Construction History on the Frontier

10th Anniversary Members’ Meeting
July 20-22, 2017
University of Washington - Seattle

It’s not too late to join us at our 10th Anniversary Members’ Meeting in two weeks!

With the region shaped first by pioneering families and resource extraction economies and later transportation networks and local urban growth, presentations of this conference reflect this evolution. With topics interesting to architects, engineers, construction historians as well as subcontractors and suppliers, this multi-track program begins Thursday afternoon and runs to 1:00 pm on July 22. In this newsletter is a preview of eight abstracts being presented at the Meeting.

A highlight of the Members Meeting is the ‘We Built Seattle’ panel discussion on Thursday evening, July 20th, celebrating legacy firms who have contributed to the history of construction in the Northwest. This panel discussion will be an opportunity to share knowledge forward and engage a new generation in rich history of construction in Seattle. This event is free and open to the public.

In addition to four keynote presentations and eight academic sessions, CHSA will offer guided tours led by local expert historians on Friday, July 21 in Seattle and the surrounding region.

See you in Seattle!
10th ANNIVERSARY OF THE CONSTRUCTION HISTORY SOCIETY OF AMERICA

In 2006 a number of American delegates attended the 2nd International Congress on Construction History at Queens College, Cambridge, England, hosted by the British Construction History Society which had been formed in 1982. At the closing plenary session a suggestion was made to consider the formation of an American branch. John Ochsendorf (MIT) and Brian Bowen (Georgia Tech) agreed to explore the feasibility. A survey was conducted in the US in early 2007 with a positive response.

The next challenge was to get through the organizational steps required to set up the Society which included: corporate registration with the state of Georgia, IRS approval of tax-exempt status, drawing up by-laws, devising a marketing plan, recruiting a management committee, etc. This required financing which we were fortunate to receive from the Georgia Tech Foundation for this purpose.

The first of our national meetings was held over a weekend in November 2007 at Georgia Tech. Forty three people were in attendance, with the theme “Learning from Design & Construction Failures”. Close to 20 papers were presented. One in particular stood out, a highly emotional talk by Bob Berkebile, architect of the Hyatt Regency Hotel in Kansas City where interior walkways collapsed in 1981 with great loss of life.

We have come a long way from there, but still have much work to do to broaden our membership base and visibility.

Brian Bowen, Chairman Emeritus

CHSA’s NEWSLETTER #1

To start celebrating our 10th Anniversary - please find a copy of the 1st newsletter written in October of 2007 attached

Look for articles on The Iowa State Fair by Tom Leslie, Iowa State University; Applied Construction History by Brian Bowen, Georgia Tech; Brownstone and Brick Rowhouses in New York by Donald Friedman, Old Structures Engineering; 2007 Construction History Anniversaries and Book Reviews.

THANKS TO OUR INSTITUTIONAL AND CORPORATE MEMBERS FOR SUPPORTING CHSA!

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Early 20th Century Hydroelectric Power in the Pacific Northwest
Neal A. Vogel
Principal, Restoric, LLC

Hydroelectric power from high-head waters—and the transmission of power over mountains and through towering forests—was instrumental to developing cities and expanding industry in the Pacific Northwest during the early 20th century. This presentation will cover the historical construction and operation of several early 20th century hydroelectric dams and plants in Washington State, and their use today; including the documentation, decommissioning and eventual demolition of two dams. Four plants will be covered in the presentation including: the Snoqualmie Falls plant (1899); the Nooksack Falls plant (1906); the Glines Canyon plant (1927) and the Elwha River plant (1911) of which the latter two are both located in Olympic National Park. Snoqualmie Falls (1899) is the second oldest plant in the Pacific Northwest and the first plant in the world to be completely constructed underground. The Nooksack Falls Hydroelectric Plant (1906) is also among the oldest plants in the Pacific Northwest which remains in operation. The Glines Canyon and Elwha dams were dramatically demolished in 2012 as part of the Elwha River ecosystem restoration project—motivated by the desire to restore natural salmon runs on the shores of Puget Sound. The Glines Canyon dam is the tallest in the world to ever be intentionally breached. Neal Vogel of Restoric, LLC, who led Historic American Engineering Record (HAER) documentation teams in documenting three of these four plants, will present the historical construction story of these engineering marvels.

Fazlur Kahn and the Tall Tube
Michael O’Brien
Texas A & M University

Not since the era before cast iron has structural design been considered intuitive. British empiricism showed the building culture the value of scientific methods for determining the size and material characteristics of each element constituting the whole. This changed in the middle 1960’s when Fazlur Kahn proposed more efficient principles for the design of tall buildings in concrete or steel. This paper will present Kahn’s revolutionary ideas in the context of tall buildings in Houston and Chicago.

Cold War Concrete: Prototype Fallout Shelter under Interstate 5 in Seattle
Craig Holstine
Historian, Washington State Department of Transportation

Supporting the north approach to the Interstate 5 Ravenna Boulevard Overcrossing is a structure unlike any other included in WSDOT’s Bridge Inventory. A sliding steel grate in an unadorned concrete wall blocks the entrance to the only Cold War fallout shelter under a highway in the US and probably the world. The underground cylindrical reinforced concrete structure, built in the early 1960s as a prototype, was to be the model for countless similar facilities under Interstate highways across the country. Like other Cold War facilities, the shelter’s lack of aesthetic embellishment reflects the frightening role it was to play in what a majority of Americans at the time believed was an inevitable nuclear holocaust. The shelter has been determined eligible for inclusion in the National Register of Historic Places.
Building the Grand Coulee Dam
Raymond Paul Giroux, Dist.M. ASCE

During the early twentieth century harnessing the water potential of the mighty Columbia River was essential to the growth of the Northwest United States. With river flows in excess of 300,000 cubic feet per second, building the biggest concrete dam in the world in a remote area of eastern Washington was seemingly impossible. With construction beginning during the Great Depression, the success of the project was not only essential to America’s long term interests, but also instrumental in providing jobs for thousands of people and restoring hope to an entire region of the country. In the decades preceding Grand Coulee Dam’s construction, tremendous advancements were realized in every discipline of engineering. This presentation highlights how the right men, the right, machines, and the right methods all came together in 1934 to build a project of unprecedented scope and challenges.

The Klickitat River Bridge: Beginning a New Era in Prestressed Concrete Construction
Sharon Boswell
SWCA Environmental Consultants, Seattle WA

The project usually recognized as launching the prestressed concrete industry in the United States is Philadelphia’s Walnut Lane Memorial Bridge, completed in late 1950. With its success, the use of prestressed concrete for bridge construction spread across the country, but in a few western states the rate of adoption was particularly rapid. In Washington, rural Klickitat County was one of the first to utilize prefabricated girders of prestressed concrete for several new bridges, initiating the design process early in 1953. The Klickitat River Bridge project provides an interesting case study of the conditions that led to this early introduction of prestressed concrete in state and local projects. An innovative bridge designer willing to experiment with new technology, a manufacturing facility well-positioned to prefabricate concrete girders, and the availability of funding and agency support for new construction on secondary roads were among the factors that ultimately contributed to the quick and widespread acceptance of prestressed concrete in Washington State. Within two years of completion of the Klickitat River spans, the Department of Highways had developed its own standard plans for this type of bridge. Within a decade, prestressed concrete had become the material of choice for most new highway bridge construction around the state.

Three Strategies for Mass Timber Construction in Seattle
Ahmad Ali
Assistant Professor, Department of Architecture, Texas A & M University
Dawn Bushnaq
Architect, Bushnaq Studio Architecture + Design, Seattle, WA

In this presentation, we share lessons learned from observing traditional Japanese timber construction, which we believe, is essential to address the discourse on the current interest in the mass timber construction movement. Seattle and the great Northwest have an established history of building with timber due to cultivating some of the tallest trees and best wood species in the United States. The recent interest in building with mass (solid) timber for mid-rise and high-rise buildings had spun the conversation on many issues especially the International Building Code (IBC). An effort to modify the code to embrace the mass timber movement is currently undertaken, but seismic issue concerns the city officials even if the code would change and the law requires in-situ testing. Pre-stressed and posted tensioned timber is currently being explored in Portland, Oregon, and certified manufacturing panel-pressing plants are quickly emerging. Manufacturing mass timber panels, components, and members can certainly benefit from the fabrication knowledge exists in Seattle and from the knowledge transfer of other industries such as Boeing and Shipbuilding. By examining traditional Japanese
construction, three strategies were essential to survive earthquakes: the use of broad and substantial overhangs, structurally separated floors and a shock-absorbing central pillar known as (Shinbashira).

What is common between Seattle and Japan are the amounts of annual precipitation. To keep the building and the foundation dry, a solution such as extending the building overhangs (eaves) protected the Pagodas from sinking, the proportion of vertical to the horizontal extension was sometimes twice the height of the walls. A bracket system was developed to support the large cantilever, which contributed to the poetic expression of a unique tectonic language. The roof weight helped to stabilize buildings during earth movement and gently sway rather than shake. Separating the floors’ structure as a stack rather than connecting all levels together also helped each floor to move in the opposite direction to the one above and below, and only loose fitting brackets were connecting the floors together. The third strategy was the central pillar, which was not supporting any building weight, but acted as a massively tuned mass damper (pendulum effect). Helping to mitigate earthquake vibration prevented the floor from swaying to collapse and absorbed the momentum of the floors as they struck against it.

The connection between timber members is the key to all three strategies, and as the industry promotes Cross Laminated Timber (CLT) as a quick and fast construction system that requires minimal craftsmanship and skills, more need to be done to address issues of seismic loads and structure. The new language of Architecture of mass timber should emerge from these inherent problems of the system rather than treat CLT as Structural Insulated Panels (SIPs), similar to those developed in Japanese architecture.

Shanty Shelters: The Rapidly Disappearing Single Wall Construction Method
Michael O’Brien
Texas A & M University

Braced frames, timber frames, balloon frames, log cabins and the “single-wall” or “box-type” construction were built side by side in the rapidly-expanding and temporary communities that sprung up around canal towns, mines, sawmills, railroads, and oilfields from 1800 to the dust bowl days of the 1930’s.

The single-wall form of wood construction, the use of vertical thin load bearing boards as walls, is unknown in the professional and technical literature of the time.[i] This may contribute to the single-wall structures being frequently over looked (sometimes intentionally) or mislabeled by field surveyors conducting inventories of historic structures and who were trained in the design/construction professions to recognize log, timber and light-wood framed structures.[ii] The single-wall is thus an unusual structural system but can be seen in hundreds of structures across the United States, from New York State, through the southern coal and iron mining camps, across the oilfield communities in Texas and Oklahoma to the silver and gold mining camps in the Rockies and California, and even Hawaii.[iii]

These early single-wall constructions were frequently referred to in the popular press as shanties or shacks. Construction of an eight or ten-foot by twelve-foot “Claim Shanty,” was a required step in filing a homestead claim. The claim shanty is prominently mentioned in author Laura Ingalls Wilder’s “Little House on the Prairie” series.[iv] The Shanty is seldom featured in nineteenth century professional journals, but an explanation is included in a 1914 popular-press publication “Shelters, Shacks, and Shanties”[v] by D. C. Beard. Beard characterized the shanty as an informal type of shelter more durable than a tent, but not a “permanent” mode of construction. This presentation will present the basic method for constructing a single wall shanty, present some notably preserved and reconstructed shanties, and argue that the shanty was a respectable form of housing as illustrated by the home of Joseph V. Frnka, lawyer and judge in Columbus, Texas.

[i] A survey of Audel’s Carpenters Builders Guides, 1923, Albert Fair’s “Practical House Framing” 1919, and Maginnis’s "Roof Framing Made Easy," 1896 shows no mention of single-wall, box, or shanty construction even though, arguably older forms of construction, the timber frame and the braced frame are copiously illustrated.
Maryhill Museum of Art: Preserving a One-of-a-Kind Building
Maya M. Foty, AIA, LEED AP
Architectural Resources Group, Portland OR

This presentation will discuss recent exterior restoration work undertaken at Maryhill Museum of Art in Goldendale, Washington, as well as present a brief biography of Sam Hill and history of the Museum’s unique site along the Columbia River Gorge.

Sam Hill was a Quaker businessman who purchased a 5,300-acre site in Goldendale with the hope of founding a Quaker farming community. He hired the prominent architecture firm Hornblower and Marshall of Washington, DC, to build him a three-story mansion made of reinforced concrete in 1914. Experimenting with possible finishes, the designers included large pieces of stone in the concrete mix and intended to remove the forms before the concrete had fully set, ultimately washing or brushing out the cement to reveal the stone aggregate. Their concrete trial didn’t work, however, leaving the mansion with an unremarkable, board-formed concrete finish. It was decided to cover the concrete with stucco. Construction of the mansion halted in 1917 after Sam Hill’s business failed and it wasn’t until 1940 that it was finally opened, not as a residence, but as a museum.

The project addressed chronic water-intrusion problems that have plagued the Museum since its construction and in doing so found ways to address exterior aesthetic deficiencies within a very strict budget and construction timeline. The building’s stucco finish did not age well; the first repair campaign was undertaken in 1936, before the museum had even opened. In 2011, Architectural Resources Group (ARG) was hired to investigate prior repair efforts and assess the current concrete and stucco conditions. The balustrade around the roof perimeter was in particularly bad shape due to long-term water intrusion, and ramps on both sides of the building exhibited cracks that allowed water to enter into the interior spaces below. ARG recommended that the museum repair the stucco and replace the building roof and the waterproofing system at the ramps. Water infiltration caused much of the damage and it was necessary to address the underlying waterproofing issues before tackling stucco repairs.

This presentation will discuss the following:
• Brief biography of Sam Hill and impact on OR and WA highway construction
• History of the site and design
• Investigation methodologies
• How the testing before rehabilitation helped guide the team in defining the rehabilitation scope and specifications
• A general overview of the work undertaken

RENEW YOUR MEMBERSHIP EACH JANUARY

Memberships are valid January 1 - December 31 of a calendar year.
http://chsamembership.wildapricot.org/page-1560508