State of Good Repair

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The author makes no claim to possessing any special knowledge or expertise regarding the subject of “State of Good Repair”. Material presented herein is merely an attempt to share some of the previous discussion, history, and published material. The author accepts no liability for any damages whatsoever to anyone as a result of attending, reading, or otherwise mentally processing this material.
At National Bridge Preservation Partnership Conference, April 2014, I volunteered to sit on a “State of Good Repair” Panel Discussion

- **George Hearn** – Moderator - Univ. of Colorado/Boulder
  (Assoc. Professor - Structural Eng. and Structural Mechanics)

- **Andy Doyle** - Georgia DOT
  (State Bridge Maint. Eng.)

- **David Juntunen** – Michigan DOT
  (Bridge Development Eng.)

- **Richard Kerr** – Florida DOT
  (Bridge Management Inspection Eng.)

- **Andrew McCloskey** – Pennsylvania DOT
  (Bureau of Design)

- **Mark Cleaver** – Yakima County
  (Bridge Eng.)
Previous Conference Discussion
Why the Discussion?

2013 Conditions & Performance

Improve Conditions and Performance Scenario

State of Good Repair ... deficiencies of existing highway and bridge assets

Portions of Slide Courtesy of George Hearn
What are some factors that should be considered in defining a “State of Good Repair” for transportation assets?

There is broad consensus that our Nation’s transportation infrastructure falls short of a “State of Good Repair”; there is, however, no nationally accepted definition of exactly how the term should be defined in the context of various types of transportation assets. The condition of some asset types have traditionally been measured by multiple quantitative indicators, which are often weighted differently in the assessment process of different transportation asset owners. Other kinds of assets have traditionally been measured using a single qualitative rating, but this introduces subjectivity into the assessment process, as different asset owners, or different individual raters, might apply such rating criteria differently. Thus, while a “State of Good Repair” goal is conducive to measurement, identifying investments that provide the greatest utility in meeting this goal would require consideration of a broad range of metrics within the context of sound asset management principles. Investment decisions should take into account the life-cycle costs of potential alternatives, including the capital costs, maintenance costs, and user costs associated with alternative strategies.

In establishing performance targets for individual assets, it is important to consider how different metrics would reasonably be expected to vary over the asset’s life cycle in response to an analytically sound pattern of capital and maintenance actions. It is important that target thresholds be set at levels high enough to measure overall progress, but not so high that they might inadvertently produce suboptimal decision making.

Another key consideration in setting performance targets is how particular assets are utilized. The physical condition of a heavily used asset will, by definition, impact more users than that of a lightly used asset. Applying higher performance standards to heavily used assets would help to capture their greater impact on the traveling public. Also, in selecting potential measures to target, it is important to recognize that some aspects of asset condition have more direct impact on system users than others. Ideally, the performance measures selected for a given type of asset would roughly reflect the weighting of agency costs and user costs that would be determined as part of a full life-cycle cost analysis for that type of asset.

Other fundamental questions to be answered are whether a particular asset is still serving the purpose for which it was originally intended, and whether the long-term benefits that it provides exceed the cost of keeping the asset in service. Simply because a previous decision was made to invest in an asset should not automatically mean that the asset should be kept in a “State of Good Repair” in perpetuity, without considering the merits of the alternative possibility of taking the asset out of service.
State of Good Repair (SGR)
A condition in which the existing physical assets, both individually and as a system (a) are functioning as designed within their useful service life, (b) are sustained through regular maintenance and replacement programs. SGR represents just one element of a comprehensive capital investment program that also addresses system capacity and performance.  

Considering the aforementioned characterization of SGR as it applies to physical assets, for bridge assets, SGR would mean: the existing physical conditions of bridge elements, components or entire bridges are such that the bridges (a) are functioning as designed and (b) are sustained through regular maintenance, preservation, and replacement programs.

5 FHWA Report number PD-96-001 "Recording and Coding Guide for Structure Inventory and Appraisal of the Nation's Bridges, December 1995."
6 Secretary Mary Peters July 25, 2008 letter to Congress on this topic.
State of Good Repair – Expansion vs. Preservation

State of Good Repair (SGR) is defined in this report as all transit capital assets being within their average service life. This is a general construct that allows FTA to estimate system preservation needs. The analysis looks at the age of all transit assets and adds the value of those that are past the age at which that type of asset is usually replaced to a total reinvestment needs estimate. Some assets may continue to provide reliable service well past the average replacement age and others will not; over the large number of assets nationally, the differences average out. Some assets will need to be replaced, some will just get refurbished. Both types of cost are included in the reinvestment total. SGR is a measure of system preservation needs, and failure to meet these needs results in increased operating costs and poor service.

Expansion needs are treated separately in this analysis. They result from the need to add vehicles and route miles to accommodate more riders. Estimates of future demand are, by their nature, speculative. Failure to meet this type of need results in crowded vehicles and represents a lost opportunity to provide the benefits of transit to a wider customer base.
Keeping Bridges in a State of Good Repair

The U.S. Congress sets the direction, national goals and funding for assuring safety, reliability, efficiency and sustainability of the U.S. transportation system.

The Secretary of the U.S. Department of Transportation carries out the congressional direction by providing visions for accomplishing the national goals.

The Federal Highway Administration (FHWA) in collaboration with the State Departments of Transportation establishes objectives and measures to carry out the visions and missions of the U.S. Department of Transportation.

The latest Act of Congress, titled “Moving Ahead for Progress in the 21st Century Act” or the “MAP-21”, establishes “Infrastructure Condition” as one of seven National Goals for maintaining the highway infrastructure asset system in a “State of Good Repair”.

State of Good Repair may be defined as a state or condition in which an existing bridge is (1) performing as designed within its service life, (2) inspected and evaluated in accordance with the National Bridge Inspection Standards, and (3) maintained, repaired or replaced in accordance with an effective preservation plan.

This presentation will discuss the values of lessons learned from past performance or failures of bridges, and the importance of integrating excellence in new design and construction, diligence in bridge inspection, and timely maintenance and preservation for keeping bridges in a State of Good Repair.

The presentation will also discuss the activities, such as, National Bridge Inspection Program, Long-Term Bridge Performance Program, Strategic Highway Research Program, guidelines, manuals, etc., being carried out by FHWA and its partners in meeting the requirements of MAP-21.
One of the national goals of the Federal-aid highway program defined in MAP-21 is “to maintain the highway infrastructure in a state of good repair”. The FHWA Bridge Preservation Guide defines State of Good Repair as “a condition in which existing assets, both individually and as a system (a) are functioning as designed within their useful life, (b) are sustained through regular maintenance, preservation and replacement programs”.

Has your state adopted a definition of State of Good Repair?

15 Yes
32 No

If you answered “yes” to the above question, your state agrees that we need:

4 A consistent national measure for State of Good Repair if the Federal funding is affected.
4 Individual state-specific definitions of State of Good Repair that reflects local conditions and program priorities
11 Both national and state-specific definitions

Which of following does your state agree that the definition of State of Good Repair should be based on?

3 Operational considerations such as “functioning as designed”
7 Program considerations such as “a systematic program of maintenance, preservation and replacement”
12 Condition measures such as element level data
2 Both operational and program considerations
23 Operational, program and condition considerations
State of Good Repair? - Not!
State of Good Repair – Better Be!
State of Good Repair - ?

Age = 50 years
Sufficiency Rating = 65
“Structurally Deficient”

Age = 67 years
Sufficiency Rating = 6
“Structurally Deficient”
Moderate Load Restriction

Age = 92 years
Sufficiency Rating = 32
“Structurally Deficient”

Age = 57 years
Sufficiency Rating = 35
“Structurally Deficient”
Severe Load Restriction