Section 41 - Bridge Security

The terrorist events of September 11, 2001 have led to an acute awareness that the nation's infrastructure is very much vulnerable to aggression. Among the infrastructure elements that are vulnerable to attack are bridge structures and tunnels. Designers of bridge structures and tunnels must be cognizant of methods that provide security to the design of bridge structures and tunnels.

Subsection 2.7 of the *AASHTO LRFD Bridge Design Specifications* has been added to establish guidance on assessing the importance of a bridge toward determining if a formal vulnerability assessment is warranted. The following criteria may be used to perform this assessment.

41.1 Vulnerability Assessment

1. Assess the location of the bridge structure or tunnel. Would the loss of the bridge create loss of access to major cities, recreation facilities or lead to major replacement cost? Would the loss create a long detour route? Would the loss cause severe economic impact to the Community, State or Region?
2. Assess the traffic usage of the bridge structure or tunnel. If the bridge were attacked, would there be a major loss of life? Is there a significant traffic count that, if attacked during peak rush hours, a large number of deaths and injuries would result?
3. Assess the prominence or historical significance of the bridge structure or tunnel. Is the bridge structure or tunnel of historical significance to the State or local community?
4. Assess the impact to the environmental if the bridge structure or tunnel location is targeted. Are there targets that are adjacent to or near the bridge or tunnel that could cause severe environmental threats if attacked?
5. Assess the presence of public service facilities. Would the loss of a bridge structure or tunnel result in the disruption of service by emergency vehicles (ambulances, fire equipment), the disruption of services by State or Federal agencies and by military personnel?

The above aspects may include others. Designers must use judgment and advice of NJDOT staff and the knowledge of others to assess the vulnerability of bridge structures or tunnels. This assessment should be documented and included in the project's Preliminary Design Submission. The Vulnerability Assessment should be a part of rehabilitation, reconstruction, replacement or new bridge projects.

41.2 Vulnerability Countermeasures

After assessing the vulnerability of a bridge structure or tunnel, certain countermeasures should be established within the project documents to provide security measures.

Following are suggested countermeasure methods that can be called for in the Plans or Special Provisions:

1. Restrict parking under a bridge structure. This can be done by the use of concrete barriers. Barriers should be placed to also restrict parking adjacent to a bridge structure.

2. Detail the installation of surveillance cameras that can be tied to NJDOT Headquarters or Operations control.
3. Restrict the placement of vegetation that would obstruct surveillance measures.
4. Restrict access to ventilation machinery in tunnels. Detail installation of emergency shut-off mechanisms.
5. Restrict access to key details that, if damaged, would result in the loss of the structure.
6. Detail the restriction of access to movable bridge machinery and operator's housing.
7. Detail the installation of lighting throughout a bridge structure to ensure surveillance. This should include lighting under a bridge that is located over a waterway.
8. Detail, in general, all bridge components so that no component is concealed from view.
9. Prohibit the use of non-redundant members.
10. Protect all main load carrying members from direct impact from automobile, marine or rail traffic.
11. Locate utilities in such a way as to minimize their potential use against the structure. Appropriate shut offs shall be provided adjacent to the structure.

Subsection 3.14.16 of the *AASHTO LRFD Bridge Design Specifications* has been added to provide guidance on assessing the intentional use of a water vessel to damage a bridge structure. Also, Subsection 3.15 has been added to assess blast force effects to a bridge structure. These Specifications should be studied in providing an overall bridge security assessment.

It should be realized that the above countermeasures may not be all inclusive. Designers are encouraged to research and recommend other methods. The security of a bridge structure or tunnel is a paramount concern to the Department. Security measures will protect New Jersey's motorists and provide the security that must be part of being a citizen of the United States.