WASHINGTON, D.C. - I-95 WILSON BRIDGE

Traffic Control Planning - Woodrow Wilson Bridge Redecking

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The Woodrow Wilson Memorial Bridge is a 5900 foot, six lane structure which carriers I-95 (Capitol Beltway) over the Potomac River south of Washington, D.C. it is the major river crossing on I-95 between Baltimore, Maryland to the north and Richmond, Virginia to the south. The structure was constructed in 1962 for the Pideral Highway Administration, and is operated and maintained jointly by the State of Maryland, the District of Columbia,.and the Commonwealth of Virginia. The low level bridge is of steel girder design and also has a 212 foot long bascule span,

Traffic volumes average over 110,000 vehicles per day across this structure. In addition to its importance for carrying Interstate thru traffic, it also handles a significant volume of Washington, D.C. metro area commuter traffic. Before reconstruction, the cross section consisted of two 38 foot wide directional roadways separated by a double faced safety shaped concrete median barrier on a raised four foot median, and three foot wide outside sidewalks with concrete parapets.

Because of the high traffic volumes and no usable shoulders, breakdowns and accidents have been creating major traffic delays on this structure for years. By 1977, these problems were compounded by serious deteriation of the concrete deck, and deck replacement had become a high priority need. Maryland initiated a study in 1978 to evaluate deck replacement methods and in 1979 a consultant was engaged to prepare design plans and contract documents. The construction methodology selected for the redecking was quite sophisticated and the redecking operation was a real engineering achievement. This presentation does not attempt to discuss the structural design or construction aspects of the project, but concentrates on the traffic control planning activities and measures implemented to maximize safety to the traveling public.

Due to the complexity of the project and because the traffic concerns were truly regional in nature, the Regional Federal Highway Administrator directed that the FHWA Regional Office be directly involved in the traffic control planning of the project. Under the leadership of the Regional Traffic Operational Engineer, a multi-agency group was formed with representatives from the three States and the Division and Regional FHWA offices, to monitor and coordinate the traffic control planning.

This group met with other technical experts in a series of meetings to review the consultant's proposed TCP in detail and to identify other things that needed to be done. Also, a meeting was scheduled with representatives from all of the police agencies (State, City, and County) who had law enforcement jurisdiction in the area; in addition AAA and public relations personnel were invited to participate and provide input and assistance in the traffic control strategy planning. Also local government representatives were invited to participate.

Some of the more significant measures agreed upon and implemented to minimize traffic disruption and provide for safe traffic flow as well as some of the thinking that went into these decisions are discussed as follows:

1. Because of the high traffic volumes and lack of alternate routes, the need to have all six lanes of traffic open dusing peak traffic periodds was a "given. " Since the selected construction method required closure of one roadway (3 lanes) to remove old deck sections and replace with precast panels, a detailed analysis of traffic was conducted to determine when the lanes could be closed, yet still allow adequate %ime for the contractor to complete a reasonable unit of work. As a result it was decided that deck replacement would be accompisbed at night. The contractor was allowed to initiate a three lane closure at 8:00 p.m.; all six lanes were required to be returned to open status by 6:00 a.m. the next morning. During daytime off-peak hours, one and two lane closures were permitted. Based on analysis of traffic data, holidays and certain weekend hours were specified when lane closures would not be permitted, A major consideration was the queue lenghts which would be developed as a result of the reduced capacity,

2. The three lane closure provided for two-way traffic on one of the bridge roadways with the center lane used as a buffer, utilizing a double row of plastic drums to block-off the middle lane. A 500 foot long section of the permanent concrete median barrier bad to be removed at each end of the bridge to provide crossovers. Initially it was proposed to utilize a single line of drums to block off the crossovers when all lanes were open. It was recognized that this presented a potentially significant . safety hazard, so after lengthy discussions it was decided to require the contractor to move a line of portable precast safety shaped median barriers into the opening each morning and swing them out each night to form the crossovers. To verify that his was acceptable

from both operational and cost viewpoints , a construction contractor who was providing review services to the design consultant evaluated this proposal and provided an estimate of cost and time for accomplishing this operation. As it turned out, this proved to be quite workable and much less costly than was feared; The contractor's bid price was $80 per move and was normally accomplished in about 20 minutes.

3. The TCP specified specific signs and other traffic control devices to be used as well as very detailed step by step instructions to the contractor for implementing and removing the lane closures. No deviation was permitted without approval of a formal request by the contractor, and actually only a few changes were requested.

4. The TCP specified that the contractor would be required to conduct several "dry runs" to rehearse the overall traffic control implementation procedure. This proved to be quite useful. Initially, it took several hours to set up/knock down the three lane closure. However, after a familiarization period, a 35 man crew was able to complete the operation in one hour or less.

5. Truck-mounted impact attenuators (Energite-Hex-Foam) were specified in the contract to shield the work area and also the exposed end of the portable "Jersey" barrier. These also proved very useful to shield the end of the moving "caravan" of vehicles used for setting up the traffic control devices each night. During the course of the contract a number of these units were impacted and reportedly worked successfully. Also, several GREAT attenuators were specified for-shielding median barrier end sections.

6. The contractor was also required to place the new deck panels in a direction opposite to the flow of traffic. Thus, when all lanes were open, vehicles were moving from the narrower existing bridge deck to the new, wider deck panels.

7. Electronic variable message signs were specified in the contract and were placed in advance of decision points in Maryland, Virginia, and DC, to provide traffic flow condition information to the motorists. Also static signs some with fold-up panels, as far as 28 miles from the site were utilized to alert motorists of possible delays with suggested alternate routes.

8. Arrangements were made for a State Trooper from both Virginia and Maryland to be on duty each night at the project site to assist in traffic control and to be available in case of accidents or other incidents. Also, the police assisted in leading initial vehicles through the lane closures. The cost for this service was reimbursed out of project funds. Also the contractor was required to keep a tow truck at the site to quickly remove disabled vehicles.

9. The State worked through the American Automobile Association to keep motorists informed. The AAA maintained a special hotline for commuters to call for up-to-date information. Also, frequent reports were provided over all major radio stations in the area and to the AP wire service. Information was also provided through trucking associations and posted at rest areas on I-95.

10. There was coordination with the Coast Guard to minimize the necessary opening of the bascule span during construction periods. A requirement for a four hour advance request for opening was instituted.

110 There was coordination with several major nighttime traffic generators in the area (Capitol Center and Rosecraft Race Track). The management a% these facilities provided announcements regarding the project at their events and suggested some alternative travel routes to their patrons.

Incentive/Disincentive Clause

Major goals of the projects were to minimize traffic disruption and to minimize potential safety hazards. It was agreed that a significant way to accomplish these goals was to reduce the total time the construction of the deck was underway and affecting traffic flow. During the design phase, a nationally known contracting firm was engaged as a

subconsultant to the designer to assist in calculating contract time. An estimated construction time was computed, taking into account daily time restrictions, winter construction, traffic volumes and construction details. After review and analysis, a contract time of 575 calendar days (to complete all work that influences traffic) was established as the best time that could be expected from a reasonable contractor.

To provide inducement to complete the deck replacement within that timeframe, an incentive/disincentive clause was included. The amount of the payment was established at $9,200/day with a maximum of 120 calendar days before or after the 575 day contract time limit.

The $9,200 represented $2,550/day of fixed contract inspection charges and the $6,650 represented traffic impact costs to the motoring public. Our office assisted in computing these costs, which were based on added travel costs for estimated traffic diverted to longer travel routes, and delay costs for traffic traveling through the restricted workzone each evening.

As it turned out, the contractor was able to complete the work well ahead of the original 120 days specified to earn the maximum incentive payment. In addition, he approached the State early in 1983 with a proposal to further reduce construction time if costs he incurred by working additional overtime would be reimbursed. The amount was $2,945/day. With FHWA concurrence, the State accepted this proposal and a new target date of September 7, 1983 was established. All deck work was completed by September, 1983, within a total of 360 calendar days earning the contractor a total incentive payment of $1,413,325.

Accident Data

No comprehensive safety evaluation of the traffic control measures has been made, but the State has furnished me a tabulation of reported accidents during the construction period and for the same period the previous year. While there was a 20 percent increase in total accidents during the work period, there was a 13 percent decrease in injury accidents. There were no fatal accidents in either period. The number of rear-ended, sideswiped, other collision, night time and wet surface accidents all were slightly higher.

Obviously, conclusions that can be drawn from this data are limited since accidents during periods when the TCP was in effect cannot be isolated and accidents on the approaches are not included. However, it does tend to indicate that there was no major increase in accident numbers or severity.

Summary

This project has demonstrated that high volumes of traffic can be safety maintained while bridge deck replacements take place. This doesn't just happen, however. Careful, comprehensive planning efforts are required, details need to be clearly specified in the TCP, and special efforts to keep the public informed are important. Also, it doesn't hurt to have an experienced and cooperative contractor which we were fortunate to have.