

# Engineering Achievement of the Year

20  07

## REPLACEMENT OF THE OUTER LOOP OF THE WOODROW WILSON BRIDGE.

The Woodrow Wilson Memorial Bridge which carries traffic on both the Capital Beltway around Washington, D.C. and I-95, the main north-south route on the east coast, has long been a major bottleneck along this heavily traveled corridor. Originally built in the early 1960's, it was the only Potomac River crossing in the southern half of the Washington metropolitan area and was carrying almost three times the traffic that it was originally designed to accommodate. The new bridge had to be aesthetically compatible with its historical surroundings while carrying heavy volumes of traffic and had to be built upon the poor river bottom soils. In addition, the surrounding communities did not want a high level structure, but the bridge had to be high enough to increase the river traffic that could pass beneath it without raising the drawbridge too frequently. To preserve the historic characteristics of the monumental arch bridges in the Nation's Capital City, a series of independent pre-cast post-tensioned segmental V-shaped arched piers were constructed with haunched continuous steel girder spans to provide an arch-like appearance. This system produces vertical loads in the pier foundations without the horizontal thrust, which is characteristic of conventional arch bridges. This design feature was important in providing an economical foundation design, particularly in consideration of the poor river bottom soils. Furthermore, the v-pier system allows longer spans than the traditional arch system and thus provides greater openness underneath the bridge. A bascule span was implemented for the drawbridge section, which would meet the community's requirements. A 270-foot long four leaf steel bascule bridge, supported on cast-in-place post-tensioned v-shaped piers, spans the 175-foot wide navigational channel. The bascule span is fully compatible with and integrated into the overall arch spans resulting in a seamless overall appearance of the bridge.

