

***Virginia Department of Transportation
Hampton Roads Bridge-Tunnel Action Plan
Implementing the Independent Review Panel Recommendations***

Initial Panel Charge August 2009

To review existing policies and procedures used for tunnel(s) operations, technology, and management and make recommendations to the Commissioner to ensure current best practices are being used and to identify critical improvements where appropriate.

Potential areas of review should include as a minimum:

1. Existing maintenance and operations policies and procedures
 - a. Frequency of visual inspections
 - b. Frequency of systems monitoring and testing
 - c. Protocols for control room operators in response notices and alarms
2. Existing protocols for communicating system issues
 - a. Notification of maintenance personnel
 - b. Notification of support personnel
 - c. Notification of management personnel
3. Existing protocols for traffic management
 - a. Identification/communication of diversion routes
 - b. Coordination with localities (for traffic diverted to local roadways)
 - c. Public outreach (VMS, 511, media, etc.)
4. Potential technology for improving tunnel management and operations
 - a. Practicality/appropriateness of sensor detection systems in lower duct/non-roadway areas
 - b. Systems to detect pump failures or malfunctions
 - c. System/operator interface issues (what is displayed, to whom, where it is received, how alarms are presented, etc.)
 - d. Technology for improved communication with public
5. Other issues which may be identified by the panel, such as
 - a. Organization and staffing
 - b. Training needs
 - c. Performance measurement and monitoring
 - d. Documentation requirements for procedures, policies, concept of operations, etc.

Implementable recommendations should relate to the areas reviewed and focus on their applicability to HRBT and other tunnels operated by VDOT.

Panel Recommendation 1

Conduct a risk assessment to identify the critical events that would result in closure of the facility or risk to the safety of the facility users.

- Water detection system installation in the lower ducts for the Interstate 64 Hampton Roads Bridge-Tunnel was completed in October 2009. VDOT will determine select locations for closed circuit television cameras to assist in monitoring critical internal systems.
- To further improve VDOT's system monitoring capabilities, flow sensors have been installed in the I-64 Hampton Roads Bridge-Tunnel potable water and fire suppression systems. VDOT is currently developing a contract to have these sensors installed in all area facilities.
- Over the course of 2010, tunnel facilities maintenance personnel will implement an Automated Maintenance Management System (AMMS). Once this system is in place, it will provide improved automated tracking of the maintenance and replacement needs of these critical systems and provide a prioritized scheduled maintenance replacement program for the noted systems. We will also include asset replacement as part of this risk assessment.
- A risk analysis has been completed to identify system failure impacts and critical events that would result in the closure of a tunnel or movable bridge facility. This risk analysis has resulted in the identification of systems, if rendered partially or wholly inoperable, which would close a facility to traffic or have a significant adverse impact on tunnel/bridge operations and VDOT's ability to deliver expected services. These critical systems are:
 1. The power distribution system
 2. The fire suppression system
 3. The drainage system
 4. The over height vehicle detection
 5. The ventilation system
 6. The hydraulic and mechanical systems

Panel Recommendation 2

Evaluate the staffing patterns and expertise required for each functional unit.

- VDOT is completing an evaluation of the staffing and organizational structure of maintenance and operations personnel as part of the VDOT restructuring to be completed by July, 1 2010. This staffing and organizational structure evaluation considered factors such as: defined position requirements and expectations, ratio of management to lower level staff, span of control, and paths for advancement. The proposed plan realigns staffing to shift staff capability to critical needs within the tunnel facilities. It resulted in a 50% increase to the number of maintenance positions and fully staffs key operations positions.
- VDOT is developing a plan to consolidate the traffic management functions at Hampton Roads tunnel facilities with the Transportation Operations Center (TOC) to leverage staff resources and provide improved coordination of traffic management during major events. The plan development will be completed by July 2010.
- The VDOT Learning Center is working with tunnel management and staff to develop and implement a formal training program including initial formal training, periodic skills assessments, and ongoing exercises and drills for operations and maintenance staff. This program will give employees a better understanding of overall systems and in-depth information to develop appropriate technical and behavioral competencies.
- VDOT will evaluate ways to strengthen our 24/7 maintenance response through training and procedural changes and to appropriately increase staffing to improve response to events. A new tasking now requires shift supervisors to inspect critical systems twice during their shift..

Panel Recommendation 3

Enhance facility management plans and procedures for tunnel facilities.

- In September 2009, VDOT completed installation of a computerized logging system to include field personnel activities, maintenance activities, and other system-related events for each of the Hampton Roads tunnel control rooms. Enhancements and further systems integration into this system will be ongoing.
- VDOT is developing enhanced management plans for the tunnel facilities. An Asset Management Working Group has been established to guide the overall tunnel asset maintenance management program. This working group includes a cross-section of management, engineers, maintenance and operations personnel which will provide a quality control function by conducting programmatic reviews of completed maintenance/work orders, equipment repair efforts, and systems replacement planning cycles for the critical subsystems identified in the risk analysis.
- VDOT is enhancing existing maintenance plans through the implementation of an Automated Maintenance Management System (AMMS). Once this tool has been fully developed to capture input from all data systems, it will ensure that preventative maintenance and inspection requirements for each tunnel subsystem are clearly defined, documented, scheduled and managed. The full implementation of the Automated Maintenance Management System tool will be completed by the end of 2010.
- VDOT is developing the process and identifying resources to conduct annual independent inspections of specific tunnel facility sections or systems as another quality control/quality assurance measure. The independent inspection process recommendations will be completed by July 2010.

Panel Recommendation 4

Enhance traveler information dissemination during incidents and other major events as a means of reducing overall traveler delay.

- The Hampton Roads Traffic Operations Center (TOC) will continue to work with the I-95 Corridor Coalition for notifications to other states (North Carolina and Maryland) during Level III incidents.
- VDOT Public Affairs will develop and implement an enhanced public education and outreach effort for the VDOT 511 Virginia system.
- The tunnel facilities staff will work with VDOT Public Affairs, other tunnel facilities and professional organizations to identify best practices regarding public information for tunnel incidents. Public Affairs will develop an education and outreach effort for public education by July 2010.

Panel Recommendation 5

Enhance the emergency plan coordination with local and first responders.

- Incident diversion plans have been developed by the Virginia Department of Emergency Management, with VDOT's support, and adopted by each locality in Hampton Roads as part of the Commonwealth's commitment to preparing for emergencies. During incidents, proposed detours onto local roads are coordinated with the impacted locality and traffic signal timings are adjusted to move the diverting traffic. Signal timing plans for incident response across jurisdictional boundaries have been completed and are coordinated between jurisdictions.
- VDOT will schedule quarterly meetings with surrounding entities including localities, fire, rescue, police and tunnel personnel responsible for responding to incidents and events that occur within the tunnels. The goal of these meetings is to ensure ongoing effective communication, coordination, planning and response to tunnel and movable bridge incidents. VDOT will also schedule periodic exercises and drills to test these collaborative response plans. The first meeting will be scheduled for April 2010.

Panel Recommendation 6

Implement periodic reviews of security-related plans and policies.

- VDOT will continue to work with the Multi-Jurisdictional Anti-Terrorist Task Force, which includes the federal law enforcement agencies, Virginia State Police, Department of Homeland Security and local law enforcement agencies, to ensure our security plans are adequate for the facilities.
- VDOT will work with the Department of Homeland Security to implement any and all changes as a result of inspection recommendations to our security systems and plans.
- VDOT will ensure that all employees are fully aware of all security policies and procedures. This will include regular training on the security plans and procedures. This ongoing training will incorporate security exercises to test the safety and security of the facilities on a routine basis.