American National Standard

for Funiculars –
Safety Requirements

ANSI B77.2-2020

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American National Standard for Funiculars – Safety Requirements

Secretariat

National Ski Areas Association

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American National Standards Institute, Inc.

American National Standard

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Foreword (This foreword is not part of American National Standard ANSI B77.2-2020.)

This standard deals with passenger transportation systems that use wire ropes to provide motion to the carriers that ride on rails or are contained by a guideway. Several names are used regionally to identify these systems (i.e., Cable Railways, Inclines, Planes), but are all considered Funiculars. These systems have unique requirements that rely on ropeway technology. This standard will give guidance to these systems that are not classified as elevators or Automated People Movers.

This standard is a revision of ANSI B77.2-2014 - *American National Standard for Funiculars - Safety requirements* and was originally based on *American National Standard for Passenger Ropeways - Aerial tramways, Aerial Lifts, Surface Lifts, Tows and Conveyors - Safety requirements*, ANSI B77.1-1999.

Section 1 provides the scope and general definitions for Funiculars covered in this standard. Section 2 covers mechanical design, electrical design, and operational requirements. Six (6) Normative Annexes and three (3) Informative Annexes are included in the standard. **Normative Annexes** are considered part of the standard. **Informative Annexes** are presented for the information provided and are not considered part of this standard.

Because of the diverse nature of the industries that may use this standard, it is recommended that authorities having jurisdiction consider an effective date of one year from the approval date of the standard. The approval date of this standard is a criterion selected by the committee and not by the American National Standards Institute.

Suggestions regarding improvement of this standard are welcome. They should be sent to the ASC B77, c/o National Ski Areas Association, 133 South Van Gordon Street, Suite 300, Lakewood, CO 80228 or e-mailed to asc.b77@nsaa.org.

This standard was approved for submittal to ANSI by the Accredited Standards Committee (ASC) B77 on Aerial Passenger Ropeways. Committee approval of the standard does not necessarily imply that all the committee members voted for its approval or the approval of every requirement in the standard. At the time this standard was approved, the ASC B77 Committee had the following members:

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American National Standard for Funiculars – Safety Requirements

Section 1
General requirements

Funicular systems, especially systems operated on steep inclines with simultaneous ascending and descending carriers on (usually very nearly parallel) guideways counterbalancing one another, are also known as cable railways or inclines.

Carriers reciprocate between the terminals, propelled and controlled by a wire rope or other flexible element operating through drive and tensioning equipment installed in the terminals.

Provisions of this section envision a system having a reversible operating mode. See 1.1 for applicable component requirements for systems in a continuous or intermittent circulation with stop-to-load features, such as a fixed attachment individual carrier or grouped carrier, which are not covered by this standard.

1.1 Scope

This document establishes a standard for the design, manufacture, construction, operation, and maintenance of funiculars for passenger transport.

Funiculars typically have the following characteristics:

- carrier capacity over 20 passengers;
- maximum operating speed over 300 feet per minute (1.5 meters per second);
- complex guideway that may contain curves, variable inclinations and a passing zone;
- direct operator supervision.

There are other types of transportation systems that utilize similar characteristics such as Incline Elevators (see ASME A17), Automated People Movers (see ASCE 4013), etc. The authority having jurisdiction, using information from the manufacturer and owner, shall specify any or all provisions of this standard that apply to the funicular.

1.2 Purpose

The purpose of this standard is to develop a system of principles, specifications, and performance criteria that will meet the following objectives:

a) reflect current state-of-the-art for funicular design, operation, and maintenance;

b) be acceptable for adoption by government agencies and others.

It is recognized that certain dangers and risks are inherent in machines of this type and their operation. It is also recognized that inherent and other risks or dangers exist for those who are in the process of embarking, riding, or disembarking from funiculars. This system is intended to result in funiculars that are designed, constructed, operated, and maintained in a manner that minimizes reduce danger, exposure to risk to passengers and maintenance and operational personnel, and to encourage improvements in productivity, efficiency, development, and progress consistent with the objectives.

Such a system with these stated objectives constitutes a safety standard.

1.2.1 Other classifications

Funicular configurations that do not fall within the definition specified in 1.4 - *funicular*, but fall within the general category of funiculars should be evaluated by the authority having jurisdiction based upon the design engineer's specifications and the applicable provisions of this standard.

1.2.2 New materials and methods for funiculars

Adoption of technological improvements in materials and advances in techniques is essential to enable the industry to keep pace with progress. If a designer or manufacturer proposes to use materials or methods not covered by this standard, those materials, methods, or both, shall be clearly identified. Complete design and test information shall be provided to the purchaser or the owner and the authority having jurisdiction (see 1.4 – *authority having jurisdiction*).

1.2.3 Exceptions

Strict application of the provisions of this standard may not be appropriate in every instance. Wherever it may be proposed to depart from the provisions of this standard, the authority having jurisdiction may grant exceptions from the literal requirements or permit the