

# NGAN OPTICAL NETWORKS: Construction of infrastructures and evolution of optical cables

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On the realization of the fibre optics broadband networks, called NGN (Next Generation Networks), the consequent increase of the optic fibre development on access has the following main problems: high social costs and costs linked to the realization of the required infrastructure, because of the peculiar working environment of the urban areas. In order to reduce global costs of the systems, during the last 3 years Telecom Italia, together with its reference suppliers, tested several technical solutions for laying down optical cables, allowing to reduce realization times, costs and environmental impact. Please read below some of the recent trials made in the North-East:

## 1. Aerial solution of the optical fibre on building facade

Main features:

- easy and fast solution for laying cables at high power (type of the fibre G.652, G.655 and G.657) fixed thanks to the engineering of the dedicated fixing accessories, cheap and easy to be installed; these products (someone is currently under qualification) have been tested for fixing on all the different types of laying on buildings (horizontal facade, vertical and crossing between different buildings).
- the visual impact of cables and accessories has been held down by the introduction of seals having specific colours (UV resistant) which tend to camouflage with the bases of buildings, especially in the city centres where there are evident architectural restrictions.
- Easy chance to get the public authorizations.

The advantages already achieved on these trials highlight the velocity of the operation and the time-saving up to the 70% compared to a traditional technique requiring the realization of new infrastructures. Also positive feedbacks from governmental authorities and privates who have been involved in it.

## 2. Aerial solution of the optical fibre on existing poles:

Main features:

- the evolution of the materials (micro optical cables) and of the accessories is allowing to re-use the existing prearranged poles for existing copper network.
- it results easy and fast to arrange high powerful micro optical cables on the same infrastructures; the only preliminary analysis to do is the static test on the existing poles that normally has been made cyclically.
- further to the fixing accessories for the optical micro

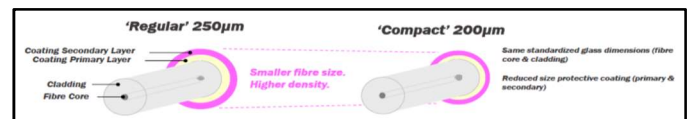
cables on the aerial solution, just like steel bands and suspension clamps (these materials passed the tensile test, wind-vibration test and salt mist test) also small hermetic elements are being engineering in order to joint directly on pole, avoiding to make excavations when laying manholes with traditional hermetic elements.

- Visual impact is held down thanks to the reduced dimensions of the products, there is no need of authorizations.

## 3. Evolution of the optical micro-cables:

- when having equal section of the cable (the standard is of about 7,7mm) it needs of more powerful supports for the realization of the optical backbone; the current optical micro cables reached the power of 144 optical fibres with a diameter of about 7,5-7,7 mm; optical micro cables with tubes with 196 optical fibres having the same diameter of the micro cables with 144 fibres are under test. It can be possible by.
- the introduction of the 200 micron fibre allowing coating reduction, but currently they are less strong than the 250 micron fibre.
- the in-depth analysis for the compatibility with the existent fibres is underway (first results are positive) just like the junction of the 200 micron fibre with the 250 micron fibre having slightly higher attenuation values. The mechanical reliability along the years has to be verified especially for connectors (laboratory tests resulted positive).

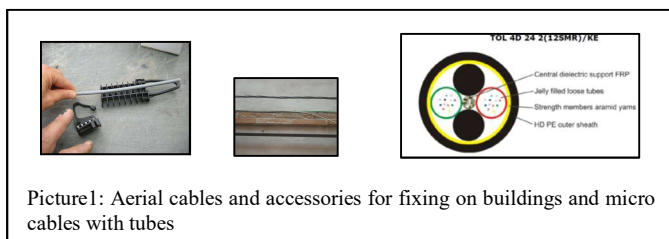
The advantages that could be reached are higher potentialities of the cables for the realization of the primary optical backbones, pre-arranging micro cables inside micro ducts having a diameter of 10/12mm, by using Blowing technology.



Picture 2: Comparison between 250 micron fibres and 200 micron fibres.

## References

- [1] Technical norms for laying down optical cables in Telecom Italia
- [2] Technical norms for laying down aerial optical cables in TRATOS Cavi
- [3] Technical norms for accessories and steel band from the supplier New Font srl



Picture 1: Aerial cables and accessories for fixing on buildings and micro cables with tubes