AMERICAN STEEL & WIRE COMPANY

AERIAL TRAMWAYS

FOR PASSENGER TRANSPORTATION

SKI TOWS AND SKI CHAIR ROPEWAYS

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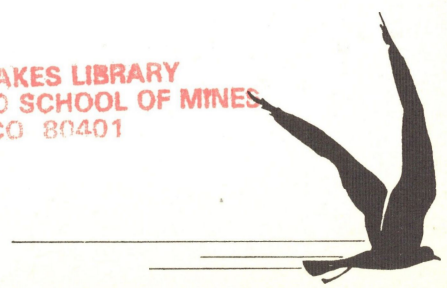


AMERICAN - BLEICHERT AND AMERICAN - BLEICHERT - ZUEGG AERIAL PASSENGER TRAMWAYS

THE UNITED STATES AND CANADA abound in scenic points of universal interest, which because of their difficulty of access have been closed to the great majority of travelers and folk bent on pleasure. The ultimate development of our great natural playgrounds requires safe, reliable, and efficient transportation from the valleys to the inspiring peaks. The past decade has witnessed a development in the transportation of passengers, namely, the modern Aerial Passenger Tramway.

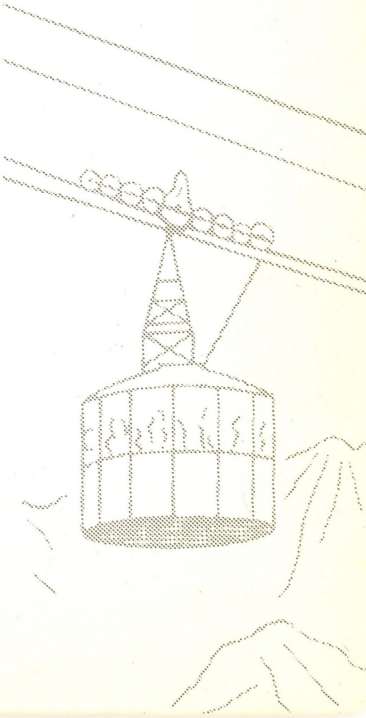
The definite public acceptance of passenger tramways is an established fact. In general use throughout Europe, they are rapidly gaining headway in America. Wherever placed in service, they have drawn greatly increased numbers of tourists — and have justified their economic existence.

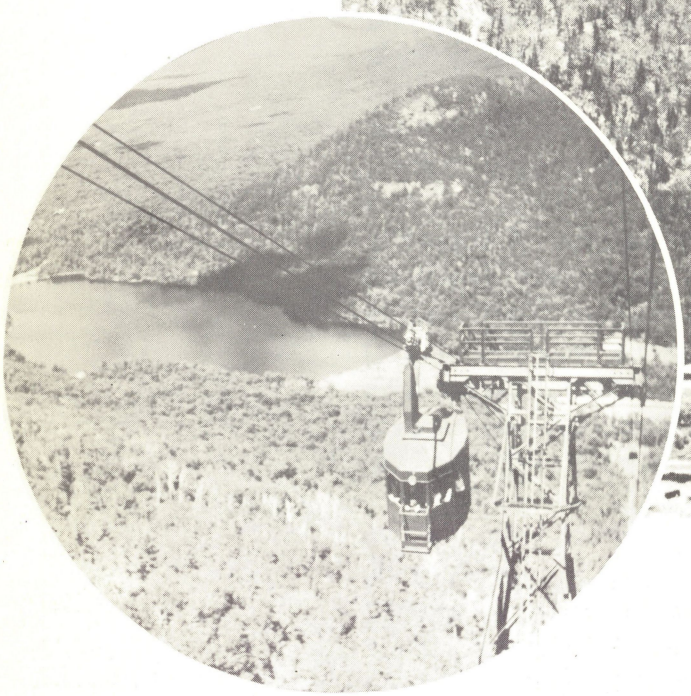
We are affiliated with the notable firm of European tramway builders, Adolf Bleichert & Company, Passenger Aerial Tramway Construction, Limited. This system was perfected by them. They have had a wide experience, and have built many passenger tramways.

From the illustrations in this booklet, it will be seen that this system transports passengers in a direct line from valley to mountain summit, independent of grades, intervening valleys, or ridges.

The track cables are carried by a minimum number of supports, over rugged country, ravines, streams, snow fields, or glaciers. The quiet and smooth operation of the carriers leaves the passenger free to enjoy the beauty of the scenery. An aerial tramway does not mar the natural beauty of its surroundings, because cables become difficult to see at a comparatively short distance. Supports, as well as terminals, can be constructed with such regard for outline and coloring that they will harmonize closely with their environment.

This system does not depend upon frictional contact between rail and wheels, or on the effective power of the rack and gear engine, as do most of the systems now in use for similar purposes. No bridges, tunnels, or cut and fill work, such as are necessary for systems employing surface tracks, are required for aerial tramways. Rain, snow, or ice do not interfere with the operation of the aerial tramway, making it possible to operate it during the entire year. Suitable areas for winter sports may be opened up and served by aerial tramways which would otherwise be entirely closed to the great majority of sports lovers. The design of this system has been so perfected that it is possible to operate at speeds varying between 11 and 16 ft. per second, equivalent to 7½ to 11 miles per hour.





View of Cannon Mountain, at Franconia Notch, New Hampshire, up whose slope the first Aerial Passenger Tramway in North America has been constructed for the New Hampshire Aerial Tramway Commission by the American Steel & Wire Company. The arrow points to the spot where supporting tower No. 1 is located. The other two towers can be seen but they too will be virtually invisible after receiving a coat of paint similar to that applied to tower No. 1.

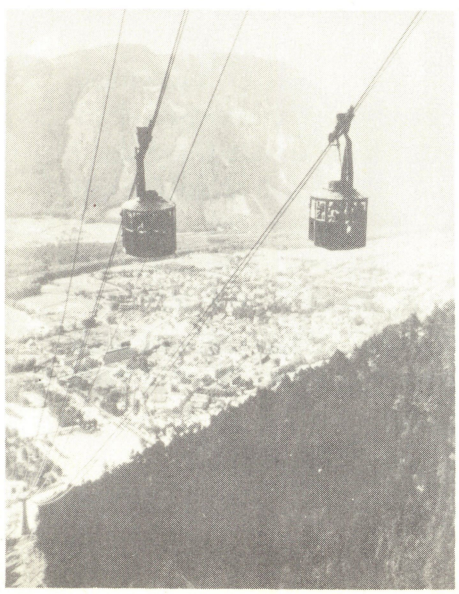
Inset shows this tramway in operation. For further details see Page 8.

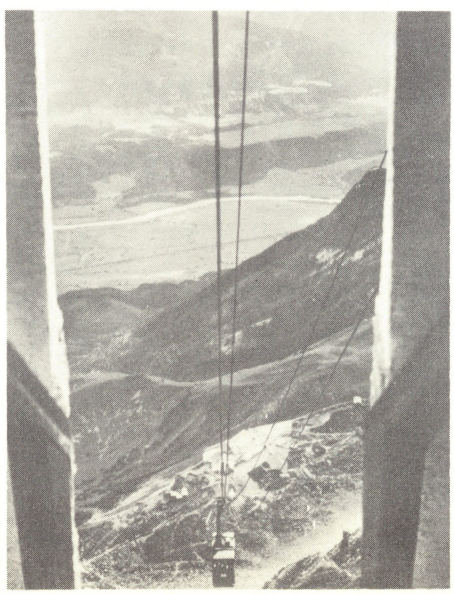
Aerial passenger tramways are usually constructed on the double reversible system with two track cables extending between terminals and one car on each cable. The cars leave the top and bottom stations, respectively, at the same time, and pass each other at a central point. The direction of travel is then reversed for the next trip. For light duty, it is of course possible to erect only one cable on which one car runs back and forth.

A traction rope runs from the car on one cable to the upper station where the drive is usually located, then down to the car on the other cable. A counter-rope connects the two cars with the lower station where the tension device is usually located. An auxiliary traction rope is normally stationary, and is not connected to the cars. It is, therefore, not subject to the deterioration of a running rope, and is always available in cases of emergency. It is provided with its own drive and tensioning device. If the passenger cars are at a stand still at any point along the cables, and are unable to proceed for any reason, the emergency can be handled in one of two ways. The auxiliary traction rope can be used to propel emergency cars from the terminal to the stalled passenger car, or the auxiliary traction rope may be attached to the stalled car and used to propel it at reduced speed to the terminal in entire safety.

Every passenger car of a Bleichert-Zuegg system tramway is equipped with a very powerful and tested braking device, which comes into action automatically and instantly if the traction rope should break. This is a remote possibility, but is nevertheless provided for to insure a full measure of safety. This braking device is located at the center of the carriage, and operates directly on the track cable. Tests have shown that its application

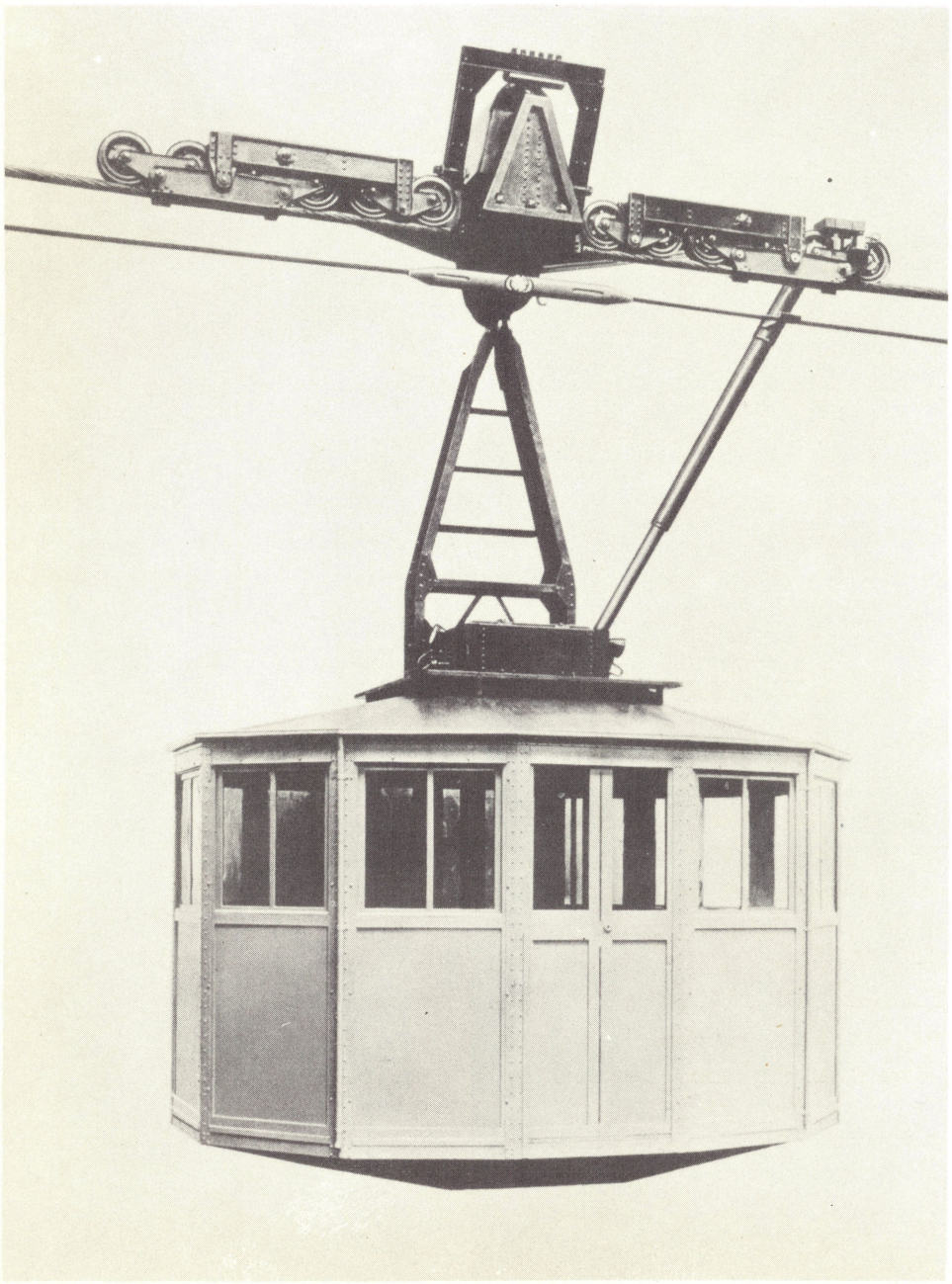
Some Aerial Passenger Tramways in daily service.





does not damage the cable, and the point of application, even on very steep slopes, is such that it effectively prevents any tendency of the carriages to lift off the cable.

The cabins of passenger cars are standardized for 6, 10, 20, 26, and 36 passengers, including the conductor, and they are supported from eight wheeled and twelve wheeled carriages. The cabins are entirely enclosed, giving necessary protection from wind and weather, and they are designed to give a maximum of window space for sight seeing purposes. Provision can be made for carrying skis, toboggans, duffle, water, and moderate loads of fuel, etc. The cabins are provided with lighting



36-passenger cabin with swing-dampening device and carriage brake.

equipment, signaling devices between the terminals, and telephone connection between each terminal and the other car. The operator is provided with a wind gauge and a car position indicator, so that he can, if necessary, run at reduced speed in wind squalls. The driving machinery is preferably located at the higher terminal, although it is possible to place the drive in the lower terminal if there is a distinct advantage in doing so.

Because of the many advantages available by the use of electrical control, it is the invariable practice to use electric motors. If power cannot be secured from commercial power lines, it then becomes necessary to install a gasoline or Diesel operated generating set.

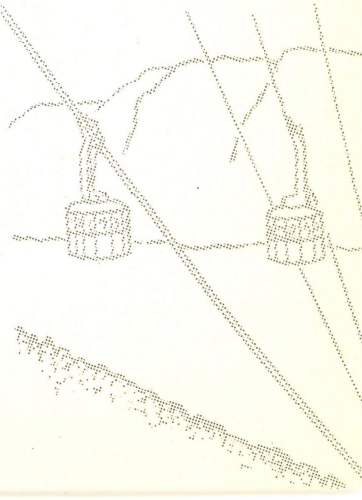
On the heavy duty passenger tramways, four methods of braking are provided: a hand operated brake acting on the drive sheave, a hand operated brake acting on the motor shaft, a centrifugally operated brake which is applied automatically if the rope speed becomes excessive, and an electrical braking device which is applied automatically if, through any cause, the power circuit should be interrupted. The system is equipped with an automatic slow-down device, which gradually reduces the speed as cars enter the terminals, and cuts the current out automatically when the car reaches the proper point in the terminal.

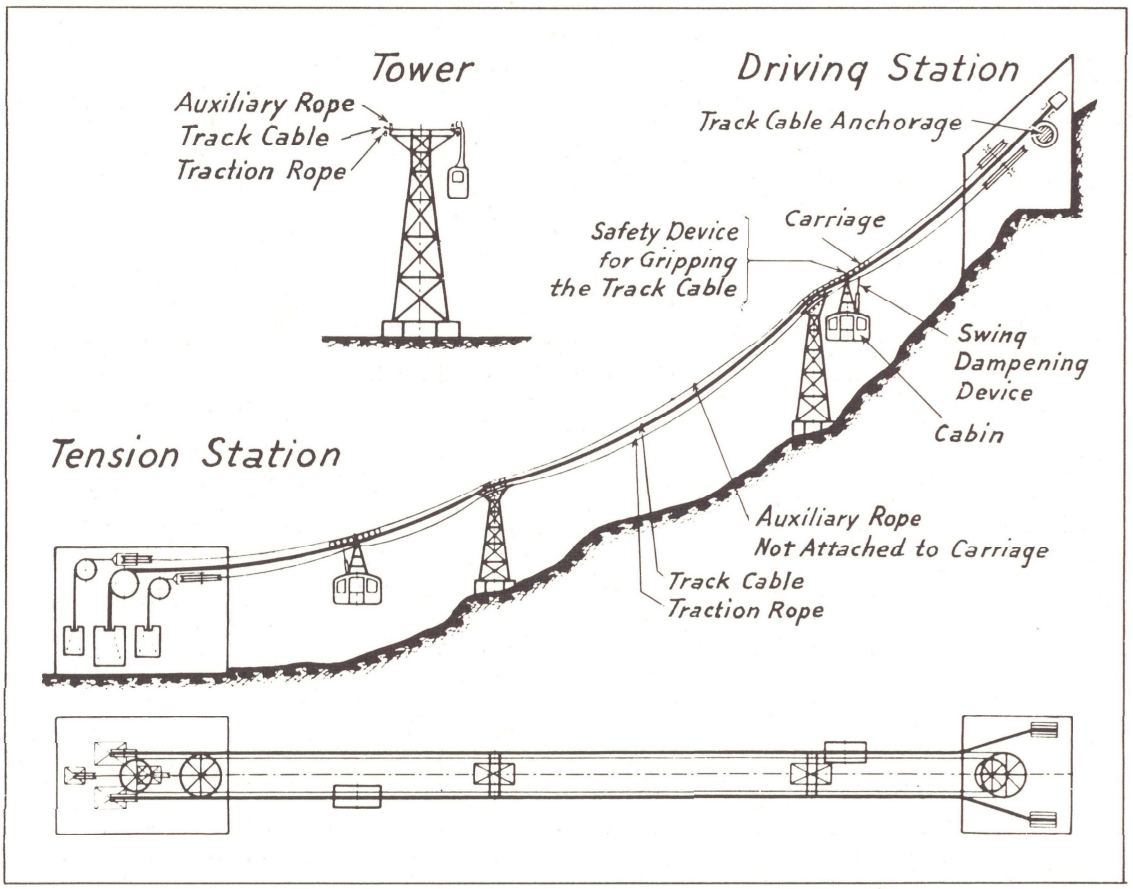
It will be seen that the modern Aerial Passenger Tramway is not a glorified freight tramway. It is a carefully developed system whose most minute detail is designed with the sole object of providing safe and reliable transportation for passengers, and it now incorporates the experience gained in many years of European development.

The sketches on the next page show diagrammatically the operation of a double reversible passenger tramway and typical terminal designs.

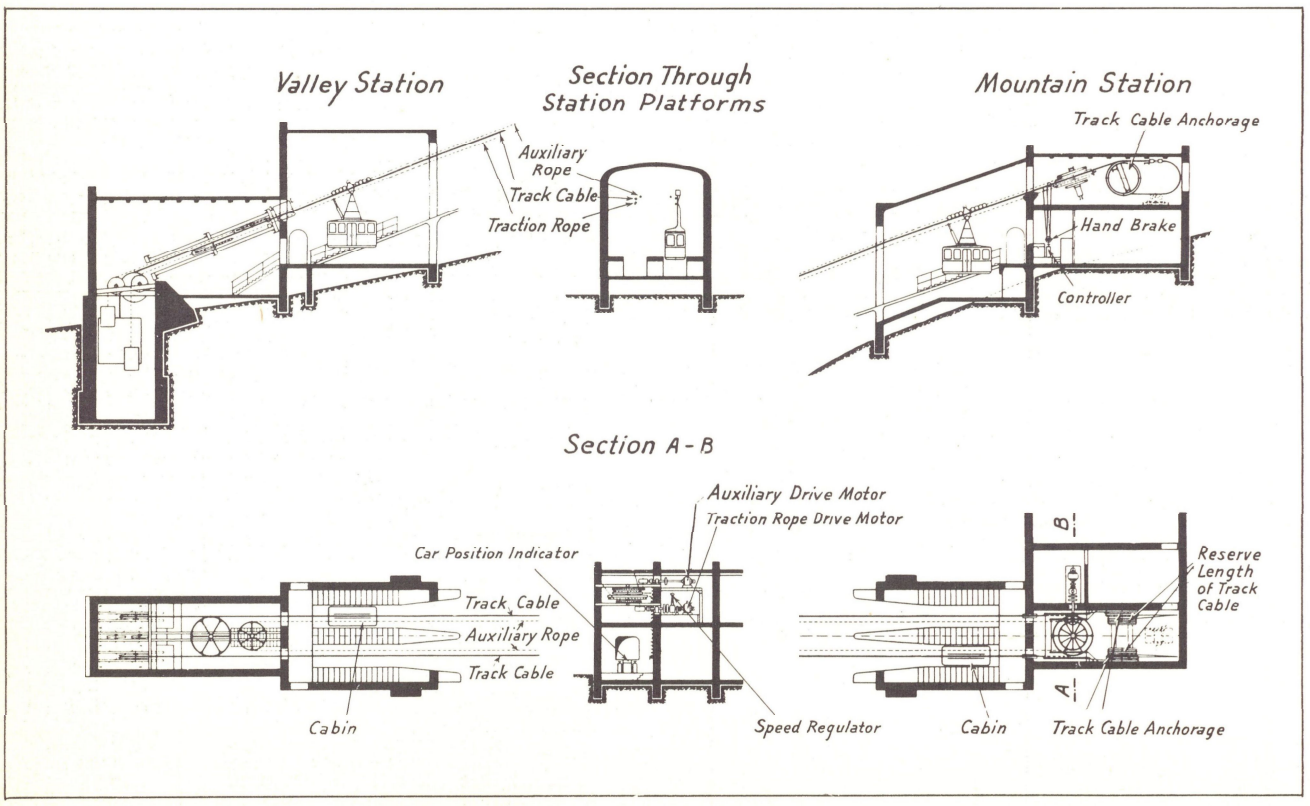
SMALL AERIAL PASSENGER TRAMWAYS

There are certain locations where heavy traffic will not develop but which will be greatly benefitted by the advantages to be derived from aerial passenger transportation. A fine view may be obtainable from a high point near a hotel in the valley, or a ski run may start from a mountain top which is difficult of access. For this class of traffic, an aerial tramway can be constructed at moderate cost without deviating from our high standard of safety and reliability. The cars are of smaller capacity, ranging from 4 to 11 passengers. Therefore, the track cables, operating ropes, driving machinery, foundations, and terminal structures may be of lighter construction. In some cases, the tramway may be built with one track





Schematic Operation of American-Bleichert-Zuegg System Aerial Passenger Tramway.



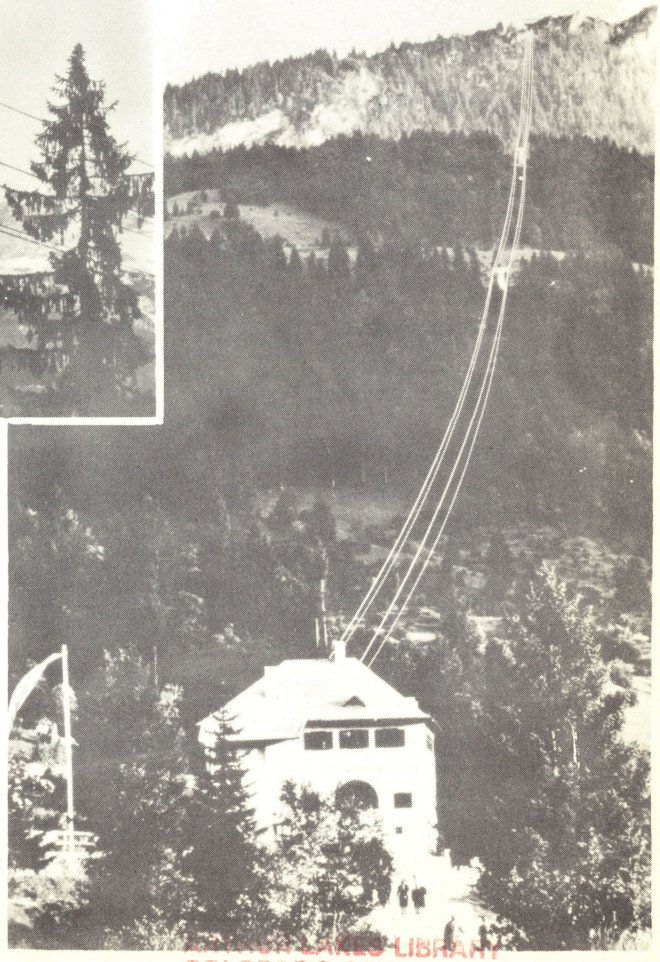
Typical Terminals.

cable and one car, and provision may be made in the design for the future addition of the other cable and car, when an increase in traffic is anticipated. When the cables are not too high above ground, and conditions are favorable for descending from the car, it is possible to dispense with the auxiliary rope. An appreciable saving in first cost is then possible. Such tramways offer an economical solution of many problems in passenger transportation.

The erection of Aerial Passenger Tramways requires experience in that type of construction work, as well as special erecting equipment. Owing to the special nature of these installations, we must erect the cables and machinery. We have the organization and facilities necessary for this work.

Interested parties are requested to write our nearest Sales Office for additional information. We shall be pleased to submit estimates of cost, and, when conditions warrant, we will send an engineer to the site to go into details thoroughly.

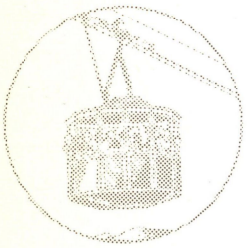
A 26-passenger car from which the passengers are enjoying a fine view.



A typical Passenger Tramway with an inclined length of 7,600 ft. and difference in elevation of 2,600 ft.

FACTS ON THE CANNON MOUNTAIN AERIAL PASSENGER TRAMWAY

LOCATED AT FRANCONIA NOTCH IN THE WHITE MOUNTAINS OF NEW HAMPSHIRE



First Aerial Passenger Tramway to be erected on North American Continent.

Tram-cars, which are suspended from steel cables hung on three massive steel towers, accommodate 27 passengers.

Continuous ride of over a mile with ascent of 2,022 feet in 5½ minutes.

Tram-cars move evenly and quietly out of Valley Station and up the slope, 40 feet above the tree tops.

As one car ascends the other descends, opening up new and charming vistas in the famous White Mountains.

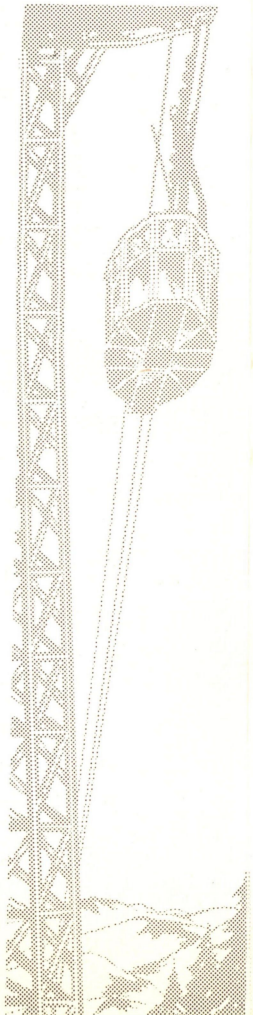
Tramway built on this construction principle used in the erection of over 70 successful tramways in Europe.

Safety is the watchword. There are various automatic brakes and controls, enabling either the conductor or the operator at the Valley Station to stop the car at any time.

The tramway operates safely under all weather conditions. Both stations heated and tramway in operation year around.

Ski trails and practice slopes laid out between altitudes of 2,000-4,000 feet, affording an extended snow season.

Designed and erected by the American Steel & Wire Company.



QUESTIONNAIRE ON PASSENGER TRAMWAYS

Copy similar to this form to be filled out and sent to
AMERICAN STEEL & WIRE COMPANY,
Aerial Tramway Department,
WORCESTER, MASS.

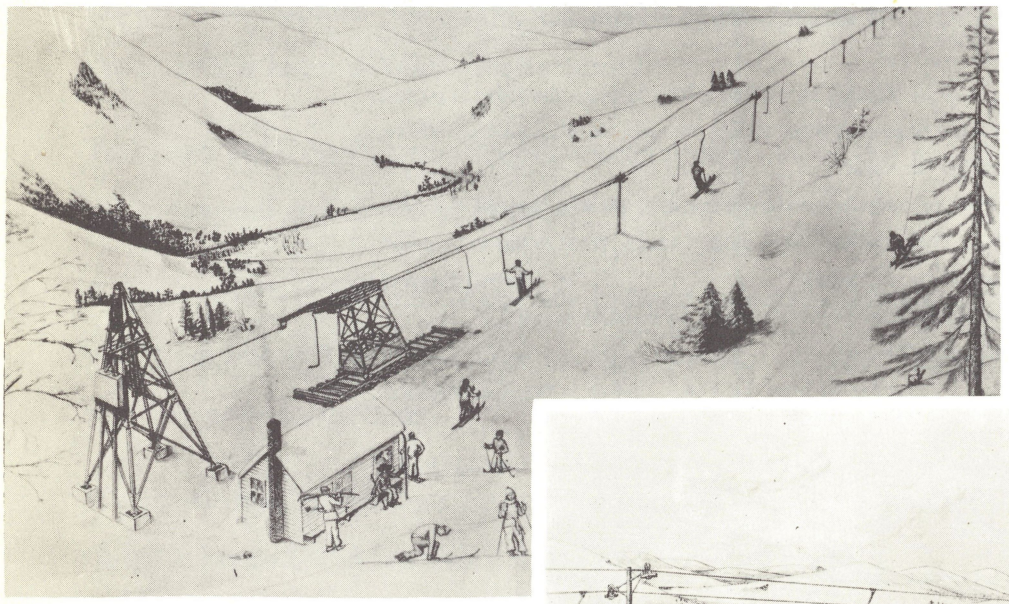
1. Customer's name .....
2. Address .....
3. Location of proposed tramway .....
4. What is the horizontal length between terminals? .....
5. What is the vertical difference in elevation of terminals? .....
6. Give elevation and location of high points on the profile between terminals .....
7. A passenger tramway must be built in a straight line. An intermediate angle necessitates two tramway units with transfer of passengers from one car to another. Is your proposed line straight between terminals? .....
8. If possible, submit a contour map with locations of terminals indicated thereon. Show also any adjacent roads, railways, or transmission lines. Enlarged contours of the ground, or photographs, at terminals are helpful.
9. What is the nature of the ground at the terminals? .....At intermediate high points? .....Is it solid rock, boulders, sand, clay, loam, etc.? .....
10. Is the site bare or wooded? .....If wooded, how high are the trees? .....
    Are there any restrictions on cutting trees? .....
11. If the line runs through a forest, a saving may be effected by cutting a lane through the trees to permit the use of lower towers. Is such economy more important than having the cars travel at all times above the tree tops so that the passengers may enjoy the view? .....
12. After the location is determined, the required capacity in passengers per hour dictates the size of equipment and structures, and therefore, the cost. This should receive careful study. What is the anticipated travel on the tramway for the different seasons of the year? .....For different times of the day? ..... What is the gross number of passengers to be handled yearly? .....
13. What is the maximum number to be handled per hour? .....
14. Is electric power available? .....How far from the Valley Station is the nearest power line? .....Give the characteristics. .....
    If the power line is some distance away, what are the prospects of having an extension installed to the tramway? .....
15. What is the cost of electric current? .....
16. What are the hourly wages of carpenters, mechanics, steelworkers, and common labor? .....
17. If tramway must cross roads, railways, or transmission lines, give required clearances. .....
18. Will the tramway be operated in connection with an existing hotel or camp? .....
19. How will traffic reach the lower terminal? .....
20. Describe the objectives at the upper terminal .....
    Will winter sports be promoted? .....What amusements or diversions will be available? .....These factors influence the design of the terminal buildings.

SKI TOWS AND SKI CHAIR ROPEWAYS

The rapid growth of skiing in this country has created an active demand for a means of transportation, low in cost, which will carry the skiers from the foot of a slope or ski-run up to the starting point. We are well equipped to take care of this demand with equipment which will meet fully the requirements of comfort, reliability, and economy of operation. We have two designs, the Ski-Tow and the Ski-Chair Ropeway, which have already met with considerable popularity.

As will be seen from the sketches, the ski tow consists essentially of a wire rope spliced endless, driven at the upper terminal, maintained under tension at the lower terminal, and supported along the line by overhead rollers situated about 12 ft. above ground. This rope supports jay sticks spaced equally for the entire circuit of the rope. These are driven by the rope, but are free to swivel in any direction so as to accommodate different positions of the skiers.

Ski tows are driven at speeds varying from 350 to 500 ft. per minute, depending upon the ground and snow conditions, size of the load, and power of the engine. Many of these installations have no available electric power, and are therefore driven by internal combustion engines.



Ski Tow—Upper Station

Ski Tow—Lower Station. Showing Counterweight Arrangement for Maintenance of Correct Tension on Line.

With the ski tow, the skier may ascend the steepest and roughest of slopes with the greatest of ease. At the lower terminal, the prospective rider grasps one of the approaching jay sticks, and eases himself into position with the crook of the jay stick in back of him. By permitting the long pole to slide through his hand, he picks up speed with the tow. After picking up speed with the tow and adjusting the crook of the pole in back of him, he leans back while holding the jay stick with one hand and his own ski poles with the other hand. To observers, it is immediately apparent that after two or three trips the skiers are so accustomed to the tow that they are towed up even the steepest slope in a perfectly relaxed position. This is in great contrast to the type of tow in which the skier must hold on to the tow rope with his hands, and accounts for the preference of skiers for the wire rope ski tow, as riding up slopes on the other type of tow can be very tiresome and exhausting.

There are a number of our ski-tows now in operation in various sections of the country.

The finest type of equipment in the whole field is the aerial ski chair ropeway, which has been patented by us in conjunction with the Union Pacific Railroad Company. The latter named Company installed two of these ropeways at Sun Valley, Ketchum, Idaho, for which we furnished the rope and equipment. We have made a similar installation in the Belknap Mountains near Laconia, N. H.

View of Sun Valley, Ketchum, Idaho, from near Mountain Station.

The photographs taken at Sun Valley, Ketchum, Idaho, give a very good idea of this type of installation. A 7/8" diameter wire rope, spliced endless and supported overhead, carries the chairs spaced at equal intervals; in this case, of about 125 ft. The rope travels at an average speed of about 450 ft. per minute, which is not too fast for the rider to seat himself or to leave the ropeway.

Ski Chair Ropeway, Sun Valley, Ketchum, Idaho. General view of Line, Showing Skier about to ascend.

These aerial ski chair ropeways are, without a doubt, the finest development of the idea of ski tows. An interesting feature of ski chair ropeways is that it makes no difference whether the passengers have skis or not; therefore, they can be adapted to wide usage for sightseers in the summer.

In regard to prices for specific installations, a certain amount of engineering data must be supplied to our Tramway Department so that they can determine the proper design. The questionnaire on the next page gives the various items which should be covered in order that we may work up an estimate.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

QUESTIONNAIRE ON SKI TOWS AND SKI CHAIR ROPEWAYS

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2. Mail address .....

3. Location of proposed installation .....

4. What is the horizontal length between terminals? .....
.....

5. What is the vertical difference in elevation of terminals? .....
.....

6. What is the maximum number of persons to be handled per hour? .....
.....

7. Is electrical power available at the upper station? .....If so, give its characteristics .....

8. What is the character of the ground at the terminals? .....
Is it rock, sand, clay, loam, etc.? .....

9. What is the general character of the ground along the line? .....
.....

10. Will the line run straight between terminals, or will one or more angle stations be required? .....

11. Our proposal will be more accurate and complete if you furnish a profile of the ground prepared from an actual survey. If this cannot be done, please send us a sketch of the ground profile drawn as nearly to scale as possible. The ground profile dictates the design and is necessary to determine the maximum ground slope and cable slope.

Form 6006

Printed in U.S.A.