BRIDGE INSPECTION SAFETY AND ACCESS GUIDELINES

Reference Title

Bridge Inspection Safety and Access Guidelines

Reference Revision and Year:

Version 1.0, 2026

Reference Introduction and Discussion

This reference is designed to provide clear guidance and best practices for ensuring safe and efficient field operations during bridge inspections. It outlines key safety considerations, from preparation and planning to on-site procedures, to help mitigate risks commonly encountered in inspection work. By following these practices, inspection teams can promote a safe work environment while maintaining the highest standards of professionalism and performance and understand general access recommendations.

Reference Description

Changes to this reference shall happen as deemed necessary by the BIPM. Annually, the inspectors should recommend changes to the reference to the BIPM. In the event of a conflict, the OSHA regulations and SCDOT requirements take precedence over this reference document.

1.0 Safety Regulations

OSHA applies different regulations depending on the nature of the work activity. The *SCDOT Employee Safety Manual* includes requirements for adherence to OSHA regulations. The general industry standards (OSHA CFR 1910) apply to activities like bridge inspection or maintenance, surveying, or wetland assessments. In addition, the construction standards (OSHA CFR 1926) may apply to bridges or roadways under construction.

It is the responsibility of each person involved in the inspection process to be familiar with the *SCDOT Employee Safety Manual*, the *SCDOT Work Zone Safety Guidelines* and applicable agency requirements. The BITL's responsibilities include supervising job procedures and ensuring safe practices are being followed. The BITL not only needs to set a good example for the inspection staff but also should enforce safety policies and institute corrective actions when these policies are not followed.

2.0 Inspection Personnel

Personnel should be physically, mentally and emotionally capable of performing inspection duties. They should take a systematic approach to the inspection process to ensure a thorough and safe inspection experience. Inspectors should practice good physical health habits including being well-rested and alert for their job assignments and should never be under the influence of substances that would impair their judgement or reaction time.

Each inspector should remember he or she is responsible for his or her own personal safety as well as the safety of others impacted by his or her work. Inspectors should practice good work habits to minimize the dangers they encounter on the job. Inspectors should be aware of their surroundings, including environmental factors that can be a source of injury.

3.0 Personal Protective Equipment (PPE)

Inspection personnel should use appropriate protective clothing and Personal Protective Equipment (PPE) when performing inspection activities. Clothing worn should be properly sized (neither too loose nor too tight) and appropriate for the working conditions.

The most common hazards during inspections are slips, trips and falls. High-top, work boots with traction soles can be worn. Safety shoes or boots with toe-impact protection meeting the requirements of ASTM F 2413 or ANSI 241 should be worn in work areas where personnel may be carrying or handling heavy materials.

Work gloves should be worn to protect against sharp edges and excessive temperatures. A tool belt or pouch may be worn to provide ready access to frequently used tools. The tools should be secured to prevent them from falling on traffic or pedestrians.

Inspection crews on the active roadway should wear ANSI 107 high-visibility safety vests.

Hard hats should meet the requirements of ANSI Z89.1. Inspectors should wear a hard hat at all times when a hazard exists above. Inspectors in the active roadway or adjacent to moving traffic should wear a hard hat or helmet as industry standard.

Safety goggles or glasses with side shields should be worn whenever chipping concrete or hammering.

Ear protection should be worn if working around loud joints, pneumatics, or power equipment.

A dust mask or properly fitted respirator should be worn when working in particularly dusty conditions or in the presence of bird droppings to prevent contracting histoplasmosis, a disease contracted from contact with microscopic fungi borne from decomposing biological fluids such as bird droppings. Dust mask and respirator use should be in accordance with OSHA regulations 29 CFR 1910.134.

4.0 Work Zones, Advance Work Signs and Safety Cones

One of the most hazardous conditions at any site is vehicular traffic. SCDOT bridge inspection vehicles should be fitted with flashing lights. Work signs and cones, sufficient to mark the operation with good sight distance for adequate warning, should be carried in each vehicle.

Good work practices include common sense activities such as keeping a clean, uncluttered work zone and using tools and equipment properly and for only their intended use.

5.0 Bridge Deck Walking

Bridge decks should be walked facing traffic. The following conditions should be considered before judging if a bridge

deck is safe for walking:

- Shoulder and sidewalk width
- Traffic volume and speed
- Weather conditions (rain, fog, ice, ambient light, visibility)
- Time of day (peak vs. low traffic volumes)
- Bridge length
- Length of time required on deck for inspection

In the event the bridge deck is deemed unsafe for walking, the deck should either be walked with appropriate traffic control or be walked at another time when safe to do so.

6.0 Ladders

Except where either permanent or temporary stairways or suitable ramps or runways are provided, ladders described in this subsection may be used to give safe access to most elevations. A ladder should be used only for those portions of the bridge or culvert which can be reached comfortably, without undue leaning.

The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction not advised. When ladders with such defects are discovered, they should be tagged defective and immediately withdrawn from service. Inspection of metal ladders should include checking for corrosion of interiors of open-end hollow rungs.

Portable ladder feet should be placed on a suitable base, and the area around the top and bottom of the ladder shall be kept clear. Portable ladders should be used at such a pitch so that the horizontal distance from the top support to the foot of the ladder is about 1/4 of the working length of the ladder (the length along the ladder between the foot and the top support). Ladders should not be used in a horizontal position (unless it is specifically designed to be used in a horizontal manner) as platforms, runways, or scaffolds.

Unless protected by the required traffic control measures, ladders should not be placed in median shoulders, sidewalks, driveways, railroads or any location where they may be displaced by traffic.

The side rails of the ladder should extend not less than 36 inches above the landing, wherever possible.

Portable ladders in use should be tied, blocked or otherwise secured to prevent movement. In most cases, the second inspector holds the bottom of the ladder to ensure the stability of the ladder.

Ladders made of fiberglass or other non-conducting material should be used where there is any chance the inspector or the ladder should come in contact with electrical conductors. Portable metal ladders cannot be used at these locations. Commercial grade fiberglass ladders must be used near wires. Assume all wires carry a current.

7.0 Scaffolding

Scaffolds provide an efficient access alternative for structures which are less than 40 feet high and over level ground with little or no traffic below. The erection of scaffolding should be performed in strict compliance with manufacturer's instructions. Unstable objects such as barrels, boxes, loose brick or concrete blocks should not be used to support scaffolds or planks. The scaffold should be tied off at the top to prevent tipping. Personnel using scaffolding must be tied off to an independent external surface.

Climbers, or mobile inspection platforms, are regulated by OSHA Standard 29 CFR 1926 Subpart L as a form of scaffolding. Floats, or wooden-plank work platforms, are also regulated by OSHA (1926.451) as a form of scaffolding. Boatswain's chairs are regulated by OSHA (1926.552) as a form of scaffolding.

8.0 Harnesses and Lanyards

When working at heights, the inspector should wear and use a properly adjusted full-body harness, shock absorbing lanyard with double locking snap hooks, and (if needed) a cross-arm strap with a D-ring. The harness should meet the requirements of ANSI A10.14, ANSI/ASSE Z359, or the current version of 29 CFR 1910.66, 1926.104 or 1926.502. Working at heights can include walking or working on an unprotected surface 6 feet or more from the ground or a lower level, when working from the basket of a MEWP, or using assisted climbing techniques.

Harnesses and lanyards should only be used for employee safeguarding. Any harnesses or lanyards subjected to service loading, as distinguished from static load testing, should be immediately removed from service and should not be used

again. The recommended service life of the soft goods included in harnesses and lanyards should not be exceeded.

9.0 Rigged Platforms

Rigged platforms are used to gain access to floor systems and the underside of main load-carrying members in areas where access by other means is not feasible, or where inspection procedures like NDT and pin inspection are required. Rigged platforms are typically used on bridges over water where there is sufficient clearance, and for structures which are over 40 feet high.

10.0 Waders

Certain inspection locations may require the use of waders to comfortably and safely access elements of the bridge or culvert to be inspected. Personnel should be aware of the water depth in which the work is taking place. If the wearer wades into water deeper than the waders, the water can fill the inside of the waders and become a drowning hazard. Prior to and after each use, the waders should be inspected for defects which would compromise the unit's ability to keep out water. Defective units should not be used.

11.0 Life Jackets or Buoyant Work Vests

Workers exposed to a risk of falling into the water and drowning, when there is no protection by railings, netting or fall arrest system (harness or lanyard), should be provided with United Stated Coast Guard (USCG) approved life jackets or buoyant work vests. Prior to and after each use, the buoyant work vests or life preservers should be inspected for defects which would alter their strength or buoyancy. Defective units should not be used.

12.0 Boats and Barges

Boats or barges may be used for bridges over water. The boat should be adequate for the task required depending on inspection scope and waterway type. A barge can be used as a work platform for cranes with buckets or high reach manlifts. Boats and barges are also used as work platforms for staging underwater inspections.

13.0 Underwater Inspection Safety

All diving operations shall be conducted in accordance with the current applicable OSHA standards. The consultant performing the underwater inspection shall be responsible for providing, maintaining, and inspecting all diving equipment necessary to safely and properly conduct the inspections. Diving operations may be conducted with either SCUBA or surface-supplied equipment. During the dive, equipment with surface-to-water voice communication shall be used to ensure thorough and accurate reporting of underwater conditions.

14.0 Mobile Elevating Work Platforms (MEWPs)

Listed below in this section are types of mobile elevating work platforms that are commonly used by inspectors. If it is determined a MEWP is required for inspection access, advanced planning is required to schedule the equipment.

The use and operation of MEWPs should be in accordance with the following:

- ANSI/SAIA A92.22-2018 Safe Use of MEWPs,
- ANSI/SAIA A92.24-2018 Training Requirements for MEWPs,
- OSHA 29 CFR 1926.453 – Aerial Lifts, and
- OSHA 29 CFR 1910.67 – Vehicle-Mounted Elevating and Rotating Work Platforms

These standards include requirements with respect to MEWP inspection, training and unit familiarization. For inspectors using MEWPs, should shall record the year of their training and level of training completed. The level of training should be either occupant, operator or supervisor. Only qualified personnel should occupy, operate or supervise the use of an MEWP.

Tying off to an adjacent pole, structure or equipment while working from MEWPs should not be permitted. A safety harness may be required when the equipment is in use. MEWP load limits specified by the manufacturer should not be exceeded. The MEWPs should be inspected and serviced regularly and kept in good repair. Operators should avoid moving a MEWP with the lift or bucket extended unless it is intended for this type of operation.

14.1 Aerial Lift

An aerial lift is a MEWP with a work platform or bucket with capacity for one or more bridge inspectors. The platform is attached to a hydraulic boom mounted on a carriage. An inspector drives the carriage using controls mounted in the bucket. This type of vehicle is usually not licensed for open road use on highways. Some aerial lifts are equipped for all-terrain use and can operate on unimproved surfaces below bridges.

14.2 Bucket Truck

A bucket truck is similar to an aerial lift; however, a bucket truck can be driven on a highway and the bridge inspector controls only the bucket, not the movement of the truck. The turning range or rotational capability of the turret varies with each type of vehicle. Bucket trucks offer extended reach and turning range and have outriggers which are lowered from the truck chassis to increase stability. Bucket trucks equipped with telescoping booms are capable of extending and retracting, providing greater flexibility and reach from a given truck location. Some vehicles can move during inspection activities, either without outriggers or with wheeled outriggers.

14.3 Under-Bridge Inspection Unit (UBIU)

An UBIU is a specialized truck with three or more booms or arms designed to reach under a bridge while positioned on the deck. Standard features include a one-person or two-person bucket or platform on the end of the final boom; a rotating turret to provide maximum flexibility; outriggers with wheels to allow for moving the unit during inspection activities; and a telescoping third boom to extend and contract, allowing for greater reach under the bridge. Optional features available include a telescoping second boom to extend and retract for greater vertical movement; an additional fourth boom to allow even greater vertical reach, (especially on bridges with deep superstructure members); a multiple-person work platform on the third boom with an access ladder on the second boom; and models offering the capability of interchanging a bucket and a platform on the third boom, as desired.

15.0 Tools

All hand and power tools and similar equipment should be maintained in a safe condition. Impact tools such as chisels should be kept free of mushroomed heads. The wooden handles of tools should be kept free of splinters or cracks. When a power tool is used, all rules recommended by the manufacturer should be followed.

Misuse of tools is the major cause of accidents on the job. Each tool is designed for a particular function and should be used accordingly. Tools for cleaning bridge members should be utilized during relevant inspections. Tools for cleaning may include:

- Wisk broom - used for removing loose dirt and debris
- Wire brush - used for removing loose paint and corrosion from steel members
- Scrapers - used for removing corrosion or growth from member surfaces
- Flat bladed screwdriver - used for general cleaning and probing
- Shovel - used for removing dirt and debris from bearing areas

16.0 Other Access Means

16.1 Permit-Required Confined Space

Inspectors who are required to enter into confined or enclosed spaces should have been trained so they are appropriately cautioned as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. Inspection of locations where toxic fumes or lack of sufficient oxygen may be hazardous falls into this category.

16.2 Existing Catwalks

Caution should always be exercised when using existing catwalks on the bridge. If accessible, inspection of the catwalk system should be performed prior to the use of the catwalk. It should be viewed as a bridge component; the catwalk system is subject to deterioration.

16.3 Climbing, Rigging and Staging

On some structures, if other access methods are not practical, inspectors may climb the bridge components. Climbing can be divided into two categories. The first category is assisted climbing, in which the bridge inspector climbs while connected to a safety lifeline or cross-arm strap secured to the structure. The second category, rope access inspections, uses rappelling or other rock-climbing techniques and safety equipment. OSHA prohibits free climbing on roadway

bridges in which the inspector is not secured to the bridge.

Rigging and staging require a support staff with a qualified rigger to ensure adequacy and safety.

The use of industrial rope access should require staff with qualified and certified riggers and climbers to ensure adequacy and safety. Rope access bridge inspectors should be certified to Society of Professional Rope Access Technicians (SPRAT).

17.0 Safety Working Around Railroads

If, during the course of inspection activities, inspectors or equipment may foul the track, a ROE or ROW permit may be required. Federal requirements for on-track work and on-track safety shall be followed by inspectors in accordance with 49 CFR Part 214 Railroad Workplace Safety. The BITL should determine if any of the railroad entity specific safety requirements should apply to the inspection. Some railroad entities may require safety training and adherence to regulations while on railroad property. General railroad safety tips include the following and should be followed whenever a bridge inspection occurs around railroads:

- Avoid stepping on the rail,
- Unless otherwise stated in a safety plan, keep your flagger visible while working on the railroad,
- Determine a muster point prior to start work for where to clear out of the way of passing trains, and
- Determine if specialty footwear or other PPE apply while on railroad property.

18.0 Daily Safety Briefing

It is good practice for the BITL to perform a daily safety briefing prior to the start of each inspection shift or when working conditions change. Topics discussed at the safety briefing might include:

- Individual worker assignments and the use of the buddy system,
- Any special considerations for the particular bridge being inspected, including potential electrical hazards from power facilities on the bridge or from overhead power lines,
- Safety procedures for work over water, other roadways, or railroads,
- Weather conditions,
- The types of traffic control which shall be used,
- Methods of bridge access which shall be used, such as ladders, MEWPs and waders,
- Safe working zones,
- Inspector First Aid and CPR certification and the location of first aid kits,
- Location and phone number of nearest first responders or medical services, and
- Communication protocol, including radios and cell phones with cell phone numbers for relevant staff.

Lastly, daily the BITL shall also use his or her best judgment to determine if inspection activities shall be suspended due to changing weather conditions. For example, potential exposure to lightning, particularly when working on steel bridges, could be justification for suspending inspection operations to ensure crew safety.