



Essay About the Erie Canal Canal Structures

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Engineers built many structures to aid in canal operation. Most numerous were lift locks, which transported boats from one level to another. But there were also many other specialized structures, including dry dock locks, weigh locks, guard locks, aqueducts, bridges, waste-weirs, basins, and reservoirs.

Of course, the ditch itself was a canal structure. Manual laborers dug out the required dimensions. Usually, they piled excavated material on either side of the ditch to become the towpath and berm banks. A berm is a ledge or shoulder along the edge of a road or canal.

Towpaths, used by the teams of horses or mules that pulled the boats, were built on only one side of the canal. The opposite bank was the berm. Sometimes, particularly early in the spring, canal banks collapsed. When a break occurred, the water in that section rushed out of the canal and often carried boats with it.

Dry dock locks were designed so that boats could be repaired on the canal. A dry dock lock had walls enclosing three sides and a wooden gate at one end. Once a boat entered the lock, the gate was closed and the water pumped out. Repairs to the boat could then be completed.

There is a dry dock lock on the Delaware and Hudson Canal, which was built to transport coal from northeastern Pennsylvania to the Hudson River at Kingston, New York. Although this canal has been closed for nearly a century, it has many intact structures. Dry docks also may be seen at Chittenango. The museum there is re-creating the 19th-century boat repair facility and canal store that once stood on the site.

The weigh lock was another type of canal lock. Its purpose was to weigh boats to determine the amount of toll due on the cargo. When the boat entered the lock, officials measured the total weight of boat and water in the lock. Then they deducted the weight of the water and that of the empty boat; the remainder represented the weight of the cargo. Charts showed the amount due on each item. A weigh lock building still stands in Syracuse; today it houses a canal museum.

Guard locks were built to let canal boats cross through streams and rivers. In these situations, a dam was constructed a short distance downstream from the crossing. The dam raised the water level to the depth required for the boat to cross the stream and helped still the motion of the water.

Boats passed from the canal, through the guard lock, across the stream, and through the opposite lock back into the canal. The guard locks also prevented stream water

from entering the canal. Crossing streams and rivers by using guard locks was known as slack water navigation.

Workers built aqueducts to allow canals to cross over rivers and streams. Simply put, canal aqueducts were bridges for boats. Stone arches carried the weight of the wooden water chamber, or trough, through which boats passed. Eventually, aqueducts replaced some slack water navigation.

John Roebling, a pioneer in suspension bridge construction, designed four novel "wire rope," or cable suspension, aqueducts for use on the Delaware and Hudson Canal. One of the Roebling aqueducts remains in use as an automobile bridge across the Delaware River.

There were also many bridges along canals. In cities and villages, large and elaborate bridges were made of wood, iron, and, later on, steel. Simple wooden farm bridges were most numerous on 19th-century canals. They were inexpensively built to connect farm fields separated by the canals, providing as little clearance for boats as possible. When a boat passed under a low bridge, passengers on the upper deck had to duck or they would be knocked off.

Waste-weirs were stone structures designed to rid canals of excess water. Most of the early canals in New York maintained a constant water depth of four feet. Less than four feet of water would cause boats to scrape the bottom of the ditch; more than four feet could damage canal banks.

The spillway of the waste-weir was built to the height of the required water depth so that unneeded water could "waste" over the top. Modern waste-weirs are constructed of reinforced concrete.

Another type of canal structure was the basin. Canal basins containing piers served as harbors, providing places to secure boats while they were being loaded and unloaded. Most basins were located in cities and key commercial villages.

Occasionally reservoirs, or artificial bodies of water, were constructed to supply canals with water. This was particularly necessary for interbasin canals, which connect two watersheds. At the highest points of the dividing line between watersheds, water is often scarce. Reservoirs, fed by natural springs and runoff, were sources of water for interbasin canals.

The successful operation of the Erie Canal depended on the construction and maintenance of this complex system of specialized structures.

http://www.archives.nysed.gov/projects/eriecanal/essays/ec_larkin2.shtml