

## Wire & Cable Report Ed 5 2021

### Chapter Summaries

#### EXECUTIVE SUMMARY

##### **Chapter 1 - ALL CABLE - ELECTRICAL CONDUCTORS AND MECHANICAL ROPE**

Wires and cable perform two basic functions. 1) They conduct electricity or communications, for which they need high conductivity, or 2) They carry loads, for which they need high tensile strength. Sometimes they combine both requirements. This report surveys the market for the first group, electricity and communications conductors, and contains a brief review of the second group, mechanical wire rope. The report excludes products from either group in the informal sector, small producers of low-end wire and cable, mainly based in China and India.

##### **Chapter 2 - GLOBAL MARKET SIZE AND END USE - ENERGY WIRE AND CABLE AND TELECOMS**

Metallic wire and cable production and consumption are sized in 2017 and forecast to 2022. For metallic cable, material prices are plotted from 2000 to 2017, and charted against tonnage production, \$/ton of cable produced and \$ sales revenue, to establish commodity price predictors. Fibre optic sales are plotted against prices.

##### **Chapter 3 - THE EUROPEAN WIRE AND CABLE MARKET**

The European market for wire and cable is estimated and forecast to 2026. Analysis by product type and end user, with analysis of Western and Eastern Europe. Profiles of the five major markets; France, Germany, Italy, Spain and the United Kingdom are provided with consumption, historical and forecast to 2026, product shares and listings and surveys of the manufacturers, with extended coverage of the market leaders. An extensive section covers manufacturing facilities in Eastern Europe.

##### **Chapter 4 - THE RUSSIAN WIRE AND CABLE MARKET**

The Russian market for wire and cable is estimated and forecast to 2026. Analysis by product type and end user and listings and surveys of the substantial Russian manufacturing industry.

##### **Chapter 5 - THE CHINESE WIRE AND CABLE MARKET**

The huge domestic market for wire and cable in China is surveyed and analysed in detail, with consumption estimates by product group and end user and forecasts to 2026. International trade, market gaps, end users, certification, a detailed discussion of user markets and analysis of the manufacturing sector. Analysis of production capacity utilisation.

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#### **Chapter 6 - THE ASIA PACIFIC (EXCLUDING CHINA) WIRE AND CABLE MARKET**

The Asian market for wire and is estimated and forecast to 2026 with analysis and end user. Profiles of four major markets; Japan, India, Korea and Taiwan, are provided with consumption, historical and forecast to 2026, Analysis of product shares and listings and brief surveys of the manufacturers.

#### **Chapter 7 - MIDDLE EAST AND AFRICA WIRE AND CABLE MARKET**

This chapter covers the Middle East and North Africa, including the countries of the Gulf and the Arabian Peninsula, Turkey, the littoral counted on the eastern Mediterranean and North Africa and the 47 countries of Sub-Saharan Africa. The markets for wire and cable are estimated and forecast to 2026, and end user and a survey of the growing manufacturing sector in the region, together with lists of the leading manufacturers in each market.

#### **Chapter 8 - NORTH AMERICAN WIRE AND CABLE MARKET**

The United States was the largest single market, in terms of production and consumption of wire and cable until 2003, when China overtook it. The US remains the second largest today. The domestic market is surveyed and analysed in detail, with consumption estimates by product group and forecasts to 2026, and end user. LV wire & cable markets, construction, automotive wire and cable, HV and MV power cable, electricity transmission and distribution, telecoms technology and market size. American wire and cable manufacturers are outlined and discussed extensively with market shares within product segments.

#### **Chapter 9 - SOUTH AMERICAN WIRE AND CABLE MARKET**

The LAC market for wire and is estimated and forecast to 2026 with analysis by product group and end users. Two countries dominate the Latin American market, Brazil and Mexico. Mexico and Brazil are parts of two different economic and trade orbits, NAFTA and MERCOSUR. The two largest markets are profiled with consumption forecasts to 2021 by product group.

#### **Chapter 10 - GLOBAL WIRE AND CABLE PRODUCTION AND CONSUMPTION**

Summary table of wire and cable forecasts of production in tonnes and consumption in \$ billion, by country and region, 2019 - 2026.

#### **Chapter 11 – COPPER SUBSTITUTION IN METALLIC CABLE**

Copper and aluminium prices are compared from 1960 to 2020 and World bank forecasts to 2026. The increasing divergence between them is shown and plotted as a factor of Cu/Al to chart copper substitution. Advantages and disadvantages of each material as a cable core.

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#### **Chapter 12 - THE TYPES AND TECHNOLOGIES OF EHV AND HV CABLE – OH AND UG**

Detailed outlines of the technologies of OHL bare conductors and UGC and subsea insulated cables: high-pressure, fluid-filled pipe (HPFF); high-pressure, gas-filled pipe (HPGF, GIL); self-contained fluid-filled (SCFF, MI); solid cable, cross-linked polyethylene (EPR, XLPE).

#### **Chapter 13 - THE TECHNOLOGY OF SINGLE AND MULTI MODE FIBRE OPTIC**

The composition of a fibre optic cable and the difference between multi-mode and single-mode fibre.

#### **Chapter 14 - WIRE ROPE**

Wire rope is used for its mechanical properties not conductivity, although there are conductors with high tensile strength, especially copper alloys. Wire rope is not a primary focus of this report, which is concerned with energy and telecoms wire and cable. This chapter has a short survey of the wire rope market, including a market size estimate and a review of global manufacturers.

#### **Chapter 15- LONG TERM PROSPECTS AND PROFITABILITY OF CONDUCTORS**

The most profitable segments of the wire and cable market are those with the best prospects of long term growth but they are not the largest. This chapter reviews the most profitable segments and plots them against long-term growth prospects.

#### **Chapter 16 - ENERGY AND COMMUNICATIONS CABLE MANUFACTURERS**

A chart of the top 56 companies which account for 54% of the global market is included, ordered by % share. The industry leaders in the United States, Europe and Japan are reviewed and tabulated with their market shares by product segment.

#### **Chapter 17 - PROFILES OF WIRE AND CABLE MANUFACTURERS**

Profiles of the 29 leading cable companies globally.

#### **Chapter 18 - WIRE AND CABLE MARKET DRIVERS**

The final uses of wires and cables are so diverse that there are many drivers of demand. In this report we comment on the following categories:

- Transmission and distribution for electrical supply - Insulated cables and bare conductors
- Railways - Insulated cables and bare conductors for dedicated T&D systems
- Telecoms - LV and telecoms cables
- Automotive sector - LV cable and wire harnesses

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- Offshore OGT (oil, gas produces) and wind power sectors – EHV, HV and MV submarine cables and MV and LV topside wires and cables
- Construction – HV, MV and LV insulated cable

#### **Chapter 19 - PRICE TRENDS AND FACTORS DRIVING PRICES**

1. The prices of electrical equipment and cable have been volatile over the years. Many factors have contributed to this, the principal factors being; commodity prices for metallic cable, level of demand for cable, cable production capacity both for metallic cable and fibre optic, the learning rate for new technologies. We review each of these factors in this chapter, and present conclusions for the cable market.

#### **Chapter 20 - INSULATED LAND CABLES – HV, MV & LV**

Insulated underground land cables are not the most profitable segment of the power cable market nor the one with the highest long-term growth prospects but together with bare conductors they have the most stable demand. This chapter contains a series of tables from StatPlan T&D Reports analysing the extent of underground lines by country. The drivers for undergrounding, together with advantages and problems are discussed.

#### **Chapter 21 - SUBSEA ENERGY CABLES**

The offshore market requires three categories of cable and this applies to oil, gas and wind. The difference between the offshore dry tree and subsea wet tree industry is explained, with state of the subsea market and future demand. SURF is outlined in detail. HVDC is discussed. The subsea energy markets consist of three main categories:

1. Interconnections between land masses
2. Offshore wind power
3. Oil & gas exploration and production.

These markets require three categories of cable.

##### **Interconnections and offshore wind power**

1. Subsea power cable –cable used under water to carry power or control functions - export and transmission cable EHV, and HV - array cable HV and MV.

##### **Oil & gas exploration and production**

2. Umbilical cable - cable that is usually a mixture of hydraulic pipes and electrical elements and may also contain risers and flow lines - MV, trending to HV .
3. Topside cable - cable used on the platform structure – MV and LV.

Subsea cables are a premium growth market. The technical barriers to entry are high and order backlogs are solid. These cables also achieve high margins above the average for the cable

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industry. There are relatively few manufacturers, which are listed and discussed. The global submarine cable networks are outlined, together with their development, technology and cable laying techniques.

#### **Chapter 22 - SUBSEA COMMUNICATIONS NETWORKS**

The global communications networks are outlined with development and the technology of submarine cable categories described.

#### **Chapter 23 - INDUSTRIAL MARKETS**

The transport, aircraft, shipping, automobile, mining, construction, terrestrial wind power, manufacturing and process industries are discussed, together with their requirements for cable and harnesses. As an example, the largest aircraft requires 500 km of cable. The chapter quotes some of these statistics to put these markets into perspective.

#### **Chapter 24 - ELECTRIFIED RAILWAYS**

Electric railways constitute a specific market for cable with different characteristics from industrial and other end users because of the distance cables travel, over many miles of track and this parallels the transmission and distribution cable market in which cables also cover long distances. The railways pose special mechanical demands on cable, which are outlined, together with railway statistics.

#### **Chapter 25 - ADVANCED TECHNOLOGY, SUPERCONDUCTORS**

Superconductors are materials that have no resistance to the flow of electricity; they are one of the last great frontiers of scientific discovery. Some materials, cooled below a material-specific temperature called 'critical temperature' ( $T_c$ ), undergo a phase transition into the superconducting state. The fundamental value proposition of superconducting wire is the elimination of electrical loss. This chapter outlines the technology, the development and status of the market for HTS superconductors, the opportunities, manufacturers and players.

#### **Chapter 26 - METAL THEFT**

Metal theft is a worldwide problem and it seriously affects vulnerable wire and cable installations. There continue to be frequent reports of cable theft, both of power cables and of telecom cables, from many parts of the world, with cables being stolen for the scrap value of their metal content, especially copper. The report outlines the problem, the scale and its effects.

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#### **Chapter 27 - CABLE PROPERTIES**

Wire, cable and rope have physical properties which distinguish them from each other and determine their suitability for different applications. They help to determine not only which product type is best for a particular use but more specifically which sub-type will perform best in a particular situation. The physical properties are mechanical and electrical; tensile strength, flexibility or flex ratio, weight, conductivity, cost.

#### **METHODOLOGY**

Sources, StatPlan Database, commodity price and forecasting consumption value.

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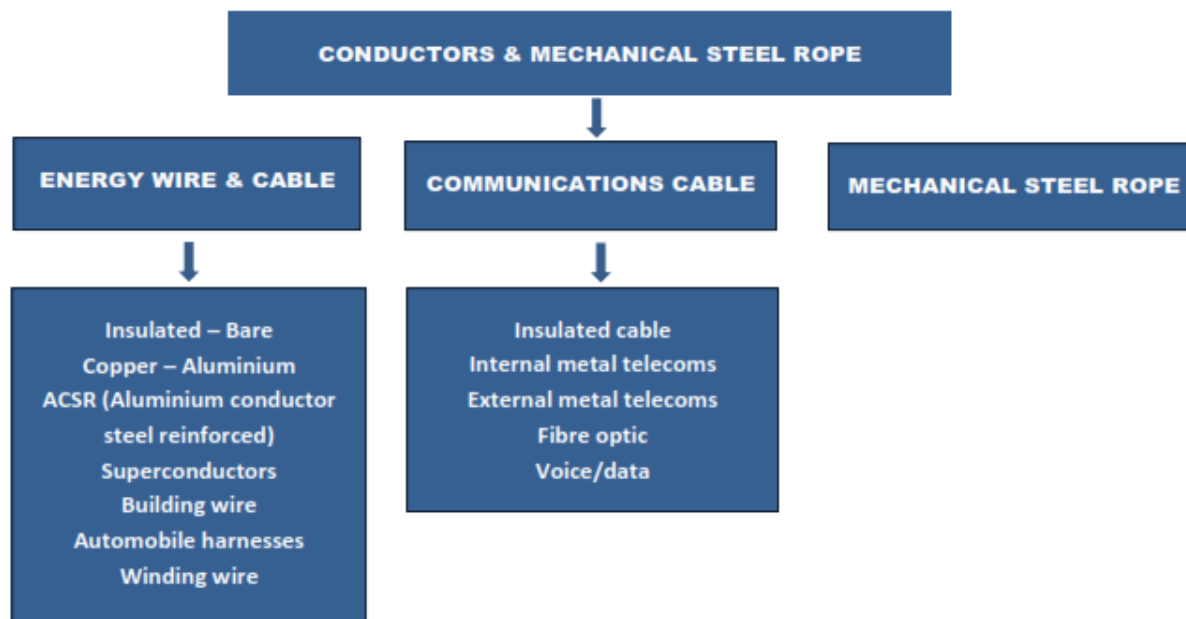
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Wires and cable perform three basic functions. 1) They conduct electricity, for which they need high conductivity, 2) They carry communications, 3) They carry loads, for which they need high tensile strength. Sometimes they combine both requirements.

**Figure 1: Categories of rope, cable and conductor**



This report surveys the market for energy and communications conductors in depth and contains a brief review of mechanical steel rope. The report excludes products from either group in the informal wire and cable sector, small producers of low-end wire and cable, mainly based in China and India.

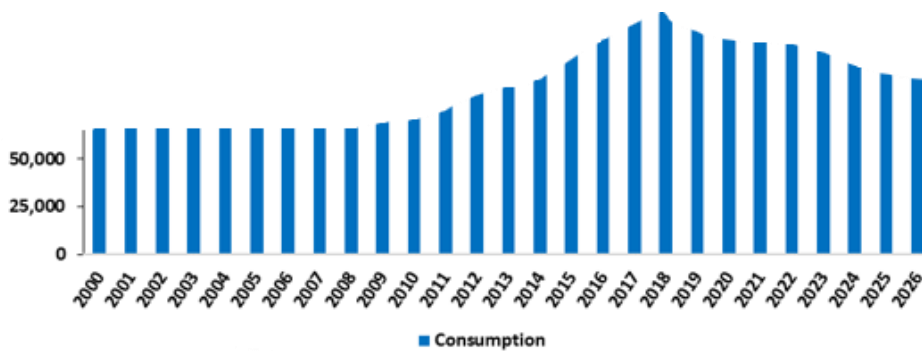
**Table 1: Types and end users of wire, cable and rope**

	Conductor type	Insulated	Bare	End users
Energy	HV power cables	Cables	OHL	Utilities, infrastructure, industry
	MV power cables	Cables	OHL	Utilities, infrastructure, industry
	HV subsea power cables	Cables		Utilities, infrastructure, industry
	MV subsea power cables	Cables		Utilities, infrastructure, industry
	LV cable cables	Cables	OHL	Utilities, infrastructure, industry
	Building LV cables	Cables		Construction and house building
	LV automotive cables & harnesses	Cables		Automotive industry
	OEM industry cables	Cables		Manufacturing industry
	Other cables	Cables		Multiple applications
Telecoms	Voice & data cables, fibre optic	Cables		Telcos and industry
	Winding wire	Wire		Used in transformers and armatures
	Fibre optic	Cable		Networks and users
	Steel rope	Stranded wire	Rope	Load bearing applications

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In 2000 global consumption of metallic and fibre optic cable above was \$XX billion, rising to \$XX billion in 2008, and after a large fall in 2009 due to the global financial crisis, recovering to \$XX billion in 2010. From a peak of \$XX billion in 2021, sales have fluctuated to \$XX billion in 2019 but falling sharply in the Covid year to \$XX billion in 2020. A recovery to \$XX billion is expected in 2021, and a decline to \$XX billion in 2024 followed by a recovery to \$ XX billion in 2026.

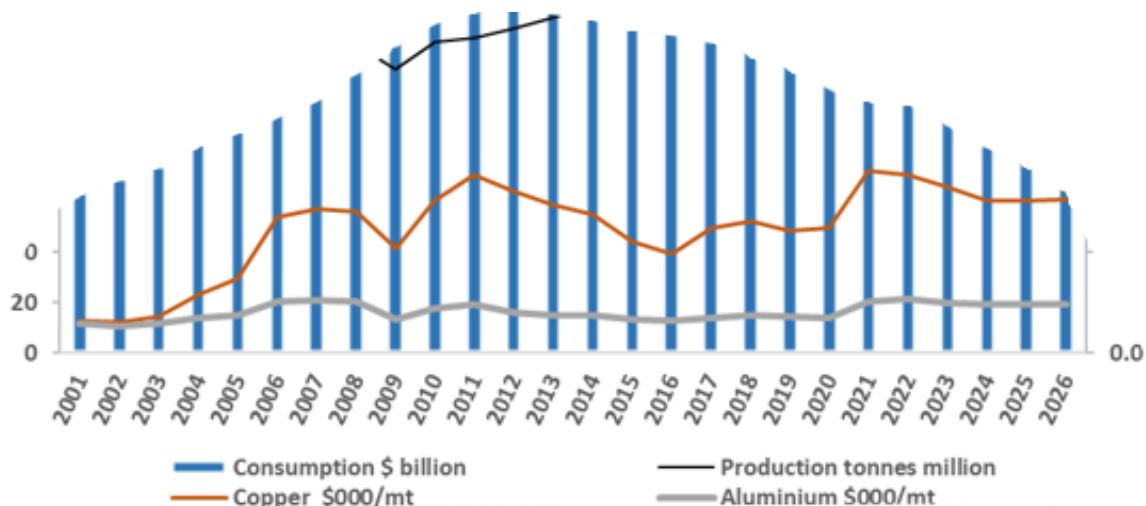
**Figure 2: Cable consumption including insulated and uninsulated metallic cable, fibre optical cable and winding wire, \$ million, 2000-2026**



### The effect of materials cost on sales vale

The key to this disparity lies in the cost of product and specifically the price of materials. The manufactured cost of insulated cable is 59% metallic raw material and 27% compounds and other materials. Figure 5 demonstrates .....

**Figure 3: Cable consumption in \$ value and production in tons, compared with the copper and aluminium prices.**



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**Table 1: Summary of wire and cable forecasts 2016 – 2022, by country and region, \$ billion**

	2019	2020	2021	2022	2023	2024	2025	2026
France								
Germany								
Italy								
Spain								
Scandinavia								
UK								
Benelux								
Rest of West Europe								
Poland								
Czech Rep								
Hungary								
Serbia								
Romania								
Slovakia								
Bulgaria								
Croatia								
Macedonia								
Slovenia								
Bosnia								
<b>Europe</b>								
Russia								
Rest of CIS								
<b>CIS</b>								
Korea								
India								
Japan								
China								
Taiwan								
ASEAN								
Australasia								
Rest of Asia Pacific								
<b>Asia Pacific</b>								
Middle East inc Turkey								
Africa								
USA								
Canada								
Mexico								
North America								
Brazil								
Rest of LAC								
LAC								
World								

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**Table 2: The top global cable manufacturers by industry**

European companies	Utilities	Construction	Industry	Other	
Prysmian					Leader in all subsea applications with largest production capabilities. New leader in optical fibre cables.
					#1 in Europe interconnections, #1 building cables in France, #1 share in aerospace cables.
					Leader in European automotive cables and provides industrial, healthcare and communication cables.
					Focus on electricity, Infrastructure and have opened factories in China and Germany. Leader in the high performance over-head rail cable market in China.
<b>US companies</b>					
General Cable (Prysmian)					64% of revenues outside North America. Leader in T& D cables in the US. 45% of ROW sales (33% of group) are in construction.
					LV, MV and HV cable, building cables and wire for automotive harnesses, electric motors and industrial equipment.
					Transmission solutions and communication systems for power plants, buildings, hospitals, rail and other end markets.
					Electrical, electronic and assembled wire and cable products for industry and utilities.
<b>Asian companies</b>					
					The largest segment of group sales (c 50%) is copper cables, industrial cables and magnet wire.
					50% Market share in Brazil in telecom cables (FISA).
					Overseas revenue forecasts 28% of sales. Hitachi cable are targeting auto cables expansion outside Japan.