= Brookville Tunnel =

The Brookville Tunnel (also Brooksville Tunnel) was a historic railroad tunnel engineered by Claudius Crozet during the construction of the Blue Ridge Railroad in the 1850s . The tunnel was part of a series of four tunnels used to cross the Blue Ridge Mountains of Virginia for the Virginia Central Railroad of the United States . The Brookville Tunnel was the second tunnel used to cross the mountains from the east (the easternmost being the Greenwood Tunnel) , and was located approximately 1 @.@ 5 miles (2 @.@ 4 km) west of the village of Greenwood , Virginia .

During its construction , numerous cave @-@ ins and landslides occurred because of the fragile and weak rock the tunnel passed through , and at one point , an outbreak of cholera forced work to stop . By October 1856 the tunnel was completed at a cost of $ 114 @,@ 600 , having been lined with a thick elliptical brick arch to hold back the earth . The Brookville Tunnel was used by the Virginia Central Railroad , and after 1868 , the line 's successor , the Chesapeake and Ohio Railroad . After the reorganization of the line in 1878 as the Chesapeake and Ohio Railway , the tunnel continued to be used until it was demolished and replaced by a cut during the construction of Interstate 64 in the 1960s and 1970s , at which point it was one of only two of Crozet 's original four tunnels still in use .

= = History = =

On March 5 , 1849 , the Virginia General Assembly passed an act to incorporate the Blue Ridge Railroad . This railroad was to construct a rail line over the Blue Ridge Mountains for the Louisa railroad (renamed as the Virginia Central Railroad in February 1850) from a point near Blair Park at the eastern base of the mountains to Waynesboro in the Shenandoah Valley via Rockfish Gap . Claudius Crozet was appointed as chief engineer of the Blue Ridge Railroad and developed a plan to cross the mountains using a series of four tunnels . The first tunnel from the east was the Greenwood Tunnel , built through a difficult and insecure ridge near Greenwood . Brookville tunnel was located 1 @.@ 5 miles (2 @.@ 4 km) west of the Greenwood Tunnel , also built through a small offshoot spur of the Blue Ridge Mountains .

Construction on the Brookville Tunnel , or the " middle " or " second tunnel " as it was then called , was begun sometime between 1849 and 1851 . The earth encountered at Brookville was of a much weaker quality than at the Greenwood Tunnel , rendering the digging of the tunnel both an extremely dangerous and difficult task . Although the eastern section of the ridge was composed of firm and sturdy rock , the majority of the tunnel passed through a mixture of frail slate that was formed at a steep angle , soapstone , and clay . When exposed to air , this mixture would often disintegrate causing large amounts of earth to fall into the tunnel bore . On two occasions during the tunnel 's construction , though great care was taken to provide temporary support , major cave @-@ ins occurred forming craters on top of the ridge , as much as 150 feet (46 m) above the tunnel . Another slide occurred on the outside of the western portal that blocked the entrance to the tunnel and prevented workers from repairing the damage from the two internal cave @-@ ins . Rocks often fell down upon the timbers under which the men worked , creating sounds described as " resembling that of distant thunder " . The weakness of the earth , especially in the western sections , necessitated the implementation of a strong arch throughout approximately 500 feet (150 m) of the tunnel and a durable brick lining . Crozet described the nature of the work on the tunnel in an 1854 letter :

The Brooksville Tunnel is the most difficult work of the kind , I have seen any record of : at the Western entrance , the pressure of the big slides actually causes the bottom to surge up , as is sometime the case in coal mines ; in view of the sliding tendency and immense pressure of this ground , it will be advisable to enter on that side with an invested arch to prevent a collapse ... This work is vastly more difficult than the Greenwood Tunnel was , though it was not , by any means , an easy safe job .

By this time , the tunnel had come to be known as the " Brooksville Tunnel , " after a small stagecoach stop and inn nearby where Crozet 's headquarters was located ; in later years , the " s "

was dropped and the tunnel was simply referred to as the " Brookville Tunnel . " In late summer of 1854 , an epidemic of cholera broke out among the Irish workers at the tunnel . In a letter to the Virginia Board of Public Works , Crozet states that the epidemic began at the eastern end of the tunnel where around 25 of the total 150 workers perished from the disease . The disease then spread to the western end where another eight workers died before work ceased . During this outbreak , little work could be done on the tunnel , adding yet another delay to the difficult work the Brookville Tunnel posed .

While work on the tunnels continued , the Virginia Central Railroad , eager to connect its eastern division to the line under construction in the Shenandoah Valley , developed plans to use temporary tracks to bypass the incomplete Blue Ridge Railroad . As was done over Rockfish Gap to the west , a temporary track approximately 0 @.@ 5 miles (0 @.@ 8 km) long was proposed by the Virginia Central Railroad 's Chief Engineer , Charles Ellet , Jr . , and constructed around the Brookville Tunnel as the digging continued . Due to the many setbacks and difficulties encountered , the tunnel was not completed until October 1856 , just two months prior to the hole @-@ through of the 4 @,@ 273 @-@ foot (1 @,@ 302 m) Blue Ridge Tunnel at the top of Rockfish Gap . Remarkably , with the exception of the cholera outbreak , no one was injured during the dangerous work completing the Brookville tunnel . The Virginia Central soon after began routing trains through the Brookville tunnel , avoiding the short temporary track .

During the American Civil War (1861 ? 1865) , a large crack was found within the tunnel 's arch , being in some locations as much as 4 inches (10 cm) wide . Upon examination of the earth above the tunnel , it was found that a section of the earth had slipped , and was resting on the tunnel walls . With the tunnel in danger of collapsing , a plan to address the tunnel 's structural issues was developed that put in place a second arch below the original . The new arch was started 12 feet (3 @.@ 7 m) above the rails and rose to a peak just above what was necessary to clear a brakeman riding atop a railroad car (at that time , 17 feet or 5 @.@ 2 metres) , around 3 feet (0 @.@ 91 m) below the original arch . Because of the ongoing war and the lack of funds and resources , the new arching could only be completed in 10 @-@ foot (3 @.@ 0 m) segments . It was deemed necessary to re @-@ arch a total of 450 feet (140 m) of the tunnel , and as of 1864 , 260 feet (79 m) had been completed at a cost of $ 23 @,@ 390 @.@ 73 (Confederate dollars) .

After the war , the tunnel continued to be used by the Virginia Central Railroad , and after 1868 , the Chesapeake and Ohio Railroad . The Chesapeake and Ohio Railroad was reorganized as the Chesapeake and Ohio Railway in 1878 , and continued to route trains through the tunnel up until the tunnel 's demolition with the construction of Interstate 64 in the 1960s and 1970s . At the time of the tunnel 's demolition , it was one of only two of Crozet 's original four tunnels of the Blue Ridge Railroad still in operation (the other , which as of 2013 is still in use , was the 100 @-@ foot (30 m) Little Rock Tunnel) . Today , Interstate 64 passes over the cut that replaced the Brookville Tunnel .

= = Architecture = =

The Brookville Tunnel was constructed in an elliptical form , a design typical of tunnel construction during the 1800s and also used on the Blue Ridge and Greenwood Tunnels . In a November 1849 report , Crozet describes the design to be used on the tunnels :

The shape I have adopted is that of an ellipse , formed by bisecting , on each side , the horizontal ordinates of a circle of 32 feet diameter , down to its center , below which the sides are to be made vertical , if no arch is necessary lower down ; otherwise , the ellipse is to continue down to the bottom and to be shaped all round with bricks , stones , or iron , as may appear most eligible . This shape leaves ample room for the cars , and , by contracting the roof , is more secure than a semicircle of 16 feet diameter .

Portions of the Brookville tunnel were lined with brick for added strength , with the brickwork originally contracted to Joseph Dettor , a local brickmaker . Because of the poor quality of Dettor 's bricks , Crozet decided to use these bricks on the Greenwood Tunnel to the east , which was a stronger bore than Brookville . Crozet estimated in 1854 that the total number of bricks required for the entire tunnel would be upwards of 750 @,@ 000 . After examining the offers of multiple

brickmakers , the Virginia Board of Public Works contracted Robert Harris to provide the bricks for the Brookville Tunnel . The resulting arch was between 3 ? 4 feet (0 @.@ 9 ? 1 @.@ 2 m) in thickness over the entire length of the tunnel , and formed an opening approximately 20 feet (6 @.@ 1 m) high and , at the extreme , 15 feet (4 @.@ 6 m) wide .

During the construction , the timbers that were used to support the fragile sections of the tunnel to be arched were left in place after the arch was completed , as it was thought too hazardous to remove them . When the earth slip occurred during the Civil War , these remaining timbers acted as levers , furthering the cracking and structural instability of the tunnel . As the new arch was constructed , the old timbers were removed , and the space in between the new and old walls was filled with brick and cement .

The original brick portals were replaced by the Chesapeake and Ohio Railway in 1928 with concrete portals , as part of a series of tunnel upgrades across the line beginning in the 1920s . The new portals no longer bore the distinctive elliptical design of Crozet 's original , but had vertical sides and a semi @-@ circular arch .

= = Construction Costs = =

The total cost to complete the Brookville Tunnel amounted to $ 114 @,@ 600 , with a cost per foot , at a length of 869 feet (265 m) , of $ 131 @.@ 90 . By comparison , the cost per foot of the 538 @-@ foot (164 m) Greenwood Tunnel was $ 138 @.@ 30 , the 100 @-@ foot (30 m) Little Rock Tunnel was $ 123 @.@ 90 , and the 4 @,@ 273 @-@ foot (1 @,@ 302 m) Blue Ridge Tunnel was $ 108 @.@ 60 . Costs at the Brookville Tunnel were greatly increased from the expected by the frail and insecure earth encountered , contrary to what originally appeared to be solid rock . Workers , both inside and outside laborers , were paid approximately $ 1 @.@ 12 per day , while miners were paid $ 1 @.@ 37 per day , equivalent to $ 29 @.@ 5 and $ 36 @.@ 08 , respectively , today .