S-BRITE Center
PURDUE UNIVERSITY

Inspecting Steel Bridges for Fatigue

TRAINING COURSE

LOCATION

Your local facility

ONLINE REGISTRATION

Click Here

EARN 0.8 CEUs (8 PDHs)

FEE: $550/PERSON INCLUDES: COURSE MATERIALS, LUNCH, BREAKS AND CEU CERTIFICATE

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 (Hoan Details) – identification and retrofit, fabrication flaws, prioritizing details for inspection, where to expect cracking, and effective retrofit strategies. This course utilizes 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.

Philip Fish, CWI, is nationally recognized for his expertise in fracture and fatigue analysis, nondestructive testing and inspection, and forensic analysis of steel structures. He conducts seminars and courses nationally each year on bridge inspection methods, fracture critical bridge structures, and structural steel welded and bolted connections.

Jason B. Lloyd, PhD, PE, is a Bridge Steel Specialist for the National Steel Bridge Alliance. Dr. Lloyd specializes in full-scale testing, field instrumentation and remote monitoring, fatigue evaluation, fracture, internal redundancy, and repair and retrofit of steel bridges.

INDIANA DEPARTMENT OF TRANSPORTATION
INDOT

JTRP

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

Participants will receive hands-on experience with NDE methods implementing training received in the classroom.

MORNING AGENDA

8:00 - Introduction and Welcome
Robert J. Connor / Phil Fish / Jason B. Lloyd
Course Announcements

8:05 – Introduction to Fatigue & Fracture
What is fatigue and what is fracture? What is a stress range cycle?

8:50 – Fatigue Susceptible Details
Where are cracks expected to initiate? Examples of details that are susceptible to fatigue

9:35 – Fracture Susceptible Details
Examples of details that are susceptible to fracture; case studies

10:45 - Break

10:55 – Non-Destructive Testing Methods
Techniques, applications, and limitations of several NDE methods

11:40– Secondary Stresses
Distortion-induced fatigue

12:10 – Working Lunch: Fundamentals of Retrofit Strategies
Fatigue & Fracture repairs and retrofits

AFTERNOON AGENDA

1:10 – Inspection of gusset plates for fatigue

1:40 – Welding fundamentals
Inspection for fatigue, defects, shop/field repairs, etc.

2:10 – Issues with impact damage

2:40 – Break

2:50 – Variability in NDE data
Performance testing of inspectors, case studies considered

3:30 – Discussion and questions

3:45 – Exam

5:00 – Course completion

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