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Technical recommendations in effect

**BOOK N. 31**  
**(Edition October 2024)**

# **Recommendations for handling Missiontime of the electrical equipment on ropeways**

This Recommendation is not mandatory but provides guidance to the profession. Its application would be desirable in all countries, however, without prejudice to national standards as well as requirements specified by public authorities.

International Organization for Transportation by Rope  
OITAF

**Recommendations  
for handling Missiontime  
of the electrical equipment on ropeways**

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## Foreword

OITAF decided to draw up recommendations for dealing with the mission time of the electrical equipment of ropeways.

The aim of the recommendations is to adapt to current developments in the ropeway industry.

The result also includes a high level of safety.

When drawing up these recommendations, the working group paid particular attention to feasibility.

These recommendations shall complement but not replace national standards and are mainly based on IFA Report 2/2017.

Functional safety of machine controls – Application of EN ISO 13849 –.

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## 1. Introduction

This document deals with the mission time of safety-related electrical, electronic, and programmable electronic equipment of ropeways and addresses ropeway operators, manufacturers, inspection bodies, national authorities responsible for ropeways and notified bodies.

In the course of time, the relevant standards for safety-related systems, (e.g. EN ISO 13849-1, EN IEC 62061 or EN 61131-6) have changed fundamentally. An important part of these changes is that a mission time of up to 20 years has been introduced. This mission time is stated in the safety manuals of manufacturers of safety-related parts. The affected components are used for safety functions e.g. safety PLCs, relays, and sensors.

Measures are required to ensure the safety of the affected parts of the ropeway control system particularly in the case of continued operation after the specified mission time has been exceeded.

This document sets out strategies for possibly dealing with an extension of the mission time and suggests possible measures.

### **Note**

The typical service life of the ropeway is longer than the mission time of the control system. This document does not cover the aspects of operational availability.

## 2. Preconditions

These recommendations apply when the following conditions are met:

- The electrical equipment of the ropeway was put into operation according to Directive 2000/9/EC, Regulation (EU) 2016/424 or equal.
- A notified body is involved that takes care out the conformity assessment for the mission time extension. A notified body is not necessary, when the national authority responsible for ropeways releases the manufacturer and the operator from the obligation having a notified body involved.
- The original manufacturer or legal successor of the equipment is still available, if the strategy of extending the operating time Option 2 (see point 4) has been chosen.

This document applies to electrical control systems put on the market according to the Directive 2000/9/EC or equal, which, as a legal basis, defines that the design of safety functions lies within the responsibility of the manufacturer and their notified body.

Prior to the effective date of the Directive, the design was carried out in accordance with the local rules and standards defined and controlled by the authorities.

### 3. Technical background

Although a constant failure rate is assumed by most probabilistic estimation methods, this only applies provided that the useful lifetime of elements is not exceeded. Beyond their useful lifetime (i.e. as the probability of failure significantly increases with time), the results of most probabilistic calculation methods are therefore meaningless. Thus, any probabilistic estimation should include a specification of the elements' useful lifetimes. The useful lifetime is highly dependent on the element itself and its operating conditions temperature in particular (for example, electrolyte capacitors can be very sensitive).

[Source: EN 61508 – 2, Chapter 7.4.9.5, Note 3]

From the aspects described above, the following background can be derived and summarized.

The determination of the probability of failure due to dangerous faults of components, subsystems and systems of a safety function is based on an approximation of a constant failure behaviour. This failure behaviour is only guaranteed over the period of use. In addition to the diagnostic capability and the architecture, this determined probability of failure is an essential parameter for the qualification and robustness of the safety level of the safety function in question.

An increase in the probability of failure due to wear failures inevitably leads to increased risk and thus at some point to a dangerous failure of a safety component or even the safety function in question.

At the end of their mission time, safety components lose the basis for their safety integrity.

In principle, the mission time  $T_M / T_{10D}$  has been designed for the intended use of the safety component in question. This means that the corresponding framework conditions under which the component is intended for use must be clearly defined. These would be, for example:

- Environmental conditions (EMC, temperature, humidity, mechanical environmental influences, radiation etc.)
- Electrical actuation profile
- Appliance / usage category
- etc.

This mandatory information by the component manufacturer is to be regarded as a prerequisite and condition for the ropeway manufacturer in order not to negatively

influence the mission time of the safety components and thus the operational reliability of the ropeway.

## 4. Possible Strategies

After reaching the mission time, there are two main possible strategies to continue operation:

### Option 1

Replace all parts of the safety functions which are affected by the end of the mission time with new or existing components that have not reached their mission time.

This leads to two sub-strategies:

- **Option 1a**  
Replacement one by one with identical components that have not reached their mission time.  
Traceability shall be ensured / provided.
- **Option 1b**  
Replacement by similar components to be defined later (modification).  
Regarding modification, the national rules have to be observed.

When carrying out any of these methods, it is highly recommended to assess their impact on the overall safety function. A validation/verification shall be performed.

### Option 2

Basically, one method is to add safety factors to the  $PFH_D$ -value for an extension of two times 5 years. In the IFA report 2/2017, a possible extension of mission time and the required measures are described in annex G.

### Note

Based on this method, it is not foreseen to extend the mission time beyond 30 years.

## 5. Roles

### **Manufacturer (of the control system)**

The manufacturer (of the control system) has to carry out a risk assessment for the maximum valid mission time.

Declares if there is a limited mission time (time starts normally with the date of permit to use / operating licence).

Defines and offers possible methods for the treatment of mission time.

Provides a declaration if the mission time has been extended and when it ends.

### **Ropeway operator**

Decides which method is carried out.

Informs the authority.

### **Authority**

Requires information from the ropeway operator about the end of mission time and treatment of the equipment.

Checks if the necessary methods / measures have been implemented in time.

### **Notified body**

Checks if the chosen method is applicable considering the different modules according to Regulation (EU) 2016/424 / Directive 2000/9/EC or equal.

Sets up a report according to the conformity assessment (this report is for the manufacturer of the control system).

Verifies if the extension of the mission time requires an update of the issued original conformity assessment (certificate).



## **6. Conclusion**

The application of the recommendations and methods stated above is not expected to impair overall safety. This statement applies to the safety-instrumented control system.

### **References**

IFA-Report 2/2017; <http://www.dguv.de/publikationen>  
Regulation (EU) 2016/424, <http://data.europa.eu/eli/reg/2016/424/oj>  
Directive 2000/9/EG, <http://data.europa.eu/eli/dir/2000/9/oj>