= Johnstown Inclined Plane =

The Johnstown Inclined Plane is a 896 @.@ 5 @-@ foot ( 273 @.@ 3 m ) funicular in Johnstown , Cambria County in the U.S. state of Pennsylvania . The incline and its two stations connect the city of Johnstown , situated in a valley at the confluence of the Stonycreek and the Little Conemaugh Rivers , to the borough of Westmont on Yoder Hill . The Johnstown Inclined Plane is billed as the " world 's steepest vehicular inclined plane " , as it is capable of carrying automobiles , in addition to passengers , up or down a slope with a grade of 70 @.@ 9 percent . The travel time from one station to the other is 90 seconds .

After a catastrophic flood in 1889 , the Johnstown Inclined Plane was completed in 1891 to serve as an escape route for future floods , as well as a convenient mode of transportation for the residents of the new communities situated above the valley . It was operated by Cambria Iron Company and its successor Bethlehem Steel until 1935 , when it was sold to the borough of Westmont . The incline was briefly shut down in 1962 when its supply of power from Bethlehem Steel was terminated . Twice in its history , the Johnstown Inclined Plane fulfilled its role as a means of evacuation from floods ? once in 1936 and again in 1977 . The incline was listed on the National Register of Historic Places in 1973 and was designated a Historic Mechanical Engineering Landmark in 1994 . It had major renovations in 1962 and from 1983 to 1984 .

= = Design = =

The Johnstown Inclined Plane was designed by Hungarian engineer Samuel Diescher , who had also designed the Duquesne , Castle Shannon and Fort Pitt Inclines in Pittsburgh . The funicular consists of a parallel set of 8 ft ( 2 @,@ 440 mm ) broad gauge railroad tracks with a 70 @.@ 9 percent grade or an angle of 35 degrees and 28 minutes from the horizontal . The incline is 896 @.@ 5 feet ( 273 @.@ 3 m ) long and ascends 502 @.@ 2 feet ( 153 @.@ 1 m ) vertically to the top of Yoder Hill and the borough of Westmont , the station of which is at an elevation of 1 @,@ 693 @.@ 5 feet ( 516 @.@ 2 m ) above sea level . The rails are supported by 720 14 @-@ foot @-@ long ( 4 m ) railroad ties made from Southern Yellow Pine . The incline is lit at night by 114 high @-@ pressure sodium @-@ vapor lamps mounted along the sides of tracks . There used to be a stairway between the two tracks with 966 steps , but these were removed circa 1963 .

Two cars traverse the slope ; as one descends , the other ascends and acts as a counterweight . The cars are 15 feet 6 inches ( 4 @.@ 7 m ) wide , 15 feet 2 inches ( 4 @.@ 6 m ) tall , and 34 feet ( 10 m ) long , and are large enough to carry either 65 people , 6 motorcycles , or an automobile . While the cars are open to the elements , an enclosed seating area containing a bench is situated along the outer side of the incline . The cables connecting the cars are 2 @-@ inch @-@ diameter ( 50 @.@ 8 mm ) , 6 × 36 right regular lay , steel wire rope . They are wound around a 3 @-@ short @-@ ton ( 2 @.@ 7 @-@ metric @-@ ton ; 2 @.@ 7 @-@ long @-@ ton ) , 16 @-@ foot @-@ diameter ( 5 m ) drum that connects the cars together . The cable on the north track is 1 @,@ 075 feet ( 328 m ) long , while the south cable is 7 feet ( 2 @.@ 13 m ) shorter . Each car weighs 22 short tons ( 20 @.@ 0 metric tons ; 19 @.@ 6 long tons ) , but they , and consequently the cables , can carry an additional load of 15 short tons ( 13 @.@ 6 metric tons ; 13 @.@ 4 long tons ) . A 400 @-@ horsepower ( 298 kW ) electric motor turns the drum , simultaneously winding and unwinding the cable , to power the incline . The Johnstown Inclined Plane is unusual in that the motor and winch are located at a 90 degree angle to the incline instead of directly underneath it . Operation of the incline is controlled via a foot pedal located in a booth in the upper station .

An emergency brake engages if the air pressure needed to control the incline is insufficient ; the brake also engages if a dead man 's switch is tripped in the operator 's booth . In addition to the hauling cables , a 972 @-@ foot ( 296 m ) safety cable capable of withstanding 165 short tons ( 149 @.@ 7 metric tons ; 147 @.@ 3 long tons ) is also connected to the cars .

= = History = =

= = = Background and construction = = =

Inclines are common in Europe , and immigrants , like the German , Slavic , and Welsh people who settled near Johnstown , remembered them from their native lands and brought the concept to the United States . The earliest inclines in the United States were a series of 10 that were built in the 1830s as part of the Allegheny Portage Railroad . The portage railroad carried canal boats over the Allegheny Mountains to connect the canals from Pittsburgh to the ones from Philadelphia . Pittsburgh at one time also had " at least 17 " inclines ? some carried passengers , others freight , while another two inclines ( like the Nunnery Hill Incline ) were curved .

On May 31 , 1889 , the South Fork Dam collapsed upstream of Johnstown on the Little Conemaugh River . The resulting deluge devastated the city , killing 2 @,@ 209 people . As the city rebuilt , the Cambria Iron Company started work on a residential development atop Yoder Hill . To provide easy transportation up and down the steep slope for the residents of the new community of Westmont , the company decided to construct an inclined plane . In addition to being a convenient mode of transportation , the Johnstown Inclined Plane doubled as an escape route in case of another flood . Diescher was hired by Cambria Iron to design the incline . The rails used in the incline were all manufactured in Johnstown at Cambria Iron , with many of the tools needed in the construction also handcrafted there . The 232 @-@ foot ( 71 m ) Inclined Plane Bridge was built to span the Stoneycreek River to provide access to the lower station of the incline . Originally named the Cambria Inclined Plane , the Johnstown Inclined Plane opened on June 1 , 1891 and cost $ 133 @,@ 296 to build . The convenience the incline provided stimulated a rapid growth of population in Westmont and made the borough one of the country 's first suburbs . Over 40 million trips were taken on the incline in its first 80 years of operation .

= = = Use = = =

The incline 's original steam engine was disconnected on January 6 , 1912 , and replaced with an electric motor . The cars used on the incline were originally double @-@ deckers , but were reconfigured into a single @-@ decker design in 1921 . The double @-@ decker cars had horses and wagons riding on the main , upper deck and passengers riding in a compartment below . Only one human fatality has occurred at the incline , though it was determined that the incident was not caused by the incline itself . There were two incidents in the 1920s when horses aboard the incline became spooked and leapt from the car onto the tracks below . Bethlehem Steel , the successor to Cambria Iron , sold the Johnstown Inclined Plane to the borough of Westmont in April 1935 . On March 17 , 1936 , nearly 4 @,@ 000 people were evacuated from Johnstown to higher ground via the incline as the Stoneycreek and Conemaugh Rivers overflowed their banks . The floodwaters continued downstream and eventually reached Pittsburgh . From February 1938 to July 1953 , the Johnstown Traction Company operated transit buses from Johnstown to Westmont with the " fully loaded public buses " being carried by the incline . Bethlehem Steel stopped supplying electricity to the Johnstown Inclined Plane when the factory switched to " an incompatible power system " , forcing the incline to close on January 31 , 1962 . Because of public pressure to keep the incline operating , it was reopened in July 1962 after an extensive renovation , in which the electric motor was rewound , ties were replaced , and the cars were repainted .

The Johnstown Inclined Plane was listed on the National Register of Historic Places on June 18 , 1973 . On July 20 , 1977 , the incline was again used as an escape route , evacuating residents from the valley amid rising floodwaters . It also carried " boats , emergency personnel , and equipment down to the valley to aid in rescue operations " . The incline was again sold for $ 1 by Westmont borough on March 8 , 1983 , to the Cambria County Transit Authority , now CamTran . CamTran initiated a $ 4 @.@ 2 million renovation on September 7 , 1983 , replacing " the incline 's foundation piers , structural steel , and track . " The renovations were completed on August 22 , 1984 , and the incline was rededicated on September 6 . It was designated an Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers ( ASME ) in September

1994 . A footbridge spanning Pennsylvania Route 56 between the incline and Vine Street was opened around the same time . On September 1 , 2000 , the incline was closed when the Pennsylvania Department of Transportation ( PennDOT ) undertook an $ 2 @.@ 3 million renovation of the bridge and the access road leading to the bridge . It was reopened in April 2001 , but again closed in September to allow PennDOT to finish repairs to the bridge deck . The repairs were completed on December 14 , 2001 . A strong thunderstorm disrupted power to the incline on April 16 , 2010 , stranding the cars and two passengers almost halfway down the slope ; the rescue took three hours and ended when firefighters rappelled down the tracks to reach the car . The Johnstown Inclined Plane was closed from September 9 to October 14 , 2010 , for the installation of a new 9 @,@ 000 @-@ pound ( 4 @,@ 100 kg ) " hoist brake shaft . " From October 29 to October 31 , 2012 , CamTran shut down the incline fearing power outages due to the passage of Hurricane Sandy . During the annual Thunder in the Valley motorcycle rally , two resistors failed and stopped the incline just outside the stations on June 28 , 2014 ; repairs took approximately a month after having experts brought in diagnose the failure . Sensor issues briefly disrupted service in August 2014 and , again , December 2014 forcing the incline to start its winter maintenance period early .

= = Current operations = =

With the growing popularity of the automobile and subsequent construction of new roads , ridership on the incline diminished and it was losing $ 25 @,@ 000 a year by 1961 . However , since the 1980s , the incline has become one of the main tourist attractions in Johnstown , with people visiting the incline to " ride for fun , nostalgia and novelty . " Though primarily used for tourism , the incline 's use by commuters , who bike or walk to work , has also increased . CamTran 's Route 18 transit bus offers connections between the incline and downtown Johnstown . As of 2015 , the cost for a ride on the incline is $ 2 @.@ 25 or $ 4 for a roundtrip ; fares for automobiles to be transported by the incline are $ 6 one way . The incline takes around 90 seconds to travel from one station to the other ; the same trip takes 10 minutes by automobile . In 2014 , the Johnstown Inclined Plane had an annual ridership of 70 @,@ 761 passengers , a decrease of 18 @.@ 7 percent from the previous year .

The upper station of the incline has a gift shop that sells souvenirs and snack foods ; a visitor center is also located adjacent to the station . The mechanical room housing the incline 's electric motor and hoisting mechanism can be viewed from windows in the gift shop and the lobby of the visitor center . An observation deck providing views of the incline , the city , and the valley is located on the opposite side of the station from the visitor center . Two hiking trails allow visitors to walk the slope . One is a sculpture trail , with works created in 1989 by local artist James Wolfe , who used remnants of the Bethlehem Steel factory in Johnstown .