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SERIES L: ENVIRONMENT AND ICTS, CLIMATE
CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Optical fibre cables – Guidance and installation technique

Low impact trenching technique for FTTx networks

Recommendation ITU-T L.155

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ITU-T L-SERIES RECOMMENDATIONS

ENVIRONMENT AND ICTS, CLIMATE CHANGE, E-WASTE, ENERGY EFFICIENCY; CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

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Low impact trenching technique for FTTx networks

Summary

With the miniaturization of the telecommunication infrastructure, i.e., with mini-ducts and mini-cables, it has been possible to use a low impact trenching technique to carry out all the steps of the network construction in a single day, in a less invasive way in terms of time and space, and with a smaller construction site than for the previous trenching technologies. Recommendation ITU-T L.155 describes this trenching technique, which allows the easy installation, in narrow trenches, of underground optical cables and mini-cables in ducts or mini-ducts or directly buried. This type of narrow trench allows the use of reduced dimension machinery in small-sized roads, typically those in cities, producing a lower quantity of waste material and so should be used in urban areas. This technology is mainly characterized by the simultaneous work of a suction machine and a trench saw, which allows for the possibility of opening and closing the work site the same day.

History

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Keywords

Environmental low-impact, FTTx network, reduction, urban trenching technique.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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Low impact trenching technique for FTTx networks

1 Scope

This Recommendation:

- gives advice on general requirements of the main phases in which the work can be divided;
- gives advice on the methods and procedures for performing the work;
- gives some application criteria;
- describes situations where a low impact urban trenching technique is recommended.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T L.260] Recommendation ITU-T L.260/L.84 (2010), *Fast mapping of underground networks*.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 urban trenching technique: It is characterized by a width of maximum 5 cm and typically a depth of maximum 30 cm.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

FTTx	Fiber To The x, where 'x' stands for the final location on the end-user side
GPR3D	Ground Penetration Radar 3 Dimensions
NGN	Next Generation Network

5 Conventions

None.

6 The urban trenching cable-laying technique

The urban trenching technique should be applied especially in urban areas, where car traffic and shop presence is very high and on routes that generally involve asphalted surfaces such as roads and sidewalks with a base of compact material (asphalt or concrete).

It is not recommended that the technique be used on routes where the soil subgrade is sandy, gravelly or contains medium-sized cobbles (i.e., measuring 10 to 20 cm in diameter).

The main advantages of this technique over traditional cable-laying technologies are the very small obstruction of the road and the low impact on traffic due to the road construction site cleaning, the immediate removal of debris and the quickness of opening and closing the road construction site.

The urban trenching technique is normally carried out by simultaneously cutting through the paving and digging a trench whose depth and cross-section vary in accordance with the number of ducts to be laid: depth is ≤ 30 cm, while cross-section can be ≤ 5 cm. In order to guarantee a protection against impact resulting from road-repairing, the depth of the laid infrastructure should be maintained constant at a known level that should be 5 cm deeper than the foreseen asphalt cutting depth normally specified for road surface repair works. Figure 1 shows some possible duct and mini-duct installation configurations that can be used.

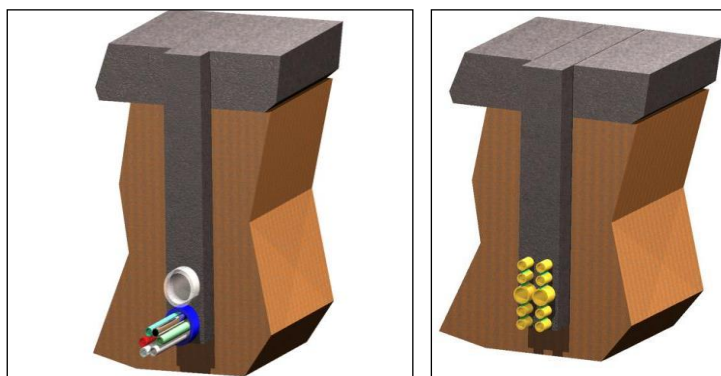


Figure 1 – Examples of urban-trenching duct installation configuration

Any crossings through unpaved sections (which should in any case have a compact subgrade) should be carried out using the same technique.

6.1 Preparatory step

Generally, a detailed survey of the route should be carried out, the purpose of which is to identify the work required to be done before starting cable installation operations. Such work could include, for instance, the preparation at bridges, or at road or rail crossings. Further, it is necessary to determine closure locations and section ends.

The location of all underground utilities should be determined in order to establish the correct route for the trench. This is normally accomplished by means of cartographic documentation provided by the administrations that own the road or by the utility company, and/or through instrumented field surveys. The detailed utilities investigation should be made with the ground penetration radar 3 dimensions (GPR3D) fast solution technique [ITU-T L.260].

The designed route should be free from sharp changes in direction. Where such changes are unavoidable, they should be made by means of cuts angled so as to comply with the minimum bend radii specified for the ducts and cables.

Where necessary, the contractor can take core samples along the planned route to determine the type of subsoil or as a further method of checking for obstacles. A GPR3D fast solution should be used in order to detect ground characteristics [ITU-T L.260].