EHV Cables

a market insight

The global power sector has witnessed significant growth in the last few years due to rise in demand from urban and rural areas across the world. As a result, the electrical equipment manufacturing sector has also been on an upswing, with survey reports suggesting that the market is likely to reach INR 238 billion by 2015, growing at a rate of 8 percent on a year-to-year basis. A significant part of this growth has been directed towards manufacturing of wires and cables, with the demand for Extra High Voltage (EHV) cables being on the rise.

What are EHV Cables?

In strict technical terms, EHV cables are those that are meant to carry electricity of higher voltage than ordinary cables. In India, all cables that are rated 66 KV and above are categorised as EHV cables. Usually in electric power transmission engineering, this refers to equipment that can carry more than 345,000 volts between conductors. As far as electronics system is concerned, a power supply that provides power of more than 275,000 volts is known as an "EHV Power Supply".

EHV cables are available with aluminium and copper conductors and even with various combination of metal sheath, such as poly-aluminium sheath, lead sheath and aluminium sheath, in combination with or without copper wire screens.

The increase in popularity of EHV cables over the last few years can be attributed to the following factors:

» High reliability
» Cost effectiveness
» Low environmental impact of polythene (XLPE)
» Low dielectric losses

It is necessary to have a full-proof insulation system for EHV cables, because as the voltage rating for cables increases, the electrical stress on the XLPE compound increases even further. It is also important to ensure that the XLPE compounds are not contaminated because in such cases the high electrical stresses imposed on the cables reduce the insulation performance and raise the risk of critical system failure.

EHV cables are generally used for high voltage underground electric connections. This is primarily because during faults these metallic paths are meant to carry a significant portion of the total faulty current which would otherwise flow through the general mass of earth while returning to the system neutrals.

The cable screen used in such wires controls the electric field stress while providing return path for cable neutral and faulty current. The screen is kept earthed at both ends in order to provide shielding from electromagnetic radiation. In the process, EHV stores dangerously high voltage within the earth, providing potential safety.

EHV Cables in India and the market potential

The introduction and development of EHV cables in India was a relatively delayed phenomenon. Even a few years ago, the domestic competency was restricted to low and medium voltage cables.

The Cable Corporation of India (CCI) was the first company to make the country acquainted with the EHV technology during the late 1980s. CCI was the first Asian company outside Japan to manufacture EHV cables with patented MCDV process from the Mitsubishi Cable Industries of Japan. It was also the first company to have introduced 230 KV cables in 1993.

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Thereafter, many companies have entered the market, gaining high returns in the process. Manufacturing giants like Finolex Cables, Polycab, Ravin Cables and KEI Industries have all shown their interest in EHV cable manufacturing, in most cases with the help of their foreign collaborators.

The trend in the EHV cable market, as it is today, reflects two things:

» The Indian companies are in the process of expanding their technical capabilities
» The country has started to look beyond the present, to the long-term cost advantages and efficiency of EHV cables.

Market study reports reveal that within just a few years the EHV cable market (rating of over 220 KV) has been able to capture almost one-fourth of the total Indian cable industry.

The EHV cable segment promises to become a dominating force in the Indian cable industry within the next few years. The main reasons behind this growth are:

» With the demand for underground distribution cables to replace overhead lines going up significantly, the demand for EHV cables has also increased.
» The industry consumption for sectors like steel, cement and petroleum refineries have driven the demand for EHV cables. Moreover, with the Indian government focusing on the construction of Special Economic Zones and industrial parks, the need for cables that can carry power of higher voltage has also been on the rise.

Moreover, with the Indian government's adoption of the 'Power for All' plan, which is planned to be implemented this year, the power and cable industry has grown stronger in force.

As more and more foreign players look to penetrate the hugely promising market of EHV cables, the future of the industry looks even brighter. As far as the export of cables is concerned, the recent electrification programmes and the need for replacing the existing electrical system can be seen as major growth drivers for the industry.

EHV Cables and technology innovations

There has been a growing demand across the world to overhaul the existing power system due to the excessive strain that is being put upon it continually. The demand for electricity and renewable energy has increased significantly in recent years. However, most of the power grids continue to be old and therefore there is a need to have more efficient and reliable power system.

In this context, the development of EHV cables can be seen as a major contribution to the power industry. EHV employs extremely high voltage XLPE which is helpful in transmitting power through underground network, suitable for operation at conductor temperature which is equal to 90 degree Celsius. Other technologies like 66/154 KV segmental insulated strand conductor XLPE cables have also been developed for larger capacity and compact-type-oil-stop joints. The XLPE cable has a Milliken type (containing six segments) copper conductor having a 2000 mm2 cross section, longitudinally watertight by means of hygroscopic tapes. It also has a semi-conductive screen both at the inner and outer level to protect it from damage.

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French company Nexans has developed a new technology for EHV cables. The newly developed cables manufactured by them will have synthetic (or dry) insulation that are particularly helpful for voltages up to 420 KV and cross-sections larger than 2000 mm2. The company is also planning to introduce segmented conductors that will be helpful to alternate the current by reducing the skin effect.

Countries like China have envisioned intercontinental electricity exchange wherein EHV DC links will be used to transport electricity from China across Russia to Europe. The introduction of CD Mesh networking technology required for deployment of successful supergrid will also be leveraged with the help of EHV cables.

EHV technology has also been hugely helpful in setting up new transmission lines for the State Grid in the Construction Phase. High voltage (under 300 KV), extra high voltage (300 KV to 765 KV) and ultra-high voltage (765 KV and above) lines are being installed worldwide with at least 1000 KV UHV AC and DC line in order to meet the growing energy demands of the rising middle class, mostly in the East and South. Currently most of the coal, hydro, wind and solar load sources are over 1000 kms away from the populous places in the East and South.

The future of EHV cable manufacturing in India – pros and cons

The power industry of India is on a massive growth drive owing to the expansion plans undertaken by the Indian Government. During the latest conference of the International Council on Large Electric Systems, a lot of emphasis was given on expansion of the power grid system. According to Mr. Y. K. Sehgal, Executive Director, Power Grid of India, the massive blackout India experienced recently and the country's rapid growth have put additional stress on the power grids. Moreover, the power grid of India is experiencing a double-digit growth and is projected to touch 240 gigawatts over the next 10 years. Almost 10 percent of this is expected to be renewable energy.

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As the government makes clear indications towards growth of the EHV cable manufacturing sector, more and more local players are trying to cash in on the opportunity. Companies that had so far concentrated on manufacturing only power cables are now focusing to expand their field of operations to include EHV cables as well. For example, cable manufacturing industry major Paramount Communications, which is part of the Paramount Group of Companies, has decided to venture into the highly promising EHV cable industry and plans of investing a few hundred crores in the industry.

However, the technology handicap continues to be a major roadblock for domestic companies. The country has so far lacked the presence of technologies like synthetic insulation, which has created major problems for EHV cable manufacturing in India.

Another concern area is that the Indian power sector is a hugely unorganised sector. Most small sectoral players do not have the financial or influential capability to arrange for foreign collaborations, making EHV cable manufacturing a difficult proposition for them. Bringing all the players under one roof therefore continues to remain a challenge for the government.

However, with rising demand for electricity and a flawless underground electrical system, the concerns are expected to be addressed sooner rather than later.

Major EHV players in India

Even though EHV cable manufacturing has been a relatively new phenomenon in India, the country has been able to do well in this segment. The Cable Corporation of India (CCI) was the first company to introduce the concept of EHV in the country. Thereafter, various other manufacturers have ventured into this sector through foreign collaborations. Companies like Finolex Cables, Ravin Cables, Polycab and KEI Industries, which have entered into agreements with international players J-Power Systems (Japan), Prysmian Cables (Spain), Nexans (France) and Brugg Kabel AG (Switzerland), respectively.

Finolex Cables

Finolex J-Power Systems Pvt. Ltd entered into a joint venture (JV) agreement with Japan's J-Power Systems Corporation in the year 2008 in order to enter into the highly promising EHV cable market in India. This agreement allows the company to offer complete turnkey solutions in EHV cable systems in India and abroad. The company's state-of-the-art production facility, which is equipped with technologies like Vertical Continuous Vulcanising towers help to produce high voltage XLPE-insulated cables required to carry high voltage power to urban areas.

Ravin Cables

Having entered into an agreement with Italy-based Prysmian Group, a global leader in the energy and telecommunications industry, Ravin Cables plans to enhance the quality factor of its products. It also aims to enhance its technology, roll out a new range of state-of-the-art EHV wires for sectors like railways, mining, petrochemicals, etc.

Polycab

France-based global cable manufacturing company Nexans has teamed with Polycab Wires Pvt Ltd to set up a greenfield manufacturing unit at Vadodara in Gujarat. The two companies will jointly invest INR 400 crore in the facility that will manufacture EHV cables to meet domestic and global demand.

KEI Industries

The KEI Industries has also forayed into the market through an agreement with Brugg Kabel AG of Switzerland. This JV will enable the company to manufacture in the 66 KV, 110 KV, 132 KV and 220 KV class within the company's existing infrastructure at Bhiwadi and Chopanki in Alwar district of Rajasthan. During 2010-11, the company completed expansion at its Chopanki Plant for manufacturing of EHV cables.

Cable Corporation of India

Over the years, CCI has continued its efforts to manufacture high-capability EHV cables. In the year 2009, CCI set up a plant in Nashik in Maharashtra for the production of EHV cables with the capacity of 500 KV. Having acquired a major market share, the company is now planning more expansion.

Recent developments – JVs / Technology collaborations

The power and cable industry has been mostly reliant on foreign technology innovations due to the lack of proper infrastructure in the country. Almost all of the Indian companies foraying into the EHV cable market have been forced to rely on foreign assistance. While the growth of the market has been guaranteed and steps like 100 percent foreign direct investment being initiated, more investment is expected to flow into the sector in the next few years.

However, investing in any industry requires a deep understanding of the market. The cable industry, in particular, has a deep penetration and large local markets. A large chunk of the products manufactured are sold through institutional purchases by government utilities and private parties. Therefore, it is a market-oriented process. This is probably why multinationals and foreign players have so far restrained themselves from entering the market alone. The result, as we can see, is an amalgamation of foreign technology with local expertise.

Recent developments in the industry include interest shown by Japan and European countries in the Indian EHV cable industry. Finolex Power's JV with J-Power Systems Corporation of Japan, in which both the companies have equal share in the ownership, will produce and install 500 KV EHV cables in India.

Similarly, French company Nexans, which is an expert in synthetic insulation, will provide all their technical expertise through a JV with Polycab Wires Pvt Ltd. Nexans holds a 50 percent equity capital and one equity share in the partnership. The French major is closely associated with the management of the joint ven-

ture company.

Italian power giant Prysmian has a 51 percent stake in its JV with Ravin Cables. It is associated with the manufacturing of all kinds of low voltage, medium voltage and high voltage cables in the EHV cable segment.

Swiss major Brugg Kabel AG, which has entered into a strategic partnership with KEI Industries, will only be a technical partner in the JV, with no financial participation planned so far.

Well-known cable manufacturer Universal Cables Limited has entered into a strategic partnership with Furukawa Electric Co. Ltd, Japan, to set up Birla Furukawa Fibre Optics Limited in Verna, Salcette, Goa. Being a professionally-managed company, it possesses all the required capabilities to make high performance optical fibres and EHV cables for current and next generation of tele-communication and data-communication.

Conclusion

In a country like India, which is desperately struggling to maintain a steady economic growth rate, the importance of an innovation like EHV is enormous. As the government focuses on the growth of the power sector, the demand for underground EHV cables is expected to rise in the days to come. Advantages like minimisation of power theft, low maintenance cost, near-zero visibility and the possibility of avoiding Right of Way make EHV an ideal option in most cases. The government's plan of providing power to all by the end of 2012 is further expected to lead to a rise in demand for EHV cables, especially in Tier II and Tier III cities. On the global front too, the demand for EHV cables is likely to grow as countries like China have taken steps to become world leaders in smart grid technology.

With prospects of the EHV cable dominating the power industry in the near future, it is necessary that requisite steps are taken to ensure its growth, because the power sector is often the most significant contributor to any country's economy ■

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