables to metro systems in Paris, Berlin and Hamburg, and MV and HV connectivity for high-speed lines in France, Germany, Belgium and the Netherlands.
- For major railways operators, Nexans developed customized EM-immunity (high-reduction factor) cables which are especially important for high-speed lines.
- Supplied LV power cables for 60 km of new tramway lines around Paris' city circumference to connect suburban communities through tram-train services.
- Provided MV and LV connectivity for subways, suburban express lines, and tramways in France and Germany.
- Nexans heating cables eliminate snow accumulation and ice in Beijing's "Bird's Nest Stadium" which is served by the Olympic line.
- While enhancing CCTV communication and radio systems in the London Underground, Nexans supplied axle counter cables for the system's Thales-based train control system. Also, delivered axle counter cables for Korea's Bundang line.
- 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. Nexans OF cables were also installed in the ongoing RATP contract (Paris), light rail for the Algiers suburbs, the Caracas subway, and several tramways worldwide.
- Provided integral cabling for the 35-kilometer Lötschberg railway tunnel in Switzerland, which will remain the longest land tunnel in the world until 2017 (outside of urban metro tunnels).
- Supplied 1,000 km of special Long Stator Winding (LSW) cables for the levitated Shanghai Transrapid system which uses MAGLEV technology to reach speeds up to 500 km/h

About the authors

Eric du Tertre is Railway Infrastructure Market Segment Director at Nexans. He has more than 20 years experience in the cable industry.

Before moving into his current position, he has held different positions within Nexans, among others in Telecommunications.

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Bruno Weider is Product Manager Railway Infrastructure Market at Nexans.

He has more than 14 years experience in the cable industry.

Before moving into his current position, he has held different positions within Nexans Switzerland, among others R & D leader, part of the Nexans technical experts network, and also chairman of the CH -TC 20 - LV standardization Committee.

About Nexans

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.

We have an industrial presence in 40 countries and commercial activities worldwide, employing close to 26,000 people and generating sales in 2013 of nearly 6.7 billion euros. Nexans is listed on NYSE Euronext Paris, compartment A.

For more information, please consult: www.nexans.com

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