SAFEGUARDING AMERICA'S BRIDGES

Structural Health Monitoring and Weigh In Motion to enhance bridge safety and extend service lifetimes

KISTLER

measure. analyze. innovate.

www.kistler.com

Addressing the problem of aging and degraded bridges

In the U.S., over 250,000 bridges are more than 50 years old, with 150,000 deemed deficient or obsolete. Aging isn't the only issue – bridges face rising traffic, vehicle overloading, extreme weather, and poor maintenance. The result? Closures or strict weight limits, causing major traffic disruptions.

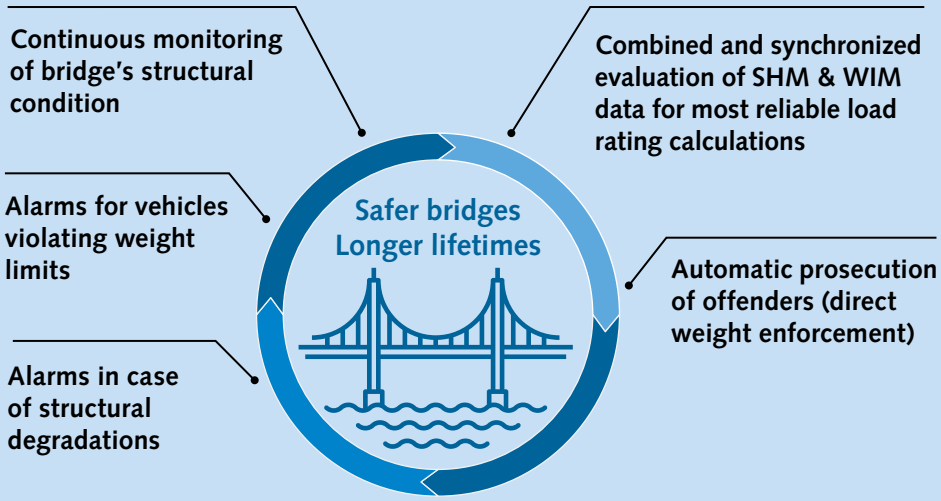
How can operators reduce risks, ensure safety, and extend service life? Kistler's SHM & WIM solutions offer the answer, helping prevent failures and prolong bridge lifetimes.

U.S. Department of Transportation
Federal Highway Administration

To effectively manage the risk of a bridge failure due to structural degradation or overload, a bridge owner must:

- Have a load rating for all bridges in their inventory that considers the current condition of the bridge and all legal load combinations;
- Regularly inspecting the bridge for deterioration and damage. Updating the load rating as soon as the condition changes (structure or loading)
- Post weight restrictions at any bridge that cannot safely carry legal loads; and
- Work with law enforcement to ensure weight restrictions are enforced.

Kistler's **SHM & WIM** solutions help bridge owners to fulfil USDOT FHWA requirements



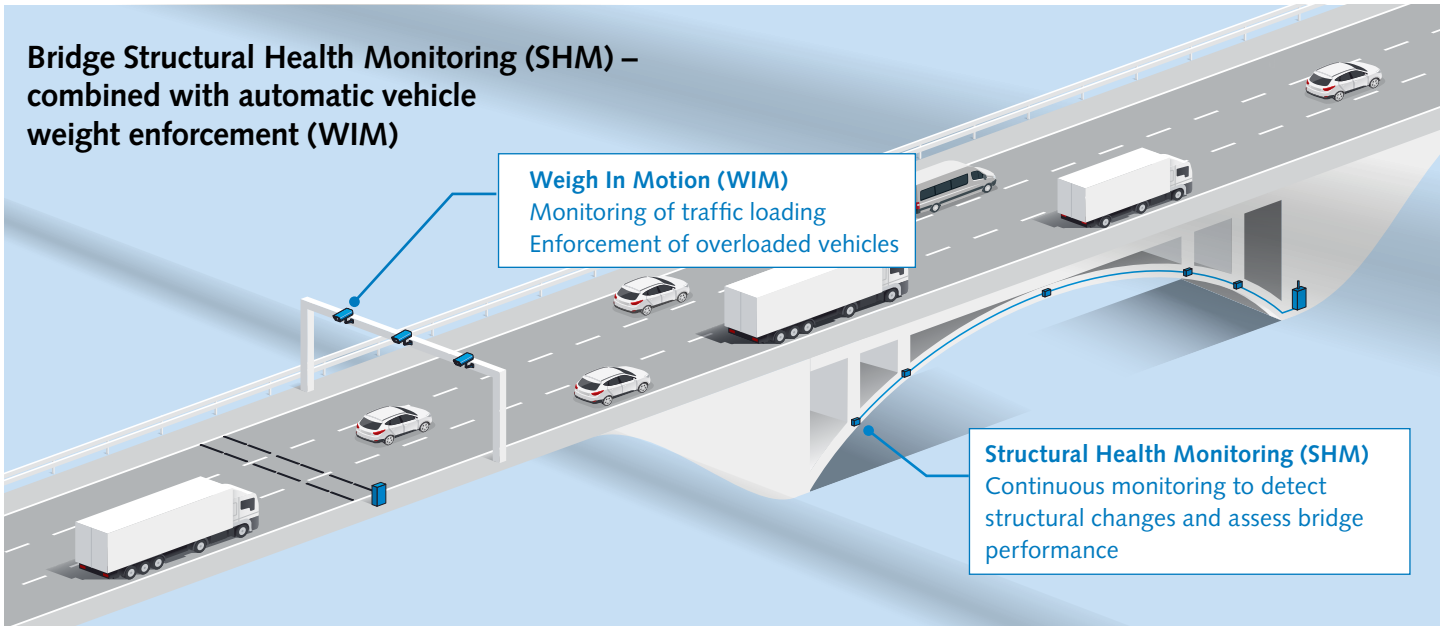
BRIDGE LOAD RATING = **BRIDGE STRUCTURAL CAPACITY** ÷ **LIVE-LOAD EFFECT**

Bridge safety –
thanks to updated, reliable load rating analysis

Kistler's SHM –
continuous structural monitoring with alarms triggered by changes in structure

Kistler's WIM
continuous traffic monitoring with alarms triggered by overloaded vehicles

Definitions: the Bridge Load Rating is the determination of the live load (traffic load) carrying capacity of the bridge. An updated load rating analysis is required when a change in the condition of the bridge occurs and when unusual loads (overload vehicles) are anticipated. Bridges that cannot safely carry statutory loads, based on a load-rating evaluation, should be load posted (weight restrictions), rehabilitated, or replaced.



Kistler combines Weigh In Motion with Structural Health Monitoring: the holistic solution for efficient bridge protection
As an operator, you gain unique advantages from continuous sensor-based bridge monitoring to complement your conventional field inspections. Kistler responds to the challenge of bridge and traffic monitoring with an integrated dual solution: SHM combined with WIM.

SHM & WIM: two solutions in one that give you multiple benefits:

- 24/7 automatic monitoring in real time – see what's happening 'on and in' your bridge
- Continuous measurement of your bridge's real structural performance
- Significant structural variations trigger immediate notifications and alarms
- Issues and faults are detected well before they can cause more serious and costly damage
- Continuous monitoring of traffic and traffic loading. Overloaded vehicles entering the bridge are detected and trigger alarms
- Automatic citation: the WIM system data can also be used to enforce overloaded vehicles
- Most reliable bridge load rating calculations thanks to combined evaluation of SHM and WIM data
- Most reliable traffic load data and real traffic spectra in comparison to AASHTO – American Association of State Highway and Transportation Officials guidelines, to better estimate lifetime predictions

New York City's overloaded truck challenge

Brooklyn-Queens Expressway (BQE) built more than 70 years ago with a triple-cantilever design, 2.4km long

New York's Brooklyn-Queens Expressway (BQE), with its 'Triple Cantilever' section, faced huge challenges from structural aging and overloaded vehicles. Kistler's WIM systems were installed to automatically detect overweight trucks, and the site was recently certified as the USA's first automated citation system for overweight vehicles. Overloading has since diminished, and acquired data is used for lifespan calculations and accurate traffic load analysis. Tanvi Pandya, P.E. DBIA, Executive Director, BQE Design Build & Emergency Contracts, comments:

"Our collaboration with Kistler and C2SMART was key to bringing this first-in-the-nation automated direct enforcement system to life."

Would you like to learn more about our our SHM application? Explore now:

www.kistler.com/bridges

Kistler Group
Eulachstrasse 22
8408 Winterthur
Switzerland
Tel. +41 52 224 11 11

Find your local contact at
www.kistler.com

KISTLER
measure. analyze. innovate.