

**The John Roebling Suspension Bridge:
An Impact on Engineering and a Change
on the “ Queen City”**

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Group Documentary

Junior Division

Process Paper

We chose the topic “John Roebling Suspension Bridge” because we believe that it is something that has significant value to our city, Cincinnati, Ohio, yet we often overlook it in our everyday lives. This innovative bridge had an impact on both engineering and bridge-building. Roebling’s innovative use of suspension cables led to the construction of bigger bridges over wider bodies of water such as the Brooklyn Bridge in New York and the Akashi Kaikyo Bridge in Japan (the longest bridge in the world).

We chose to do a documentary because we already had experience in this category in last year’s National History Day competition. Also, we thought that was the optimal presentation style for this subject. Once we decided on our topic, we visited our local library to find books related to the bridge. We wrote separate research papers and compiled bibliographies. Later, we combined this information to create our storyboard. We visited the Cincinnati Historical Society Library to find sources from the time period; most of these were primary sources including building reports and old newspaper articles.

Matt’s Dad drove us along Route 8 in northern Kentucky so we could make a digital video of the river, choosing a rural area where there were no modern buildings. Later, we walked and drove across the Suspension Bridge for more scenes for the documentary.

We interviewed Mr. Ralph Wolff from the Covington and Cincinnati Suspension Bridge Committee of Kentucky and Mr. David Tomley, the chief engineer for KZF Design, an engineering company in Cincinnati. Then, using our storyboard we recorded

our narration and timed it to make sure it fit within the regulation limit. Once the recording was completed, we added maps, pictures and music. Finally, we added the video clips we had recorded and parts of our interviews.

After the regional competition we revised our video, process paper and bibliography. After the state competition, we continued our search for more primary sources. We returned to the Cincinnati Historical Society and found additional building reports and a list of bonds which were issued to fund the bridge. We exchanged e-mails with one of our interviewees, Mr. Wolff, who sent us a list of books and gave us a copy of a report written by John Roebling. We also visited the Behringer-Crawford Museum in Kentucky and the Kentucky Transportation Cabinet office in Covington, where we saw original documents pertaining to the bridge.

The “Roebling Suspension Bridge” includes all aspects of the National History Day Topic, Innovation in History: Impact and Change. This bridge was an innovation in construction using cables for support. It impacted the lives of people in southern Ohio and northern Kentucky by making business and social interactions easier. Roebling’s bridge changed the style of bridge-building and became the inspiration for the Brooklyn Bridge and other memorable suspension bridges in the world. The techniques which John Roebling used to build this bridge are still in use today, one hundred and fifty years later.

495 words

Bibliography

Primary Sources

Reports from the Archives of the Cincinnati Historical Society Library:

Annual Report of the Covington and Cincinnati Bridge Company. Tech. Covington, Kentucky: Munger & Croninger, Print, 1858.

This report listed the resources used to purchase material for the bridge. It also showed that the Covington and Cincinnati Bridge Company owed money to its creditors.

Annual Report of the Covington and Cincinnati Bridge Company. Tech. Covington, Kentucky: Munger & Croninger, Print, 1859.

This report described the water height of the river and the resources used to build the towers. At the time this report was printed, 311,950 cubic feet of masonry already had been constructed

Farrington, E. F. *A Full and Complete Description of the Covington and Cincinnati Suspension Bridge with Dimensions and Details of Construction.* Tech. Cincinnati: J.P. Lindsay &, 1867.

This was an excellent source with great information about the dimensions of the bridge. This was written by the master carpenter of the bridge.

President and Director. *Annual Report of the President and Directors to the Stockholders of the Covington and Cincinnati Bridge Company.* Tech. Trenton: Murphy & Bechtel, Steam Book and Job Printers, 1867.

This report assured the stockholders that they would receive a return on their investments. The payment of tolls on the bridge helped raise money to repay the bridge company's creditors.

Report of a Meeting of the Covington and Cincinnati Bridge Company Concerning the Basic Financing of the Bridge by Stock Subscription. Tech.

At this meeting, members of the bridge company were trying to figure out a plan to finance the buying of materials. They didn't want to go over their budget of \$500,000.

Roebing, John A. *Final Report of John A. Roebing, Civil Engineer, to the President and Directors of the Niagara Falls Suspension Bridge and the Niagara Valley International Bridge Companies*. Tech. Lee, Mann &, 1855.
This was John Roebing's final report before beginning construction on his suspension bridge in Niagara. The Suspension Bridge between Cincinnati, Ohio and Covington, Kentucky was the first true modern suspension bridge in the world. It was the construction of this bridge that assured Roebing's fame as a bridge builder.

Reports from the Kentucky Transportation Cabinet:

Bridge Inspection Report: John A. Roebing Bridge Over the Ohio River at Covington. Tech. Louisville: Parsons Brinkerhoff Quade & Douglas, 1988.
This report described every section of the bridge and gave each a rating.

Bridge Inspection Reports. Tech. Kenton, Kentucky: Kentucky Transportation Cabinet Divisions of Operations, 1975-2007.
This series of reports described the state of the Suspension Bridge every few years starting in 1975. The rating system, from zero to nine, was initiated after the collapse of the Silver Bridge over the Ohio River.

Elliston, Howard L. *General Conditions and Specifications*. Rep. Covington, Kentucky, 1955.
This report detailed the conditions of the bridge and whether or not they met the specifications.

John A. Roebing Bridge Over the Ohio: Covington, Kentucky to Cincinnati, Ohio. Historic Aspects of Proposed Repairs and Restoration. Tech. Louisville: Parsons Brinkerhoff Quade & Douglas, 1990.
This report explained that the restoration of the bridge in 1990 was planned to maintain the historical aspects of the bridge as they existed in the 1880s.

Ren, Wei-Xen, Issam E. Harik, George E. Blandford, Michael Lenett, and T. Michael Baseheart. *Structural Evaluation of the Historic John A. Roebing Suspension Bridge*. Tech. 2003.
This report was written by university professors and the Kentucky Transportation Cabinet who performed structural analysis tests to check the strength of the bridge.

Roebing, John A. *Annual Report of the President and Directors to the Stockholders of the Covington and Cincinnati Bridge Company, For the Year Ending February 28, 1867*. Rep. Trenton: Murphy and Betchtel, Steam Book and Job Printers, 1867.
This was Roebing's final report describing all the expenditures and great accomplishments during the years of construction.

Roebing, John A. *Report and Plan for a Wire Suspension Bridge, Proposed to Be Erected Over the Ohio River at Cincinnati*. Tech. Cincinnati, Ohio, 1846.
This was Roebing's second attempt to present an acceptable proposal to the Bridge Committee in 1846. His earlier report was not accepted.

Roebing, John A. *Report of John A. Roebing, Civil Engineer, to the President and Board of Directors of the Covington and Cincinnati Bridge Company*. Tech. 1867.
This report described Roebing's last year of working on the bridge before his final report.

Newspaper Articles:

"Cincinnati." *Appleton's Journal* [New York] 11 Jan. 1873: 65-66.
This article gave a history of the early days of Cincinnati. It mentioned the Suspension Bridge numerous times. Matt saw this article framed on the wall of a family friend's home near Dallas, Texas.

Driehaus, Bob. "River Rainbow: The Ohio River Bridges Are a Colorful Lot, and the Star of Them--The Suspension Bridge--May Have a New Hue Next Summer." *The Post* [Cincinnati] 14 May 2005.
This article described the plan in 2005 for the repainting of the Suspension Bridge.

Reis, Jim. "Span's Safety Questioned a Year Ago: Suspension Bridge Renovated to Correct Floor, Cable Problems." *The Kentucky Post* 13 Feb. 1989, 4K-Perspective sec.
This article explained the need to repair the floor of the bridge so it could accommodate heavier loads. As trucks and automobile traffic increased, the maintenance of the bridge had to keep pace.

Rutledge, Mike. "Roebing Will Receive Long-Awaited Makeover." *The Cincinnati Enquirer* 21 Oct. 2009, Local News sec.: C2.
This article told us that the bridge would be repainted in 2010. The project would require the temporary closing of the span for several months.

Rutledge, Mike. "Bridge Backers Ask Kids For Help." *Cincinnati Enquirer* 23 Nov. 2009, Local News sec.: B
This article was an interesting one about how the bridge company asked kids to chip in one dollar to help pay for new lights for the bridge.

"The Brooklyn Bridge's Older Brother." *The New York Times* 26 May 1983.
During the centennial celebration for the Brooklyn Bridge, people in New York also celebrated the building of the Roebing Suspension Bridge, the model for the Brooklyn Bridge.

Newspaper Articles from the Local History Collection of the Cincinnati Historical Society, Visited November 15, 2009:

In 1854 construction was begun on the Suspension Bridge. There were many newspaper articles in the 1950s celebrating the centennial year.

Arms, Richard G. "The Suspension Bridge." *Presenting the Past*, 24 May 1959.
This reference described the opening of the bridge and the great celebrations in Cincinnati and Northern Kentucky.

Cronin, John F. "Framed Span's Luster Dims." *Cincinnati Enquirer*. 30 Nov. 1952.
This article complimented the bridge in Cincinnati and Roebling for his achievements. It suggested that the historic bridge needed a new coat of paint.

"It's A Wonder She Got Built!" *Cincinnati Enquirer*. 13 Nov. 1955.
This article about the bridge noted how it surprised everybody that Roebling could accomplish its construction.

"Kentuckians Favored Span When Cincinnatians Did Not! Now State Is To Get It Back." *Cincinnati Enquirer*. 17 July 1953.
This article described the controversy raging during the construction of the bridge. Most Kentuckians supported the bridge but many Cincinnati merchants did not. They were fearful of losing business to the South.

Linn, Alan. "Monument to its Builder." *Cincinnati Enquirer*. 2 Nov. 1958.
This article summarized John Roebling's life and his work on the bridge.

"Obituary: John A. Roebling, the Engineer." *The New York Times* 23 July, 1869.
This notice announced the death of John Roebling in 1869. He contracted tetanus after suffering a minor injury on the building site of the Brooklyn Bridge. The obituary also mentioned many of Roebling's accomplishments.

"Suspension Bridge." *Cincinnati Enquirer*. 21 Jan. 1961.
This article explained how the Roebling Bridge impacted the construction of other bridges in Cincinnati.

"Suspension Bridge Strengthened." *The Post* [Cincinnati] 18 June 1987.
This article announced that the bridge needed stronger cables to support all of the cars and pedestrians.

"The Covington and Cincinnati Bridge Co." *Times-Star* [Cincinnati] 18 Nov. 1942.
This article was an announcement to the City of Cincinnati that there would be reduced toll rates for the Roebling Bridge.

"They Said it Was Impossible." *Times-Star* [Cincinnati] 13 Jan. 1953.
This article told about the struggles John Roebling endured during the building process.

"Turning Back The Clock." *Times-Star* [Cincinnati] 15 June 1943.
This article described Roebling's work on the Monongahela River.

Letters:

Ellet, Charles. "Letter on the Proposed Bridge Across the Ohio River at Cincinnati With a Span of 1400 Feet and an Elevation of 112 Feet Above Low Water." Letter to J.H. Riley.
In this letter, Charles Ellet described his plan for a bridge over the Ohio River. Since this was to be the first bridge over the Ohio, this engineer preferred to build the bridge at a site other than Cincinnati, suggesting Louisville, Maysville or Marietta, all older settlements than Cincinnati.

Roebling, John A. "Letters to Henry Bruce." Letter to Henry Bruce. Jan-July. 1859.
This collection of letters informed Henry Bruce of the supplies that Roebling needed to begin work on the bridge in Cincinnati-Covington.

Historical Documents:

Anslinger, Steve, T. Michael Baseheart, Gerard Roberto, Robert L. Sierakowski, and David A. Simmons. Fifth Historic Bridge Conference. Ohio, Columbus.
This document described the events during the Fifth Historic Bridges Conference in 1997 held in Union Terminal, Cincinnati, Ohio. This building is now the home of the Cincinnati Historical Society, as well as the Cincinnati Museum Center.

Original Contract Between the Covington and Cincinnati Bridge Company and John A. Roebling. 4 May 1859.
This was the original contract that was signed by John Roebling, Henry Bruce, and Miles Greenwood who was the bridge company president.

Magazine Articles:

Engelken, Ruth. "What Would Roebling Think?" *The Enquirer Magazine* 7 Mar. 1976: 10.
This article referenced Roebling's German heritage and what he might have thought of blue paint on the bridge.

Lathrope, Carl. "Roebling's Cable-Suspension Prototype Now Historic Site." *Rural and Urban Roads* Jan.-Feb. 1962: 53.
This article explained how Roebling's first bridge at Lackawaxen, Pennsylvania was the prototype for many of his later bridges.

"Northern Kentucky Suspension Bridge Designated A Landmark." *The Scraper* Winter 1983: 6.
This described how the American Society of Civil Engineers designated the Roebling Suspension Bridge as a National Historic Civil Engineering landmark.

Secondary Sources

Interviews:

Wolff, Ralph. Personal interview. 17 Mar. 2010.

Ralph Wolff is a long-time member of the Covington and Cincinnati Suspension Bridge Committee. He gave us great information about the bridge. We included part of this interview in our documentary.

Tomley, David. Personal interview. 8 Mar. 2010.

David Tomley is the Chief Engineer for KZF Design. He gave us informative papers on types of bridges and read passages about the Suspension Bridge. We included part of this interview in our documentary.

E-mail Communication:

Wolff, Ralph. May 9, 2010.

Mr. Wolff answered by e-mail many of our questions about the Suspension Bridge. In this e-mail, he explained the ownership of the bridge. He said, "The bridge was privately owned until it was purchased by the Commonwealth of Kentucky in 1953 A group of citizens was organized in 1975 when the bridge was designated a National Historic Landmark, to dedicate themselves to the preservation and enhancement of the bridge. This group is the Covington - Cincinnati Suspension Bridge Committee, Inc The CCSBC currently has a fund drive under way to replace the lights with an upgraded system after the painting project is completed."

Books:

Clooney, Nick. *Cincinnati--City of Charm, a Love Story*. Memphis, Tenn: Towery Pub., 1991.

This reference included many pictures from Cincinnati in 1991.

Dean, Frederick E. *Bridges and Tunnels*. New York: Golden, 1968.

This book told us about the structure of certain bridges and tunnels. The structure of suspension bridges was explained but the Cincinnati Suspension Bridge was not mentioned.

Feck, Luke. *Yesterday's Cincinnati*. Cincinnati, Ohio: Writer's Digest Books, 1987.

This digest gave information about how people considered the Suspension Bridge as part of the future growth of the city.

Flischel, Robert A. *Then & Now, Cincinnati & Northern Kentucky*. Gibsonia, Pa: Scripps Howard Pub., 1995.

This reference had concise information about the bridge and its location.

Plowden, David. *Bridges, the Spans of North America*. New York: Norton, 2002.
This was a great source that described almost every bridge in North America and the architect(s) in great detail.

Radel, Cliff. *Cincinnati Moments: a Celebration of Photographs from the Cincinnati Enquirer*. Cincinnati: Cincinnati Enquirer, 1991.
This book gave us pictures of many different views of the Suspension Bridge.

Silberstein, Lola Hessler. *Cincinnati, Then and Now*. Cincinnati, Ohio: Voters Service Education Fund of the League of Women Voters of the Cincinnati Area, 1982.
This was a short excerpt from a book that gave us information about Roebling's life.

Tolzmann, Don Hinrich. *John A. Roebling and his Suspension Bridge on the Ohio River*. Milford, OH: Little Miami Pub. Co., 2007.
This was an excellent book that told us all about the life and work of John Roebling.

Museums:

"Cincinnati Historical Society Library: Cincinnati Museum Center/Union Terminal."
1301 Western Avenue Cincinnati, Ohio 45203. November 15, 2009.
We found several primary sources for our topic at this library such as the newspaper articles and journal entries. After the state competition we returned to this library and found some of Roebling's letters and two reports.

"Behringer-Crawford Museum." 1600 Montague Rd., Covington, KY 41011. May 1, 2010.
We visited the Ohio River Section of the museum to research floods, ferries and other aspects of the river. A special description of the Suspension Bridge was on the wall in the River Section.

Government Office:

"Kentucky Transportation Cabinet office in Northern Kentucky." 421 Buttermilk Pike, Covington, KY 41017. May 13, 2010.
Mr. Rob Harris, Chief District Engineer of this office, very kindly shared with us folders, books and boxes of information on the Suspension Bridge.

Movie:

Cincinnati Bridges. WCET Educational Center. Videocassette.
This movie told us about bridges in Cincinnati. It described their history and architects. It began with the story of the Suspension Bridge, the first bridge in the Cincinnati area.

Video Clips:

"Views of the Ohio River and of the Suspension Bridge." 2010.

We filmed these scenes while riding along Route 8 in Northern Kentucky showing the river and the distant Ohio riverbank. In a later trip we drove across the bridge and made a video of the bridge as it is today. We included these clips in our documentary.

Reference Books:

WPA Guide to Cincinnati, a Guide to the Queen City and its Neighbors. Cincinnati, Ohio: Cincinnati Historical Society, 1937.

This brief source included the dimensions of the bridge.

Giglierano, Geoffrey J., Deborah A. Overmyer. *The Bicentennial Guide to Greater Cincinnati: A Portrait of Two Hundred Years.* Cincinnati, Ohio: The Cincinnati Historical Society, 1988.

This was a good source that helped us gain a better understanding of the problem which the design of this bridge addressed.

Websites:

"John A. Roebling Cincinnati Suspension Bridge." *Cincinnati-Transit.net*. Web. 30 Sept. 2009. <<http://www.cincinnati-transit.net/suspension.html>>.

This site described past bridges that failed on the Ohio River and how John Roebling either fixed them or made new ones.

"John Augustus Roebling--Great Buildings Online." *Architecture Design--Architectural Images History Models and More – Architecture Week Great Buildings*. Web. 02 Nov. 2009. <http://www.greatbuildings.com/architects/John_Augustus_Roebling.html>.

This site gave a brief story of Roebling's life. It was helpful in our early research.

"Roebling, John Augustus." *Invention Factory, Trenton, New Jersey*. Web. 30 Sept. 2009. <<http://www.inventionfactory.com/history/RHAgem/jarbio.html>>.

This website helped us begin our project. It summarized the life of John Roebling. Our teacher suggested that we find the best website on our topic. We outlined this material to start our research.

"Silver Bridge Collapse." *Corrosion Science and Engineering Information Hub*. Web. 10 Dec. 2009. <<http://corrosion-doctors.org/Bridges/Silver-Bridge.htm>>.

This article described the collapse of the Silver Bridge on the Ohio River in 1967. This disaster caused engineers to make a thorough study of all the bridges on the Ohio River. The Suspension Bridge, the oldest bridge on the Ohio, was found to be one of the sturdiest and safest of those studied.