



ENGINEERED WOOD SHAPES STATE HISTORY

STRUCTURAL WOOD PANELS USED TO FORM MASSIVE CONCRETE ARCHES

Project Summary

PROJECT:

Washington State History Museum

OWNER:

State of Washington

DEVELOPER:

Washington State
Historical Society

ARCHITECT:

Moore/Andersson
Austin, Texas

ASSOCIATE ARCHITECT:

Olson/Sundberg
Seattle, Washington

CONTRACTOR:

Ellis-Don Construction
Bellevue, Washington

CONSTRUCTION MANAGER:

K.D. Fuller Company

COST:

\$31.8 million

LOCATION:

Tacoma, Washington

SQUARE FOOTAGE:

100,000 total square feet

CONCRETE FORMING:

APA trademarked HDO Plywood

COMPLETION:

Spring, 1996

It was clear from the beginning that building the Washington State History Museum in Tacoma, Washington was going to be a challenge. Not only was the museum a high-profile project on a prominent site in downtown Tacoma, but the project featured the construction of a dramatic series of eleven, 55-foot-high reinforced concrete arches that were designed to accentuate the building's facade and blend into the neighboring historical Union Station.

Union Station is a huge masonry structure built in 1911 with four vaulted arches forming a central dome. The goal of the Washington State Historical Society was to construct a world class facility while maintaining the historic architecture of the former railroad station. The Historical Society turned to Moore/Andersson Architects to design the facility

The Texas-based design firm joined the History Museum with Union Station by creating a scenic courtyard and amphitheater. The new structure was designed to flow eloquently south, repeating the pattern of vaulted arches of Union Station – forming an architectural allegiance between the two independent buildings.

Moore/Andersson designed the eleven 55-foot-high reinforced concrete arches to match the same height and scale as those in Union Station. Of the eleven arches, four run east and west and the remainder intersect and run north and south.

The difficult nature of constructing these arches required an experienced construction team. Ellis-Don Construction Co. of Bellevue, Washington was hired as the general contractor.



A crane hoists into place portions of the 6,800-square-foot gang form composed of APA Rated HDO plywood panels.

The construction team built a formwork model to scale to test the mammoth monolithic pour. Rather than form and pour each arch in a number of separate lifts, the Ellis-Don team decided the quality of the project would benefit significantly if they were able to construct each arch with a continuous pour.

The construction team built a 6,800-square-foot gang form composed of APA trademarked high-density overlay (HDO) plywood panels to form a single arch. Over 4,000 sheets of HDO plywood were used to create sections of gang forms. "The first arch took us four weeks," recalls Eric Holopainen, senior project manager for Ellis-Don. "By the time we finished the second cycle, it took us just 15 days."



Over 4,000 sheets of HDO plywood were used to create sections of the giant gang forms.

By using HDO plywood, Holopainen was able to reuse the panels seven times while pouring the other arches. The scale model proved essential in determining how the panels would be laid out in the gang forms.

Plywood Form

In complex concrete forming projects similar to the History Museum, plywood overlays such as HDO add dimensional stability and provide a smooth, durable surface. Overlaid plywood consists of resin-impregnated fiber sheets bonded to the plywood face with high heat and pressure during panel production.



A series of eleven 55-foot-high reinforced concrete arches blend into the historic Union Station.

HDO plywood panels, like the ones used in constructing the gang forms for the History Museum, have a hard, slick, semi-opaque surface of thermoset, resin-impregnated material that forms a durable, continuous bond with the plywood. Because the overlay is hard and abrasion-resistant, HDO is often specified when the smoothest possible concrete finish is desired.

Virtually any exterior-type APA trademarked panel can be used for concrete formwork because all such panels are manufactured with waterproof adhesives. Exterior grades, especially those specifically intended for concrete forming, will give the best finish-surface appearance. The plywood industry also produces a special product called Plyform which is recommended for most general concrete forming uses. Plyform bears the APA trademark and is exterior-type plywood limited to certain wood species and veneer grades to assure high performance.

Shaping History

Back inside the colossal archways of the Washington State History Museum galleries, resource facilities, a 215-seat auditorium and a museum cafeteria fill the 100,000-square-foot interior. The main exhibit gallery encompasses 20,000 square feet and temporary and topical galleries total an additional 10,000 square feet.

The exhibit halls showcase a century of Pacific Northwest legacy. A region with a rich tradition of engineered wood production and birthplace to the plywood industry.

We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:

APA – THE ENGINEERED WOOD ASSOCIATION HEADQUARTERS

7011 So. 19th St.
Tacoma, Washington 98466
(253) 565-6600 • Fax: (253) 565-7265



www.apawood.org

PRODUCT SUPPORT HELP DESK

(253) 620-7400
E-mail Address: help@apawood.org

Form No. W115A/Revised July 2001/0050

