



## ***Tech Logical***

***Innovation and infrastructure must learn to coexist***

**By Donald P. Fusilli Jr., P.E., J.D.**

More than 77,000 bridges in the U.S. are rated structurally deficient by Federal Highway Administration (FHWA) standards. Unfortunately, bridge owners have not objectively separated the truly dangerous bridges—like the collapsed I-35W in Minnesota—from those with less severe issues to improve overall structural management, ensure lowest life-cycle costs and enhance public safety.

Visual inspection following National Bridge Inspection Standards (NBIS) remains the FHWA's method of evaluating the condition of our aging bridges—an approach first put into place under President Richard Nixon. To its credit, the FHWA sponsored a study in 2001 that found the NBIS visual condition assessment process highly variable, subjective and nonrepeatable. The FHWA is now proposing a long-term program to upgrade bridge condition assessment methods, but it will not deliver meaningful results for at least five years or even longer. Bridge owners cannot afford to wait that long.



Two separate industry reports issued over the past two years cite the American Association of State Highway & Transportation Officials (AASHTO) endorsing preservation as the highest priority for U.S. transportation needs and structural monitoring as a means to support safely extending bridge life span. Yet state transportation departments across the U.S. have not enthusiastically adopted advanced, second-generation condition assessment technologies—including structural health monitoring—because of perceived budget constraints, lack of understanding and resistance to changing their condition assessment methods.

Is there no middle ground here? The need obviously exists for better techniques to inspect and maintain the vital infrastructure across the nation—particularly such high-profile and high-impact structures as bridges, but many states seem reluctant to adopt new ways of approaching the problem.

Innovation and infrastructure must coexist with greater effectiveness if we as a nation are to maintain our ability to support trade, commerce, tourism and our American way of life.

### ***An 'A' in spending***

Overall transportation funding will not be sufficient for decades, so owners have to think and manage differently. The ability to allocate appropriate funding for structurally deficient bridges may permit the investment of sufficient remaining funds into needed capacity expansion to

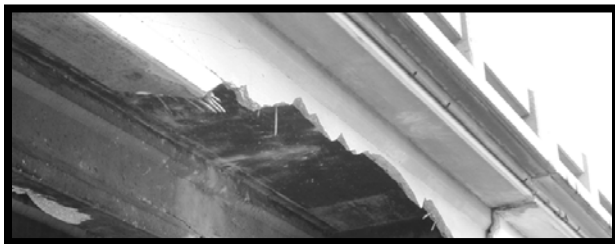
reduce congestion, fuel use and urban air pollution, while simultaneously addressing the approximately 70,000 bridges that are functionally obsolete, and providing increased public safety for citizens crossing structurally deficient bridges. But this rosy scenario will not happen without better information.



A “spend smart, not fast” approach using advanced, second-generation condition assessment technologies should be considered as the basis for future federal transportation funding allocations to address our structurally deficient bridge problem. This type of innovative approach can be found across the country among breakthrough-thinking entrepreneurs working to solve tough problems in new ways.

At InspectTech, a Pittsburgh-based engineering software company, a program called BridgeInspect has helped a number of major municipalities—including the cities of Philadelphia and Baltimore and counties across the state of Maryland—access deeper levels of salient information from bridge inspections. These higher-range analyses, when placed in the hands of a more targeted group of decision makers, have led to better results in planning and executing bridge repairs and rehabilitation projects. InspectTech provides mobile inspection and asset management solutions, enabling customers to more effectively collect, manage and analyze inspection reports. Its software lowers the total cost of inspections, enhances reliability, greatly improves the richness of data collected (pictures, video, audio, GPS coordinates) and improves productivity of both inspectors and management.

In the same context, Atlanta-based LifeSpan Technologies offers 21st-century asset assessment technology as a means to safely extend the life of structural assets like bridges, perhaps for decades. The key to supporting these difficult decisions is more accurate condition assessments using tools that include highly precise sensing devices, wireless communication and the Internet, tools that allow owners to access near-real-time information on structural condition. This information lowers operational risks and may even allow prudent upgrades of asset condition, in addition to safely extending life.



In one notable instance, LifeSpan helped show a major northeastern U.S. toll road how to safely delay a costly project to replace steel deck truss members on a bridge following recommendation by a third-party visual inspection. Using its innovative dual-channel sensors to capture data, coupled with a calibrated finite-element analysis, LifeSpan worked with the owner to

ascertain the in-service performance of the bridge. Based on this objective performance data, the owner learned the bridge was indeed structurally sound and safe for travel and that the nearly \$1 million cost to refurbish the span was not necessary. The owner also learned of another problem not delineated in the visual inspection report. The experience clearly showed the benefits of diagnosing the real problem before starting repairs or retrofits based solely on visual inspections.

As more state transportation departments appreciate the value derived from innovative ways of gathering, processing, analyzing and acting on more objective information regarding the condition of bridges and other key structures, the typical fallback objections of lack of funding, lack of interest and lack of action cannot help but fall away.