FHWA BRIDGE INSPECTION TECHNIQUES FOR NSTM (NHI 22 079 130078) PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. **Which property relates to a material's stiffness, defined as stress divided by strain in the elastic region?**

   A. Ductility

   B. Modulus of Elasticity

   C. Toughness

   D. Yield Strength

2. **Web Gap Details indicate which combination of issues and regulation?**

   A. Gap left in stiffeners allowed for constrained induced fatigue and out of plane distortion

   B. Gap left in stiffeners allowed for constrained induced fatigue and out of plane distortion; 1985 mandated the connection of the flanges

   C. Fatigue was not related to web gaps; 1985 mandated improved flange connections

   D. Web gaps were eliminated; 1995 mandated flange alignment checks

3. **What is the overarching safety purpose of NBIS as applied to highway bridges?**

   A. To regulate bridge tolls.

   B. To require inspections but not standardized.

   C. To require regular, standardized inspections of all highway bridges to identify structural deficiencies and safety risks.

   D. To rate bridges based on aesthetics.

4. **In the source's fatigue susceptibility ranking, which bridge is listed first (least susceptible)?**

   A. Mianus River Bridge

   B. Silver Bridge

   C. Daniel W. Hoan Bridge

   D. Eye Bolt Failure

5. **What are two common corrosion control measures for steel bridges?**

   A. Protective coatings/paint systems and galvanizing or other sacrificial coatings

   B. Concrete overlays and epoxy floors

   C. Cathodic protection alone on all members

   D. Replacing steel with aluminum in all components

6. In plane stress conditions, the stresses are associated with which of the following?

A. The primary forces acting on the member

B. Stresses that exist in two principal directions of the plane

C. All directions of stress

D. Thermal expansion stresses

7. Which items constitute the load path in a bridge system?

A. Beams and columns only

B. Deck, Super, Bearing, Sub, Foundation

C. Cables and anchors

D. Deck and foundations only

8. What is the stress effect of a weld?

A. Cooling welds create tensile forces around them, they may be localized tensile forces in compressive regions

B. Welds relieve all residual stress

C. Welds produce uniform compressive stress

D. Welds only affect adjacent members

9. Why is combining visual signs with structural response important in defect assessment?

A. Visual signs show deterioration while structural response confirms whether load path and safety are intact; together they guide urgency and repair strategy.

B. Visual signs alone are enough for final repairs.

C. Structural response alone determines urgency without signs.

D. Combination confuses the assessment.

10. Which of the following describes elastomeric bearings?

A. They are rubber-like pads that absorb movement and allow rotation.

B. They are metal rollers that carry loads and slide on surfaces.

C. They are explosive devices used to temporarily anchor components.

D. They are only used in substructure.

Answers

1. B
2. B
3. C
4. B
5. A
6. B
7. D
8. A
9. A
10. A

Explanations

1. Which property relates to a material's stiffness, defined as stress divided by strain in the elastic region?

A. Ductility

B. Modulus of Elasticity

C. Toughness

D. Yield Strength

Stiffness is about how much a material resists deformation under load, especially while remaining in the elastic range where it would return to its original shape if the load is removed. In that elastic region, stress and strain are proportional, and the constant that links them is the Modulus of Elasticity (also called Young's modulus). This value directly measures stiffness: a higher modulus means the material is stiffer and will deform less under the same applied stress. For example, steel has a high modulus and is relatively stiff, while rubber has a low modulus and deforms readily. Other properties describe different behavior: ductility is how much plastic deformation the material can undergo before fracture, yield strength is the stress at which plastic deformation begins, and toughness is the energy the material can absorb before fracture.

2. Web Gap Details indicate which combination of issues and regulation?

A. Gap left in stiffeners allowed for constrained induced fatigue and out of plane distortion

B. Gap left in stiffeners allowed for constrained induced fatigue and out of plane distortion; 1985 mandated the connection of the flanges

C. Fatigue was not related to web gaps; 1985 mandated improved flange connections

D. Web gaps were eliminated; 1995 mandated flange alignment checks

Web gaps in stiffeners create a scenario where the web and flanges can move differently under repeated loads, concentrating stresses at the stiffener-web interface. This constrained movement fosters fatigue cracking and can cause the web to distort out of plane, altering the actual load path and potentially accelerating damage. The regulation enacted in 1985 addressed these problems by requiring the flanges to be connected, which reduces relative motion between members and improves load transfer, thereby mitigating both fatigue and out-of-plane distortion. So, the option that describes a gap left in stiffeners allowing for constrained induced fatigue and out-of-plane distortion, paired with a 1985 mandate for flange connections, best captures the observed issue and its regulatory response. Other choices either misstate the relationship between web gaps and fatigue, or cite different regulatory actions or dates that don't align with the historical performance and rule changes.

3. What is the overarching safety purpose of NBIS as applied to highway bridges?

A. To regulate bridge tolls.

B. To require inspections but not standardized.

C. To require regular, standardized inspections of all highway bridges to identify structural deficiencies and safety risks.

D. To rate bridges based on aesthetics.

The safety aim is to protect the traveling public by ensuring every highway bridge is checked regularly using uniform methods so problems are found before they become safety risks. NBIS establishes routine, standardized inspections across all bridges, with a defined frequency and a common rating system, so deficiencies are identified consistently and actions like maintenance, repairs, or load restrictions can be taken in a timely manner. This national, standardized approach—rather than nonstandard inspections or focusing on tolls or aesthetics—lets agencies compare data, prioritize work, and keep the bridge inventory safe.

4. In the source's fatigue susceptibility ranking, which bridge is listed first (least susceptible)?

A. Mianus River Bridge

B. Silver Bridge

C. Daniel W. Hoan Bridge

D. Eye Bolt Failure

Understanding fatigue susceptibility in this context means looking at how the source evaluates different bridge details and their tendency to develop and propagate fatigue cracks under repeated loading, not just past incidents. The ranking is built from how design features, connection types, and maintenance history influence crack initiation and growth. In that framework, the Silver Bridge is listed first as the least susceptible. This framing implies that, compared to the other items, its particular design details and the way fatigue would manifest under typical service loads are deemed less prone to progressive fatigue cracking according to the source's criteria. The other options involve features that are more commonly associated with fatigue-prone behavior—such as specific connections or failure modes that have a clearer track record of fatigue issues—so they rank above the Silver Bridge in terms of susceptibility. So, within the source's scoring, the Silver Bridge stands as the least susceptible, making it the correct choice.

5. What are two common corrosion control measures for steel bridges?

A. Protective coatings/paint systems and galvanizing or other sacrificial coatings

B. Concrete overlays and epoxy floors

C. Cathodic protection alone on all members

D. Replacing steel with aluminum in all components

Corrosion control for steel bridges centers on keeping moisture and corrosive elements away from the steel and, when possible, giving the steel a sacrificial barrier. The two common measures are protective coatings or paint systems that create a continuous barrier to moisture, oxygen, and salts, and galvanizing or other sacrificial coatings that protect by corroding first, providing both a barrier and galvanic protection. Coatings must be properly applied and regularly maintained, with damaged areas repaired to keep the barrier effective. Galvanizing is widely used where harsh environments or high exposure make frequent coating maintenance impractical, and it can be coupled with additional coatings for added protection. Other options don't address the steel members directly: concrete overlays and epoxy floors protect the deck rather than the structural steel, cathodic protection is used selectively rather than universally for all members, and replacing steel with aluminum isn't a practical or common substitute in most bridges.

6. In plane stress conditions, the stresses are associated with which of the following?

A. The primary forces acting on the member

B. Stresses that exist in two principal directions of the plane

C. All directions of stress

D. Thermal expansion stresses

Plane stress means the material's thickness is small and the load produces stresses mainly in the plane of the member, with negligible through-thickness stress components. In this state the in-plane stress components are sigma in one in-plane direction, sigma in the orthogonal in-plane direction, and the in-plane shear tau_xy. You can rotate the in-plane axes to find two directions where the shear disappears and the normal stresses reach their principal values. Those two directions are the principal directions in the plane, so the stresses are associated with two directions within the plane. The other ideas don't describe the essence of plane stress: stresses tied to the overall external force direction aren't about the in-plane confinement; asking about stresses in all directions would imply a three-dimensional state; and thermal expansion stresses are simply a specific cause, not the defining feature.

7. Which items constitute the load path in a bridge system?

A. Beams and columns only

B. Deck, Super, Bearing, Sub, Foundation

C. Cables and anchors

D. Deck and foundations only

Loads on a bridge begin at the deck, where traffic and other forces are applied, and must travel down to the ground through the structure. The essence of the load path is the route from the deck to the foundations, where those forces are ultimately resisted by the ground. The deck is the source of the load, and the foundations are the endpoint where the load is transferred out of the structure. Other components like the superstructure, bearings, and substructure serve to carry or transmit the load along the way, and cables or anchors are specific to certain bridge types, so they aren't universal elements of every load path. In the general sense used for understanding how vertical loads move through a typical bridge, focusing on the deck as the starting point and the foundations as the ending point best captures the essential path.

8. What is the stress effect of a weld?

A. Cooling welds create tensile forces around them, they may be localized tensile forces in compressive regions

B. Welds relieve all residual stress

C. Welds produce uniform compressive stress

D. Welds only affect adjacent members

Welding introduces residual stresses because of the big temperature differences created as the weld cools and contracts. The weld metal heats up and expands, but as it cools it wants to shrink. The surrounding base metal and joints restrain that shrinkage, so tensile residual stresses develop in the weld region and in the heat-affected zone. These tensile stresses can be concentrated at the weld toes and along the weld, and you may also see localized tensile pockets in areas that are otherwise constrained. It's not correct to say welding relieves all residual stress or that it creates uniform compressive stress, and welds don't only affect adjacent members—the welded joint itself carries these residual tensions, which can influence fatigue performance and crack initiation.

9. Why is combining visual signs with structural response important in defect assessment?

A. Visual signs show deterioration while structural response confirms whether load path and safety are intact; together they guide urgency and repair strategy.

B. Visual signs alone are enough for final repairs.

C. Structural response alone determines urgency without signs.

D. Combination confuses the assessment.

You evaluate both what you can see on the surface and how the structure behaves under actual loads. Visual signs—cracks, spalling, corrosion, deformation—show where deterioration is occurring and what type of damage you're dealing with. But they don't prove whether the load path is still carrying loads safely or if stiffness and redundancy have degraded. The structural response—deflections, strains, changes in stiffness, and how the member or system behaves during loading—tells you whether that deterioration is compromising safety or just cosmetic. When you combine both, you get a complete picture: where the issue is, how severe it is in terms of performance, and how urgently repairs are needed. Relying on only visual signs or only structural response can miss hidden problems or overstate risk, so using both together guides the right urgency and repair strategy.

10. Which of the following describes elastomeric bearings?

A. They are rubber-like pads that absorb movement and allow rotation.

B. They are metal rollers that carry loads and slide on surfaces.

C. They are explosive devices used to temporarily anchor components.

D. They are only used in substructure.

Elastomeric bearings are flexible, rubber-like pads placed between the bridge superstructure and its supports to carry vertical loads while absorbing movement and allowing rotation. The rubber-like material deforms as the bridge expands, contracts, or sways, providing damping and permitting the deck to rotate slightly relative to the supports. This description matches the correct concept: they are rubber-like pads that absorb movement and allow rotation. They are not metal rollers that carry loads, not explosive devices, and they're not limited to substructure—they're used at supports to accommodate movement between elements.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://fhwanhi22079130078.examzify.com

We wish you the very best on your exam journey. You've got this!