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SERIES L: CONSTRUCTION, INSTALLATION AND
PROTECTION OF CABLES AND OTHER ELEMENTS OF
OUTSIDE PLANT

Disaster management for outside plant facilities

Recommendation ITU-T L.92



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Disaster management for outside plant facilities

Summary

Recommendation ITU-T L.92 gives an overview of the technical considerations for protecting outside plant facilities from natural disasters. Disaster management for outside plant facilities such as cables, poles and manholes are introduced, and countermeasures for natural disasters such as earthquakes, strong winds and floods are described. In the appendices, Korean and Japanese experiences of disaster management are respectively introduced. Also, answers to a related questionnaire are also included to provide basic information about natural disasters around the world. The objective of this Recommendation is to share observations, knowledge, experiences and practices internationally, so that local engineering practices can be adopted to improve the disaster resistance performance of outside plant facilities.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T L.92	2012-10-29	15

Keywords

Disaster management, earthquake, flood, landslide, natural disaster, outside plant facilities, tsunami.

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

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Introduction

Recently, natural disasters such as earthquakes and floods have occurred more frequently. Outside plant facilities such as manholes and poles are occasionally damaged by these disasters, and as a result, telecommunication services stop. In order to minimize the damage and/or to safely protect outside plant facilities, appropriate disaster management is needed. This Recommendation provides typical examples of disaster management including technical considerations.

Recommendation ITU-T L.92

Disaster management for outside plant facilities

1 Scope

This Recommendation:

- describes typical natural disasters and events such as earthquakes, tsunamis, floods, strong winds, etc.;
- describes typical disaster management for outside plant facilities;
- deals with outside plant facilities such as cables and associated hardware (cable tunnels, underground conduits, manholes, poles, towers, cabinets, etc.);
- provides technical considerations for protecting outside plant facilities from natural disasters.

Telecommunication buildings including indoor facilities are out of the scope of this Recommendation. The protection of cables and plants against lightning is dealt with by [ITU-T K.47].

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 K.47] Recommendation ITU-T K.47 (2012), *Protection of telecommunication lines against direct lightning flashes*.
- [ITU-T L.81] Recommendation ITU-T L.81 (2009), *Monitoring systems for outside plant facilities*.
- [ITU-T Y.1271] Recommendation ITU-T Y.1271 (2004), *Framework(s) on network requirements and capabilities to support emergency telecommunications over evolving circuit-switched and packet-switched networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 response spectrum [b-IEC 60068-2-57]: Plot of the maximum response to a defined input motion of a family of single-degree-of freedom bodies as a function of their natural frequencies and at a specified damping ratio.

3.1.2 soil liquefaction [b-ASCE]: Soil liquefaction is a phenomenon whereby a soil loses strength and stiffness during an earthquake, causing it to behave like a liquid. Surface-supported structures have settled several feet below grade, and buried tanks have floated to the surface.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 earthquake-resistance performance: The capacity to withstand a certain level of shaking without excessive damage.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

IPOCM Incident Preparedness and Operational Continuity Management

NATM New Austrian Tunnelling Method

TBM Tunnel Boring Machine

5 Conventions

None.

6 Natural disasters

6.1 Typical natural disasters

Typical natural disasters which may potentially affect outside plant facilities are listed in Table 1.

Table 1 – Typical natural disasters

Natural disasters	Typical effects
Earthquakes	Destruction of all outside plant facilities; duct bursts and disconnection of cables.
Tsunami	Damage to all outside plant facilities; damage to central office power supplies in coastal areas.
Flash floods/floods	Immersion of cable tunnels; potential cable damage; liquid penetration into cables.
Forest fires	Burned down telecommunication poles; disconnection of aerial cables.
Hurricanes/tornadoes/typhoons/wind storms	Falling telecommunication poles or towers; physical damage to aerial structures; disconnection of aerial cables.
Landslides	Destruction of underground ducts; failure of retaining structures.
Severe cold, snow, ice or heat	Destruction of telecommunication equipment.