INTRODUCTION

The New York State Department of Transportation Bridge Inspection Manual (NYSDOT BIM) contains the Inspection Flagging Procedure which sets forth a uniform method of notification to Responsible Parties of bridge deficiencies that require timely attention. The Inspection Flagging Procedure also establishes requirements for certifying that proper responses are undertaken and completed within a specified time frame by a professional engineer licensed to practice in New York State.

This document supplements the NYSDOT BIM Inspection Flagging Procedure by providing Hypothetical Examples of bridge conditions which might warrant various Flag types (Red PIA, Red, Yellow, and Safety PIA).

The following hypothetical flagging examples are not meant to list all situations, nor be a limit guideline for determination of Flag issuance, but are typical examples of conditions that have occurred in the past. Each bridge and its conditions are different due to factors such as design, materials, loading, load posting, and current deterioration; hence, professional judgment by competent personnel is required for the issuance of Flags. These examples will be periodically updated as needed.

Flags issued for deterioration (such as section loss) requiring detailed capacity evaluations should have an expedited load rating performed. In such cases, Flag reports and accompanying information must be sent to the Load Rating Engineer for the expedited analysis.
NYSDOT INSPECTION FLAGGING PROCEDURE

HYPOTHETICAL EXAMPLES

“FLAGGED BRIDGE REPORT” (FBR) CONTENT

A bridge owner receives a FBR before he receives a completed Bridge Inspection Report; therefore, the FBR must include specific, comprehensive information imperative for understanding the reported condition and for the bridge owner to take appropriate action. The FBR shall provide thorough documentation of the flagged condition, including, but not limited to:

1) Condition notes, condition photos, and condition sketches.
2) Clear indication of the flag location on the structure.

Flagged Bridge Reports that simply make reference to the following hypothetical flagging examples as justification for issuance are not acceptable.

HYPOTHETICAL FLAGGING EXAMPLES

A. Red Flag

1. Substructure Examples

a. Scour that has caused more than minor undermining of an abutment or pier without piles and is not founded on rock and there is a high probability of potential failure with the next flood.

b. Movement, deterioration, or distress in piers or abutments which is so excessive that the danger of failure is imminent. (Prompt Interim Action)

c. Structural cracks in substructures along with continuing signs of movement.

d. An abutment not on piles that has a large scour hole beneath the footing and exhibits vertical or diagonal cracks in the stem.

e. A cap beam in a two column concrete pier that has reinforcement cage exposed for its entire length on the underside with broken longitudinal reinforcing bars at the midspan.

f. Deterioration of a concrete pedestal under the bearing of two girder bridge or truss that has reduced the effective bearing area 50% or more.

g. A six or more girder bridge that has lost 50% of the bearing area in two adjacent concrete pedestals.

h. Debonding of Fiber Reinforce Polymer (FRP) wrap contributing to structural capacity.
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2. Superstructure Examples

a. Distortion in a load path non-redundant member (e.g., the visible buckling of a compression chord member in a truss).

b. Any crack in a fracture critical member or major impact damage in a primary member. (It should be noted that the primary members and fracture critical members include the connections between them).

c. Any condition causing visible change in primary member elevation or profile such as sagging and crippling. (Prompt Interim Action may be warranted)

d. A one-third or greater loss of section to either the top flange or bottom flange of a non-redundant member (or on two or more adjacent girders of a redundant girder bridge) in an area of high flexural stresses.

e. A one-half or greater loss of section to a non-redundant girder web (or on two or more adjacent girders of a redundant girder bridge) at or near a support or point of maximum shear.

f. Expansion bearings overextended to the point that portions of the superstructure may drop in elevation.

g. High rocker bearings that appear to be at or near to their full extension or full contraction (tilt) when ambient temperatures are not near extreme levels.

h. A hole in a bridge deck along with deterioration of the bridge deck extensive enough to threaten a structural failure of the deck. Normally, holes in a bridge deck will be Safety Flags.

i. A crack in the tension flange of a welded two girder bridge. (Prompt Interim Action)

j. Missing load posting sign. (Prompt Interim Action)

k. A truss gusset plate that has lost 50% or more of its section in a line above the connection to the bottom chord.

l. A composite prestressed concrete adjacent box beam bridge with more than 30% broken total strands in two adjacent beams near midspan.

m. A crack in the tension area or cracks in compression areas of a steel primary non-redundant member.
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n. Debonding of Fiber Reinforce Polymer (FRP) wrap contribution to structural capacity.

o. Web Bearing Areas of:
   Rolled Beams without Bearing Stiffeners:
   • When corroded to the point of having a hole through the lower portion of the web in the bearing area, even if distortion has not yet occurred.
   • When the possibility of a localized failure of the lower portion of the web in the bearing areas exists.
   Rolled Beams & Plate Girders with Bearing Stiffeners:
   • When the lower portion of web in the bearing area and the bearing stiffeners have more than 75% combined section loss for non-redundant members or multiple beams with this condition in the same line of bearings.

p. A crack is found in floorbeam hangers of pin connected truss.

B. Yellow Flag

1. Substructure Examples
   a. Pier or abutment piles exposed due to scour, but the piles are still capable of functioning. Number of piles exposed, length of piles exposed, and condition of piles should be used to make informed judgment.

   b. When annual monitoring is recommended for scoured or tilted wingwall whose failure would threaten the highway travel lane.

   c. A cracked and spalled pedestal with more than 50% loss of bearing on a multi girder bridge. Depending on stringer spacing, deck condition, or fascia location, this could possibly be a Red Flag.

   d. A pier capbeam with half the tension reinforcement completely exposed for the entire span between columns.

2. Superstructure Examples
   a. Two non-adjacent girders on a redundant girder bridge with a one-third or greater loss of section to the top or bottom flanges near their point of maximum bending or a one-half or greater loss of section to the girder webs near the supports or point of maximum shear.
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b. A crack in the tension area or cracks in compression areas of a steel primary redundant member.

c. A fascia girder in a multi girder bridge that is bent out of alignment (not severely) with a crack in the web at a diaphragm connection.

e. A composite prestressed concrete adjacent box beam bridge that has 20 to 30% broken total strands in two adjacent beams near midspan or 40% broken total strands in a single beam.

f. Web Bearing Areas of:

   - Rolled Beams without Bearing Stiffeners:
     - When the webs have lost more than 50% of their thickness to corrosion in the lower portion of the bearing area.
   
   - Rolled Beams & Plate Girders with Bearing Stiffeners:
     - When the lower portion of web in the bearing area and the bearing stiffeners have more than 50% combined section loss for non-redundant members or multiple beams with this condition in the same line of bearings.

g. High rocker bearings that are contracted in warm weather or expanded in cold weather.

C. Safety Flag PIA

a. Concrete may fall onto under-feature traffic or onto an area where pedestrians or vehicular/railroad/waterway traffic can be present.

b. Exposed curb reinforcing bars or portions of bridge railing protruding into the roadway.

c. Leaking combustible gases or liquids on/under bridges.

d. Severely deteriorated or broken inspection catwalks and ladders.

e. A significant sized hole in a bridge deck, but there is no threat of structural failure.

f. Missing, or illegible vertical clearance sign, where required. Signs which are improperly posted, but are more restrictive, are not Safety Flag PIA.

g. Live and exposed conductive electrical wiring on light standards on the bridge where pedestrian traffic could be present.
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h. Missing or non-functional sections of bridge rail or approach rail. Missing rail is defined as rail that once existed as per plans or other bridge records but at the time of inspection did not exist. If a railing is simply non-conforming to present standards, it shall not be flagged.

i. A through-hole in a bridge sidewalk.

j. Hole or spall in the wearing surface exposing reinforcing bar that can create potential for flat tires.

k. Non-operational navigation lights.

l. Primary end diaphragm with deterioration such that it may fall onto under-feature traffic or onto an area where pedestrians or vehicular/railroad/waterway traffic can be present.