CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

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FINANCIAL AUDIT

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Audit Report on the Department of Transportation's Remediation of Bridge Defects

7E11-128A

June 5, 2012

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John C. Liu
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June 5, 2012

To the Residents of the City of New York:

My office has audited the New York City Department of Transportation (DOT) to determine whether it is carrying out repairs of safety and structural defects on bridges in a timely manner. We audit agencies such as DOT to ensure that the City's infrastructure is being properly maintained and that public safety is not jeopardized.

The audit found that the DOT appropriately handled all but one of the 112 deficient conditions that were to be addressed immediately, but has not remediated 71 of the 122 critical red flag conditions in a timely manner. This problem was brought about in part because of delays in routing flags to the appropriate staff who actually carried out the remedial work or deferring remediation work multiple times. In addition, while there are no designated timeframes for remediating yellow and safety flags, five of the red flags examined were initially identified as yellow flags that deteriorated over time to the point where the conditions had to be flagged as red.

The audit recommends that the DOT remediate red flag conditions in a timely manner, assess and subsequently prepare guidelines for routing flag conditions to the appropriate workforce within a reasonable time period, limit the practice of routinely deferring the remediation of red flag conditions and reconsider the practice of deferring red flag remediation more than once, provide written justification in those cases where the remediation of a red flag must be deferred. enhance coordination between flag engineering staff and the workforce that will carry out the remediation work, and carry out the remediation of yellow and safety flags in a reasonable timeframe.

The results of the audit have been discussed with DOT officials, and their comments have been considered in preparing this report. Their complete written response is attached to this report.

If you have any questions concerning this report, please e-mail my audit bureau at audit@comptroller.nyc.gov.

Sincerely,

John C. Liu

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The City of New York
Office of the Comptroller
Financial Audit

Audit Report on the Department of Transportation's Remediation of Bridge Defects

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AUDIT REPORT IN BRIEF

The Department of Transportation's (the Department) Division of Bridges (Division) is required to perform corrective or protective actions for safety and structural defects (i.e., "flags") on the 782 bridges it maintains.[1] [2] Flags are usually identified during the course of inspections carried out by Division inspectors or inspectors from the New York State Department of Transportation. According to the New York State Department of Transportation Engineering Instruction EI10-016 (Inspection Flagging Procedure for Bridges), there are three classifications for these flags: red, yellow, or safety. A red flag is "a structural flag that is used to report the failure or potential failure of a primary structural component." A yellow flag is "a structural flag that is used to report a potentially hazardous structural condition which, if left unattended could become a clear and present danger before the next scheduled biennial inspection." A safety flag is "used to report a condition presenting a clear and present danger to vehicular or pedestrian traffic, but poses no danger of structural failure or collapse." Red and safety flags may also be designated for prompt interim action, which means that a condition must be addressed within 24 hours of notification to the Division's Flag Engineering unit.[3] Red flags are to be remediated within six weeks after notification, although action may be deferred if appropriate certifications are made by a professional engineer. Yellow flags and safety flags do not have a specific timeframe for remediation according to the Engineering Instruction.

According to the Department's Bridges and Tunnels 2010 Annual Condition Report, there were 973 flag conditions routed (i.e., sent to the Department's staff of trades-workers,

[1] The Division also maintains five tunnels, resulting in a total of 787 structures.

[2] Corrective or protective actions may include closing or demolishing the bridge, implementing a monitoring program, or repairing the defect. The use of the term "remediate" in this audit report may refer to any of these actions.

[3] Remediation for flags that are designated for prompt interim action (PIA) is typically done as a temporary repair or stabilization pending a permanent correction at a later date.

requirement contractors, or capital project staff to undertake repairs, or sent to inspection for monitoring) in 2009, and 1,390 flag conditions routed in 2010. Information about flag conditions is recorded in the Department's Bridge Inventory Management System (BIMS) database. Our analysis of data extracted from BIMS provided to us by Department officials found that there were five red flags with prompt interim action conditions, 107 safety flags with prompt interim action conditions (a total of 112 flags with prompt interim action conditions), and 117 red flags without prompt interim action conditions routed in 2009 and 2010. The audit consisted of a review of all of these 229 flags.

Audit Findings and Conclusions

The Department appropriately handled all but one of the 112 prompt interim action conditions, but has not remediated 71 of the 122 red flags (58 percent) in a timely manner.[4] This problem was brought about in part because of delays in routing flags to the appropriate staff who actually carried out the remedial work or deferring remediation work multiple times. In addition, while there are no designated timeframes for remediating yellow and safety flags, five of the red flags we examined were initially identified as yellow flags that deteriorated over time to the point where the conditions had to be flagged as red. Carrying out remedial work within required and reasonable timeframes for bridge conditions that have been identified as deficient is critical for ensuring that public safety is not jeopardized.

Additionally, the Department has not fully complied with required State Transportation Department procedures for the reporting of flag remediation. Moreover, the Department lacks sufficient written procedures of its own. Finally, problems with the Department's BIMS database impede the Department's ability to effectively monitor and report on the condition and status of flag repairs.

Audit Recommendations

This report makes a total of 17 recommendations, including that the Department:

- Remediate red flag conditions in a timely manner—by either the end of the six-week period as specified in the State Department of Transportation Engineering Instruction EI10-016 or the end of the deferral timeframe as certified by the Department.

- Assess and subsequently prepare guidelines for routing flag conditions to the appropriate workforce within a reasonable time period.

- Limit the practice of routinely deferring the remediation of red flag conditions and reconsider the practice of deferring red flag remediation more than once.

[4] We considered a flag remediation to be late if the flag condition was not addressed by the later of the end of the six-week period stated in the Engineering Instruction or the deferral timeframe as certified by the Department.

- Provide written justification in those cases where the remediation of a red flag must be deferred.

- Enhance coordination between flag engineering staff and the workforce that will carry out the remediation work.

- Carry out the remediation of yellow and safety flags in a reasonable timeframe.

- Develop a system for tracking and monitoring correspondence and certifications to the State Transportation Department and submit all required certifications and correspondence within required timeframes.

- Accurately record in BIMS the dates that show when the Department was notified about flag conditions and remediated them. Additionally, update BIMS to allow for the recording of remediation dates for prompt interim action conditions.

Department Response

In its response, the Department stated, "We disagree with the Report's recommendations related to flag remediation timeframes and deferral periods. Several of these recommendations seem to eliminate engineering judgment for the actions taken in response to flags and suggest adopting rigid remediation procedures."

The Department's response indicates that it has clearly misunderstood the salient facts, conclusions, and recommendations of our audit:

- We did not and do not recommend eliminating engineering judgment in favor of rigid remediation procedures.

- Red flags are "used to report the failure or potential failure of a primary structural component." Therefore, these types of flags should be remediated timely, which was the focus of our audit.

- We accepted as being timely, remediations that occurred within either six weeks of notification, as required by the Engineering Instruction, or by the end of the first deferral period, as specified in the Department's certifications to the State.

- 38 of the 71 red flags (54 percent) that were cited as not being timely remediated, were not completed within this timeframe and were not certified as being safe beyond this timeframe. The 38 flags are 31 percent of the 122 red flags routed during calendar years 2009 and 2010.

- The other 33 of the 71 red flags (46 percent) that were cited as not being timely remediated were not completed within this timeframe but there were additional deferral letters certifying safety beyond this timeframe in the files. However, there were cases where the Department's engineering safety certifications lapsed before the

next deferral letter certifying safety was sent to the State. The 33 flags are 27 percent of the 122 red flags routed during calendar years 2009 and 2010.

- As the State's Engineering Instruction does not clarify procedures pertaining to deferrals, the Department should establish its own policies and procedures to cover these matters and provide for discretionary action.

- Additionally, the 71 red flags cited for late remediation were routed for repair—not for monitoring. If the Department intends that a flag condition be monitored, it should be clearly routed for monitoring, in contrast to routing the flags for repair. Furthermore, the response to the State should reflect the monitoring status. We did not cite flags routed for monitoring as deficient.

The Department response continues, "Simply stated, State procedures set a 'default' time frame for addressing PIA and red flags — 24 hours and six weeks, respectively. However, the procedures allow the responsible engineer to set different timeframes, based on the particular condition, if the engineer certifies that it is safe to do so. Several options for assuring safety, other than full repair, are contained in the procedures." The Department further alleged that the "auditors added their own arbitrary standard in which PIA and red flags may be deferred only once (Footnote 4 of the Report) and then measured NYCDOT's performance against this self-created standard."

Contrary to the Department's belief, our recommendations are based on time standards that are stipulated in the New York State Department of Transportation Engineering Instruction EI10-016, which "establishes requirements for certifying that appropriate measures are taken within a specified timeframe" for addressing bridge deficiencies. These requirements include addressing the "observed condition within 24 hours" for prompt interim action conditions and, in the case of red flags, "Generally, all actions taken shall be completed within six weeks from the date of Written Notification . . ." We recognized the Department's prerogative to exercise engineering judgment by considering a remediation to be timely if completed by the end of the deferral period certified by the Department. In other words, we accepted that deferring action to a later timeframe was valid.

The Department also responded that, "State procedures and good practice mandate that the prioritization of flag repairs be based on safety, and not solely on a clock. Prioritization needs to be flexible since conditions can frequently change. The procedures in the State and throughout the country allow for methods of addressing flags other than repair" such as "posting a bridge for specific load restrictions" or monitoring the structure.

We agree that flags may be addressed by methods other than repair. Accordingly, our audit did not cite as deficiencies sampled flags that were routed for monitoring or had load restrictions posted. The flags cited as late in the audit report, however, were all routed to either the Department's in-house trades-workers, requirement contractors, or future capital contracts; in these cases, none of the Department's responses to the State indicated that the flags were routed for monitoring nor was there any documentation in the Department's flag files that showed that monitoring had been performed.

The Department has clearly misunderstood our recommendations regarding the deferral of flag remediations. In contrast to the Department's assertion that "the Report recommends that once the repair is deferred in order to implement the monitoring, it should not be further deferred regardless of the results of that monitoring," we recommended that if lengthy timeframes are necessary, the Department should consider routing flags to inspection under a defined condition monitoring program. It should be noted that the 71 red flags cited for late remediation were routed for repair—not to inspection for monitoring.

Furthermore, in contrast to the Department's assertion that "Rigid adherence to any schedule, regardless of how reasonable it was when it was created, ignores the fact that priorities are required to be reevaluated and changed frequently," we stated that for those red flag conditions that are deferred beyond six weeks, the Department should ensure that the deferral timeframe for remediating a red flag condition is reasonable and accurate.

For the 33 cases that were deferred multiple times, we note that there was no documentation to justify why the remediation did not occur in the original timeframes or to substantiate a change in Departmental priorities. Furthermore, as the Engineering Instruction does not address the issue of multiple deferrals, it is important that the Department develop written procedures that cover deferrals and documenting their need.

Finally, the audit report simply never recommended that "NYCDOT change repair priorities to comply blindly with a schedule, without consideration of safety or cost." The State's Engineering Instruction defines a red flag as "a structural flag that is used to report the failure or potential failure of a primary structural component." Therefore, it is reasonable that these defects be remediated timely. However, the report did not state that the Department's failure to remediate red flag conditions timely meant that bridge safety was endangered.

Of the 122 red flags that were routed during calendar years 2009 and 2010, 38 red flags (i.e., 31 percent) were not completed within six weeks or by the end of the deferral period certified by the Department in its response. We note that after the expiration of this timeframe the files lacked any further deferral letters and certifications by the Department's engineers that the bridges associated with the red flags were safe to use. An additional 33 (27 percent) of the 122 routed red flags were deferred multiple times. For these, Department engineers certified that the bridges were safe to use. However, we noted some cases out of the 33 in which the deferral letters lapsed prior to new deferral letters being issued, thereby leaving interim periods that were not covered by an engineer's safety certification.

The Department agreed with eight recommendations, disagreed with six recommendations, and contended that three recommendations were already implemented.

INTRODUCTION

Background

The Division is responsible for operating and maintaining 782 bridges in New York City. The Department is required to remediate safety and structural defects (i.e., "flags") on these bridges. The Department's Bridges and Tunnels Annual Condition Report provides various statistics and information about maintenance and capital projects on these structures. According to the Department's 2010 Annual Condition Report, there were 973 flag conditions in 2009 and 1,390 flag conditions in 2010 that the Division was responsible for correcting.

Flags are usually identified during the course of inspections carried out by Division inspectors or inspectors from the New York State Department of Transportation. (Flags may also be verbally reported through the Department's Communication Center.) Flags are classified as red, yellow, or safety. The most severe type of defect is a red flag, which is "a structural flag that is used to report the failure or potential failure of a primary structural component." A yellow flag is "a structural flag that is used to report a potentially hazardous structural condition which, if left unattended could become a clear and present danger before the next scheduled biennial inspection. This flag would also be used to report the actual or imminent failure of a non-critical structural component, where such failure may reduce the reserve capacity or redundancy of the bridge, but would not result in a structural collapse." A safety flag is "used to report a condition presenting a clear and present danger to vehicular or pedestrian traffic, but poses no danger of structural failure or collapse." Red and safety flags may also be designated for prompt interim action, in which a condition must be addressed within 24 hours of notification. Red flags are to be remediated within six weeks after notification, although action may be deferred if appropriate certifications are made by a professional engineer. Yellow flags and safety flags do not have a specific timeframe for remediation, according to the Engineering Instruction.

The Division's Bureau of Bridge Maintenance, Inspections, and Operations has a Flag Engineering Section that consists of engineers who review flag conditions. Flag repairs that are undertaken by the Department are carried out by the Bridge Repair Section's staff of skilled trades-workers. Flag repairs may also be handled by private contractors that were awarded "When-and-Where" requirement contracts by the Department. Additionally, flag repairs may be carried out as part of a Departmental capital project.

Information about flag conditions is recorded in the Department's Bridge Inventory Management System (BIMS) database. When a flag condition is discovered, a flag notification letter, with an attached "flag packet," is e-mailed to the Flag Engineering Director. The flag packet contains all information needed to document the flagged condition. For flags identified for prompt interim actions and all red flags, telephone notification is made when the flag is discovered and the e-mail notification later follows. Flag notifications are recorded in the BIMS database by the administrative staff, and a flag number is assigned. The database is maintained by the Department's personnel. Data about flags is updated until the flag is remediated and closed out.

The timeliness of repairing red flags was previously audited by the Office of the New York State Comptroller in a report dated January 12, 2010, *Department of Transportation Management and Oversight of Structural Defects on Highway Bridges*. That audit, which examined the status of red flag conditions in New York State bridges (including those in the City) during the period of January 1, 2006, to June 24, 2008, found problems with the timeliness of repairs for City bridges.

Objective

The objective of this audit was to determine whether the Department of Transportation is carrying out repairs of bridge safety and structural defects in a timely manner.

Scope and Methodology Statement

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter. This audit was conducted by staff that included auditors with engineering backgrounds.

The scope of this audit covers flags "routed" (i.e., sent) in Calendar Years 2009 and 2010 to the Department's staff of trades-workers, requirement contractors, or capital project staff to undertake the repairs, or to inspection for monitoring. As our audit objective focused on timeliness, we limited our audit population to flags that have a specific timeframe for remediation according to the Engineering Instruction, specifically, red and safety flags with prompt interim action conditions and red flags in the Division of Bridges workload. Please refer to the Detailed Scope and Methodology at the end of this report for the specific procedures and tests that were conducted.

Discussion of Audit Results

The matters covered in this report were discussed with Department officials during and at the conclusion of this audit. A preliminary draft report was sent to Department officials on March 23, 2012, and discussed at an exit conference held on April 12, 2012. On April 18, 2012, we submitted a draft report to Department officials with a request for comments. We received written comments from the Department on May 8, 2012.

In its response, the Department stated, "We disagree with the Report's recommendations related to flag remediation timeframes and deferral periods. Several of these recommendations seem to eliminate engineering judgment for the actions taken in response to flags and suggest adopting rigid remediation procedures."

The Department's response indicates that it has clearly misunderstood the salient facts, conclusions, and recommendations of our audit:

- We did not and do not recommend eliminating engineering judgment in favor of rigid remediation procedures.

- Red flags are "used to report the failure or potential failure of a primary structural component." Therefore, these types of flags should be remediated timely, which was the focus of our audit.

- We accepted as being timely, remediations that occurred within either six weeks of notification, as required by the Engineering Instruction, or by the end of the first deferral period, as specified in the Department's letter to the State.

- 38 of the 71 red flags (54 percent) that were cited as not being timely remediated, were not completed within this timeframe and were not certified as being safe beyond this timeframe. The 38 flags are 31 percent of the 122 red flags routed during calendar years 2009 and 2010.

- The other 33 of the 71 red flags (46 percent) that were cited as not being timely remediated were not completed within this timeframe but there were additional deferral letters certifying safety beyond this timeframe in the files. However, there were cases where the Department's engineering safety certifications lapsed before the next deferral letter certifying safety was sent to the State. The 33 flags are 27 percent of the 122 red flags routed during calendar years 2009 and 2010.

- As the State's Engineering Instruction does not clarify procedures pertaining to deferrals, the Department should establish its own policies and procedures to cover these matters and provide for discretionary action.

- Additionally, the 71 red flags cited for late remediation were routed for repair—not for monitoring. If the Department intends that a flag condition be monitored, it should be clearly routed for monitoring, in contrast to routing the flags for repair. Furthermore, the response to the State should reflect the monitoring status. We did not cite flags routed for monitoring as deficient.

The Department response continues, "Simply stated, State procedures set a 'default' time frame for addressing PIA and red flags — 24 hours and six weeks, respectively. However, the procedures allow the responsible engineer to set different timeframes, based on the particular condition, if the engineer certifies that it is safe to do so. Several options for assuring safety, other than full repair, are contained in the procedures." The Department further alleged that the "auditors added their own arbitrary standard in which PIA and red flags may be deferred only once (Footnote 4 of the Report) and then measured NYCDOT's performance against this self-created standard."

Contrary to the Department's belief, our recommendations are based on time standards that are stipulated in the New York State Department of Transportation Engineering Instruction EI10-016, which "establishes requirements for certifying that appropriate measures are taken within a specified timeframe" for addressing bridge deficiencies. These requirements include addressing the "observed condition within 24 hours" for prompt interim action conditions and, in the case of red flags, "Generally, all actions taken shall be completed within six weeks from the date of Written Notification . . ." We recognized the Department's prerogative to exercise engineering judgment by considering a remediation to be timely if completed by the end of the deferral period certified by the Department. In other words, we accepted that deferring action to a later timeframe was valid.

The Department also responded that, "State procedures and good practice mandate that the prioritization of flag repairs be based on safety, and not solely on a clock. Prioritization needs to be flexible since conditions can frequently change. The procedures in the State and throughout the country allow for methods of addressing flags other than repair" such as "posting a bridge for specific load restrictions" or monitoring the structure.

We agree that flags may be addressed by methods other than repair. Accordingly, our audit did not cite as deficiencies sampled flags that were routed for monitoring or had load restrictions posted. The flags cited as late in the audit report, however, were all routed to either the Department's in-house trades-workers, requirement contractors, or future capital contracts; in these cases, none of the Department's responses to the State indicated that the flags were routed for monitoring nor was there any documentation in the Department's flag files that showed that monitoring had been performed.

The Department has clearly misunderstood our recommendations regarding the deferral of flag remediations. In contrast to the Department's assertion that "the Report recommends that once the repair is deferred in order to implement the monitoring, it should not be further deferred regardless of the results of that monitoring," we recommended that if lengthy timeframes are necessary, the Department should consider routing flags to inspection under a defined condition monitoring program. It should be noted that the 71 red flags cited for late remediation were routed for repair—not to inspection for monitoring.

Furthermore, in contrast to the Department's assertion that "Rigid adherence to any schedule, regardless of how reasonable it was when it was created, ignores the fact that priorities are required to be reevaluated and changed frequently," we stated that for those red flag conditions that are deferred beyond six weeks, the Department should ensure that the deferral timeframe for remediating a red flag condition is reasonable and accurate.

For the 33 cases that were deferred multiple times, we note that there was no documentation to justify why the remediation did not occur in the original timeframes or to substantiate a change in Departmental priorities. Furthermore, as the Engineering Instruction does not address the issue of multiple deferrals, it is important that the Department develop written procedures that cover deferrals and documenting their need.

Finally, the audit report simply never recommended that "NYCDOT change repair priorities to comply blindly with a schedule, without consideration of safety or cost." The State's Engineering Instruction defines a red flag as "a structural flag that is used to report the failure or potential failure of a primary structural component." Therefore, it is reasonable that these defects be remediated timely. However, the report did not state that the Department's failure to remediate red flag conditions timely meant that bridge safety was endangered.

Of the 122 red flags that were routed during calendar years 2009 and 2010, 38 red flags (i.e., 31 percent) were not completed within six weeks or by the end of the deferral period certified by the Department in its response. We note that after the expiration of this timeframe the files lacked any further deferral letters and certifications by the Department's engineers that the bridges associated with the red flags were safe to use. An additional 33 (27 percent) of the 122 routed red flags were deferred multiple times. For these, Department engineers certified that the bridges were safe to use. However, we noted cases in which the deferral letters lapsed prior to new deferral letters being issued, thereby leaving interim periods that were not covered by an engineer's safety certification.

The Department agreed with eight recommendations, disagreed with six recommendations and contended that three recommendations were already implemented.

The full text of the Department's response is attached as an addendum to this report.

FINDINGS AND RECOMMENDATIONS

The Department appropriately handled all but one of the 112 prompt interim action conditions, but has not remediated 71 of the 122 red flags (58 percent) in a timely manner. This problem was brought about in part because of delays in routing flags to the appropriate staff that actually carried out the remedial work or deferring remediation work multiple times. In addition, while there are no designated timeframes for remediating yellow and safety flags, five of the red flags we examined were initially identified as yellow flags that deteriorated over time to the point where the conditions had to be flagged as red. Carrying out remedial work within required and reasonable timeframes for bridge conditions that have been identified as deficient is critical for ensuring that public safety is not jeopardized.

Additionally, the Department has not fully complied with required State Transportation Department procedures for the reporting of flag remediation. Moreover, the Department lacks sufficient written procedures of its own. Finally, problems with the Department's BIMS database impede the Department's ability to effectively monitor and report on the condition and status of flag repairs.

These matters are discussed in the following sections of this report.

Failure to Repair Red Flag Defects Timely

The Department appropriately handled all but one of the 112 prompt interim action conditions, but has not been timely in remediating red flags. Engineering Instruction EI10-016 (Inspection Flagging Procedure for Bridges) requires that red flags be remediated within six weeks after notification of the condition. Additionally, remedial action may be deferred if appropriate certifications are made by a professional engineer.

In Calendar Years 2009 and 2010, 122 red flags were routed.[5] Of these flags, 71 (58 percent) were not remediated timely and lacked explanatory file documentation. (See Table 1 on page 12.) Six (40 percent) of the 15 red flags identified by the City were remediated late: work was completed on average 150 days after the required deadline date. Sixty-five (61 percent) of the 107 red flags identified by the State were remediated after the required deadline date. Of these, 46 were remediated an average of 144 days late; 19 flags were still not remediated as of the conclusion of our review on December 21, 2011. After we advised the Department about the 19 flags that had not been remediated, we were informed by a Department official on February 12, 2012, that four of the flags had since been completed, two were temporarily made secure, and 13 remained open.[6]

[5] Five of the 122 red flags were also designated for prompt interim action, which requires remediation within 24 hours. In these five cases as noted above, the prompt interim action conditions were timely remediated.

[6] According to the Department official the 13 open flags will be handled as follows: two flags routed to in-house Bridge Repair for repair by mid-May 2012, one flag routed to When-and-Where requirement contract for repair in April 2012, and 10 flags routed to capital contracts. Additionally, the two flags that were made temporarily secure were routed to capital contracts for permanent repair.

Table 1
Red Flags Completed Late with No Justification

Flag Source	No. of Red Flags	Red Flags Completed Late	Range of Days Late
City	15	6 (40.0%)	19 to 408
State	107	65 (60.7%)	4 to 482
Total =	122	71 (58.2%)	

These results are comparable to those found by the Office of the New York State Comptroller in a January 2010 audit of red flag conditions, which found that for the New York City Region, 39 of 66 defects (59 percent) identified between January 1, 2006, and June 24, 2008, were not addressed within required timeframes. Therefore, the issue has not improved.

We attribute the problem of remediating red flags to delays in routing flags to the appropriate staff for remediation, and the Department's practice of frequently deferring remediation multiple times. Additionally, although it is permissible to defer remediation with appropriate certifications, we find it troubling that the reason why a deferral has been requested cannot be readily ascertained from the flag documentation. Furthermore, timely remediation is hampered by a lack of an automatic tracking system that warns the Department of impending deadlines and the lack of written procedures for addressing flag conditions. These matters are discussed in the following sections of this report.

Although the audit did not identify any imminent risks, it must be noted that red flags are indicators of serious structural defects.[7] The failure to timely remedy defects that are red flagged could compromise public safety and increase remedial costs. Although it is currently unknown whether the Department will ultimately be found responsible for a February 2012 incident at the Queensboro Bridge in which a falling "large screw and a piece of metal" damaged a vehicle, this incident shows how bridge defects can lead to serious consequences.[8]

Recommendation

1. The Department should remediate red flag conditions in a timely manner—by either the end of the six-week period as specified in the State Engineering Instruction EI10-016 or the end of the deferral period as certified by the Department.

Department Response: See response following recommendation no. 5.

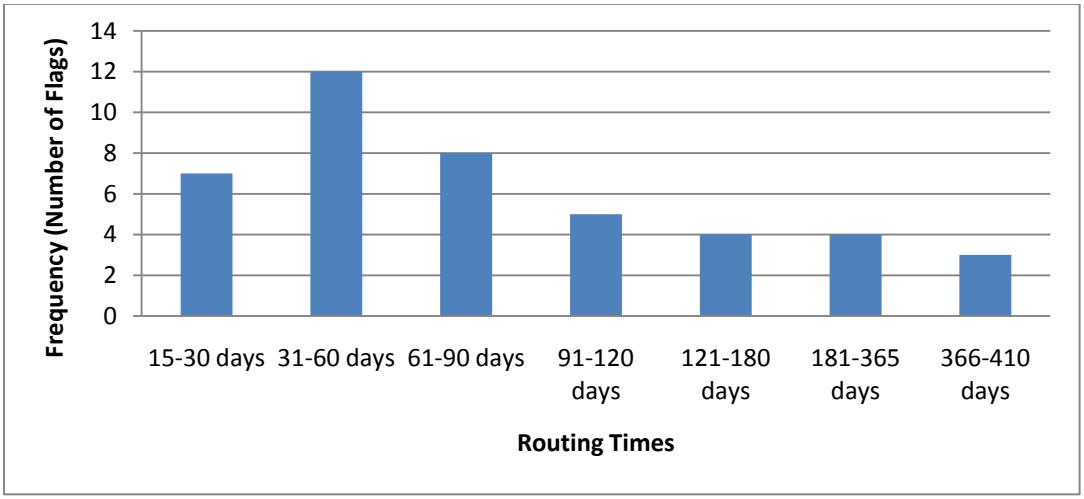
[7] Some examples of possible red flag conditions listed in the Engineering Instruction include: "Structural cracks in substructures along with continuing signs of movement," "Distortion in a load path non-redundant member (e.g., the visible buckling of a compression chord member in a truss)," and "Expansion bearings overextended to the point that portions of the superstructure may drop in elevation."

[8] We could not identify any specific flags that might have pertained to this incident as our audit data only covered flags that were routed through the end of Calendar Year 2010.

Delays in Routing Flags

In order to meet the six-week timeframe for remediating red flags, expeditious routing to the appropriate workforce that will carry out the repairs is critical. In the absence of a criteria and based on our understanding of the process, it is our opinion that two weeks is ample time for the Department's Flag Engineering Section to assess and subsequently route a flag condition. However, our review indicated that the Department took more than two weeks to route 43 (35 percent) of the 122 red flags that were not timely remediated. (See Chart 1 below.) The delay in routing times ranged from 15 to 410 days. There were no explanations in Department files to substantiate the reasons that flags were not handled promptly.[9]

Chart 1
Red Flag Conditions That Were
Routed After More Than Two Weeks



Recommendation

2. The Department should assess and subsequently prepare guidelines for routing flag conditions to the appropriate workforce within a reasonable time period.

Department Response: "Practices in place for routing flags will be documented."

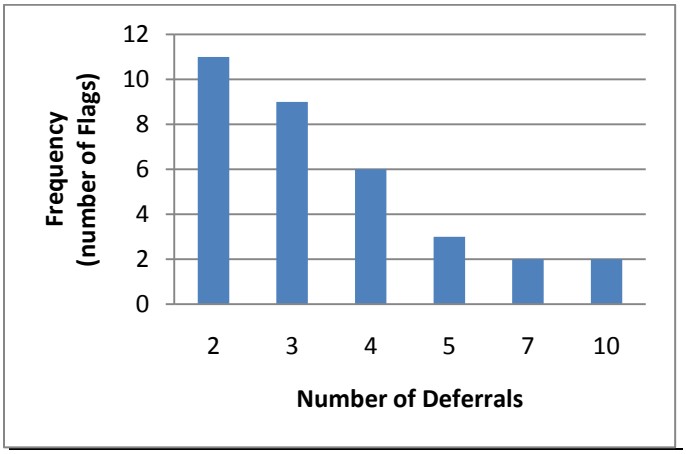
Auditor Comment: The audit identified significant delays in routing flags to the appropriate work force. Therefore, we hope that the Department will not only document its current practices, but also enhance them in accordance with the recommendation.

[9] An additional 13 of the 122 red flags took longer than two weeks to route. In these cases, file documentation contained acceptable explanations for the lengthy routing time.

Flag Remediation Deferred Multiple Times

The Department deferred remedial action for 33 red flags more than once. In fact, two red flags were each deferred 10 times. Chart 2 below shows the frequency of each number of deferrals:

Chart 2
Multiple Deferral Frequencies



The Department's policy of frequently deferring the remediation of flag conditions multiple times points to problems with the Department's ability to plan accurate and reasonable timeframes for remediating red flag conditions. Additionally, multiple deferrals may indicate problems in coordinating work schedules between the flag engineering staff and the workforce that will carry out the remediation work.

Deferring remediation even once is a precarious policy. The Engineering Instruction states: "Generally, all actions taken shall be completed within six weeks from the date of Written Notification," a clear sign that deferrals be infrequent. Nevertheless, the Department deferred remedial action in 82 cases of red flags.

The Department provided justifications for deferments in only five of the 82 cases. Our review indicated that of the flags that lacked justifications, 23 were to be handled under future capital contracts. We believe this practice is appropriate and financially prudent provided that a capital contract is awarded expeditiously. However, the remaining 54 flags that were deferred and lacked justifications were, according to documentation, to be handled by the Department's trades-workers or requirement contractors. For these cases, we were unable to ascertain whether the deferments were indeed appropriate. Although the Engineering Instruction does not require that deferrals be justified, doing so would provide an additional level of oversight information for the State Transportation Department.

Recommendations

The Department should:

3. Limit the practice of routinely deferring the remediation of red flag conditions. In that regard, the Department should investigate the reasons for frequently deferring red flag conditions.

Department Response: See response following recommendation no. 5.

4. Provide written justification in those cases where the remediation of a red flag must be deferred.

Department Response: "Although State procedures do not require written justification for the deferral of a red flag, we will provide it."

5. Reconsider the practice of deferring red flag remediation more than once. In that regard, for those red flag conditions that are deferred beyond six weeks, ensure that the deferral timeframe for remediating a red flag condition is reasonable and accurate. If lengthy timeframes are necessary, consider routing flags to inspection under a defined condition monitoring program.

Department Response to Recommendations 1, 3, and 5: "We disagree with these recommendations [nos. 1, 3 and 5]. By requiring that we close a flag at the end of the six-week period, or at the end of the first deferral period, these recommendations tacitly restrict the alternatives to full repair and exclude options that are good practice throughout the country and contained in the State procedures. For example, State procedures provide that we can monitor certain cracks in structural elements, and if they are not propagating, defer repair. This allows the owner to address conditions considered more hazardous. By definition, monitoring can be indefinite as long as the results show that the condition remains safe. With multiple deferrals we can (and do) set deferral periods in shorter increments and check the results of the monitoring, extending the deferral period if conditions are not changing and remain safe, and expediting the repair if conditions are changing.

In contrast, under these recommendations, we would be precluded from further deferrals, even if monitoring would have shown no change in condition. As a result, resources would be diverted to repairing this safe condition merely to comply with the arbitrary standard. Thus, NYCDOT would be encouraged to set a long deferral period, because the shorter the deferral, the more unnecessary repairs we will be forced to make. Recommendation 5 recognizes this and tries to mitigate the longer timeframe Recommendations 1 and 3 created by recommending that we monitor during the deferral period. It is contradictory for this recommendation to require that the single deferral timeframe be 'reasonable and accurate', while at the same time requiring that it must be determined within six weeks of receipt of the flag — long before any monitoring can produce significant data. With the current practice of incremental deferrals when appropriate, each deferral has a built-in defined

monitoring period and is based on the condition at the time of the latest deferral. We disagree with the blind following of a schedule for its own sake, and with the elimination of engineering judgment in a process where its use could save time, money, and major disruption to the community. The auditors have not presented any justification to demonstrate that the State procedures that we follow are inappropriate."

Auditor Comment: In contrast to the Department's belief that we recommended that the Department "close a flag at the end of the six-week period, or at the end of the first deferral period," we actually stated that red flag conditions should be remediated in that timeframe. As noted in the audit, remediation is not restricted to repair and, in fact, refers to alternative corrective or protective actions including closing or demolishing the bridge or implementing a monitoring program. This requirement is clearly stipulated in the New York State Department of Transportation Engineering Instruction. None of the flags cited in our audit as being remediated late were routed to inspection for monitoring nor was there any documentation in the Department's flag files that indicated that monitoring had been performed. In accordance with the Engineering Instruction, we deemed any flags that were clearly routed to inspection for monitoring as not having a specific timeframe for completion, and, therefore, were not cited as late.

As a representative example of a sampled flag that was not routed for monitoring, in the case of flag no. 35071, the Department was notified about a red flag condition on August 18, 2009. On August 24, 2009, the Department responded to the State that "This flag will be forwarded to our In-House Maintenance Section for repair and the condition will be repaired within three months." There is no mention in the letter about monitoring this condition nor was there any documentation about monitoring in the Department flag files. Moreover, this flag was deferred three additional times. Each time, the Department's letter reiterated that the flag would be forwarded to the "In-House Maintenance Section for repair," and that the condition would be repaired "within three months." However, the condition was not repaired until August 27, 2010—one year after the initial State notification.

6. Enhance coordination between flag engineering staff and the workforce that will carry out the remediation work to ensure that red flag conditions are corrected within planned timeframes.

Department Response: "We believe the current coordination is at a high level and we will continue to encourage the exchange of information among all involved parties."

Auditor Comment: Additionally, the Department should ensure that it coordinates remediation timeframes with the workforce that will carry out the remediation work.

7. Ensure that capital contracts that contain remedial flag work are awarded expeditiously.

Department Response: "We will continue to seek expeditious award of all capital construction contracts; however, occasional delays due to outside parties (oversights, permitting agencies, etc.) are inevitable in certain instances."

Yellow Flags Deteriorated to Red Flags

The State Engineering Instruction does not stipulate a timeframe for remediating yellow and safety flags. Nevertheless, yellow and safety flags that are not timely remediated may eventually deteriorate to the point where the conditions must be flagged as red. In that regard, we identified five sampled red flags that were originally flagged as yellow by the New York State Transportation Department.[10]

Four flags at the Brooklyn Bridge were originally flagged yellow by the State Transportation Department in May 2008; one flag at the Manhattan Bridge was originally flagged yellow in November 2008. The Department did not act to remediate these flag conditions. As a result, the conditions worsened; from May through November 2010 the State Transportation Department replaced the Brooklyn Bridge yellow flags with red flags; the State replaced the yellow flag at the Manhattan Bridge with a red flag in June 2010.[11] In fact, for one of the flags the condition became so critical that it was designated for prompt interim action.[12] Although the Department was originally made aware of these conditions more than three years before our review, all five red flag conditions had not been remediated as of December 21, 2011.[13]

Department Response: "The Report talks about five yellow flags on the Brooklyn and Manhattan Bridges that deteriorated into red flags, and suggests that these flags should have been remediated sooner. The Report states on the previous page that 'We believe that this practice [of deferring flags to future contracts] is appropriate and financially prudent provided that a capital contract is awarded expeditiously', but 'expeditiously' is not defined. By not defining this term, the Report is able to be in favor of the current practice of delaying a repair so that it does not have to be demolished by the upcoming reconstruction contract, while one page later recommending that flags on bridges that went into construction soon after the study period of the Report should have been repaired before construction. Our procedure,

[10] The New York State yellow flag numbers were NA080075, NA080072, NA080074, NA080022, and NW080062.

[11] The New York State red flag nos. and the corresponding City red flag nos. were NM100061/36187(36186), NM100018/36117, NM100020/36370, NM100404/36916, and NN10017/36415. Four of the five red flags were to remediate severe beam section loss, a condition that reduces the amount of available steel to carry the bridge load. The other flag was to remediate a full height and depth vertical crack in a connection plate.

[12] The condition of extreme beam section loss was remediated under NYC Flag No. 36186 by barricading the affected area of the roadway with safety drums.

[13] The Department informed us on February 12, 2012, that NYC Flag No. 36415 was closed on February 8, 2012. The other four flags were routed to capital contract work at the Brooklyn and Manhattan Bridges.

which we believe to be appropriate when a construction project is scheduled in the near future, is to monitor the conditions and only address those flags that could pose a hazard prior to construction."

Auditor Comments: We concluded that a significant cause of the problems noted in this audit is that the Department lacks its own written procedures for flag remediation, which would include carrying out the remediation of yellow and safety flags in a reasonable timeframe. If the Department believes it is appropriate to allow yellow flags to deteriorate to red flags while waiting for future capital contract work to address these deficiencies, the procedures the Department develops should clearly spell this out.

We found other problems with the above noted cases. The BIMS system contains information concerning the yellow flag notifications reported by the State. However, there was no indication that the Department assigned corresponding yellow flag numbers of its own. Division officials explained to us at the exit conference that these yellow notifications were found by the City to not require "flag" work. Nevertheless, the subsequent red flag numbers assigned by the Department could not be traced in the BIMS system to the original yellow notifications by the State. Consequently, BIMS does not reflect the complete sequence of events for these red flags. Moreover, the yellow flag notifications cannot be readily located in the Department's files as the Department did not assign them flag numbers.

The lack of a stipulated timeframe for remediation of yellow and safety flags, which are indicators of serious conditions, must be addressed. As of July 25, 2011, the remediation of 364 yellow flags and 555 safety flags routed in calendar years 2009 and 2010 remained open. As noted above, the these flags, if not remediated within a reasonable period of time may eventually deteriorate to the point where they must be designated as red flags or prompt interim action conditions, both of which may increase repair costs and pose a risk to public safety. In that regard, we note that the Comptroller's Office adjudicated one property damage claim and one personal injury tort claim for $5,250 that resulted from two safety flags that the Department was notified about in calendar year 2009. For the property damage claim, the defect was flagged two months prior to the incident occurrence. For the personal injury claim, the defect was flagged six months prior to the incident occurrence. Although the defect causing the property damage claim was remediated shortly after the incident occurred, the defect responsible for the personal injury claim was not remediated for another eight months.

Department Response: "The Report stretches to find a justification for the auditor's theory that yellow and safety flags that are not closed within a specific timeframe will result in more claims. To put this discussion in perspective, of the thousands of flags that were open during the two year period covered by the audit, the Report identifies only two claims of injury or damage to property, totaling $5,250. This supports the effectiveness of NYCDOT's current procedure. NYCDOT's use of its engineering judgment has in fact resulted in few claims and requiring it to adhere to a strict timeframe for repair, as recommended in the Report, will likely result in greater and more frequent claims of injury and damage."

Auditor Comments: It is obvious that the longer a deficient condition remains open, the greater the likelihood that incidents resulting in claims may occur. Surely, although a safety flag "poses no danger of structural failure or collapse," according to New York State, a safety flag is "used to report a condition presenting a clear and present danger to vehicular or pedestrian traffic . . ." It would be imprudent of the Department to value cost efficiencies above public safety. The Department's contention that adhering to a strict timeframe for repair will likely result in greater and more frequent claims is, quite frankly, illogical.

Recommendations

The Department should:

8. Carry out the remediation of yellow and safety flags in a reasonable timeframe. In that regard, the Department should develop procedures and designate timeframes for the remediation of yellow and safety flags.

Department Response: "NYCDOT currently performs remediation of yellow and safety flags within reasonable timeframes. The Report has provided no justification for its recommendation to establish a specific timeframe, which is not the procedure followed by any bridge owner that we are aware of. As noted previously, we receive new inspection reports frequently, which require that we readjust our priorities for repair operations accordingly. Rigid adherence to any schedule, regardless of how reasonable it was when it was created, ignores the fact that priorities are required to be reevaluated regularly. This recommendation will be counterproductive and it is not acceptable."

Auditor Comment: The Department did not provide any evidence that it currently performs remediation of yellow and safety flags within reasonable timeframes. We note that, according to the 2011 Bridges and Tunnels Annual Condition Report, outstanding yellow flags have increased by 52 percent (from 556 in calendar year 2009 to 845 in calendar year 2011), and safety flags have increased by 11 percent (from 1,309 in calendar year 2009 to 1,459 in calendar year 2011.) Given the increase in the backlog of these flags, it is reasonable to suggest that the Department provide guidelines and timeframes to curb this trend.

9. Maintain documentation in a central location for State Transportation Department flag notifications for which the Department has not assigned flags numbers. Ensure that these notifications are linked in BIMS to any subsequent notifications and flags.

Department Response: "Documentation for flag notifications that have not been assigned flag numbers will be kept in a central location."

Auditor Comment: The Department did not address our recommendation to provide a link in BIMS between notifications that were not assigned flag numbers to any subsequent notifications and flags for the same condition.

Compliance Problems with New York State Regulations

The Department has not complied with reporting criteria set forth in the New York State Department of Transportation Engineering Instruction EI10-016 (Inspection Flagging Procedure for Bridges). Our review of documentation contained in the Department's files indicated that many required New York State certifications and responses were either missing or submitted late.

Missing and Late Certifications

For flags that are designated for prompt interim action, the Engineering Instruction requires that within 24 hours of notification to the Division's Flag Engineering unit of the flag condition, a New York State professional engineer must certify in writing the remedial action. Our review found that Department files lacked certifications for 21 of the 40 safety flags that were identified by the State Transportation Department and required prompt interim action. An additional 17 certifications for safety flags with prompt interim action conditions were submitted after the 24-hour deadline. Similarly, Department files lacked certifications for three of the five red flags that required prompt interim action. The other two certifications for red flags with prompt interim action conditions were submitted after the 24-hour deadline.

For red flags, the Engineering Instruction requires that within six weeks of being notified of a flag condition, a New York State professional engineer must certify in writing the remedial action. If the decision is to defer remediation beyond the six-week timeframe, the engineer must certify that the bridge is safe and the flag condition is not a danger to the public. Our review found that Department files lacked certifications for 23 of the 107 red flags that were identified by the State Transportation Department. An additional 14 certifications were submitted after the six-week deadline.

Additionally, the Engineering Instruction requires that the completion of certified corrective or protective actions be reported to the State Transportation Department. The Department appropriately provided "Flag Closure Letters" for all but four of 88 red flags that were remediated, although 72 of the notifications were submitted more than seven days after remedial work was completed.[14]

We attribute these problems to the Department's lack of an appropriate system to track correspondence and certifications to the State Transportation Department. Instead of a tracking system, the Department uses a manual system. We were advised by Department officials that "all correspondence with the NY State is in the flag folder."

[14] Although the Manual does not specify a timeframe for notifying the State about closed flags, it is reasonable to expect that flag closure letters be sent timely (i.e., within one week after remediation). The submission timeframes for the 72 notifications submitted more than seven days after remedial work was completed ranged widely from eight to 277 days after flag closure.

Lack of Professional Engineer License Numbers

According to the Office of the New York State Comptroller's January 2010 audit report of red flag remediation, New York State Transportation Department officials advised that "they have instructed the regional offices to require the Professional Engineering License Number or stamped seal when actions are certified by engineers." Although we found that only 13 of the 189 actions that were to be certified by engineers contained the required professional engineer license numbers, our review indicates that the Department has started to comply with this stipulation.[15]

Department officials told us that accompanying certifications with a professional engineer license number or stamp seal are not required. Nevertheless, in order to conform to the above noted audit, the Department agreed that "due to a recent request from NY State DOT our P.E. license number is placed on all our correspondence with NYS DOT." Provision of a professional engineer license number or stamp seal on the certifications provides additional assurance that the certifications are, in fact, being made by a licensed New York State Professional Engineer.

Recommendations

The Department should:

10. Submit all required certifications and correspondence to the State Transportation Department within required timeframes.

Department Response: "We will revisit procedures to ensure documents are submitted within required timeframes and revise, as necessary."

11. Develop a system for tracking and monitoring correspondence and certifications to the State Transportation Department.

Department Response: "We will enhance our system that tracks and monitors correspondence and certifications to NYCDOT."

12. Develop guidelines to ensure that flag closure letters are submitted to the State Transportation Department within a reasonable time period after flag conditions are remediated.

Department Response: "As with Recommendation 10, we will enhance our procedures to ensure documents are submitted within required timeframes and revise, as necessary."

13. Provide professional engineer license numbers or stamp seals on all certifications and correspondence as recommended in the New York State Comptroller's January 2010 audit.

[15] Although many of the certifications lacked license numbers, the actual certifications were signed by professional engineers.

Department Response: "Professional Engineer's license numbers were included on certifications and correspondence since May 2011, when we were asked to do so by NYSDOT."

Lack of Sufficient Written Procedures

The Department lacks sufficient written procedures for remediating flag conditions. While the Department relies primarily on procedures contained in the New York State Department of Transportation Bridge Inspection Manual and Engineering Instruction EI10-016, these do not cover all aspects of the flag remediation process. Consequently, certain aspects of the process are not handled consistently by the Department or do not have a specific timeframe for remediation.

For example, red flags and flags designated for prompt interim action that are identified by New York State inspectors require the Department to provide a timeframe for remediation if work is to be deferred. However, there is no similar requirement for providing timeframes for these types of flags that are identified by City inspectors. Consequently, as this information is not available in the Department's files or in the BIMS system, there is no way to ascertain whether remedial work for these flags is proceeding expeditiously.

Additionally, we note that the routing of flags that are designated for prompt interim action is not handled consistently. According to the Department, "The repair work on red PIA or a safety PIA can be addressed by one or two flags." In other words, the temporary repair of a prompt interim action condition is sometimes handled under one flag number while the permanent repair is handled under another flag number. Using only a single number for flags that have prompt interim action conditions would be a means of effectively tracking temporary and permanent repairs at the same location.

We also note that the Department's procedure for closing the file for a flag whose condition has been remediated is not consistent. In some cases, there was no evidence that an engineer had reviewed the documentation about a completed flag. In other cases, engineers initialed and dated flag tracking forms, whereas some forms were only initialed.

Recommendation

14. The Department should develop its own formal written procedures for carrying out remediation of flag conditions. Where appropriate, the Department should incorporate elements of the procedures in the New York State Department of Transportation Bridge Inspection Manual and Engineering Instruction EI10-016.

Department Response: "We disagree with this recommendation. We believe the NYSDOT Bridge Inspection Manual and EI 10-016 provide a rational, practical and effective method of addressing flag conditions."

Auditor Comment: As noted in the audit, the Engineering Instruction does not cover all aspects of the flag remediation process as it pertains to the Department. Procedures

developed by the Department should contain specific detail about implementing in daily practice the overall requirements specified by the State. Additionally, procedures should provide guidelines for prioritizing and scheduling flag remediations, routing flags, and maintaining hard copy and electronic documentation. Furthermore, written procedures should provide clarification about the Department's policy regarding deferrals and timeframes.

Problems with BIMS Database

The Department's BIMS database was intended to track information about all City-owned bridges. However, during the course of our audit, we found various problems with the database that impedes the Department's ability to effectively monitor and report on the condition and status of flag repairs.

We found various inaccuracies in dates recorded in BIMS. For flags designated as prompt interim action, the actual notification date (i.e., the date that the Department was informed of the condition by telephone, e-mail or oral report) is not always recorded correctly in BIMS. Our data testing of 15 flags designated as prompt interim action identified seven cases with discrepancies between the notification dates in BIMS and those handwritten on the hardcopy flagged bridge tracking form. In addition, the BIMS system lacks a specific date field to show when prompt interim action conditions were remediated.[16]

Similarly, for red flags, the actual completion date is not always recorded correctly in BIMS. Our data testing of 15 red flags identified nine cases of discrepancies between the flag completion dates in BIMS and those handwritten on the hardcopy flagged bridge tracking form. According to Department officials, "For all flags, the completion date is the date handwritten by the unit that did the work in the DATE OF COMPLETION field on the COMPLETION REPORT of the FLAGGED BRIDGE TRACKING FORM." Accordingly, BIMS should reflect these dates accurately.

We also identified inaccuracies in the status of certain flag conditions. The Department provided us with a list of 68 flags whose status was "Error-not a flag." However, for 63 of these flags, the work status in BIMS was "Repair Required;" the work status for two flags was "Monitoring."

The Department does not have an automatic system to track the dates by which flag conditions must be remediated. Consequently, as the BIMS system cannot be used to ascertain whether flag repairs are timely or late, BIMS is not an adequate means of monitoring the status of flag conditions. Similarly, the BIMS system does not track correspondence and certifications to the State Transportation Department.

[16] Remediation dates are generally noted in a comments field in BIMS—an ineffectual way for performing date related calculations and for ensuring that completion dates are always recorded.

Recommendations

The Department should:

15. Accurately record in BIMS the dates that show when the Department was notified about flag conditions and remediated them.

Department Response: "NYCDOT will continue to monitor the accuracy of data recorded in BIMS with enhanced frequency."

16. Update BIMS to allow remediation dates for prompt interim action conditions to be recorded in a specific date field.

Department Response: "We disagree with this recommendation. We feel that it is important to track that upon implementation of an interim repair, the flag is no longer a PIA condition, despite the fact that the flag itself remains open. In those cases we will close the PIA flag and issue a new flag for the current condition. Combining that information into a single flag, complicates our ability to track and prioritize a flag that now represents a less urgent condition."

Auditor Comment: The Department did not directly respond to our recommendation. As noted in the audit report, remediation dates for prompt interim action conditions are generally noted in a comments field in BIMS, which is an ineffectual way for performing date-related calculations and for ensuring that completion dates are always recorded.

17. Ensure that information about flag work status is periodically updated in the BIMS system, and reviewed for accuracy by the flag engineer.

Department Response: "NYCDOT will continue to monitor the work status updates with enhanced frequency."

DETAILED SCOPE AND METHODOLOGY

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter. This audit was conducted by staff that included auditors with engineering backgrounds.

The scope of this audit covers flags "routed" (i.e., sent) in Calendar Years 2009 and 2010 to the Department's staff of trades-workers, requirement contractors, or capital project staff to undertake the repairs.

To understand internal controls that are relevant to our audit and to understand the flag remediation process, we interviewed officials of the following Department Division of Bridges units: Flag Engineering, Inspection, Repair and Preventive Maintenance, and "When and Where." We also interviewed the supervisor of flag analysis and administration to understand how flags are recorded in BIMS, and BIMS MIS support staff to understand what data is contained in BIMS and how it relates to the hardcopy Flagged Bridge Tracking Form. Additionally, we reviewed organizational charts to determine relationships and responsibility hierarchies.

To understand the policies, procedures, and regulations governing the flag remediation process, we reviewed and used as criteria:

- The New York State Department of Transportation Bridge Inspection Manual
- The New York State Department of Transportation Engineering Instruction EI10-016 (Inspection Flagging Procedure for Bridges)[17]
- The Laws of New York – Highway (HAY) Article 9 Sections 230, 231, 232, and 234, and
- Appendix B-1 of the 2009 and 2010 New York City Department of Transportation Bridges and Tunnels Annual Condition Reports, which provide flag definitions, statistics, and procedures.

In addition we also reviewed the Office of the New York State Comptroller's Audit Report #2008-S-102 entitled: *Department of Transportation Management and Oversight of Structural Defects on Highway Bridges* dated January 12, 2010.

[17] EI10-016 was provided to us by Division officials at the exit conference. This EI replaces Appendix I of the Bridge Inspection Manual effective from July 1, 2010. It was subsequently reviewed and the audit report was updated as necessary.

We also obtained and reviewed background information about the Department and its Division of Bridges from the Department's website and the Fiscal 2010 Mayor's Management Report. We documented our understanding of these controls and procedures in written memoranda and a comprehensive flowchart.

On July 25, 2011, the Department provided a list of flags routed in Calendar Years 2009 and 2010. (This data was extracted from the Department's BIMS system.) From the data provided by the Department, we created separate listings for flags that were the responsibility of the Division of Bridges (referred to as Division of Bridges workload), and segregated them by flag type. We tested the data for accuracy and completeness. We analyzed the data for duplicates and gaps, and compared the data contained in the hardcopy files with the BIMS data. A number of records were removed from the listings so they would accurately reflect a single record for each valid flag.

As our audit objective focused on timeliness, we limited our audit population to flags that have a specific timeframe for remediation according to Appendix I (Flagging Procedure) of the New York State Department of Transportation Bridge Inspection Manual and Engineering Instruction EI10-016. The types of flags that meet this criteria are red and safety flags with prompt interim action conditions and red flags in the Division of Bridges workload. Our population consisted of 231 flags as follows:

- 207 flags shown on the listing as completed comprised five red flags with prompt interim action conditions, 105 safety flags with prompt interim action conditions, and 97 red flags without prompt interim action conditions.

- 24 flags shown on the listing as open, consisting of two safety flags with prompt interim action conditions, and 22 red flags without prompt interim action conditions.

We chose to sample 100 percent of the population (i.e., 231 flags).

During our audit fieldwork, the population was reduced to 229 flags, after finding that, in two cases, the same condition was reported as two separate flags—one flag was used for the temporary repair of the prompt interim action condition and a second flag for the permanent repair. Additionally, three of the 22 open red flags were subsequently closed, thereby leaving 19 open red flags. Although the two safety flags were still open, their prompt interim action conditions had been addressed; as the remediation of prompt interim action conditions has a specific timeframe, these flags would be considered closed for the purposes of our audit. Accordingly, our audit population was re-stated as follows:

- 210 completed flags comprised five red flags with prompt interim action conditions, 107 safety flags with prompt interim action conditions (a total of 112 flags with prompt interim action conditions), and 98 red flags without prompt interim action conditions.

- 19 open red flags without prompt interim action conditions (a total of 117 red flags without prompt interim action conditions).

To determine whether the Department is carrying out repairs of safety and structural defects in a timely manner, we reviewed the hardcopy flag files and information contained in the BIMS database. We collected and develop spreadsheets of relevant information about pertinent dates, flag routings, deferrals, and compliance with State requirements. Furthermore, we obtained additional clarifying information from the Department. We analyzed the spreadsheets for timeliness of repairs, presence and completeness of required certifications to the State Department of Transportation, justification of delays and deferrals, and other issues. We developed our findings and conclusions on the basis of our analyses.

Additionally, using the New York State Education Department Office of the Professions online verification search feature, we verified the credentials of all personnel that the Department stated were professional engineers licensed in the State of New York.

Finally, in order to assess whether delayed repairs could have a financial impact, we also obtained from the New York City Comptroller's Office Bureau of Information Systems a list of filed claims that occurred January 1, 2009, or later, and that were likely to be related to bridges. Focusing on claims that were settled and paid, we reviewed each claim to determine whether the occurrence was actually on a bridge and caused by a condition that met flag requirements. For claims meeting these criteria, we performed a manual match between occurrence information (locations, dates, and description of incident) and flag data. Based on this assessment, we identified seven claims that were directly related to three uncorrected flagged bridge defects.

NEW YORK CITY Department of Transportation

JANETTE SADIK-KHAN, Commissioner

May 8, 2012

Ms. Tina Kim
Deputy Comptroller for Audits
1 Centre Street Room 1100
New York, N.Y. 10007-2341

Re: Draft Report on the Audit of the New York City Department of Transportation's (NYCDOT) Remediation of Bridge Defects 7E11-128A

Dear Ms. Kim:

Thank you for the opportunity to respond to the Draft Audit Report on the Department of Transportation's Remediation of Bridge Defects (the "Report"). We appreciate the independent assessment of the New York City Department of Transportation's (NYCDOT) timeliness in responding to bridge defects and we are pleased that the audit confirmed that NYCDOT's procedures do not pose any imminent risks. We have considered the Report's seventeen recommendations carefully and offer the following responses.

General comments:

We disagree with the Report's recommendations related to flag remediation timeframes and deferral periods. Several of these recommendations seem to eliminate engineering judgment for the actions taken in response to flags and suggest adopting rigid remediation procedures. As stated on page 5 of the Report, the audit objective was to determine whether NYCDOT is carrying out ***repairs*** of bridge safety and structural defects in a timely manner. The New York State Department of Transportation ("NYSDOT" or "State") procedures, which NYCDOT follows, have no rigid timeframes for repair, as their focus is on safety. The existing procedures provide other remedial actions besides repair and even allow the stated timeframes for Prompt Interim Action ("PIA") and red flags to be deferred if the licensed engineer for the responsible party determines that the condition would remain safe. There is no requirement that the deferment of remedial action be made only once nor do they contain timeframes for the repair of yellow and safety flags.

Simply stated, State procedures set a "default" time frame for addressing PIA and red flags – 24 hours and six weeks, respectively. However, the procedures allow the responsible engineer to set different timeframes, based on the particular condition, if the engineer certifies that it is safe to do so. Several options for assuring safety, other than full repair, are contained in the procedures.

In the absence of a "fixed timeframe" standard with which to measure NYCDOT's timeliness as required by the objective of the audit, the auditors added their own arbitrary standard in which PIA and red flags may be deferred only once (Footnote 4 of the Report) and then measured NYCDOT's performance against this self-created standard. We object to this "deferred only once" standard since it does not appear to be based on any engineering or safety analysis.

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The Report states that not adhering to the default time frames and instead utilizing the other options contained in State procedures is "precarious policy". Again the Report fails to provide any support for this determination. The Report goes even further and arbitrarily restricts the number of times engineers can use their professional judgment, which results in the creation of unrealistic and unworkable schedules. We disagree and assert that State procedures and good practice mandate that the prioritization of flag repairs be based on safety, and not solely on a clock.

Prioritization needs to be flexible since conditions can frequently change. The procedures in the State and throughout the country allow for methods of addressing flags other than repair. Those methods include posting a bridge for specific load restrictions based on a determination by a licensed engineer that the bridge remains safe until the repair can be made. As just one example, the procedures (and practice throughout the world) allow for the condition to be monitored and repairs to be deferred as long as the monitoring indicates that the structure remains safe. However, the Report recommends that once the repair is deferred in order to implement the monitoring, it should not be further deferred regardless of the results of that monitoring. The State procedures are based on years of experience that have demonstrated that it is a reasonable way of setting priorities, and it is consistent with procedures used throughout the country. The Report's recommendations regarding timeliness of repair are not based on evidence obtained by auditors, but rely on anecdotal (and incorrect) information and conjecture. We disagree with the recommendation and feel that priorities that are set solely by a clock would result in a less safe and more expensive flag repair program.

The Report talks about the upside of fixing all categories of flags sooner than required by the State procedures, but makes no mention of downsides. For yellow and safety flags, the auditors put the onus on NYCDOT to define "reasonable" timeframes as used in their recommendation. However, with 787 structures undergoing inspections every two years, NYCDOT receives new inspection reports regularly, which require that it readjust its priorities for repair operations accordingly. Rigid adherence to any schedule, regardless of how reasonable it was when it was created, ignores the fact that priorities are required to be reevaluated and changed frequently. The success of NYCDOT's procedure is clear from the Report, which states that "the audit did not identify any imminent risks". Moreover, of the more than 4,700 flags that were open at some time during the audit period, the Report identifies only two claims of injury or damage to property related to a flag, totaling $5,250, that were filed with the Comptroller's Office. While our goal is zero, this low number indicates that our prioritization, which is consistent with State procedures, is clearly effective

In sum, while we will enhance some portions of our procedures as recommended in the Report, we disagree with the recommendation that NYCDOT change repair priorities to comply blindly with a schedule, without consideration of safety or cost. It is clear that if unnecessary repairs are performed simply to adhere to a schedule, the fewer necessary repairs can be implemented and the more costly each repair will become. We believe that the recommendations related to the timeframe for implementing repairs will adversely impact a process that is compliant with State procedures and national practice, and that, as documented in the Report, is efficient and effective.

Specific Comments:

Page 7. Despite the claim (on page 16) that "the evidence obtained [in this audit] provides a reasonable basis for our findings and conclusions", the auditors have cited no evidence in the audit study period that supports the recommendation on this page. By its own conclusion, "the audit did not identify any imminent risks". However, to justify a proposed change in the procedures that are, by its own words, working, the Report relies on a recent incident on the Queensboro Bridge wherein a "large screw and piece of metal" fell onto a car below (although this incident occurred outside the audit period; see Footnote 6). Had this incident occurred during the study period, the auditors would have found that the condition was never flagged and that the debris in question did not even come from our bridge. Although the auditors use this example as the best argument in support of their recommendation, their reliance on it is misplaced.

The Report does not provide a single example of a red flag that is an imminent risk. Instead, in Footnote 8, it quotes textbook descriptions of hypothetical red flag conditions creating the false impression that these are actual unattended conditions. In contrast, the Report neglects to quote NYSDOT Engineering Instruction EI10-016, Inspection Flagging Procedure for Bridges ("EI10-106"), which states: "Red Flags may be replaced by Yellow Flags and vice versa based on an evaluation by the Responsible Bridge Engineer (RBE). The RBE has the reclassification authority," (EI10-106, p. 8/24).

Page 9: The second paragraph of the Report states that "Deferring remediation even once is a precarious policy". The only basis for this statement is a selective quote from EI10-016 that "Generally, all actions taken shall be completed within six weeks from the date of the Written Notification". The Report concludes that this is a "clear sign" that deferrals should be infrequent. This conclusion is a huge leap from an assumed preference to a "precarious policy", and was made without any basis.

The referenced paragraph of EI10-016 (at p. 5/24) actually continues as follows: "... but if action is deferred, a New York State Professional Engineer shall certify that the bridge is safe and the flagged condition is not a danger to the traveling public." The preceding paragraph states that "If no action is taken, the response will explain the reason for this decision." It appears that the incomplete quote was edited to convey the predetermined position of the auditors and distorts the guidance and intent of EI10-106.

Page 10. The Report talks about five yellow flags on the Brooklyn and Manhattan Bridges that deteriorated into red flags, and suggests that these flags should have been remediated sooner. The Report states on the previous page that "We believe that this practice [of deferring flags to future contracts] is appropriate and financially prudent provided that a capital contract is awarded expeditiously", but "expeditiously" is not defined. By not defining this term, the Report is able to be in favor of the current practice of delaying a repair so that it does not have to be demolished by the upcoming reconstruction contract, while one page later recommending that flags on bridges that went into construction soon after the study period of the Report should

have been repaired before construction. Our procedure, which we believe to be appropriate when a construction project is scheduled in the near future, is to monitor the conditions and only address those flags that could pose a hazard prior to construction. For example, 451 flags were routed to the contractor on the Brooklyn Bridge, 56 flags are currently routed to the contractor on the Manhattan Bridge (a total of 1,015 flags were closed on this bridge by reconstruction contracts since 1996), 107 flags were routed to the contractor for the Belt Parkway over Paerdegat Basin (50 were already closed, mostly by the demolition of the old eastbound bridge), and we closed 90 flags when we demolished the Willis Avenue Bridge and associated ramps. This practice saves not only the cost of repairing something that would be demolished shortly, but minimizes the impact of additional roadway closures on traffic and the community.

Page 11. The Report stretches to find a justification for the auditor's theory that yellow and safety flags that are not closed within a specific timeframe will result in more claims. To put this discussion in perspective, of the thousands of flags that were open during the two year period covered by the audit, the Report identifies only two claims of injury or damage to property, totaling $5,250. This supports the effectiveness of NYCDOT's current procedure. NYCDOT's use of its engineering judgment has in fact resulted in few claims and requiring it to adhere to a strict timeframe for repair, as recommended in the Report, will likely result in greater and more frequent claims of injury and damage.

Recommendations and responses:

Recommendations 1, 3, and 5

Recommendation 1: The Department should remediate red flag conditions in a timely manner - by either the end of six-week period as specified in the Engineering Instruction or the end of the deferral period as certified by the Department.

Recommendation 3: Limit the practice of routinely deferring the remediation of red flag conditions. In that regard, the Department should investigate the reasons for frequently deferring red flag conditions.

Recommendation 5: Reconsider the practice of deferring red flag remediation more than once In that regard, for those red flag conditions that are deferred beyond six weeks, ensure that the deferral timeframe for remediating a red flag condition is reasonable and accurate. If lengthy timeframes are necessary, consider routing flags to inspection under a defined condition monitoring program.

Response:

We disagree with these recommendations. By requiring that we close a flag at the end of the six-week period, or at the end of the first deferral period, these recommendations tacitly restrict the alternatives to full repair and exclude options that are good practice throughout the country and contained in the State procedures. For example, State procedures provide that we can

monitor certain cracks in structural elements, and if they are not propagating, defer repair. This allows the owner to address conditions considered more hazardous. By definition, monitoring can be indefinite as long as the results show that the condition remains safe. With multiple deferrals we can (and do) set deferral periods in shorter increments and check the results of the monitoring, extending the deferral period if conditions are not changing and remain safe, and expediting the repair if conditions are changing.

In contrast, under these recommendations, we would be precluded from further deferrals, even if monitoring would have shown no change in condition. As a result, resources would be diverted to repairing this safe condition merely to comply with the arbitrary standard. Thus, NYCDOT would be encouraged to set a long deferral period, because the shorter the deferral, the more unnecessary repairs we will be forced to make. Recommendation 5 recognizes this and tries to mitigate the longer timeframe Recommendations 1 and 3 created by recommending that we monitor during the deferral period. It is contradictory for this recommendation to require that the single deferral timeframe be "reasonable and accurate", while at the same time requiring that it must be determined within six weeks of receipt of the flag – long before any monitoring can produce significant data. With the current practice of incremental deferrals when appropriate, each deferral has a built-in defined monitoring period and is based on the condition at the time of the latest deferral. We disagree with the blind following of a schedule for its own sake, and with the elimination of engineering judgment in a process where its use could save time, money, and major disruption to the community. The auditors have not presented any justification to demonstrate that the State procedures that we follow are inappropriate.

Recommendation 2: The Department should assess and subsequently prepare guidelines for routing flag conditions to the appropriate workforce within a reasonable time period

Response: Practices in place for routing flags will be documented.

Recommendation 4: Provide written justification in those cases where the remediation of a red flag must be deferred.

Response: Although State procedures do not require written justification for the deferral of a red flag, we will provide it.

Recommendation 6: Enhance coordination between flag engineering staff and the workforce that will carry out the remediation work to ensure that red flag conditions are corrected within planned timeframes.

Response: We believe the current coordination is at a high level and we will continue to encourage the exchange of information among all involved parties.

Recommendation 7: Ensure that capital contracts that contain remedial flag work are awarded expeditiously.

Response: We will continue to seek expeditious award of all capital construction contracts; however, occasional delays due to outside parties (oversights, permitting agencies, etc.) are inevitable in certain instances.

Recommendation 8: Carry out the remediation of yellow and safety flags in a reasonable timeframe. In that regard, the Department should develop procedures and designate timeframes for the remediation of yellow and safety flags.

Response: NYCDOT currently performs remediation of yellow and safety flags within reasonable timeframes. The Report has provided no justification for its recommendation to establish a specific timeframe, which is not the procedure followed by any bridge owner that we are aware of. As noted previously, we receive new inspection reports frequently, which require that we readjust our priorities for repair operations accordingly. Rigid adherence to any schedule, regardless of how reasonable it was when it was created, ignores the fact that priorities are required to be reevaluated regularly. This recommendation will be counterproductive and it is not acceptable

Recommendation 9: Maintain documentation in a central location for State Transportation Department flag notifications for which the Department has not assigned flags numbers. Ensure that these notifications are linked in BIMS to any subsequent notifications and flags.

Response: Documentation for flag notifications that have not been assigned flag numbers will be kept in a central location

Recommendation 10: Submit all required certifications and correspondence to the State Transportation Department within required timeframes

Response: We will revisit procedures to ensure documents are submitted within required timeframes and revise, as necessary.

Recommendation 11: Develop a system for tracking and monitoring correspondence and certifications to the State Transportation Department.

Response: We will enhance our system that tracks and monitors correspondence and certifications to NYSDOT.

Recommendation 12: Develop guidelines to ensure that flag closure letters are submitted to the State Transportation Department within a reasonable time period after flag conditions are remediated.

Response: As with Recommendation 10, we will enhance our procedures to ensure documents are submitted within required timeframes and revise, as necessary.

Recommendation 13: Provide professional engineer license numbers or stamp seals on all certifications and correspondence as recommended in the New York State Comptroller's January 2010 audit.

Response: Professional Engineer's license numbers were included on certifications and correspondence since May 2011, when we were asked to do so by NYSDOT.

Recommendation 14: The Department should develop its own formal written procedures for carrying out remediation of flag conditions. Where appropriate, the Department should incorporate elements of the procedures in the New York State Department of Transportation Bridge Inspection Manual and Engineering Instruction EI 10-016.

Response We disagree with this recommendation. We believe the NYSDOT Bridge Inspection Manual and EI 10-016 provide a rational, practical and effective method of addressing flag conditions

Recommendation 15: Accurately record in BIMS the dates that show when the Department was notified about flag conditions and remediated them.

Response: NYCDOT will continue to monitor the accuracy of data recorded in BIMS with enhanced frequency.

Recommendation 16: Update BIMS to allow remediation dates for prompt interim action conditions to be recorded in a specific date field.

Response: We disagree with this recommendation. We feel that it is important to track that upon implementation of an interim repair, the flag is no longer a PIA condition, despite the fact that the flag itself remains open. In those cases we will close the PIA flag and issue a new flag for the current condition. Combining that information into a single flag, complicates our ability to track and prioritize a flag that now represents a less urgent condition.

Recommendation 17: Ensure that information about flag work status is periodically updated in the BIMS system, and reviewed for accuracy by the flag engineer.

Response: NYCDOT will continue to monitor the work status updates with enhanced frequency.

If there are questions on this response, I can be reached at (212) 839-4408.

Very truly yours,

LUCITA C. ANDRES
Auditor General

cc: Comm. J. Sadik-Khan, FDC L. Ardito, DC/CBO H. Perahia, DCE R. Holcomb, G. Davis (MOO)