Further Reading

I love projects, don't you?
(Luther Billis, in South Pacific by Rogers and Hammerstein)

Many books and articles delve into the history of infrastructure projects and systems, highlighting the personalities of champions and opponents, the needs addressed by the project, the technologies used, the trials and tribulations that were faced, and the ultimate achievements. This bibliography lists books and articles that I have enjoyed, and I suspect that there are many more. Reading about past projects, including failures as well as successes, will provide a valuable context for anyone involved or interested in project evaluation and infrastructure systems. We can all learn from the successes and failures of those who have gone before us. The best options are not always chosen, the long-term impacts are not always considered, and the process is not always transparent, objective, or even rational. Nevertheless, many great projects have been built, many bad proposals have been rejected, and many innovations have helped to make infrastructure systems perform better.

Books about Infrastructure Projects and Programs

Al Naib, S.K., *London Docklands Past, present and future: An illustrated guide to history, heritage and regeneration*. Research Books, Romford, Esses RM6 5BY, Great Britain. (The docklands were originally constructed as port facilities in London for Great Britain's extensive international trade. As ships became larger, different types of facilities were required, and the docklands slid into decay. In the 1980s, a massive urban renewal effort converted the docklands into a variety of commercial and residential uses. The book combines concise history with many interesting photographs and maps.)

Ambrose, Stephen E. *Nothing Like it in the World: the Men who Built the Transcontinental Railroad 1863-69*. Simon & Schuster, NY, London, Toronto, Sydney, Singapore, 2000. (A fascinating story of what it took – men, materials, and financing - to build a railroad across the deserts and mountains of the American West.)

Bevis, Trevor. *Water, water, everywhere*. David J. Richards Printers and Stationers, Chatteris, Cambridgeshire, UK PE16 6AH, 1992. (The 500-year story of the construction of canals and the use of windmills and pumps to drain the fens of East Anglia.)

Carrels, Peter. *Uphill Against Water: the Great Dakota Water War*. University of Nebraska Press, Lincoln NB, London, 1999. (Local farmers and citizens fight to stop construction of a massive irrigation project.)

Clausen, Meredith L. The *Pan Am Building and the Shattering of the Modernist Dream*. MIT Press, Cambridge, MA, 2005. (The story of the issues and controversy surrounding the first of many post-WW II skyscrapers in Manhattan. "A conspicuous landmark and a testament to what many in New York felt should never have been built and should never be allowed to happen again … a social utopia based on the use of new industrial materials and new modes of production to generate new, efficient, clean-lined forms [was] displaced by the imperatives of a capitalist economy, and instead of the decent housing for growing urban populations modernists promised, flagship buildings for corporations were build." pp. 386-87)

Conuel, Thomas. *Quabbin – The Accidental Wilderness*. The University of Massachusetts Press, Amherst, revised edition, 1990. (The story of the creation of Quabbin Resevoir, which required the flooding of four towns in western Massachusetts in order to provide water for populations in the eastern part of the state.)

DeBoer, David J. *Piggyback and Containers: A History of Rail Intermodal on America's Steel Highways*. Golden West Books, San Marino, California, 1992.

Fredich, A.S. *Sons of Martha - Civil Engineering Readings in Modern Literature*. ASCE, 1989. (Pure fun!)

Gordon, John Steele, *A Thread Across the Ocean: the Heroic Story of the Transatlantic Cable*. Walker & Company, NY, NY, 2002. (Laying a cable across the Atlantic reduced the speed of news from weeks or months to seconds; after several failed attempts, the project was completed using the Great Eastern, the huge steam/sailing ship designed by I.K. Brunel.)

Graham-Leigh, *London's Water Wars: The competition for London's water supply in the nineteenth century*. Francis Boutle Publishers, London, 2000. (At the beginning of the 19th century, various water companies built competing systems for delivering running water to London neighborhoods, leading to many abuses of customers, legal battles, and eventually a recognition of the need to regulate water delivery as a public utility.)

Green, Julie. *The Canal Builders: Making America's Empire at the Panama Canal*. The Penguin Press, 2009.

Gutner, Tamar L. *Banking of the Environment: Multilateral Development Banks and their Environmental Performance in Central and Eastern Europe.* MIT Press, Cambridge, MA, 2002. (An investigation into the ways that the World Bank and others balance economic, environmental and social concerns in their attempts to promote development and reduce poverty in poor countries.)

Halliday, Stephen. *The Great Stink of London: Sir Joseph Bazalgette and the Cleansing of the Victorian Metropolis*. Sutton Publishing, Stroud, Gloucestershire, UK, 1999. (The installation of sewers and the creation of the Thames embankment as a means of cleaning up the Thames in the mid-1800s: the book is as fascinating as its title!)

Hughes, Thomas P. *Rescuing Prometheus: Four Monumental Projects that Changed the Modern World*. Vintage Books, New York 1998. (The development of management systems for complex projects including the Central Artery/Tunnel – the "Big Dig" – in Boston and ARPANET, a pre-cursor to the internet.)

Koeppel, Gerald. *Bond of Union: Building the Erie Canal and the American Empire*. Da Capo Press, Cambridge MA, 2009

Larson, Erik. *The Devil in the White City: Murder, Magic, and Madness at the Fair that Changed America.* Vintage Books, New York, 2003. (A delightful history of mass murder at the time of the creation of the "White City" along the banks of Lake Michigan to host the World's Columbian Exposition in 1893.)

Lewis, Tom, *Divided Highways: Building the Interstate Highways, Transforming American Life.* Penguin Books, New York, 1997.

McCullough, David. *The Path Between the Seas: The Creation of the Panama Canal, 1870-1914*. Simon & Schuster, New York, 1977.

McCullough, David. *The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge*. Simon & Schuster, New York, 1972.

McCullough, David. *The Johnstown Flood: The Incredible Story Behind One of the Most Devastating 'Natural' Disasters America Has Ever Known*. Simon & Schuster, New York, 1968.

McDonald, Frank and Kathy Sheridan. *The Builders: How a Small Group of Property Developers Fueled the Building Boom and Transformed Ireland*. Penguin Ireland, Dublin, 2008. (A portrait of the types of individuals whose decisions fueled the real estate bubble that burst in Ireland and around the world in 2007.)

Newhouse, Elizabeth L. Editor. *The Builders: Marvels of Engineering*, National Geographic Society, Washington, DC, 1992. (Great pictures and good overviews of major projects in all areas of civil engineering; a relatively inexpensive reference that captures the excitement of big projects, although it has little detail concerning project evaluation.)

Nye, David E. *Electrifying America: Social Meanings of a New Technology*. MIT Press, Cambridge MA, 1990.

Okrent, Daniel. *Great Fortune: The Epic of Rockefeller Center*. Penguin Books, London, 2004. (How Rockefeller Center came to be developed during the depths of the Great Depression on under-utilized land in central Manhattan.)

Oppitz, Leslie. *Lost Railways of East Anglia.* Countryside Books, Newbury, Berkshire, UK, 2004. (Brief but detailed history of introduction first of the horse-drawn and later the electric tramway into the cities and towns of this region that is northeast of London. Many of the issues dealt with at that time remain central issues for modern transit operations.)

Payne, Robert. *The Canal Builders: The Story of Canal Engineers Through the Ages*. The Macmillan Company, NY, 1959.

Pellow, David Naguib. *Garbage Wars: the Struggle for Environmental Justice in Chicago*. MIT Press, Cambridge, MA, 2004.

Peters, Tom. *Building the 19th Century*. MIT Press, Cambridge, MA.

Pierce, Patricia. *Old London Bridge: the Story of the Longest Inhabited Bridge in Europe.* Headline Book Publishing, London, UK, 2001. (The 750-year history of a bridge that at one time was the retail center of London and the site of many trendy homes.)

Pole, Graeme. *The Spiral Tunnels and the Big Hill: A Canadian Railway Adventure*. Altitude Publishing Canada Ltd., Vancouver, Canada, 1995. (The construction of the spiral tunnels that, when completed in 1909, reduced the ruling grade on Canadian Pacific's transcontinental line through the Rocky Mountains, enabling longer trains, faster speeds, and less expensive operations.)

Reisner, Marc. *Cadillac Desert: The American West and its Disappearing Water*. Penguin Books USA Inc, NY, NY, 1993. (This book documents the struggles, by politicians and government officials in Los Angeles and elsewhere, to find and divert water for agriculture and cities.)

Richmond, Peter. *Ballpark: Camden Yards and the Building of an American Dream.* Simon & Schuster, NY, London, Toronto, Sydney, Tokyo, and Singapore, 1993. (The construction of a new, old style, urban ballpark that incorporated structures and designs from Baltimore's industrial past.)

Ridgeway, James. *Powering Civilization: the Complete Energy Reader*. Pantheon Books, NY, NY, 1982. (Ridgeway compiles readings about the various forms of energy, tracing the extraction, transportation, and use of coal, oil, natural gas, nuclear power, and alternative energy sources. The readings provide compelling insights into the powerful forces that have affected the exploitation of energy sources.)

Rose, Mark H. *Interstate – Express Highway Politics, 1941-1956*. The Regents Press of Kansas, Lawrence, KA, 1979. (The politics that influenced the design, location and financing of the Interstate Highway System.)

Sabbagh, Karl. *Skyscraper: the Making of a Building*. Penguin Books, NY, NY, 1989 (The building of the 50-story Worldwide Plaza in New York City.)

Schodek, Daniel L. *Landmarks in American Civil Engineering*. MIT Press, 1987 (Short articles on more than 100 projects that were selected by the ASCE as notable achievements.)

Standiford, Les. *Last Train to Paradise: Henry Flagler and the Spectacular Rise and Fall of the Railroad that Crossed an Ocean*. Crown Publishers, NY, NY, 2002. (Construction of a railroad from Jacksonville to Key West, a

spectacular feat that opened southern Florida to development and transformed Miami from a tiny port into a major resort destination.)

Taurancac, John. *The Empire State Building: The Making of a Landmark*. Scribner, New York, 1995.

Talese, Gay. *The Bridge.* Walker & Company, NY, NY, 2003. (A history of the construction of the Verrazano-Narrows Bridge that focuses on the ironworkers and others who actually built it.)

Tsipis, Yanni K. *Images of America: Building the Mass Pike.* Arcadia Publishing, Charleston, SC, 2002. (One of the popular "Images of America" series, this is an annotated collection of photographs concerning the construction of the Mass Pike and its controversial extension into Boston; the author is a graduate of MIT and was both a student in and teaching assistant for Project Evaluation, the class that eventually led to this book.)

Vance, James E. Jr. *The North American Railroad: Its Origin, Evolution, and Geography*. The Johns Hopkins University Press, Baltimore and London, 1995. (A geographer's perspective on the development of the North American Railroad System.)

Wood, F.J. *The Turnpikes of New England*. Branch Line Press, Pepperell, MA, 1997. (Reissue of the 1919 classic, which provides a short description of every one of the 19th century turnpikes that were authorized by the states, constructed by chartered companies, and financed by tolls.)

Zimiles, Martha and Murray Zimiles. *Early American Mills.* Bramhall House, NY, 1973. (A history of the construction of water-powered mills and mill-towns throughout New England during the 1800s.)

Articles about Projects:

Ardila, Arturo, and Gerhard Menchkhoff. "Transportation Policies in Bogota, Colombia: Building a Transportation System for the People." *Transportation Research Record* 1817, (2002): 130-136.

Ball, Steven C. "Unconventional Expansion." *Civil Engineering*, (April 2008). (The design, construction, and notable environmental features in the largest building to achieve LEED certification; also an example of delivering a project on time and on budget using a design/build team.)

Boettner, Danita S., Don Koci, Darren L. Brown, and Bruce Allman. "Clean, Blend and Reuse." *Civil Engineering*, (July 2009): 59-65, 86. (A $35 million remediation project aimed at cleaning up contaminated groundwater and to provide potable water to Hutchinson, KA.)

Bourke, Michael R., Donald R.F. Harleman, Heidi Li, Susan E. Murcott, Gautam Narasimhan and Irene W. Yu. "Innovative Wastewater Treatment in the Developing World." *Civil Engineering Practice*, 17 (1), (2002): 25-34.

Brocard, Dominique N., Brian J. Van Wheels, and Lawrence A. Williamson. "The New Boston Outfall." *Civil Engineering Practice,* 9 (1), (1994): 33-48. (The engineering options for the new sewer system in Boston Harbor, with consideration of the geotechnical, water and pollution concerns.)

Breen, Cheryl, Jekabs Vittands, and Daniel O'Brien. "The Boston Harbor Project: History and Planning." *Civil Engineering Practice*, 9 (1), (1994): 11-32. (Very good overview of the history, need, and options considered for the whole program)

Capano, Daniel E. "Chicago's War With Water: on its way to pioneering our modern sewer system, Chicago survived epidemics, floods, and countless bad days." *Invention & Technology*, (Spring 2003): 51-58.

Curtis, Wayne, “Going with the Flow: Historic dams are being demolished or vastly altered to allow fish to return to their historic spawning grounds. Is there another way?” *Preservation,* (July/August 2003): 29-33. (Fish ladders are good for the fish, but look awful next to historic dams and mills.)

Deakin, Elizabeth. “Sustainable Transportation: US Dilemmas and European Experiences.” *Transportation Research Record* 1792, (2002): 1-11.

Dornhelm, Rachel. “Beach Master: Coney Island has been world famous for 150 years, but who remembers that its beach is the revolutionary achievement of one embattled engineer?” *Invention & Technology*, (Summer 2004): 43-48.

Drapeau, Raoul. “Pipe Dream: with creative engineering and heroic endurance, freezing, beleaguered workers pushed the Canol Pipeline through the brutal Arctic wilderness during World War II. But it was a project that should never have been started.” *Invention & Technology*, (Winter 2002): 25-35.

Fox, Richard D., William F. Callahan and Walter G. Armstrong. “Effective Facilities Planning Ensured a Successful Boston Harbor Cleanup.” *Civil Engineering Practice*, 17 (2), (2002): 25-34.

Griggs, Francis E. Jr., "Thomas W.H. Mosely and His Bridges." *Civil Engineering Practice*, 12 (2), (1997): 19-38. (One of the first to use iron for bridges, Mosely developed standard designs and worked with a prefab company to market railway and highway bridges at an advertised price per foot during the 19th century).

Griggs, Francis E. Jr. "The Panama Canal: Uniting the World for Seventy-Six Years", *Civil Engineering Practice,* 5 (2), Fall/Winter 1990, pp. 71-90. (A 20 page synopsis of the “Path Between the Seas” that focuses on the trials and tribulations of building the canal.)

Grimm, Mike. "Floodplain Management." *Civil Engineering*, (March 1998): 62-66. (This is a good, short example of a post audit. Because Fort Collins was a leader in the systems approach to flood control, they escaped their 500-year flood with little property loss and only 5 deaths versus what likely would have been $5 million damage with nearly 100 fatalities if they had not implemented their flood control projects. See Section 13.3.6.)

Grunwald, Michael. “Everglades: The nation’s storied wetland is the focus of the world’s largest environmental restoration project. But will that be enough?” *Smithsonian*, (March 2006): 46-57.

Hall, Sir Peter. “Speed Rail Comes to London.” *Traffic Technology International*, (Dec 2001/Jan 2002): 25-31. (A brief introduction to the high speed rail link that had to be created between London and the Channel Tunnel.)

Hecker, George E. "Hydraulic Engineering in China." *Civil Engineering Practice*, 6 (1), (1991): 7-24. (An interesting perspective on the magnitude of China's major water resource projects.)

Heppenheimer, T.A. “Nuclear Power: Engineers Finally Made it Safe, but They Couldn’t Make it Cheap.” *Invention & Technology*, (Fall 2002): 46-56.

Holly, H. Hobart. "The Middlesex Canal." *Civil Engineering Practice*, 7 (2), (1992): 104-106. ("It was the Middlesex Canal that proved, through low freight rates and expanded traffic, that canal transportation in the US was practical and economical.")

Holly, H. Hobart. "The Charles River Basin." *Civil Engineering Practice*, 8 (2), (1993): 77-80.

Holly, H. Hobart. "Lowell Water Power System." *Civil Engineering Practice*, 1 (2), (1986): 141-145.

Izaguirre, Ada Karina. “Private Infrastructure: A Review of Projects with Private Participation, 1990-2001.” *Public Policy for the Private Sector* 250, The World Bank Group, October 2000.

Johnson, Christopher. “The Law that Saved the Appalachians.” Appalachia, (June 2005): 88-97. (The history of the Weeks Act, which led to the creation of the national forest system.)

Joseph, Patrick. “The Battle of the Dams: those who think some of our rivers are a dammed shame argue for the structures to come down.” *Smithsonian*, (November 1998).

Kain, John F. and Zvi Liu. “Secrets of success: assessing the large increases in transit ridership achieved by Houston and San Diego transit providers.” *Transportation Research Part A*, (1999): 601-624.

Kaplin, John and Geoffrey Hughes. “Construction of Underground Facilities for the Narragansett Bay Combined Sewer Overflow Program, Phase I.” *Civil Engineering Practice*, **(**Fall/Winter 2008): 7-32.

Koeppel, Gerard. “A Struggle for Water.” *Invention & Technology*, (Winter 1994): 19-30. (The 70-year effort required to complete New York City’s first major water system, which was authorized in 1774.).

Langdon, Virgil L. Jr., Michael R. Hilliard, and Ingrid K. Busch. “Future Utilization and Optimal Investment Strategy for Inland Waterways.” *Transportation Research Record* 1871, (2004): 33-41. (Optimizing investments over an entire system under a series of forecast scenarios taking into account scheduled and unscheduled closures that might affect the inland waterways.)

Martland, C., R. Gakenheimer, K. Kruckemeyer, T. Lee, M. Murga, F. Salvucci, D. Shi, D. Sze, S. Gongal, G. Flood, R. Imai, and J. Won. “Linking the Delta: Bridging the Pearl River Delta.” The 2022 Foundation, Lai Chi Kok, Hong Kong, 2003. (Examination of the transportation, environmental, and economic issues related to the proposed construction of a bridge that would link Hong Kong and Macau.)

Mueller-Lust, Andrew. “Crystal Clear.” *Civil Engineering*, (December 2008): 38-71. (The design, construction, and notable environmental features of the Bank of America Tower at One Bryant Part, one of the first skyscrapers to achieve LEED platinum certification.)

Morrall, J.F. and T.M. McGuire. “Sustainable Highway Development in a National Park.” *Transportation Research Record* 1702, (2000): 3-10. (Examples of sustainable highway development in Canada’s Rocky Mountain National Parks, including fencing that directs animals to crossings constructed at intervals over the highway.)

O’Neill, Tom. “Curse of the Black Gold: Hope and Betrayal in the Niger Delta.” *National Geographic*, (February 2007): 88 to 117. (Profits from oil production in Nigeria have not reached the people living near the oil fields; extreme poverty, destruction of fishing grounds, pollution, and general disillusionment have fueled insurgents willing to use violence and disruption of the oil flows if their call for local control of resources isn’t met.)

Pennington, Robert A., Kristies A. Gersley, Anthonyh Gagliostro, Daniel T. Eagan, Alvin L. Zach, and John T. George. “Saving a City’s Sewers.” *Civil Engineering*, (December 2008): 61-68. (Description of a 20-year effort to inspect and rehabilitate Newark’s 68 miles of brick sewers that were originally constructed in the 19th century.)

Peters, Tom. "How Creative Engineers Think." *Civil Engineering*, (March 1998): 48-51. (Peters uses historical examples including Brunel's bridges, the Crystal Palace, the Palm House at Kew Gardens, and the Thames tunnel to illustrate what he calls "technological thinking", a combination of the linear, objective scientific method and the subjective matrix method. In every case, the project required new thinking and new technology to succeed.)

Powderham, Alan J. “Heathrow Express Cofferdam: Innovation & Delivery Through the Single-Team Approach – Part I: Design and Construction.” *Civil Engineering Practice*, 18 (1): 25-50. (“Partnering, value and risk

management, and technical innovation rescued this project from substantial delay and cost overruns following a major setback during construction.)

Reich, Leonard S. "The Dawn of the Truck: it caught on much more slowly than the automobile, partly because of the expense, partly because horses did a good job, and partly because people had to figure out just what it was and could do." *Invention & Technology*, (Fall 2000): 18-24.

Reid, Robert L. "Under One Green Roof." *Civil Engineering*, (March 2009). (The new California Academy of Sciences building in San Francisco houses a museum, an aquarium, a planetarium and scientific research operations in a vast structure designed for sustainability. Most notable perhaps is its 2.5 acre undulating roof, which is covered with vegetation and its stunning use of windows and interior open space.)

Rosales and Gottemoeller. "Urban Design Considerations for the New Woodrow Wilson Memorial Bridge: Competition-Winning Design for Metropolitan Washington, D.C." *Transportation Research Record* 1740, (2000): 104-107.

Scheader, Edward C. "The New York City Water Supply: Past, Present and Future." *Civil Engineering Practice* 6 (2), (1991): 7-20. (A very readable overview of NYC's water supply history written by the director of the Department of Environmental Protection.)

Schipper, Lee. "Sustainable Urban Transport in the 21st Century." *Transportation Research Record* 1792, (2002): 12-19. (Schipper confronts the issues related to the long-term problems with the automobile and what must be done to achieve sustainable transportation for the future, especially in very large urban areas in developing countries. This paper provides a clear perspective on what might be called "hard sustainability", i.e. the basic environmental problems related to global warming, air quality, and dependence upon fossil fuel.)

Schmutz, Armin. "Inside the World's Longest Tunnel." *Trains,* (2004): 40-47. (A new 35-mile-long rail tunnel under the Alps improves transportation through Switzerland).

Sheridan, Thomas E. "The Big Canal: The Political Ecology of the Central Arizona Project." in John M. Donahue and Barbara R. Johnston, eds. *Water, Culture and Power*. Island Press, Washington DC, 1998.

Shumay, Laurence W. "Making the Most of Transportation Infrastructure: MBTA's South Station Intermodal Transportation Center." *Civil Engineering Practice*, 16 (1), (2001): 67-74.

Sipes, James L. and Ron Blakemore. "Aesthetics in the Landscape: How Nevada and other States are Integrating Aesthetics into Transportation Projects." *TR News*, (February 2007): 3-12

Tsipis, Yanni, "Central Corridor Highway Planning in Boston, 1900-1950: The Long Road to the Old Central Artery." *Civil Engineering Practice,* 18 (2), (2003): 33-52.

Vic, Thomas E. and Mark Surwillo. "Small Footprint, Big Promise." *Civil Engineering,* (February 2008): 66-85. (The use of new technologies to reduce the space needed for a more effective sewerage treatment plant. See Example 15.8)

World Bank. "Integrated Coastal Zone Management Strategy for Ghana." *World Bank Findings* 113, June 1998. (This example of the many studies carried out by the World Bank shows how a qualitative process led to the identification and prioritization of environmental concerns and recommendations for management strategies to deal with these concerns.)

Zoellner, Tom. "Oil and Water: the adventures of getting one from deep beneath the other." *Invention & Technology*, (Fall 2000): 44-52.

Resource: Project Evaluation: Essays and Case Studies

Carl D. Martland