

# Who, What, Where, and Why?

by John W. Norton, Jr.

*The column of geotechnical and civil engineering achievements, and the heroes behind the triumphs, successes, and sometimes failures.*

*This issue's theme is "in and around existing structures." For your entertainment, we have a disaster, two types of construction, and, of course, the Terzaghi Question to test your mettle.*

1. Located within miles of Vermont and New York, this Massachusetts tunnel through mica schist, quartz, granitic gneiss and a poor-quality rock called "porridge stone" shortened the Albany-to-Boston route by only a few minutes, but inspired numerous tunneling innovations.

Starting in 1848, three different sets of engineers worked on the project before the Shanly brothers, two highly regarded Canadian civil engineers, completed it in 1874.

At first, contractors used hand-powered drills and blasting powder to carve out the tunnel. An early tunnel-boring machine was evaluated, but achieved only a ten-foot-deep hole before breaking down.

After more than 13 years of meager progress, steam-powered mechanical drills were introduced, and in 1866 a com-

pressed air drill invented by Charles Burleigh was put to work drilling the blasting holes. The same year, the Alfred Nobel invention of nitroglycerin was first used for blasting in this tunnel.

The construction of this tunnel saw the use and improvement of massive dewatering pumps and the design of a huge steam-powered elevator that lifted 1,028 feet to remove rock from a central access shaft.

What is the name of this tunnel, still used 126 years later?

2. River banks are usually underlain by soft, sandy muck with limited bearing capacity. As a result, bridges usually have piers sunk deep into the soil or to bedrock. Until the development of this invention, sinking these piers required the construction of expensive and unreliable cofferdams to dewater the pier's foundation.

Developed by the French, this method allowed the construction of the masonry pier upward and the sinking of the pier foundation downwards to occur at the same time, dramatically improving the rate of construction. However, this method was not foolproof, and had some nasty side effects,

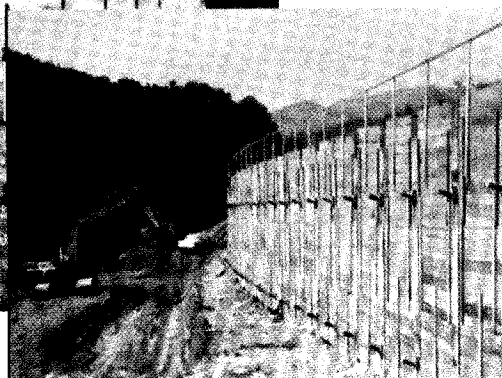
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