Bridge Inspection Questions and Answers

Q. Please describe the bridge inspection program in California.
A. Caltrans has one of the best bridge inspection programs in the world. Bridge inspections are conducted by highly trained and experienced civil engineers and non-destructive testing technicians. Caltrans performs three main types of inspections; routine inspections, fracture critical inspections and underwater inspections. These inspections are conducted at regular intervals in accordance with national standards for bridge inspections.

Q. What does a bridge inspection involve?
A. The inspectors examine the bridge and document their findings. They assess the condition of structure, recommending repairs and other action necessary to preserve the bridge. The inspection data is compiled and maintained as part of the living history of the bridge. Any conditions that are discovered that are of concern to the inspector are addressed immediately.

Q. Has Caltrans inspected all the bridges similar to the one that collapsed in Minnesota?
A. Inspections of all steel deck truss bridges in California were completed between August 3rd and August 5th 2007.

Q. What does the term “fracture critical” mean?
A. A fracture critical bridge is a steel structure that is designed with little or no load path redundancy. Load path redundancy is a characteristic of the design that allows the bridge to redistribute load to other structural members on the bridge if any one member loses capacity. This designation is a function of the design of the bridge and not the condition of the structure. In fact, a brand new bridge can be fracture critical. California has 238 fracture critical bridges on the state highway system. Caltrans has a fracture critical inspection unit that uses specialized access and non-destructive testing equipment to identify any potential concerns even those that are not visible to the human eye.

Q. What is the “sufficiency rating” and what is it used for?
A. The federal government uses inspection data compiled by Caltrans engineers to calculate a complex formula called the sufficiency rating to determine federal bridge program funding eligibility. The sufficiency rating combines the condition and functional adequacy data collected on every bridge into a single aggregate number. Sufficiency rating values range from 0 (low) to 100 (high). If the sufficiency rating on a bridge is 50 or less and it is designated as “structurally deficient” or “functionally obsolete” the bridge qualifies for federal replacement funding. A low sufficiency rating number does not necessarily mean that the bridge is in need of immediate repair.

Q. Can you provide an explanation of how the sufficiency rating is calculated?
A. Handouts and an explanation will be provided.
Q. What does the term “structurally deficient” mean?
A. The designation of structurally deficient does not mean that a bridge is unsafe. The federal bridge inspection standards require bridge conditions to be assessed on a scale that ranges from 0 (low) to 9 (high). The federal government designates a bridge as “structurally deficient” if the individual ratings for the deck condition, superstructure condition, substructure condition or culvert condition are rated a 4 or less. Additionally, a bridge can be classified as structurally deficient if it has a lower load carrying capacity or the waterway below the bridge frequently overtops the bridge. There are 1620 structurally deficient bridges on the state highway system with approximately 95% of the bridges designated as structurally deficient due to minor cracks in the concrete deck or the condition of the paint. The remaining 5% of the bridges may or may not warrant repairs depending on the nature of the problem. The need for repairs is evaluated by licensed engineers based on the condition assessment and/or analysis of the bridge.

Q. What does the term “functionally obsolete” mean?
A. The functional obsolete designation is a design or configuration issue not one of structural adequacy. The federal government will designate a bridge as “functionally obsolete” if the number of lanes on the bridge doesn’t meet current standards, the vertical clearance above the bridge is restrictive or the roadway alignment is not ideal. Additionally, a bridge may be designated functionally obsolete if it has a lower load capacity or water frequently overtops the bridge. There are just over 2000 functionally obsolete bridges on the state highway system in California. Approximately 90% of these functionally obsolete bridges carry this designation because of narrow road widths and restrictive vertical clearances.

Q. Why aren’t there projects in the works for all bridges designated as structurally deficient or with sufficiency ratings or 50 or less?
A. Caltrans identifies prudent repair and rehabilitation projects taking into consideration many factors that may not be fully captured by these federal designations and ratings. For example, none of the federal designations or ratings take into consideration the need for seismic retrofit. Caltrans relies on the recommendations coming from our field assessments and analysis to develop the pool of needs. These needs may be minor and assigned to Caltrans maintenance crews or they may be more involved and require further analysis or planning studies to determine the appropriate course of action. Caltrans utilizes bridge management system software tools that can forecast deterioration and conduct life cycle cost analysis along with multi-disciplinary peer reviews to develop our ultimate projects. Project decisions are made on a bridge-by-bridge basis.