



Ropeways – A Leader in Safe Accessible Transportation

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Becoming an accessible transportation leader:

- **Persons with a disability, increased use, and adaptive technologies and equipment**
- **Requirements in law and standards and guidelines for persons with a disability**
- **Ropeway transportation systems accessibility successes**
- **Ropeway transportation systems challenges and opportunities**
- **Conclusions and a way forward**

Persons with a disability, increased use, and adaptive technologies and equipment



Persons with a Disability & Increased Participation

AT LEAST 50% OF THE U.S. POPULATION DIRECTLY BENEFIT FROM ACCESSIBLE INFRASTRUCTURE, TRANSPORTATION, AND ADAPTIVE TECHNOLOGIES/EQUIPMENT

- There are approximately 40.8 million people in the U.S. living with a disability
- This is 12.7% of the total U.S. population
- This number is increasing by about 1 million each year
- 20.6 million reporting a disability are reporting ambulatory difficulty or reduced mobility
- By 2026 more than 50% of the U.S. population (170 million) will be more than 55 years of age
- Most people travel or recreate with family or friends
- Global disabled and assistive technology market forecast at \$66.8 billion by 2030 -6.7% growth from 2022
- Ropeway transportation plays a significant role in recreation transportation
- Ropeway transportation hopes to play a larger role in commuter and urban transportation

Persons with a Disability and Adaptive Technologies and Equipment

KEEPING UP WITH INCREASED USE AND TYPES OF ADAPTIVE TECHNOLOGIES AND EQUIPMENT WILL BE CRITICAL IN COMING YEARS

- A majority of the 20.6 million reporting reduced mobility also report using some form of adaptive device or technology
- Trends in publications on adaptive sport show a continuous annual growth of 15.3%
- Unified and adaptive only sports in U.S. high schools have increased 9 fold and 163% respectively over the last 3 years
- Recent studies show the economic impact of adapted sport and para events in the U.S. up to \$78 million annually
- Common adaptive technologies and equipment most common on ropeway transport systems are wheelchairs, scooters, sit-skis, ski-bikes (tri-skis), stand-up skis, nordic bi-skis, wheelchair skates, and adaptive trikes

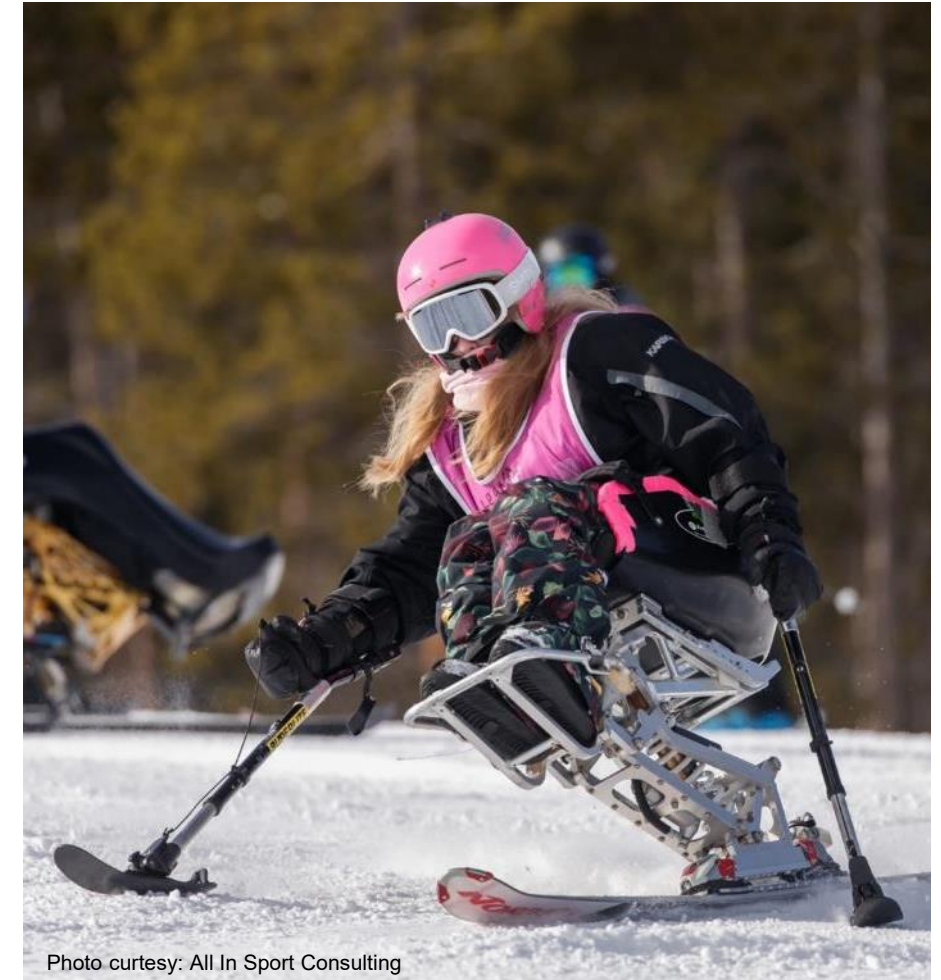
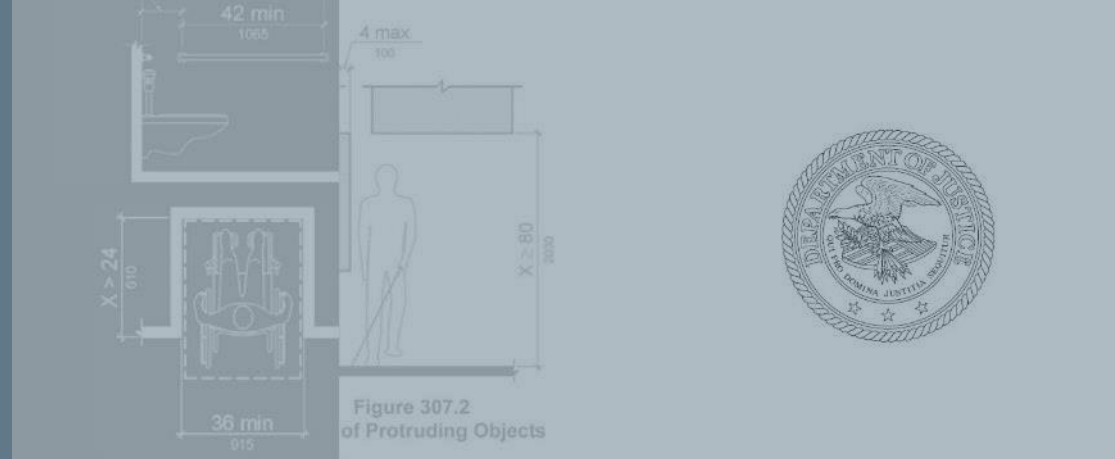
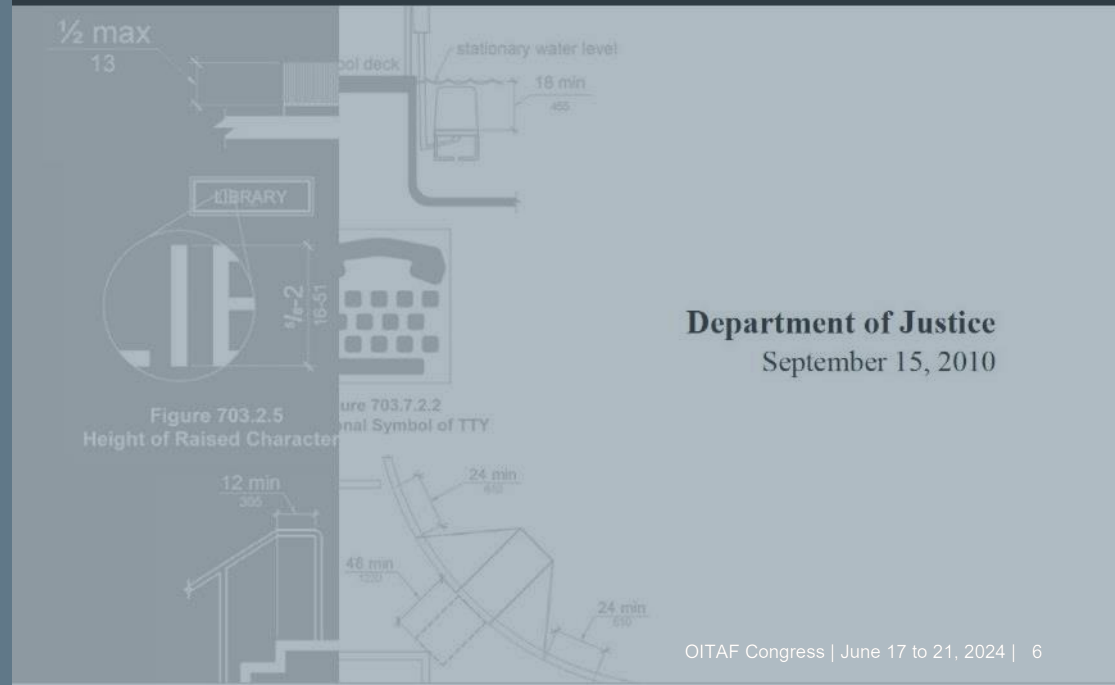


Photo courtesy: All In Sport Consulting

Requirements in law and passenger ropeway standards and guidelines for persons with a disability



2010 ADA Standards for Accessible Design



Department of Justice
September 15, 2010

Requirements in Law and Passenger Ropeway Standards and Guidelines for Persons with a Disability

Architectural Barriers Act (ABA) of 1968 –requires all federal and federally leased or permitted facilities comply with applicable accessibility guidelines and standards.

Rehabilitation Act of 1973 (Section 504 & 508) –requires equal opportunity for persons with disability to participate under any program or activity receiving federal funds or conducted by executive agency.

The Americans with Disabilities Act (ADA) –implements Section 504 and 508 and extends application of ABA and Section 504 & 508 to state and local government services, public transportation/accommodation including businesses open to the public.

American National Standard (ANSI B77.1-2022) for Passenger Ropeways –which establishes a standard for the design, manufacture, construction, operation, and maintenance of passenger ropeways.

American National Standard (ANSI/RESNA WC-1, WC-4, & ASE-1) for Wheelchairs and Adaptive Sports Equipment –requirements and test methods for wheelchairs, wheelchairs and transportation, and adaptive sports equipment performance.

International Organization for Transportation by Rope (OITAF) Book 9-1 Technical Recommendations (Edition 2014) Provisions for Special Transport Cases –which provides that certain groups of passengers (persons with reduced mobility, children) require special operational and technical measures before transport begins to ensure safety of persons and installations.

Ropeway Transportation Systems Accessibility Successes



Ropeway Transportation Systems Accessibility Successes

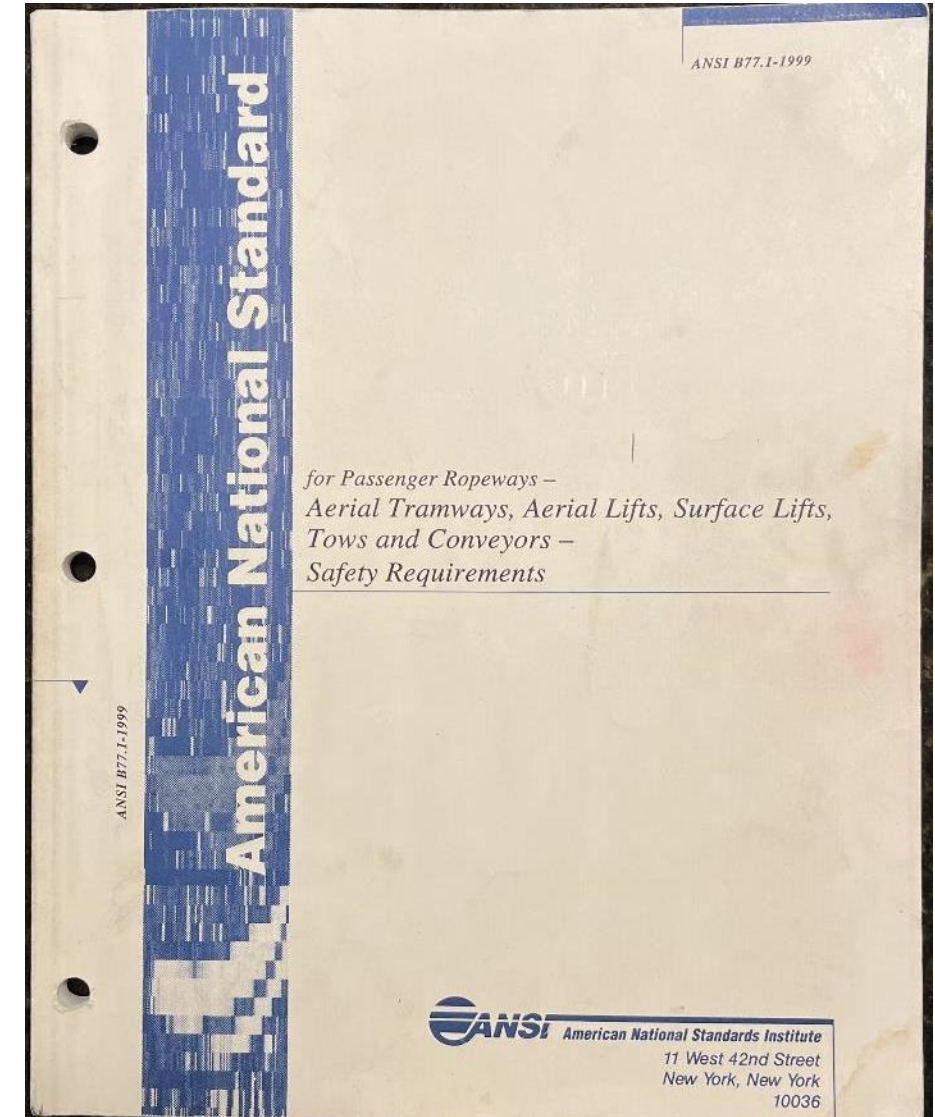
The 1999 Revision of the ANSI B77.1 Standard for Passenger Ropeways included 12 specific provisions addressing accessibility and general requirements of the ADA for the first time, including:

- Definitions and locating of ropeways requirement
- Platform, loading / unloading, and signing requirements
- Cabin and chair parameter requirements for adaptive equipment
- Operations, personnel training, evacuation, and passenger responsibilities

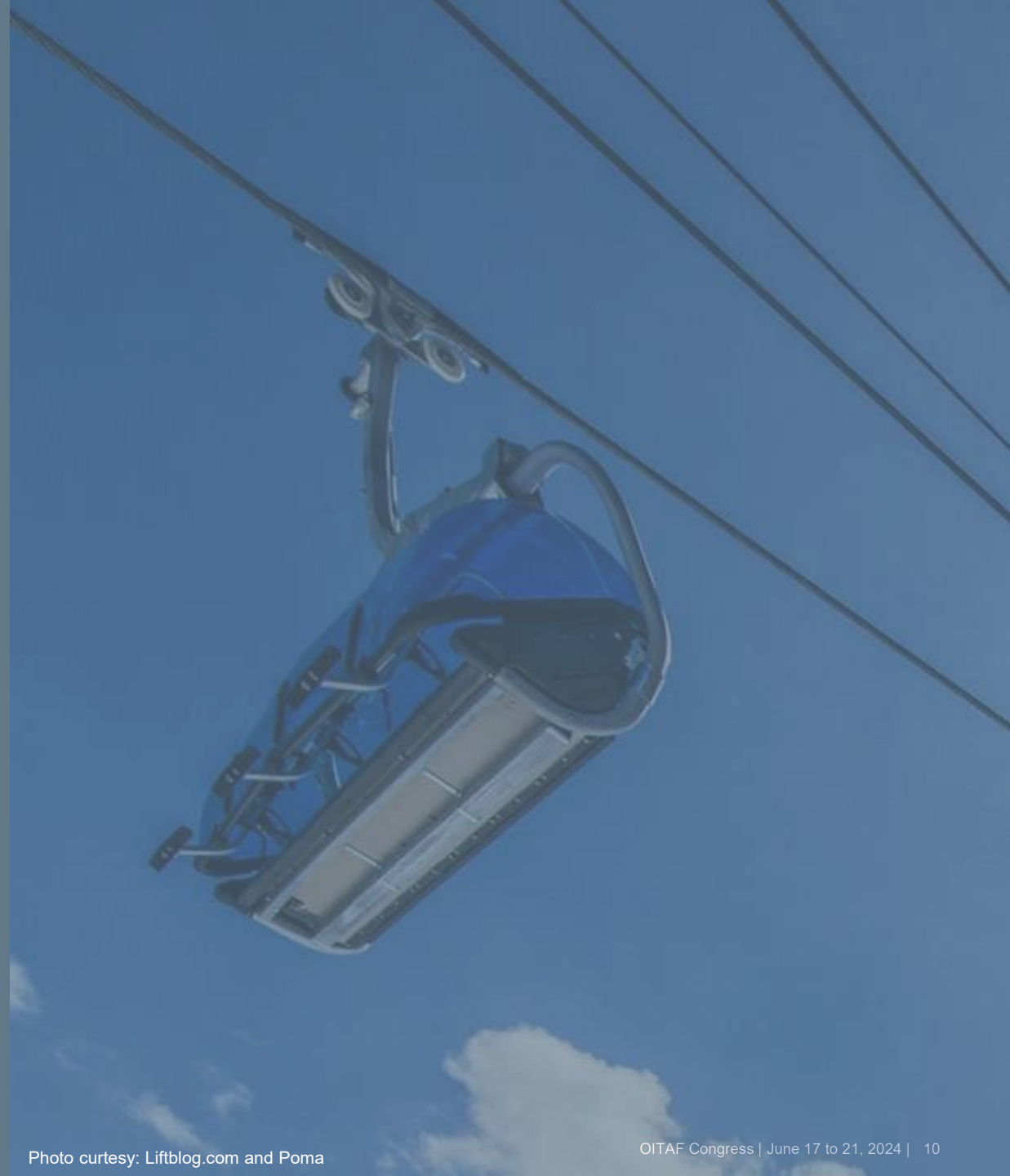
The 2006, 2011, and most recently 2022 Revision of ANSI B77.1 included an additional 7 specific provisions addressing accessibility, including:

- Definition of SMB, loading/unloading area height limits, operations, and evacuation, including:
 - Aerial lift chair height limits at load and unload are now required to be between: 18-20in. (with +/- 2in. allowance for snow conditions)

Additionally new and updated stations and platforms have been built to comply with general facilities related requirements of the 2010 ADA standards specified in building codes.



Ropeway Transportation Systems Accessibility Challenges and Opportunities



Ropeway Transportation Systems Accessibility Challenges

- Older pre-ADA stations and platforms not yet updated
- Change in access needs due to increasing year-round use
- Cabin access that requires removal of adaptive equipment
- Tram and gondola cabins without securing points for passengers in adaptive equipment
- Tram cabins without designated locations for passengers in adaptive equipment
- Lack of sufficient signing and compliant messaging
- Lack of expertise and training on accessibility requirements
- Constant influx of new adaptive and micromobility devices
- Safety and comfort features on carriers that conflict with access and safety of passengers using adaptive equipment



Ropeway Transportation Systems Accessibility Opportunities



Photo courtesy: Peter Axelsson

- Increase industry expertise relative to persons with disabilities, adaptive use, and universal design
- Improve development and communication of essential eligibility requirement for passengers and their equipment
- Increase updating of station and platform areas to improve access around ropeways and accommodate year-round use
- Provide cabin access to passengers while still in their adaptive equipment to the fullest extent possible
- Provide designated space(s) with securing points in tram and gondola cabins
- Improve signing and messaging to passengers with disabilities to streamline safe access to ropeways
- Improve training of operators and attendants in aiding and providing direction to persons with disabilities
- Ensure aerial lift chairs provide equivalent access and safety features for passengers with disabilities
- Investigate accessibility needs of other ropeway categories such as conveyors, surface lifts, and tows

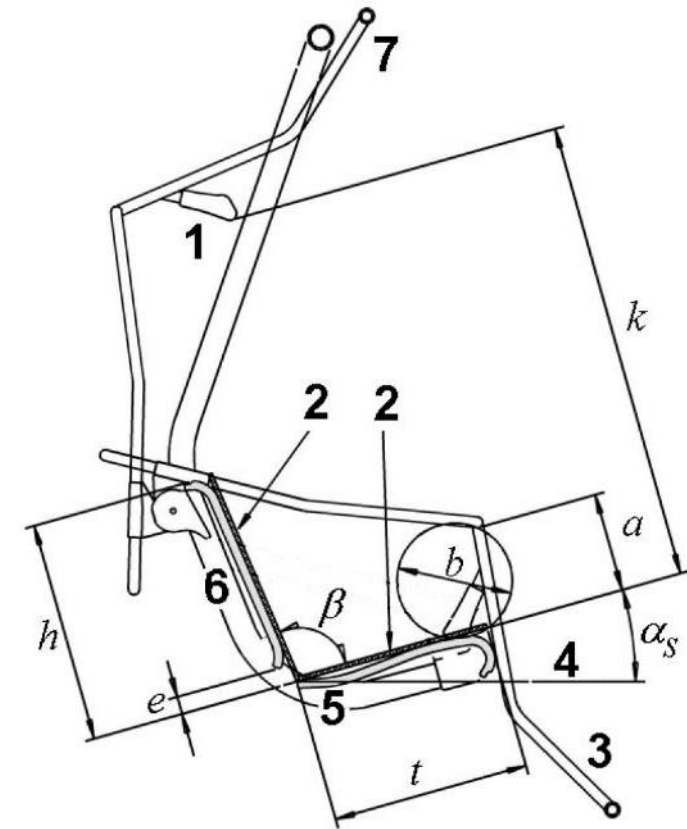
Ropeway Transportation Systems Accessibility Opportunities

EXAMPLE: UNIVERSAL DESIGN FOR AERAIL CHAIRLIFTS:

EN 13796-1:2017 (E)

- Seat surface effective depth (t) that allows for SMB¹ skid surface
- Seat to back angle (β) that allows SMB to use effective depth (t)
- Seat surface tilt (α_s) that allows SMB to unload effectively
- Seat back heights (h) or other device that allow temporary holding point while restraint device is up
- End railings or similar structure that provides holding point that can be gripped while loading, riding, and unloading
- Gap between seat surface and back (e) or securing point for use of retention strap
- Ability to use restraint device while in designated seat without interference between SMB and foot supports, pommels, pins, or other items
- Restraint device that is equally effective for SMB and other passengers riding the same carrier

Note 1: Assumes SMB complying with ANSI/RESNA ASE-1(2019)



Conclusions and A Way Forward



Photo courtesy: John Landolfe and GoByTram.com

Conclusions and A Way Forward



Photo courtesy: Smart Cities Dive and Swyft Cities (info@swyftcities.com)

- Increase in passengers with disabilities
- Increase in number and types of adaptive devices and technologies
- Progress on accessibility for ropeway transportation systems has been made
- There are challenges and opportunities to improve access
- Align with goals and strategies of the recent U.S. DOT Strategic Plan on Accessible Transportation
- Universal design strategies can be a great solution for all passengers
- Ropeway transportation can be a great accessible solution for urban transit
- Become a leader in safe accessible transportation into the future



**Thank you for
your Attention!**