Visual inspection is the primary means of ensuring the safety and functionality of in-service bridges in the United States, yet research has consistently demonstrated that visual inspection performed by a human inspector is an inherently imperfect and unpredictable process. To succeed at this highly subjective task, inspectors need to understand both “how to inspect” and “where to inspect”.

Intended to supplement the current collection of bridge inspector training courses that focus on “where to inspect”, this visual observation skills training focuses on the physical and mental aspects of visual inspection. The cognitive skills used during visual inspection allow an inspector to observe and interpret environmental information, compare it to previous experiences and knowledge stored in long-term memory, and use that analysis as the basis for a decision. This course covers both the theory and application of these observation skills and offers techniques for improvement. This four-hour course is delivered through a combination of lecture, class discussion, and individual exercises. The training includes a list of good practices for steel bridge inspection based on the recommendations from visual inspection literature and the findings from the hands-on inspections. It has been offered successfully virtually and in person.

MEET THE INSTRUCTORS

Robert J. Connor, PhD, is a professor of civil engineering at Purdue University and Director of the Steel Bridge Research, Inspection, Training, and Engineering (S-BRITE) Center. Dr. Connor is nationally recognized as an expert in fatigue and fracture of steel bridges and ancillary steel structures.

Leslie Campbell, PhD, PE, SE, is structural engineer with the US Army Corps of Engineers. She is an expert in the area of bridge inspection, hydraulic steel structures, fatigue evaluation, NDT variability, and improving the reliability of bridge inspection.
LEARNING OBJECTIVES

- Develop skills to improve the reliability of an individual’s approach to bridge inspection
- Gain awareness of the variability in visual inspection results
- Gain a basic understanding of the subtasks performed during a visual inspection
- Understand the physical and mental aspects of visual inspection
- Understand how visual observation skills can influence inspection results and learn how to improve observation skills
- Understand how previous experience can, at times, negatively influence judgment and decision making during a typical inspection

Register at https://engineering.purdue.edu/CAI/SBRITE/Training

Registration is included with the registration for the course “Inspecting Steel Bridges for Fatigue” to be held the following day.

AFTERNOON AGENDA

1:00 – Welcome and Introductions
1:05 – Visual Inspection Process / Introduction to Visual Observation Skills
1:30 – Perception and Recognition
   Includes Exercise 1
1:55 – Attention
   Includes Exercise 2
2:20 – Memory
   Includes Exercise 3 and 4
2:50 – Break – 10 Min
3:00 – Mental Images
   Includes Exercise 5
3:20 – Mental Models
   Includes Exercise 6
3:50 – Judgment and Decision Making
   Includes Exercise 7
4:10 – Review/Check of Understanding
4:30 – Closing Remarks and Final Questions
4:50 – Adjourn
Inspecting Steel Bridges for Fatigue Training Course

When cracks are discovered on bridges in service, fatigue is usually the cause. A working knowledge of fatigue susceptible details, AASHTO fatigue categorization, and NDE methods and limitations is essential to the proper inspection of both new and in-service steel structures.

This course will focus on fatigue and fracture from the point of view of inspectors and fabricators. Topics will be focused on steel highway and railroad bridges of all types. Other topics will include: fatigue and fracture performance of steel bridges which have been damaged by impact and subsequently heat straightened; Constraint-Induced Fracture (CIF aka Hoan Details) – identification and retrofit, fabrication flaws, prioritizing details for inspection, where to expect cracking, and effective retrofit strategies. This course utilizes some of the specimens that are available from the unique S-BRITE Center Bridge Gallery, as well, reinforcing concepts discussed in the classroom.

MEET THE INSTRUCTORS

Robert J. Connor, PhD, is a professor of civil engineering at Purdue University and Director of the Steel Bridge Research, Inspection, Training, and Engineering (S-BRITE) Center. Dr. Connor is nationally recognized as an expert in fatigue and fracture of steel bridges and ancillary steel structures.

Leslie Campbell, PhD, PE, SE, is structural engineer with the US Army Corps of Engineers. She is an expert in the area of bridge inspection, hydraulic steel structures, fatigue evaluation, NDT variability, and improving the reliability of bridge inspection.

Jason B. Lloyd, PhD, PE, is Manager of Bridge & Infrastructure Solutions at Nucor Corp. Dr. Lloyd specializes in bridge fabrication, bridge behavior, remote monitoring, fatigue evaluation, fracture, internal redundancy, and repair and retrofit of steel bridges.
LEARNING OBJECTIVES

- Be able to identify and prioritize critical fatigue prone details;
- Be able to recognize details susceptible to fatigue cracking due to secondary stresses and out-of-plane distortion.
- Be able to recognize potential fatigue problems which may occur in special situations such as curved bridges, skewed bridges, anchor bolts and sign structures;
- Be able to recognize and understand issues arising during fabrication as related to material, fracture toughness, defects, shop/field repairs, mill scale, tack welds, etc.;
- Understand differences in redundant and non-redundant bridges;
- Be familiar with the most common forms of NDT;
- And identify details susceptible to constraint induced fracture (CIF)

COMMENTS FROM A FEW PAST ATTENDEES

- "This was an excellent course. By far the best course on fatigue and fracture I’ve been to." - Member of Kansas DOT
- "This was the best class I have had in 13 years." - Member of Kansas DOT
- "Great! Especially the hands-on in the classroom and at S-BRITE." - Member of Illinois DOT

Register at https://engineering.purdue.edu/CAI/SBRITE/Training