europacable®
Try life without us

Europacable
Technical newsletter
The challenges and importance of fibre optic network Quality, operation and maintenance
PART 2

July 2024

The passive infrastructure represents more than 80% of the overall cost of an optical fibre network and needs to be operational for several decades. This infrastructure is made up of a wide variety of equipment with very specific implementations:

- **Existing or new hosting structures: conduits, ducts, gutters, overhead supports, pylons, poles, chambers, etc**

- **Passive equipment:**
  - **Optical fibres, cables, cords, and fibre optic pigtails.**
  - **Connection, junction, and terminal equipment (units, cabinets, etc.) with their components (cassettes, connectors, splitters, etc.).**

Specifiers and design offices dealing with project management must be trained in:
- The need for quality in infrastructure.
- The technical characteristics of the products.
- Environmental constraints and energy efficiency.
- Best practices in infrastructure implementation.

The choice and quality of equipment and installation

The equipment and its installation must meet precise quality objectives. Attention must also be given to scalability and interoperability to guarantee network performance for several decades.
Deployments are very diverse and equally complex.

Quality of equipment

The choice of the diverse types of equipment is very important because it makes a major contribution to the longevity of the networks. What is more, this choice directly impacts construction and, above all, operating/maintenance costs.
Building a network requires heterogeneous products but each of those products must offer high-performance, reliability and durability. Compatibility between various products and their suitability for their environment and installation conditions, must also be allowed for. Supply conditions during deployment and maintenance, as well as after-sales service support, are other factors to be taken into consideration.
It is essential to take the key parameters and essential indicators into account when selecting optical fibres, cables, and connection equipment to ensure long-term optical and mechanical reliability and the durability of the infrastructure. For decades to come, the optical fibres installed must be able to accommodate new transmission systems with ever-faster data rates.

For more information, please see Europacable Technical newsletter "FttH and Optical distribution network reliability".

To keep the carbon footprint as small as possible and encourage network energy efficiency, preference must go to products developed in an eco-design approach. Note that, for fixed networks, fibre optics is the technology consuming the smallest amount of energy.
Stringent qualification and control must be applied to meet the standards in force, for raw materials, components, finished products and end-to-end solutions.
Test results must be compiled in qualification reports. It must be possible to confirm the test results in the presence of representatives of the customer or a duly accredited third party.

Quality of equipment

Civil engineering and equipment installation account for the greater share of the total cost of building very high-speed fibre-optic infrastructure.
It is really important to optimise these processes to avoid prohibitive costs:

- By the reuse of existing civil engineering as much as possible.
- By industrialising deployment (standardised procedures to reduce operating and maintenance costs).
- By using consistent practices across the entire country.

Existing or new hosting infrastructures and civil engineering must be in good condition, suitably sized and checked before installation. The implementation of the products (laying and connection of cables and terminations) has a direct impact on the performance and durability of networks.
To reduce the number of operating faults, installation must be done by trained and qualified staff and in compliance with engineering rules, manufacturers data sheets, standards and guides.
Priority must go to products and solutions that make installation, maintenance and servicing easier, such as pre-connectorised solutions, permanently accessible solutions, etc.

For more information, please see Europacable Technical newsletters "Aerial cables in FttH" and "Pulling and blowing a cable in a duct".

Compliance with standards and good practice rules

References to standards: As things now stand, there are more than two hundred European (CENELEC) and international (IEC/IEC) standards covering optical fibre networks.
In particular, these standards ensure the security and interoperability of the networks.
The equipment and its installation must comply with current regulations, standards, specific product specifications and good practices rules.
Specifiers must ensure that these rules are clearly set out in the specifications and that they are taken into consideration at every stage of deployment and operation/ maintenance.
Equipment suppliers must accompany their offers with technical data sheets, implementation guides and training courses. For new products and/or new applications, prior on-the-spot experiment is essential.

Inspection

A high-quality fibre-optic network requires stringent checking. Checks must be carried out in accordance with standards and benchmarks at every stage of product manufacture and installation to detect any non-conformities.
It is also important to ensure that the people involved have the skills needed to carry out serious qualification, certification, and control during:
- Equipment procurement.
- Installation work.
- Terminal network reception.
- Maintenance work or upgrades to installations.

Training

The quality, reliability and durability of fibre optic networks depend on many factors and one of them is decisive: the skills of the people doing the work. This is a collective responsibility that must be shared by all the players.
To obtain a high-quality network and reduce the number of faults, installation must be carried out by trained and qualified staff.
It is essential to provide fibre-optic network deployment teams with initial or adjusted vocational training. Training is a way of ensuring that the work is done as per the state-of-the-art rules and prevent installation faults and malfunctions. This quality approach is essential for those involved in fibre optic deployment.

Operating and maintenance procedures

Deviations from best practices impact directly network durability, scalability, availability so as operating and maintenance costs.

To ensure the life of the networks for several decades and maintain the quality of the services, there must be standardised operating and maintenance procedures with a preventive stock of a list of products that need to be defined. The availability of trained and qualified teams is also key.

Manufacturers provide installation manuals that shall be used as a basis for operating and maintenance procedures.

Fibre optic resilience

Resilience is the capability of a system to continue operating in the event of a breakdown, a technical failure, an intentional or unintentional incident and/or extreme stress. It depends on the quality and robustness of the passive and active equipments and on the quality of their installation. Quality resilience is based on redundancy.

A high-quality passive fibre optic infrastructure must be durable, robust, scalable, homogeneous, and interoperable, with high availability over several decades. It must also be energy-efficient and require rigorous verification of its performance throughout its life cycle.

For further information please contact:
Alberto Lampasona, Director Public Affairs, a.lampasona@europacable.eu

About Europacable
uropacable is the voice of Europe's leading wire and cable producers. High-quality, sustainable power and telecommunication cables, produced by our members in Europe, empower electrification and digitalisation of our societies. Founded in 1991, Europacable represents the largest cable makers in the world providing global technology leadership, as well as highly specialized small- and medium sized businesses from across Europe.
With our future being ever more electrified and digitalised, cable technology will be the core backbone of Europe´s energy and telecommunication infrastructures. Sustainable, low-carbon manufacturing and high-performance cables are essential to achieve Europe's climate neutrality objectives by 2050. Europacable is committed to the principles of free enterprise and fair trade. Our members employ over 80.000 people of which more than 50% in Europe, generating a worldwide turnover over €70 billion in 2023.
Europacable is a member of EuroFSA, FEEDS, Orgalim, RGI, WindEurope and a partner of CENELEC and EUEW. Europacable is listed in the European Commission's Transparency Register under 453103789-92.
www.europacable.eu

europacable®
Try life without us

www.europacable.eu

The information provided in this document reflects the best knowledge of Europacable experts at the moment of its publication and is provided as an informative tool to assist the readers in the assessment and use of Optical fibre cables and components.

The content of the document is not legally binding and is not intended as a substitute for user's or manufacturer's own assessment and decision-making.

Readers of this document are encouraged to seek information on specific matters regarding Optical cables and components from the manufacturer or provider and to consider the Technical Standards relating to the selected products.

A binding interpretation of the relevant legislation is of the exclusive competence of the European Court of Justice and Europacable and its members decline all liability for any measures taken or not taken on the basis of the content of this information leaflet which is intended for general information only.

July 2024 – Ed1