Article

Nineteenth Century Contracting Foibles in the Building of America's Canals

Pre-Civil War canals pioneered in the development of a new relationship between the government and the economy, for they could not have been built without a combination of state support and private enterprise. But when canals invited competitive bids from construction companies, both parties discovered that promoting the public interest and making profits might not be compatible goals.

By JAYME A. SOKOLOW, Ph.D.

July 4, 1828, was a bright and sunny day in Washington, DC. Early that morning, President John Quincy Adams and other political dignitaries breakfasted in Georgetown and then took boats about five miles upstream on the Potomac River to Little Falls. A large crowd was there to greet them at the official groundbreaking ceremony of the Chesapeake & Ohio Canal, which its directors dreamed would link the nation's capital with the Ohio River in Pittsburgh and thus make Washington, DC a great entrepot for western trade.

After the usual fanfare, President Adams spoke briefly and then tried to break the ground with a shovel. But his spade struck a root. He tried a second time and failed again. With great aplomb, Adams calmly put down his shovel and removed his coat. As the crowd roared its cheers of encouragement, Adams thrust his shovel into the ground and succeeded in dislodging some dirt. The construction of the Chesapeake & Ohio Canal had officially begun.

John Quincy Adams, like many other Americans, was an enthusiastic supporter of canals. Canals, their supporters tirelessly argued, would extend the benefits of republicanism to all parts of the Union and promote prosperity. By 1860, there were 4,254 miles of public and privately constructed canals in the United States, more than in any other country in the world.

Building America's Canals

Canal construction opened up massive new markets and created job opportunities for thousands of common laborers and skilled professionals. Canals were America's first modern business enterprises in terms of their scale of capitalization, mobilization of labor, and bureaucratic management. They served as a corporate model for railroad companies to emulate.

They also pioneered in the development of a new relationship between the government and the economy, for canals could not have been built without a combination of state support and private enterprise. Canals were a new kind of business entity in pre-Civil War America because they combined the promotion of the public interest with corporate gain.

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National Park Service, photographer E. B. Thompson

The Chesapeake & Ohio Canal (believed to be 1859)—Canal boat no. 32 passes through Lock no. 15 in Maryland, northwest of Washington, D.C.

Although the national government partially supported the construction of some canals, most states followed the example of New York and built their canals through a combination of state appropriations and public stock subscriptions. Other canals, such as the Sault Canal, were built by private companies, often with special state corporation privileges and lotteries.

Once canal companies had incorporated, appointed a board of directors, hired engineers and surveyors, sold stock subscriptions, and determined a canal route, they all faced a daunting challenge. They needed to find competent building contractors because none of them had the staff or the expertise to undertake canal construction on their own. Even privately built canals had to subcontract their construction work. Finding reliable government contractors was as problematic then as it is today.

Credit: Shaw, Ronald E. *Erie Water West: A History of the Erie Canal, 1792-1854.* Lexington, KY: University Press of Kentucky, 1966, p. 295.

The Erie Canal at West Troy, 1830

Bidding for Canal Contracts

Canal building technology and engineering expertise did not exist in America at the beginning of the 19th century. The canal company solved this problem by importing British civil engineers, who taught Americans how to build canals. The canal company also developed the Bid and Proposal process that was used by other canal companies throughout the United States.

When construction on the Erie Canal began in 1817, there was no single construction company in the United States to build the entire canal and the state of New York had no public works department or canal workforce. At the same time, the New York canal commissioners feared turning canal construction over to private companies. "Too great a national interest is at stake," they intoned. "It must not become the subject of a job, or a fund for financial speculation."

Necessity forced the Erie Canal Company to divide the canal route into small sections and to bid each section competitively. Thus, the canal commissioners found themselves in the exact situation they had feared. The Erie Canal would become a lucrative source of jobs and profits. Public funds would promote private enterprise.

To assist potential bidders, the canal company announced what amounted to a Request for Proposals that included the following information:

- A brief description of each section, including the section length.
- A Statement of Work that included clearing land, excavating and building embankments, and building towpaths, fences, culverts, and locks.
- Piece rates of $.10 to $.14 cents per cubic yard of excavation with higher fees for marl ($.75 per cubic yard) and rock ($2.00 per cubic yard).
- A completion date.
- An approval mechanism for completion of the contract. Contracts stated that an Erie Canal superintending engineer had to inspect and approve all works before contractors received payment. Before payment, each contractor's section of the canal was filled with water, and any leaks had to be repaired at his expense.
- A requirement that all contractors had to guarantee their lock construction for five years.
- A payment mechanism. After construction had been inspected and approved, contractors would receive payment.

In the first RFP competition, more than 50 companies won contracts to build the first 58 miles of the canal. Construction bids included no provision for indirect costs.

Contracting Foibles

The biggest problem contractors faced was accurately calculating the cost of canal labor, the major budget item in every proposal. About 80 percent of canal construction costs were directly related to labor. Construction companies had to pay workers a daily wage, house and feed them, and usually provide them with a standard dram of whiskey at the end of the work day. The other 20 percent of construction costs were allotted to management, tools, and equipment.

At first, canal construction seemed quite lucrative to working class New Yorkers. In 1818, a Welsh laborer near Utica reported that "wages on the canal are one dollar a day and thirteen to fourteen dollars a month with food and washing and half a pint of whiskey a day. Those who provide their own food, wet and dry, get twenty-two to twenty-three dollars." Wages on the Erie Canal were comparable to those laborers could earn in other kinds of manual work.

But Erie Canal workers, who numbered 9,000 by 1821, worked 12-hour days in both good and bad weather and were unemployed during the winter months when freezing temperatures curtailed construction. Most of the monotonous, backbreaking work was done with old fashioned picks and shovels, although dynamite was used to blast rocks, and tree stumps were often removed by a metal device drawn by a team of horses.

Gunpowder explosions and collapsing locks and canal beds maimed and killed laborers. Canal workers, who often lived and worked in highly unsanitary conditions, also were felled by cholera and other diseases.

In addition, wages fluctuated throughout construction. Daily rates were high when construction boomed and workers were difficult to recruit, but they declined when construction slowed down or there were too many qualified job applicants.

Not surprisingly, many construction companies made very low bids to win contracts. When they found their labor costs escalating, they had to choose among two courses of action. One involved paying lower wages to workers, reducing their workforce, or, in some cases, delaying the payment of wages or paying only partial wages.

Credit: Gray, Ralph D. *The National Waterway: A History of the Chesapeake and Delaware Canal, 1769-1985.* Urbana, IL: University of Illinois Press, 1989, p. 259

The Chesapeake and Delaware Canal at Delaware City, Delaware

The other involved requesting additional money in the settlement of their contracts. Some claims were legitimate, but others were not, leaving one canal engineer to complain that "it was by no means rare for ingenious contractors to swell these claims to large amounts."

The Erie Canal's construction problems resurfaced in the building of the Chesapeake & Ohio Canal. After John Quincy Adams's speech, canal engineers laid out 34 sections above Little Falls. Contractors, many of whom had worked on other canals in the United States and Canada, submitted 462 proposals to complete the first section of the canal.

Despite detailed instructions in the Request for Proposals similar to those used in Erie Canal contract competitions, winning contractors encountered predictable problems. Many companies made unrealistically low bids and found themselves in the unenviable position of scrambling to find laborers and then paying to feed and house them. On top of that, work was frequently disrupted by floods, accidents, the national cholera epidemic of 1834, labor strikes, and ethnic violence between Irish and German laborers and among Irish workers.

In 1834, the Chesapeake & Ohio Canal teetered on the edge of bankruptcy and had trouble paying its contractors. Workers feared, in the words of a contemporary, "either the suspension of work, or of payment, on one or more sections of the canal." They started rioting, used violence to exclude other laborers from remaining jobs, and physically threatened contractors. It took federal troops, the Maryland militia, and the payment of back contracts to restore calm. Between 1834 and 1840, there were ten serious labor disturbances, all caused by Company's financing of contractors.

Some Chesapeake & Ohio Canal contractors never completed their contracts or fully paid their laborers. Others found that the scarcity of workers, at least in the early years of canal construction, forced them to pay higher wages than they could afford. In response, they subcontracted their work at prices below the original bid so they could make a profit.

Many of these problems were caused by the divergent interests of canal boards and contractors. Canal boards wanted to secure faithful and responsible construction companies that would "finish their jobs as low as labor and capital can afford," personally supervise their work, and assume all the risk of financial failure. Put simply, they wanted work done as cheaply as possible without falling below acceptable standards of quality.

Contractors, on the other hand, wanted to make a profit, which meant strictly controlling labor costs, the major expense in canal construction. Not surprisingly, canal laborers were caught in a vice between parsimonious canal companies and employers whose profit margins were sustained by low wages.

During the pre-Civil War era, unskilled labor became an increasingly low-paid form of employment for the young and mostly single men who built America's canals. While some canal laborers experienced upward economic mobility and became foreman or better paid skilled workers, most drifted from job to job with no hope of advancement.

Too often laborers went hungry, lost their livelihoods, had trouble collecting their wages, turned on each other, or attacked contractors for mistreating or bilking them. It is a miracle that 4,254 miles of public and privately constructed canals were completed in the United States by 1860.

The More Things Change...

At the heart of all these problems was the Bid and Proposal process on America's canals. Beginning with the Erie Canal, canal boards were determined to find contractors that would complete their work on time according to specification at minimal cost because they feared turning their canals into a financial boondoggle for the private sector. This led them to accept unrealistic cost proposals, which then created subsequent contractual problems.

When the Alexandria Canal Company put out a Request for Proposals in 1832 to build an aqueduct spanning the Potomac River to connect the Chesapeake and Ohio Canal with the Virginia shore, it received bids ranging from \$99,092 to \$247,090. A firm won the contract to build the aqueduct's cofferdams because one of its owners had served on the Board of Engineers of the Chesapeake and Ohio Canal. The firm subcontracted its work, but the Alexandria Canal Company voided the contract because the subcontracting did not meet its specifications.

The Chesapeake and Delaware Canal, which connected the Chesapeake and Delaware Bays, had similar problems. The final cost of the canal—\$2,201,864 in 1824—was more than 80 percent higher than the original estimate because the swampy land at both ends of the canal was difficult to excavate. Only a timely \$300,000 Congressional subsidy signed by President James Monroe on his last day of office saved the canal's contractors from financial ruin.

Today, national and state governments are more solvent and responsible than 19th century canal companies, and there are laws and labor unions to protect workers from many of the iniquities they experienced during the Canal Era. Nevertheless, the divergent interests of canal boards and contractors in pre-Civil War America are still mirrored in the relationship between

Credit: Hahn, Thomas Swiftwater, and Emory L. Kemp. The *Alexandria Canal: Its History and Preservation*. Morgantown, WV: West Virginia University Press, 1992. p. 34.

The Alexandra Aqueduct, 1868

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government agencies and contractors today. As the Erie Canal commissioners well understood, promoting the public interest and corporate gain may not actually be compatible goals.

Although government agencies need contractors to achieve their missions and many businesses depend heavily on government contracts, the two parties have different motives for cooperating with each other. The government wants acceptable work to be completed on time and within budget. Contractors, on the other hand, want to make a reasonable profit, which conflicts with the government's goal of minimizing costs. The result of these opposing interests is the complex, intricate dance that we call Bids and Proposals, which dates back at least to the Canal Era of the early 19th century.

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America's Canal Era

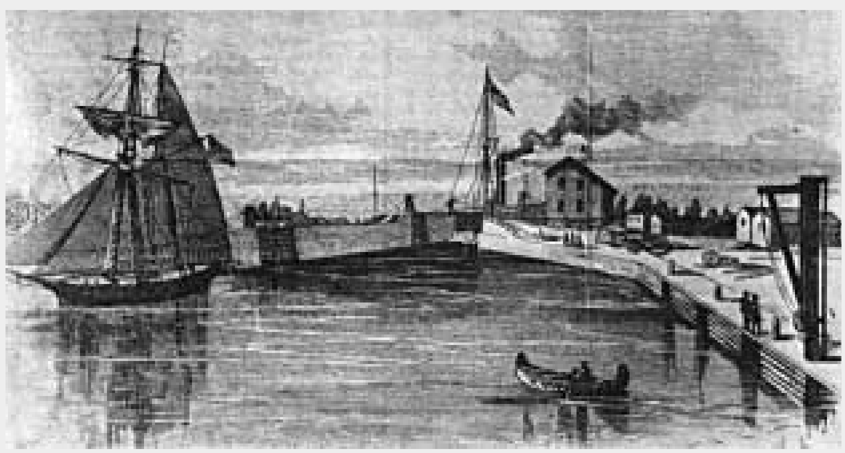
Canal construction began soon after the new nation was founded. In the 1790s, the Middlesex Canal in Massachusetts, which linked the Merrimack River with the Charles River and Boston, and the Santee and Cooper Canal, which linked South Carolina's interior with Charleston, launched America's dynamic Canal Era. Many others soon followed, including the Chesapeake & Ohio Canal.

By the Civil War, America was dotted with canals, especially in New York, Pennsylvania, New Jersey, Virginia, Maryland, Ohio, Indiana and Illinois. Some canals were quite short, such as the Sault Canal, which was less than a mile in length and opened navigation between Lakes Michigan and Superior by bypassing the rapids and falls of the St. Mary's River. Others, such as the Wabash & Erie Canal that connected Evansville to Terre Haute and Fort Wayne, meandered for hundreds of miles through Indiana. Between 1816 and 1840, Americans invested about $125 million in canal construction, a huge amount of money for a nation where most Americans still worked on modest family farms or lived in small towns.

Most canals carried agricultural staples and coal inexpensively to eastern markets. It cost between 15 and 25 cents to carry a ton of goods by wagon over a mile of America's muddy and rutted roads. In contrast, canals carried a ton of flour, lard, and pork for less than 2 cents a mile.

Wherever canals were built, cities grew and agriculture boomed. For example, Evansville became a major river port after the completion of the Wabash & Erie Canal. Between 1853 and 1859, it received almost 4 million pounds of tobacco, 4.5 million pounds of bacon, pork, and lard, and 250,00 bushels of wheat, and sent nearly 3 million pounds of molasses and more than 1 million pounds of sugar northward on the canal.

The Erie Canal in New York State was the greatest success of America's Canal Era and a model for all subsequent canal efforts. Built from 1817 to 1825, this 363-mile canal linked Buffalo on Lake Erie with Albany on the Hudson River. By creating a cheap and reliable water route between the Old Northwest, western New York, and the Atlantic Ocean, the Erie Canal helped make New York the Empire State. In 1850, New York State led the nation in population, the number and value of its farms, and in the production of wheat, maple sugar, milk, hay, potatoes, butter, and cheese. In the same year, the Erie Canal carried about 23 million bushels of wheat and flour, almost one-fourth of all the grain produced in the United States.



Credit: Dickinson, John N. *To Build a Canal: Sault Ste. Marie, 1853-1854 and After.* Columbus, OH: Ohio State University Press, 1981, p. 133.

The Sault Ste. Marie Canal at Lake Michigan, 1855

Jayme A. Sokolow, Ph.D., is founder and president of The Development Source, Inc., a proposal services company located near Washington, DC. He is also Assistant Managing Editor and Chair of the Editorial Advisory Board of *Proposal Management*. When not writing proposals, he and his family enjoy hiking on the Chesapeake & Ohio Canal. He can be reached at JSoko12481@aol.com.