

I-95 New Haven Harbor Crossing Corridor Improvement Program



EXTRADOSED BRIDGE

The new Pearl Harbor Memorial Bridge will be the one of the first extradosed cable stayed bridge constructed in the United States. The extradosed system is a hybrid design that is a combination of a concrete cable stressed girder bridge (*The Baldwin Bridge, I-95 over the Connecticut River*), and a cable stayed bridge (*Leonard P. Zakim Bunker Hill Bridge in Boston, MA*). Extradosed bridges have been successfully designed and constructed for several years in both Europe and Japan. The extradosed main spans of the new Pearl Harbor Memorial Bridge were designed in both steel and concrete, allowing bidders to choose the least cost alternative.



The New Pearl Harbor Memorial Bridge in New Haven, CT

Some characteristics of extradosed cable stayed bridges are:

- An extradosed bridge lends itself to longer spans than a conventional girder bridge. This was a benefit for the design of the Pearl Harbor Memorial Bridge in that the new bridge will have a longer main span than the existing bridge. This allowed the new bridge foundations to be built without interfering with the existing bridge foundations, which have to remain in service to carry traffic during construction of the new bridge. Also, the longer main span will benefit boat and barge navigation below the bridge by providing a wider navigation channel, as well as lessen impacts to the environment.
- The tower height of 75 feet above the bridge deck is much less than that of a cable stayed bridge. The extradosed bridge type is similar to a cable stayed bridge in its use of towers and external cables to support the bridge deck superstructure but differs in its reliance on shorter towers and shallow cable angles than a conventional cable stayed bridge. This extradosed bridge, with a tower height 75 feet above the roadway, maximizes the available straight span length within the highly curved New Haven I-95 highway alignment. The available straight span length would be uneconomically short for a conventional cable-stayed bridge.
- The stay cables need no tension adjustment as would be required for a conventional cable stayed bridge. This will result in reduced future maintenance costs for the extradosed bridge.
- The girder depth of an extradosed bridge is less than that of a standard girder bridge. This allows for a longer span length while not impacting the profile of the bridge deck roadway.
- The extradosed main span of the new Pearl Harbor Memorial Bridge consist of a center span at 515 feet and the two side spans each at 249 feet long. The overall length of the bridge will be approximately 1, 013 feet long.
- The lighting for the new Pearl Harbor Memorial Bridge consists of white-light metal halide roadway lighting carried across the extradosed main spans of the bridge, security lighting under the bridge piers, and aesthetic lighting of the main towers, the pylon piers, the cables, and the spans, as well as spotlight-type memorial lighting of the central towers of the two tower piers.