**MOVABLE BRIDGE ELECTRICAL INSPECTION REPORT – VERTICAL LIFT BRIDGES**

Wisconsin Department of Transportation

DT2027 6/2017 s.84.17 Wis. Stats.

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| --- | --- |
| Bridge Number      | Overall Rating of Electrical System      |
| Bridge Name      | Date Inspected      |
| Lead Electrical Inspector      | Weather      |
| Inspection Team Leader      |  |

Follow the bridge’s Lockout-Tagout procedures and wear proper PPE for inspecting both energized and de-energized electrical equipment.

Notes:

* This form provides specific inspection detail in conjunction with the items provided in the HSI Movable Inspection Tab. While there may be some overlap with the routine inspection, updates to the Elements and Assessments Inspections Tabs are not necessarily required.
* Place comments in each box next to the component inspected.
* For each component rating, enter “(1)” for Good, “(2)” for Fair, “(3)” for Poor, or “(4)” for Severe.
* If the component does not apply to this bridge enter “NA”.
* Include a comment and photo reference documenting any components rated (3) or (4).

**Traffic Warning and Protection Devices** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| **Warning Lights** – Confirm all flashing lights function on bridge opening warning signs, traffic warning gates and barrier gates |       |
| **Traffic Warning and Barrier Gates** – Inspect for damage, debris and missing covers. Inspect for discoloration or scorching of any electrical elements and wires. Check for lack‑of or excess grease in gear systems. Check mounting bolts for looseness, inspect keys, bolts and pins for proper position. Check for unusual noises or vibration. Check electrical connections. Perform dielectric test to check insulation resistance values on all motors. Record ammeter readings as the bridge is operated (every 5 years). |       |
| **Gate Operation** – Observe gates during operation, confirming whether they are balanced and operate smoothly. Verify no manual override is required for bridge operation. |       |
| Confirm barrier gate system properly engages when down |       |
| **Gongs** – Confirm gongs sound on traffic warning gates or barrier gates. |       |
| **Navigation Lighting** – Check all span-mounted and pier mounted navigation lights illuminate. Check for broken lenses, loose mountings, poor electrical connections, corrosion, or other issues. |       |

**Power Distribution Panels/Panelboards** Component Rating:

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| **Component** | **Finding/Comment** |
| **Circuit Breakers** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels |       |
| **Fuses & Fuse holders** - Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **Grounds** – Check for resistance. Inspect bonded grounding conductors to disconnect switches, meter, racks and cabinets. Look for any corrosion on connections. Check for any damaged conductors, missing ground wires, or loose terminals. Look for any discoloration or scorching. Inspect ground rod if accessible and check for any damage to rod or grounding conductors such as cut or frayed wires. Lightly tug on grounding lugs or rod to check for any loose connections. Inspect any bonded connections to bridge structure and components. |       |
| **Contactors** - Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels |       |
| **Terminals** – Check for any loose connections, damaged conductors, missing labels |       |
| **Voltages** – Test and record incoming voltage (every 5 years). |       |

**Motor Control Centers/Panels** Component Rating:

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| **Component** | **Finding/Comment** |
| **Circuit Breakers** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **Fuses & Fuse holders** - Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **Grounds** – Check for resistance. Look for any damage such as cut or frayed wires and for any discoloration or scorching. Inspect any grounding/bonding conductors to racks and cabinets. Lightly tug on ground lugs to check for any loose connections. Look for any corroded connections. |       |
| **Starters/Contactors** - Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels |       |
| **Terminals** – Check for any loose connections, damaged conductors, missing labels |       |
| **Misc.** – Inspect for any new components and new conductors or jumpers |       |

**PLC/Relay Control Panels** Component Rating:

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| **Component** | **Finding/Comment** |
| **Circuit Breakers** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **Fuses & Fuse holders** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **Grounds** – Check for resistance. Look for any physical damage such as cut or frayed wires and for any discoloration or scorching. Inspect any grounding/bonding conductors to racks and cabinets. Lightly tug on ground lugs to check for any loose connections. Look for any corrosion on connections. |       |
| **Relays** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. |       |
| **PLC** – Observe PLC status lights for any faults or errors. Inspect for any damage, dirt debris, discoloration or scorching, missing covers, missing labels. |       |
| **Terminals** – Check for any loose connections, damaged conductors, missing labels. |       |
| **Misc.** – Check for any new components and new conductors or jumpers. |       |

**Transformers** Component Rating:

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| **Component** | **Finding/Comment** |
| **Function** – Verify all limit switches operate properly. |       |
| **Condition** – Verify general condition of all limit switches. |       |
| **Conductors** – Verify conductors are soundly connected to limit switches. |       |

**Control Console** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| **Switches and Pushbuttons** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, damaged or incorrect nameplates. Operate all devices to check spring or detent action. |       |
| **Indicator lights** – Inspect for any damage lenses, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, damaged or incorrect nameplates. Check that all lights illuminate properly |       |
| **Terminals** – Check for any loose connections, damaged conductors, missing labels. |       |
| **HMI Touchscreen** – Inspect for any damage and cleanliness of screen. Check alarm history for any recurring alarms or problems. |       |
| **Amperage readings** – Observe and note amperage readings for power to HPU’s during raising and lowering span. |       |
| **Misc.** – Inspect for any new components and new conductors or jumpers. Check that operating instructions are clearly posted. Observe any notes taped or attached to devices on the console. Inspect condition of nameplates. |       |

**Transformers** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| **Panel Doors** – Check hinges and gasket seal condition. |       |
| **Transformers** – Check for damage, corrosion, lost paint and unusual noises. Check housings for indication of excessive heat being emitted. |       |

**Raceway and Conduit System** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| **Conduit** – Check for loose supports, corrosion, dirt and debris build-up. |       |
| **Conduit Fittings** – Check for loose connections, and condition of gasket seals. |       |
| **Junction Boxes and Terminal Boxes** – Check for missing covers, gasket seals and corrosion. |       |
| **Wire and Cable** – Check for abrasion, cracking, discoloration, overheating, kinks and moisture infiltration. |       |
| **Terminations** – Check for loose connections, untagged wires, damaged wires and terminal corrosion. |       |
| **Flexible Cables** – Check for cracking or damage. |       |
| **Droop Cables** - Check during bridge operation to verify range of motion. Check for abrasion, cracking or damage. |       |
| **Submarine Cables** – Check for deterioration, cable supports and cable terminations. Resistance test the insulation of the individual wires and record the values(every 5 years unless previous report indicates declining/low level). |       |

**Electric Motors** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| Inspect for any damage, dirt, debris, discoloration or scorching, missing covers, lack of or excess grease. Check mounting bolts for looseness, inspect keys, bolts and pins for proper position. Check electrical connections. Record ammeter readings as the bridge is operated. Perform dielectric test to check insulation resistance values on all motors (every 5 years unless previous report indicates declining/low level). |       |

**Limit Switches** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| Inspect for damage, corrosion or build-up of dirt. Verify free movement of switch. Inspect striker plate for any damage. Observe during operation. |       |

**Lighting and Utilities** Component Rating:

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| --- | --- |
| **Component** | **Finding/Comment** |
| **Service Lighting and Receptacles** – Check for damaged or inoperable lights and receptacles. |       |
| **Electrical Utilities** – Check heating and air-conditioning equipment for damages or signs of developing problems. |       |
| **Sump Pumps** – Check condition of sump pumps and their electrical connections and discharge pipes. Test operate pumps. |       |

**Alternate/Backup Power Supply Function** Component Rating:

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| **Component** | **Finding/Comment** |
| **Function** – Operate the bridge under alternate/backup power supply system. Record the voltage during bridge operation (every 5 years). |       |

**Transfer Switch** Component Rating:

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| **Component** | **Finding/Comment** |
| Inspect panel and wiring. Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, missing covers, missing labels. Verify bridge operates when switched to alternate power sources. Verify automatic/manual transfer switch between power sources operates properly. |       |

**Operational Testing by Full Opening and Closing Cycles** Component Rating:

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| **Component** | **Finding/Comment** |
| **Operating Modes** – Verify bridge can be fully operated without any issues under all applicable modes – Manual, Automatic, Remote, etc. Note any alarms that occur during operation. |       |
| **Bypasses** – Verify bridge can be fully operated in all modes without any bypasses being activated. |       |
| **Safety Interlocking System** – Verify under all modes of operation that the safety interlock system and logic fully operates as designed and in proper sequence – taking into account bridge traffic signals, traffic gages, locks, machinery and operating brakes, span motors, and other applicable devices. |       |

**Control Console for Remote Operation of this Bridge** Component Rating:

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| **Component** | **Finding/Comment** |
| Location of Remote Operation for this Bridge |       |
| **Switches and Pushbuttons** – Inspect for any damage, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, damaged or incorrect nameplates. Operate all devices to check spring or detent action. |       |
| **Indicator lights** – Inspect for any damage lenses, dirt, debris, damaged conductors, loose conductors, discoloration or scorching, damaged or incorrect nameplates. Check that all lights illuminate properly |       |
| **Terminals** – Check for any loose connections, damaged conductors, missing labels. |       |
| **HMI Touchscreen** – Inspect for any damage and cleanliness of screen. Check alarm history for any recurring alarms or problems. |       |
| **Cameras and Monitors** – Verify functionality and clarity of view for all cameras and monitors at remote station |       |
| **PA System** – Verify functionality and clarity of sound received and transmitted for PA system at remote operation station |       |

**Recommended Short Term Actions & Repairs for Electrical System:**

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**Recommended Long Term Rehabilitation Needs for Electrical System:**

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**General Remarks – Electrical System** Overall Rating *(Also enter on page 1)*:

(Overall Rating is lowest of all of the component ratings above.)

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