New Jersey Bridges
From Washington to Roebling

Three Project Management Stories on

New Jersey's Early Bridges

Story Telling for Project Management

- The whole story should be believable.
- The story needs to be factual.
- The story needs to be of interest to the audience and needs to be able to be remembered.

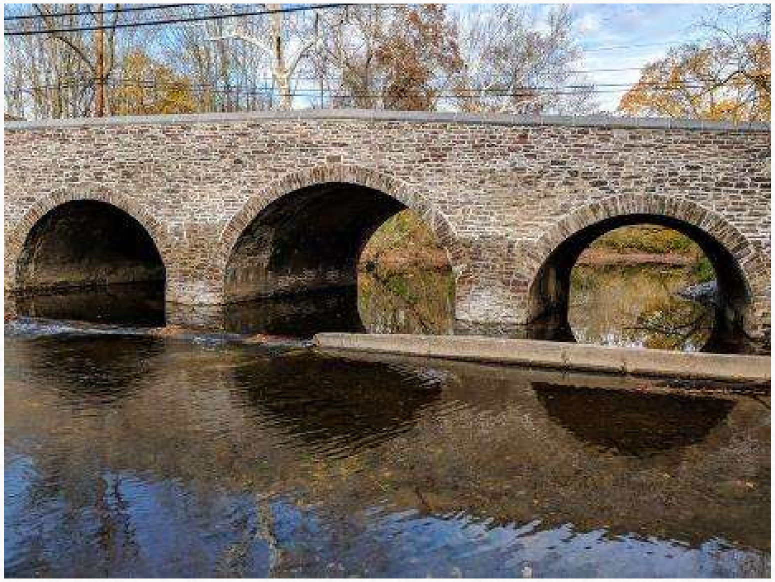
Story Telling

- A good story can be used for the following
  - Interviewing strategy
  - Networking
  - Pass along useful and useless information
  - Giving instructions that can be remembered
  - Selling and marketing

Three Stories

- George Washington and the Stony Brook Bridge
- Delaware and Raritan Canal vs the Camden and Amboy Railroad
- John and Washington Roebling and the Development of the Brooklyn Bridge
- Bonus Stories (if we have time)

Stony Brook Bridge

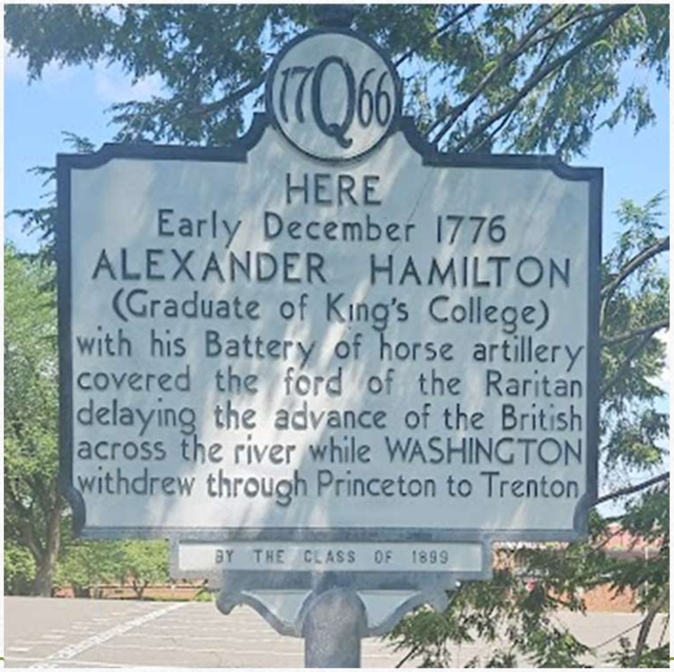


Stony Brook Bridge

- Original bridge pre-revolutionary war was a timber deck bridge
  - The original documents do not state weather the entire bridge was all timber or if it was composed of other materials. We also do not have a build date of the "original bridge."
  - Most Pre-Revolutionary War bridges were built by farmers to connect fields; the largest load was typically a five-ton hay wagon plus horses.

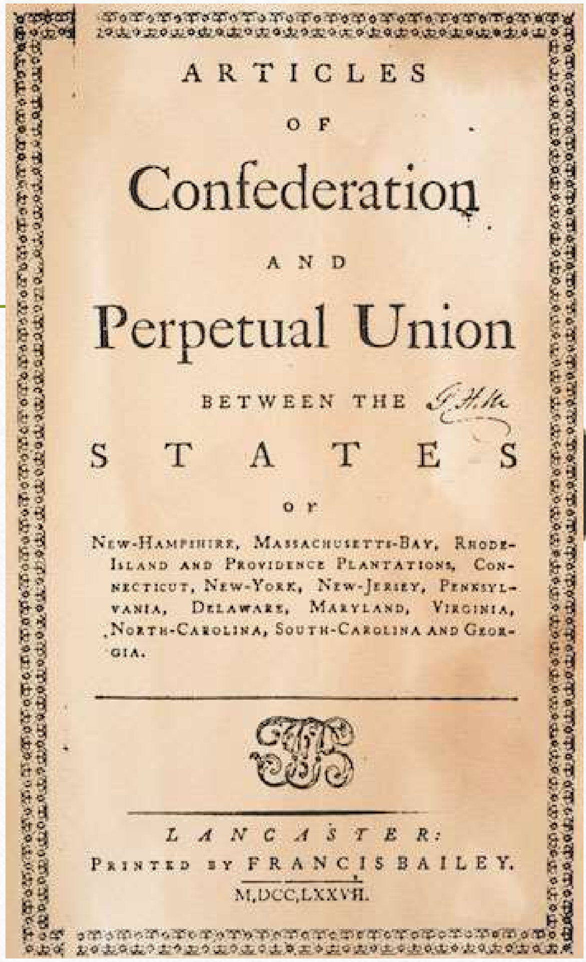
Stony Brook Bridge (Early Bridge)

- Revolutionary War
  - Bridge was on the main road between Trenton and New Brunswick.
  - During the Revolutionary War when George Washington on the move to Princeton after the battle of Trenton he had his troops burn the Stony Brook Bridge deck slow the British troops down.



Stony Brook Bridge

- After the Revolutionary War there was a period that the country as a whole did not have a means or method to do infrastructure improvement projects, so the bridge sat half burnt.
  - There was no way for the new country to collect tax revenue as we were under the Articles of Confederation.


ARTICLES
OF
Confederation
AND
Perpetual Union
BETWEEN THE
STATES
OF
NEW-HAMPSHIRE, MASSACHUSETTS-BAY, RHODE-ISLAND AND PROVIDENCE PLANTATIONS, CONNECTICUT, NEW-YORK, NEW-JERSEY, PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA, NORTH-CAROLINA, SOUTH-CAROLINA AND GEORGIA.

LANCASTER:
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Stony Brook Bridge

- The first session of congress of the United States appropriated money in the budget to rebuild the Stony Brook Bridge.
- Most likely George Washington and Alexander Hamilton supported the building of the new Stony Brook Bridge.
- Today the Bridge carries US 206 over Stony Brook. It is the oldest "known" bridge in New Jersey.
- The bridge also saw at least two rehabilitations over its long lifetime. Once in 1916 it was widened to accommodate "modern 206" and then it in 2016-2017 it was rehabilitated.

Stony Brook Bridge Take Aways

- Any project you need to make sure you have advocates supporting it outside of the Project/ Program Manager circle.
- You need to make sure that you have a dedicated funding source.
- Verify that funding sources do not come with other costs.

D and R Canal and The Camden and Amboy Railroad

D and R Canal and The Camden and Amboy Railroad

- Both the D and R Canal and The Camden and Amboy Railroad crossed central NJ diagonally from the mouth of the Raritan River to Trenton at the Delaware River.

D and R Canal and The Camden and Amboy Railroad

- Both were built for moving freight (one could move passengers)
- One sold all shares in ten minutes.
- The other waited till the owner's father put up the money to fund it.*

* Note another story just says Robert Stockton just put up his family fortune

Emerging technologies (Advantage of trains)

What the "supporters" saw

- Move goods more efficiently
- Could move people
- Straight Path
- Efficient use of manpower

Emerging technologies (Advantage of trains)

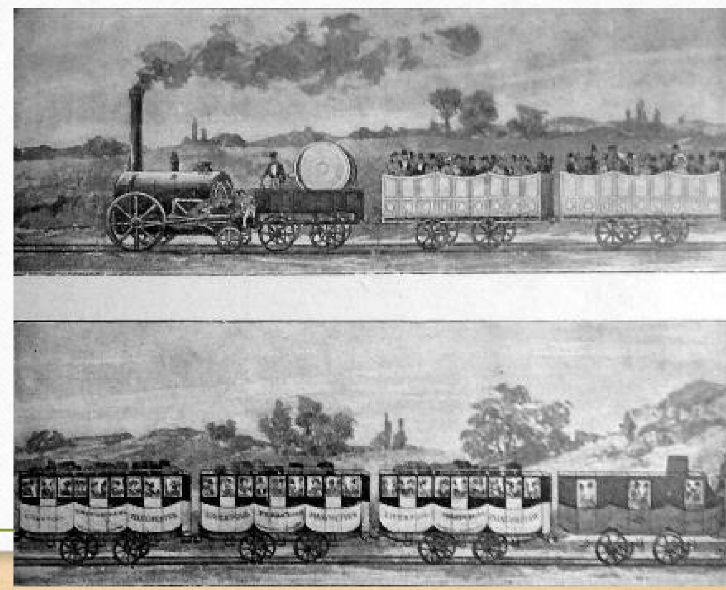
What "supporters" did not see

- Use of different power sources.
- More efficient and larger locomotives.
- Faster speeds
- Even more efficient use of manpower!

Comparison of the loads

Stony Brook 1790s

Camden and Amboy RR 1840s



Canal Building Technologies

What they saw

- Proven technology
- Route was not straight
- More labor intensive

What survived what did not

- The Delaware and Raritan Canal eventually became a conduit for the water company.
- The Camden and Amboy Railroad route survives as AMTRAK.

D and R Canal and The Camden and Amboy Railroad Take Aways

- Need to advertise the project properly.
- Doing demonstrations pay off in dividends.
- Make sure you have a plan for the current and potential competition.

John and Washington Roebling and the Brooklyn Bridge

John and Washington Roebling and the Brooklyn Bridge

- John Roebling was the innovator
- Founded the Roebling iron works
- Roebling was an experimenter; he got his start on canals! The Delaware and Hudson.
- Major innovation was development of wire rope for making dams and canal structures.

Roebling Iron Works in Kinkora NJ

Emerging technologies

- Wire cable
- Suspension bridges
- Long span bridges

Emerging technologies

- Replace the river ferry service
- Be able to carry heavier loads across any river
- Less manpower needed.
- Possibly the car replacing the horse drawn wagon.
- Possibly carrying the “new” subway system

Where was this done before

Fith of Forth Bridge

Comparison of the loads

Stony Brook 1790s

Brooklyn Bridge 1870s

Camden and Amboy RR 1830s

Unforeseen issues

- The methods of geotechnical studies were not developed yet in the 1860s.
- The caisson approach for building the bridges was basically let the bridge pier sink to bedrock by digging under it.
  - Only one of the two towers of the Brooklyn Bridge is on bedrock
- Cassion construction was dangerous work since the bends while it existed, they did not know what it was back then.
- Today there are other methods such as drilled shafts and pile driving

John and Washington Roebling Take Aways

- Verify technology is developed enough and tested to build what you need it for.
- Develop accurate cost and quantity estimates.
- Obtain support for your project.
- Do demonstrations if new technologies are not proven.
- Build with the future in mind.
- Develop innovations by a method of Continuous Improvement

Bonus Story

Questions

References

- Linda Barth; A History of Inventing in New Jersey
- Linda Barth; The D and R Canal