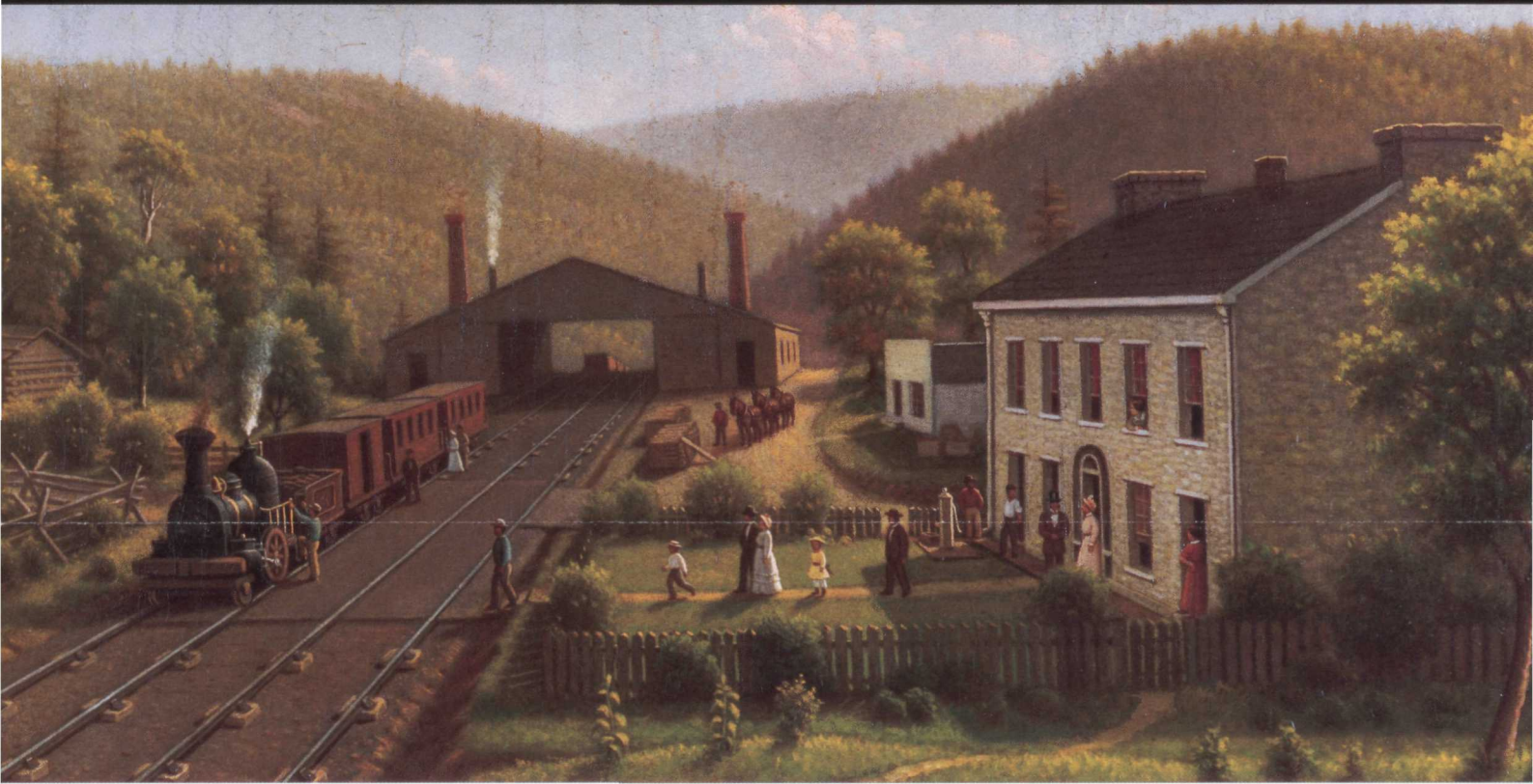


Allegheny Portage Railroad

National Park Service
U.S. Department of the Interior



National Historic Site
Pennsylvania



Lemon Inn on the Portage Railroad, by George Storm
THE STATE MUSEUM OF PENNSYLVANIA

Pushing a Nation Westward

Completion of the Erie Canal in 1825 was cause for celebration among the merchants of New York City, but the feat discouraged their counterparts in Philadelphia. Those merchants watched helplessly as their trade slipped away, diverted through New York to take advantage of the western markets opened by the new canal. In 1826 Pennsylvania's legislators authorized the Main Line canal system between Philadelphia and Pittsburgh—an ambitious plan requiring aqueducts, tunnels, reservoirs, dams, 82 miles of railroad track, and 276 miles of canal. The trade lost to New York loosened Pennsylvania's purse strings and spurred construction. By 1831 much of the state-owned Main Line canal system was finished. But everyone was so concerned with pushing the eastern and western canal sections toward each other that no one had grappled with their greatest obstacle—the Allegheny Mountains.

As workers on both canals approached the Alleghenies in March 1831, the legislature authorized a system in which canal boat passengers and goods would be moved to railroad cars and towed by stationary steam engines up a huge staircase of five inclined planes. On the descent they would be let down five more planes, then transferred again to canal boats. By late 1833 workers

had completed one track. The portage officially opened on March 18, 1834, and the first adventurous passengers were pulled up Incline Number 1. The drawback of the system—transfer of freight from canal boat to railroad car—was eliminated in the mid-1830s by the development of sectional boats. These could be split into sections and loaded onto railroad cars for the portage, allowing freight to make the entire journey from Philadelphia to Pittsburgh on the same canal boat. At first horses towed the cars on the levels between inclines. They were dependable but slow, and soon they were replaced on most levels by locomotives.

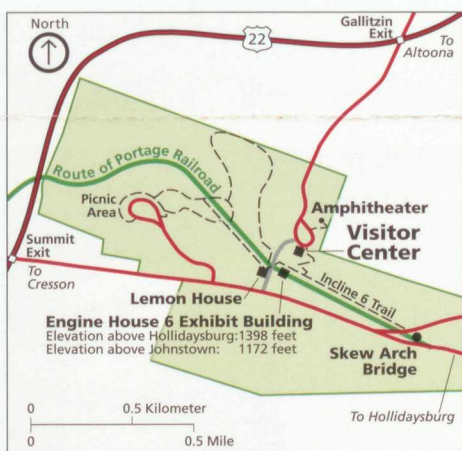
The portage railroad was a daring stroke of engineering that worked remarkably well, when railroads were still experimental. But, it was not without its hazards. Boilers exploded and the 3½-inch hemp tow ropes broke too often. John Roebling solved the rope problem by suggesting the portage railroad use the new “wire rope” that he was developing. By 1849 wire cable, later used by Roebling on the Brooklyn Bridge, was used on all planes.

Despite the new technology, the portage railroad was obsolete within a few years. As locomotives grew more powerful and dependable, railroads provided stiffer com-

petition, finally putting most canals out of business. Moreover, inclines were slow and costly compared to continuous track. In the early 1850s Pennsylvania began construction of a New Portage Railroad without inclined planes, spelling the demise of the old system. The new portage was doomed before it was finished, when the privately owned Pennsylvania Railroad completed its line over the Alleghenies in 1854. Canals, which froze in winter, could not compete with a carrier that offered faster service year-round. The portage was abandoned after 23 years of service, when the Pennsylvania Railroad bought the Main Line canal system in 1857.

The Main Line never captured enough western markets to live up to its commercial expectations. Nevertheless, the Main Line canal system was important to Pennsylvania because it quickened trade between the coal-producing western towns and eastern manufacturing cities. Its role in the country's westward expansion was perhaps its greatest contribution. Before the canal and portage were built, an arduous, weeks-long journey lay between eastern farms and cities and the uncrowded West. The Main Line, decades before the first rails spanned the distance, gave settlers reasonably comfortable transportation to their new homes.

Planning Your Visit



Visitor Center The visitor center has information, exhibits, and a film about the portage railroad. From there you can follow a boardwalk through a stone quarry to Incline Plane 6. The Engine House 6 Exhibit Building preserves the remains of the original engine house foundation. It features exhibits and a life-sized model of the stationary steam engine. Samuel Lemon built Lemon House on Cresson Summit (see photo above and painting) about 1832. It served as his home, tavern, and business.

Other features in the park include planes 6, 8, 9, and 10, stone culverts, stone railroad ties, Skew Arch Bridge, and Staple Bend Tunnel, the first railroad tunnel constructed in the United States. Ask at the visitor center about activities, trails, and nearby park areas that you can visit.

Accessibility The visitor center (a wheelchair is available here), boardwalk, Lemon House, picnic area, and Engine House 6 Exhibit Building are accessible for visitors with disabilities.

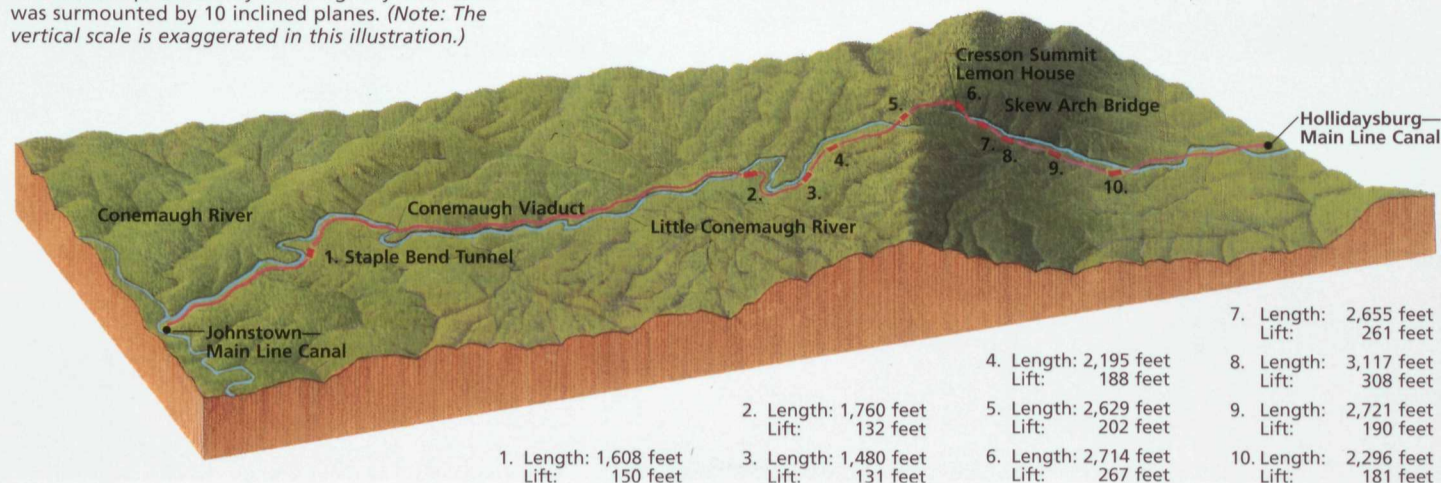
Safety and Regulations Much of the portage railroad is next to or covered by busy highways. Be cautious when stopping. Camping, hunting, open fires, and removal of objects are prohibited.

More Information
Allegheny Portage Railroad National Historic Site
110 Federal Park Road
Gallitzin, PA 16641
814-886-6150
www.nps.gov/alpo

Crossing a Mountain

ILLUSTRATION: NPS/L.K. TOWNSEND

The obstacle presented by the Allegheny Mountains was surmounted by 10 inclined planes. (Note: The vertical scale is exaggerated in this illustration.)



How an Inclined Plane Worked

The railroad portage over the Allegheny Mountains—although only a short section of the Pennsylvania Main Line—was crucial to the enterprise. It joined the system's two canals into an efficient artery between eastern and western Pennsylvania. In 1840 passengers leaving Philadelphia could reach Pittsburgh in four days instead of 23.

The engineering was simple in principle but bold in execution. In the canal basin at Hollidaysburg, the packet boat sections in which passengers had traveled from Philadelphia were floated onto railroad cars for the portage. They were hauled from the water by stationary steam engines, then pulled by locomo-

tives at about 15 mph over the long grade to the first incline. In a shed at the foot of the incline workers hitched three cars at a time, each with a load averaging 7,000 pounds, to the continuous cable that moved over rollers between the rails. This cable was pulled at about four mph by a stationary steam engine beneath a shed at the top of the incline.

During the portage's busiest periods six trains an hour were pulled up each incline. Operators used cars descending on the other track to counterbalance those ascending, lessening the strain on the engines. By today's standards these were not steep inclines, but they were too much for early locomotives. The steep-

est—Number 8—had a slope of 9.9 percent (a 9.9-foot rise in 100 feet), or less than six degrees. The average incline rose an inch every foot, easy enough for horses to pull up one car at a time if the engines broke down.

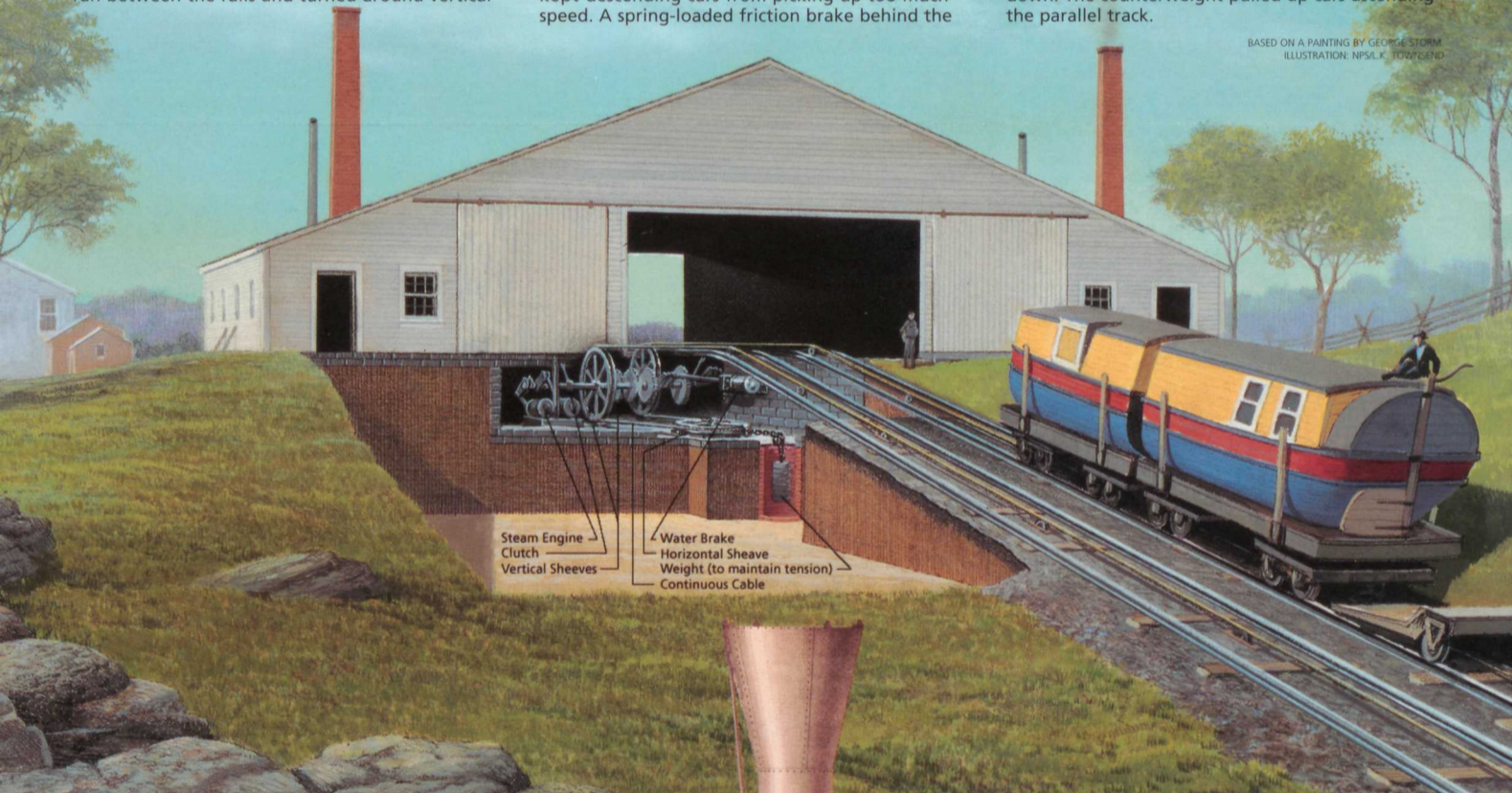
Five inclines carried cars to the summit. On near-level grades between inclines, horses or locomotives pulled the cars. The process was reversed on the other side of the summit, and gravity made the descent faster. Upon reaching the Johnstown canal basin boat sections were eased into the water, reassembled, and floated to Pittsburgh. In six hours the boats traveled 36 miles, ascended 1,398 feet, and descended 1,172.

Sheds at the top of inclines housed twin 35-hp steam engines; they were used one at a time, with the other as a backup. Each pulled the continuous cable that ran between the rails and turned around vertical

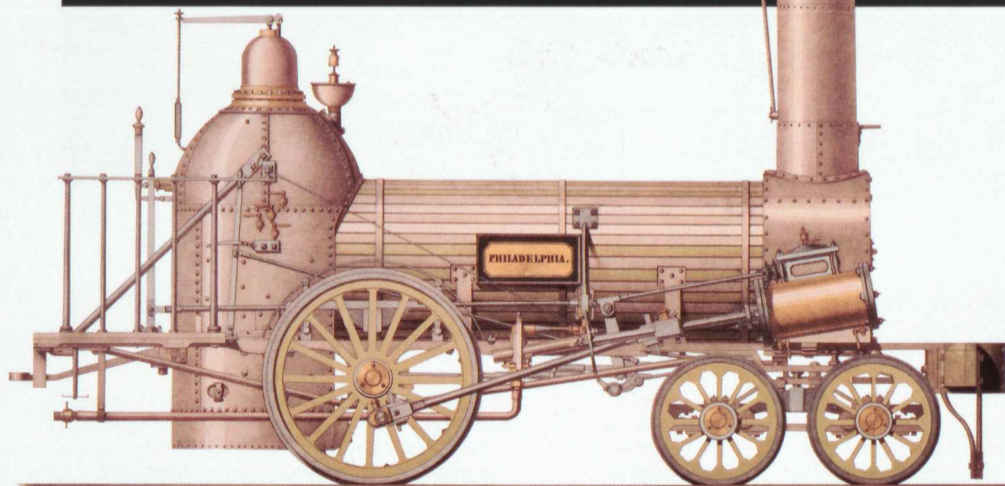
pulleys rotating in opposite directions beneath the shed floor. The cable was kept taut by weighted horizontal pulleys. A water brake on the pulleys kept descending cars from picking up too much speed. A spring-loaded friction brake behind the

canal packet (see track below) prevented cars from rolling downhill if a rope broke. Cars descending an incline were attached to the cable and slowly eased down. The counterweight pulled up cars ascending the parallel track.

BASED ON A PAINTING BY GEORGE STORM
ILLUSTRATION: NPS/L.K. TOWNSEND

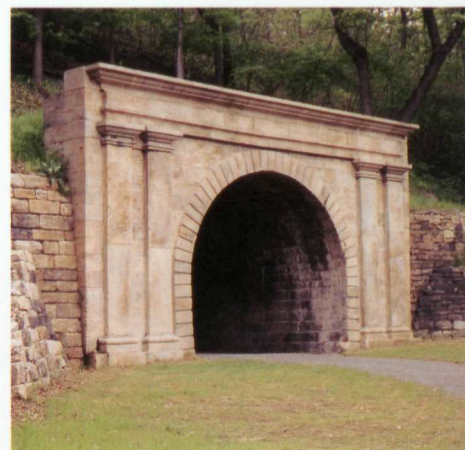


Other Sources of Power



Locomotives (see the Norris above) or horses pulled cars on the levels between inclines. The long level between incline Number 10 and Hollidaysburg was steep enough to allow cars to descend by gravity, with a locomotive used only to control speed.

Allegheny Portage Railroad National Historic Site is one of more than 380 parks in the National Park System. The National Park Service cares for these special places so that all may experience our heritage. To learn more visit www.nps.gov.



Staple Bend Tunnel—the oldest railroad tunnel in the United States—was built by Irish and Welsh workers between 1831 and 1833. Today you can walk through this 901-foot-long engineering feat.

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