Society for the History of Technology Annual Meeting, New Orleans, LA,18-21 Nov. 2021
Open Session Proposal
Organizer: Julie Mark Cohen, PhD, PE, SECB (jmcohen@jmcohenpe.com)

Honorably-Designed Engineered Artifacts Doomed to Failure: Engineering Education and Practice, Public Policy, and Social Justice

> On December 15, 1967, the 1928 Silver Bridge collapsed during rush hour, killing 46 people. "The outstanding attention to detail exhibited in the accident investigation, especially with regard to the hard evidence of the fractured eyebar, left little doubt that the failure was rooted in a design that inadvertently made inspection all but impossible and failure all but inevitable. If ever a design was to blame for a failure, this was it. The intention of the bridge's designers was evidently nothing if not honorable. They did not wish to design a doomed bridge; they did so because they - and all their contemporaries - were ignorant of the full implications of the materials and details they employed. They were also perhaps overly cavalier about relying so much on [nonredundant] eyebar links that were cleverly placed to do double duty. In retrospect, the designers should not have proceeded in such ignorance, and they should have realized the potentially catastrophic consequences of their design choices. But this was a different time…"
>
> - Henry Petroski. *To Forgive Design*: *Understanding Failure*, Harvard University Press. Kindle 2012 Edition, pg. 174.

The design of the Silver Bridge was not unique. Other structures have been designed and constructed since the 1920s with nonredundant critical components whose failure resulted a loss of the entire engineered artifact. Other elevated bridge and train structures have collapsed; land-based and offshore oil drilling rigs have exploded and/or allowed toxins to escape into the soil and air; levees and dams have failed destroying properties in the path of uncontrolled water flow; and so on. When these structures failed, humans, water creatures, and plant lives have been adversely affected with deaths and maiming. Financial burdens have been imposed on communities; the public-at-large has been subjected to inconveniences of daily life; in some instances, chronic health and environmental problems have surfaced.

A number of these honorably-designed, doomed structures on land were constructed in economically-disadvantaged residential and commercial neighborhoods or next to them, physically cutting them off from adjacent neighborhoods. Public policy, specifically zoning, introduces social justice issues.

This 2021 SHOT open session will include papers on engineers' unintentional, unrecognized-at-the-time, risk-laden design decisions that resulted in the inability to inspect and maintain their engineered artifacts, immediate or eventual failures, the need to improve (structural) engineering education and practice, and efforts to change public policy.

#

Note: Dr. Cohen plans to present a paper on the Silver Bridge.

Procedure: Those interested in proposing presentations for potential inclusion in this session should prepare a one-page abstract (500 words maximum) and a one-page short biographical sketch (300 words maximum) with current contact information. Please send these materials to Julie Mark Cohen (jmcohen@jmcohenpe.com) no later than April 7, 2021.

Robinson Prize: If you will be a first-time SHOT presenter, do not hold a tenure-track position, are no more than two years from receipt of a terminal academic degree, and wish to be considered for the Robinson Prize, please indicate as much in your abstract. (Find information about this prize at the Robinson Prize page at the SHOT website.)