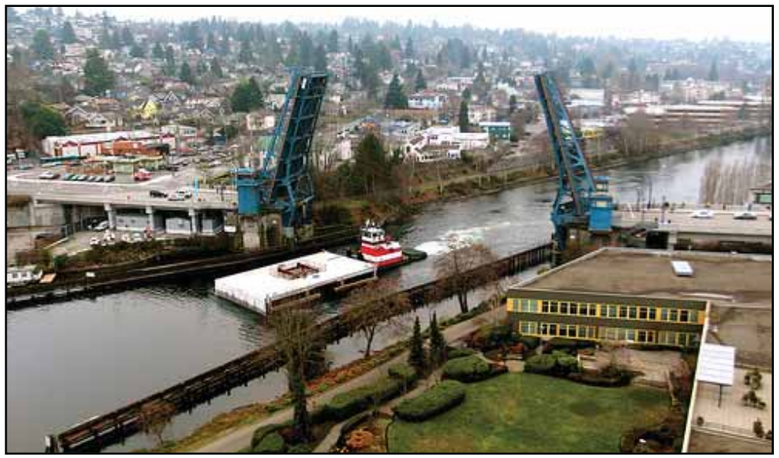
A pontoon's voyage to Lake Washington

After a cycle of concrete-and-steel pontoons are constructed in their water-free casting basin, large gates are opened to flood the basin. The pontoons – usually six or eight in a cycle – are then floated and towed out, either into the Chehalis River or Commencement Bay. Then, inspectors thoroughly examine each pontoon, inside and out – even underwater – to ensure it meets the bridge's 75-year design standard. Next, the pontoons may be temporarily moored at nearby sites before being towed, by tugboat, to Lake Washington. Depending on ocean conditions, the 260-nautical-mile journey from Grays Harbor to Lake Washington takes about three to five days. The shorter trip from Tacoma takes less than a day.



A Tacoma-built supplemental stability pontoon, pushed by a tugboat, proceeds past the opened Fremont Bridge in Seattle en route to Lake Washington.

Wetland and aquatic improvements at Grass Creek

The 2011 construction of a new pontoon casting basin and launch channel in Aberdeen resulted in the loss of about one acre of wetlands and shoreline habitat.

The removal of earthen dikes and restoration of tidal channels is a key component of WSDOT's Grass Creek enhancement project.

To mitigate for this loss, WSDOT made improvements to wetland and aquatic resources at the 68-acre Grass Creek site in Grays Harbor County.

The enhancements are strengthening the site's ecosystem by establishing wetlands, creating mudflats, removing invasive species, and reconnecting tidal channels. The habitat rehabilitation, which began in summer 2011, is now complete, and WSDOT is monitoring and maintaining the site until 2022.

For more information:

SR 520 Bridge Replacement and HOV Program

999 3rd Avenue, Suite 2200
Seattle, WA 98104
Phone: 206-770-3500

Website: www.wsdot.wa.gov/projects/SR520Bridge

E-mail: SR520bridge@wsdot.wa.gov

Americans with Disabilities Act (ADA) Information:

This material can be made available in an alternate format by emailing the WSDOT Diversity/ADA Affairs team at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

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It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OEO's Title VI Coordinator Jonte' Robinson at (360) 705-7082.

Washington State Department of Transportation

Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

STATE ROUTE 520

October 2014

Pontoon construction nearing completion at two sites

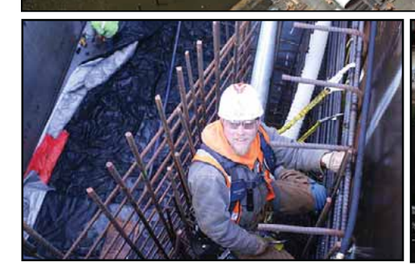
Building a safer SR 520 floating bridge

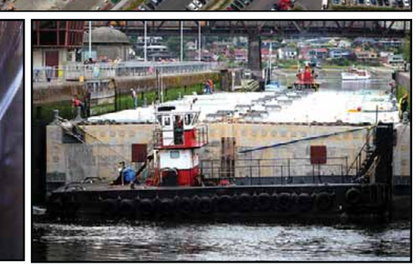
The existing SR 520 floating bridge on Lake Washington is vulnerable to windstorms. Studies show the bridge could break apart in a severe windstorm. Moreover, without carpool and transit lanes, the cross-lake bridge creates weekday delays for commuters.

Now more than 50 years old, the bridge needs to be replaced. As part of the SR 520 Bridge Replacement and HOV Program, WSDOT is building new pontoons to support a stronger floating bridge – one that can move more people and withstand sustained winds of up to 89 mph.

Seventy-seven massive, concrete pontoons will keep the new, wider bridge afloat. Thirty-three of these are being built at a new Grays Harbor casting facility in Aberdeen. Crews are constructing the other 44 at an existing facility at the Port of Tacoma.

Pontoon construction sites





An aerial view (top) of pontoons under construction at the Grays Harbor casting facility; a 75-foot-wide pontoon (lower-right) squeezes through the Chittenden Locks in Seattle; an ironworker (lower-left), perched three stories above the concrete floor of a pontoon, fastens rebar for the pontoon's wall.

Pontoon construction two-thirds complete

The new, 1.4-mile-long floating bridge's first cycle of completed pontoons floated out of the Aberdeen casting basin in mid-2012. Since then, nearly all of the concrete pontoons needed to support the new floating bridge have been built at the Grays Harbor and Tacoma casting basins.

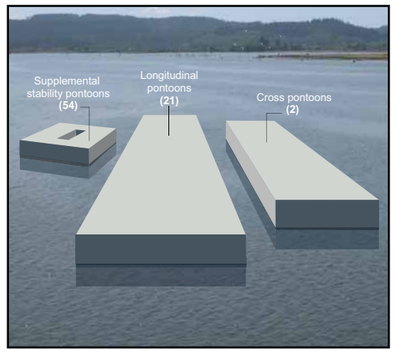
As of October 2014, 66 of the newly built pontoons have been built and towed to Lake Washington, with more scheduled to arrive over the coming months. All 77 bridge pontoons are slated to be constructed by early 2015. Crews now are joining the pontoons on Lake Washington and anchoring them to the lake's bottom to form the new floating bridge's foundation.

What are bridge pontoons?

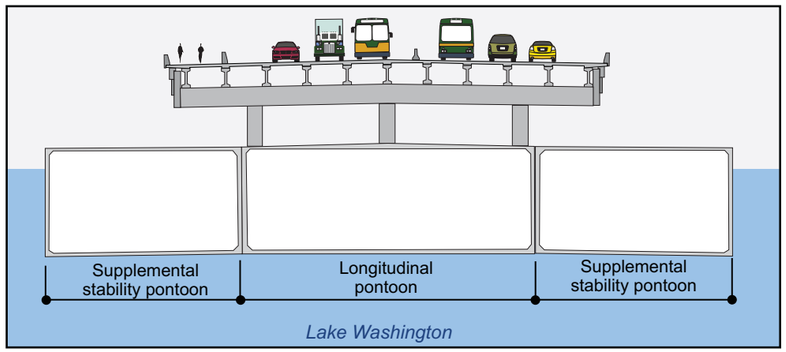
Bridge pontoons are the foundation of a floating bridge. These massive, hollow, concrete boxes are designed to support the weight of the road and the cars, trucks, buses, bicyclists and pedestrians that will use the bridge every day.

The largest, longitudinal pontoons for the SR 520 bridge are 360 feet long – as long as a football field. Each one weighs a little more than 11,000 tons – roughly equal to 23 Boeing 747 jets. Constructing all of the massive pontoons in Aberdeen requires 112,000 cubic yards of concrete, 35,000 tons of steel rebar, and 2.7 million square feet of plywood formwork. The bridge's 54 supplemental stability pontoons, roughly one-third the size of the larger pontoons, give the bridge added stability and flotation.

Pontoons are similar to a tanker ship or barge; though very heavy, they float because they are lighter than the weight of water they displace.



Three types of pontoons will support the new SR 520 floating bridge.



Conceptual graphic of the new SR 520 floating bridge with two general-purpose lanes and one transit/HOV lane in each direction, a new bicycle/pedestrian path, and shoulders for disabled vehicles.

Pontoon construction creates hundreds of jobs

Building the new bridge's pontoons supports hundreds of jobs in Aberdeen and Tacoma. Many of these workers are residents of Grays Harbor and Pierce counties.

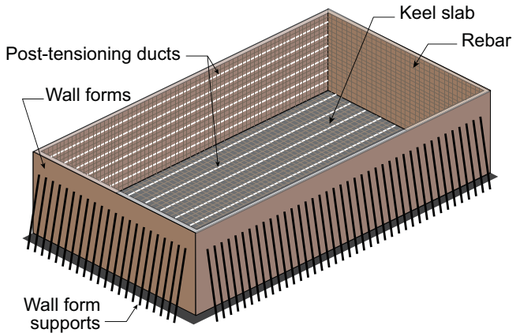
WSDOT's contractors are responsible for all project hiring, including working closely with unions to secure the skilled workers required, in a variety of trades, to construct pontoons.

Working together, riggers secure an 11,000-ton pontoon as it floats off the casting basin floor.

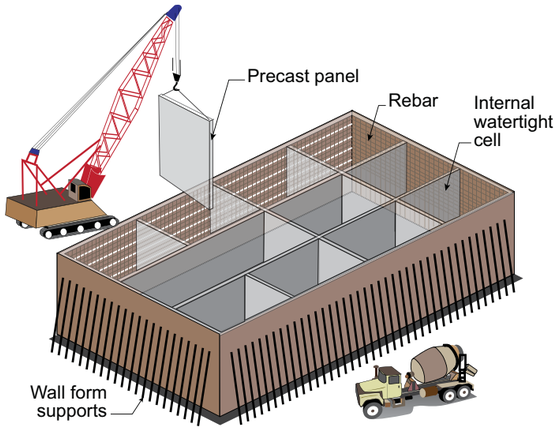
Workers install rebar for the inner walls of a supplemental stability pontoon built in Tacoma.

Concrete workers pour the top slab of a pontoon at the Grays Harbor casting basin.

How to build a pontoon

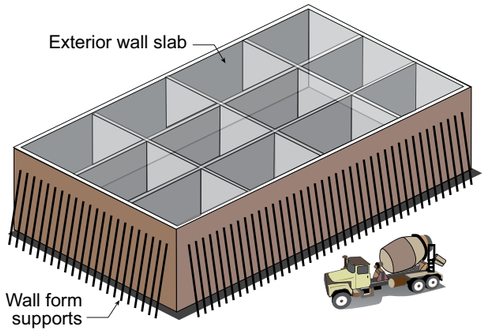


1 Set wall forms, rebar, and install post-tensioning ducts

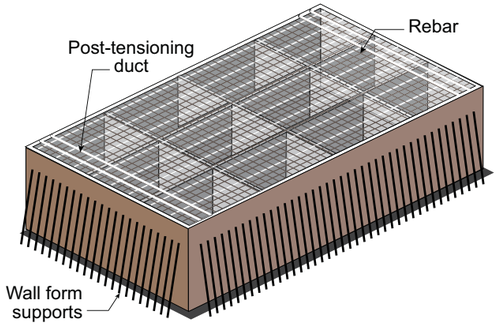


2 Install interior precast panels and pour concrete in keel slab

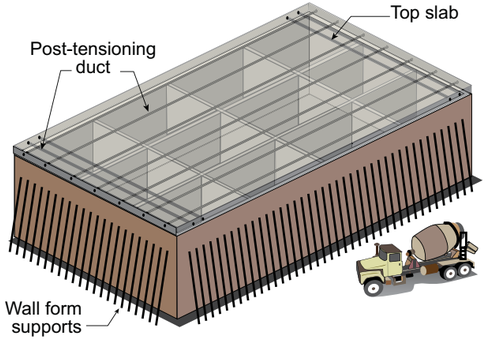
- Longitudinal pontoons: 90 precast panels
- Cross pontoons: 57 precast panels
- Supplemental stability pontoons: 9 precast panels



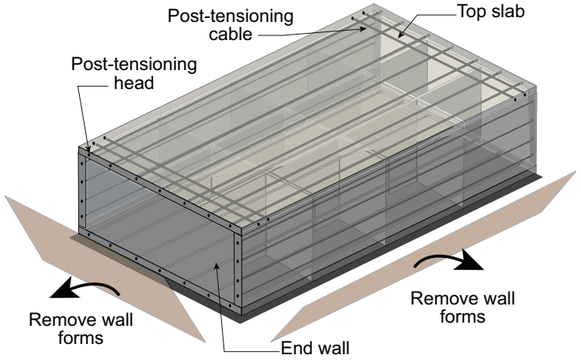
3 Pour concrete for exterior walls and joints between interior precast panels



4 Install top slab rebar and post-tensioning ducts



5 Pour top slab concrete



6 Remove wall forms and perform post-tensioning to add strength