IMPROVING THE MANAGEMENT OF CREWS IN THE MTA LONG ISLAND RAIL ROAD'S STRUCTURAL MAINTENANCE DIVISION

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OVERVIEW

The MTA Long Island Rail Road (LIRR) maintains its vast network of stations, bridges and facilities with an in-house workforce comprised of five- or six-person crews. Unlike those performing particular duties each day at the same facility, these crews might be assigned to various locations over a wide area throughout any given day. While monitoring the performance and whereabouts of such workers is certainly challenging, doing so is essential to maintain an appropriate and cost effective level of productivity.

The Office of the MTA Inspector General (OIG) examined the replacement of a staircase at the Great Neck station performed by a crew from LIRR's Structural Maintenance Division and concluded that workers were not productively engaged. We estimate that several thousand labor hours and more than $160,000 were wasted through lax supervision of the crew assigned to the project. Notably, the problems that OIG encountered on this project appear to be systemic. Our findings indicate that low expectations on the part of the supervisor in charge of the project with regard to the amount of time that the crew was expected to spend at the job site each day, reduced the productivity of the crew. Moreover, because division managers and the project supervisor did not employ a project schedule and budget to plan and monitor the project, they could not ensure that the project would be completed in a timely and efficient manner. Indeed, our review of two other LIRR construction projects performed by crews from Structural Maintenance—a fence installation along a roadway in Manhasset and staircase replacement at Deer Park station—revealed that the same management deficiencies, including low expectations, also delayed the completion of these projects..

In conducting its review, OIG utilized information obtained through the LIRR's Automatic Vehicle Location Monitoring (AVLM) system. The LIRR has employed AVLM since 2007 to track all trucks and vehicles that support the maintenance of its infrastructure. This system allows LIRR to locate vehicles in real time, and run historical reports on vehicle location. OIG used the AVLM data specifically to reconstruct the amount of time crews spent at the job sites for our three case studies. We also supplemented our analysis of Great Neck with several field observations of the crew members and interviews with their supervisor.

Summary of Findings

- The staircase replacement at Great Neck station was completed in 115 working days over the course of six months, consumed 5,677 labor hours, and cost more than $261,000 in labor alone. Based on input from a construction, engineering, and scheduling consultant retained by OIG, we estimate that the work should have taken the LIRR crew 2.5 months to complete, consumed 2,500 labor hours and cost just over $98,000 in labor. The supervisor in charge of the project could not adequately explain why the staircase replacement at Great Neck took so long to complete.

- On average, slightly more than one hour each shift, totaling some 660 labor hours, was lost on the Great Neck job specifically because the crew members were slow to arrive at the job site and/or left the site well before the scheduled end of their shift. This total represents 12 percent of the labor hours consumed on the project, and 21 percent of the overall 3,177 labor hours we determined were wasted time.

- Approximately 120 labor hours were lost on the Manhasset fence installation, because the crew members left their headquarters late and returned early. The lost time represents 13 percent of the 926 labor hours consumed by this project.

- The Manhasset project employed an inefficient method of fence construction that predictably extended the length of the job. The project supervisor could not adequately explain why he employed this method.

- At Deer Park, the crew was offsite for 13 percent of an expected onsite time of six hours and 15 minutes. This down time further reflects a pattern of inefficient management.

- Supervisors do not use the AVLM system to track the performance of their crews.

- Because Structural Maintenance managers and supervisors do not employ commonly used management tools, such as project work scopes, schedules, budgets and status reports to plan and monitor the construction work performed by the division, project delivery dates are not established for projects, the cost of the job is never calculated and progress is not tracked and reported by supervisors to management as the job progresses.

- The crew that worked on the Great Neck project frequently claimed that it "worked through lunch," and were paid time-and-a-half for the 30 minutes it claimed to work. Although the amount involved was small (about $5,200), LIRR management acknowledged that Structural Maintenance workers would rarely have a valid reason for working through lunch.

As a result of these project management and reporting deficiencies, managers and supervisors cannot adequately plan the work, control costs, take remedial action in timely fashion, or fully explain why projects are not completed in a reasonable time. The absence of project

management and reporting also weakens management's ability to measure performance and hold supervisors and crews accountable for their work.

Recommendations

In order to ensure that all field crews are productively engaged, LIRR management must set standards for work performance, have adequate tools to measure that performance, and periodically monitor these workers. OIG recommends that LIRR management:

- Set clearly-defined expectations for its field crews regarding job site arrival and departure times, and require that supervisors and foremen enforce those expectations.
- Require supervisors to utilize the LIRR's AVLM to monitor their crews on a daily basis
- Require development of work scopes, budgets, and schedules for construction jobs performed by crews in the Structural Maintenance Division.
- Require that each supervisor in charge of a crew performing work prepare a written status report for review by the principal engineer of the Structures Department at least once every 30 days.
- Establish and enforce a written policy and procedure for employees that defines and controls "working through lunch."

Summary of Agency Response

We discussed our findings and recommendations with LIRR management throughout our review, rather than waiting for the report process to be completed, and then shared with management our preliminary report in early June 2012 for agency comment.

In a written response to the OIG dated September 4, 2012, the railroad accepted all our recommendations, noted that it had already implemented many of them, and declared: "In short, the LIRR has taken proactive steps to change the way in which these types of projects are managed." Specific steps taken by LIRR are detailed in this report following each recommendation.

BACKGROUND

The Engineering Department (Engineering) is responsible for the design, construction, maintenance and rehabilitation of LIRR's physical plant, excluding rolling stock. Construction and maintenance is performed by five sub-departments, one of which is Structures. This sub-department is responsible specifically for the design, inspection, construction, maintenance and rehabilitation of line structures throughout the LIRR System.

The Structural Maintenance Division (Structural Maintenance) is a unit of the Structures Department (Structures) that is responsible for repairs to train stations, support structures (such as bridges), and right-of-way enclosures (such as fences and retaining walls). Almost all of this work is funded by LIRR's operating budget.

The applicable reporting structure within the Engineering Department is detailed in Chart 1. LIRR's chief engineer is the highest ranking official in Engineering.

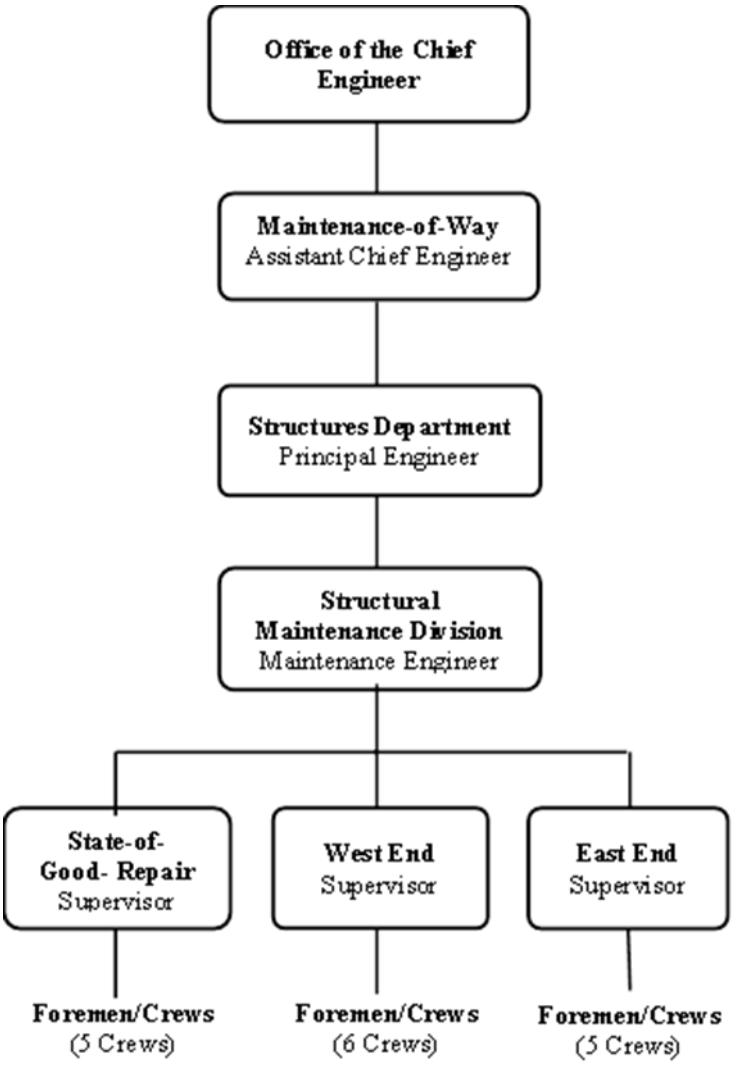
Structural Maintenance is divided into three subdivisions. Each subdivision is headed by a supervisor who reports to the engineer for Structural Maintenance (Maintenance Engineer), who in turn reports to the principal engineer for Structures.

As of January 2012, Structural Maintenance employed 82 individuals as mechanics, work equipment operators, and welders. These employees were organized into 16 crews of five or six workers under the direct supervision of a foreman. Each crew was assigned at least one work truck or van. Crew members normally report to their designated headquarters at the start of the work shift, and then travel together to the job site. For a project expected to require several months of continuous work, however, the Maintenance Engineer will usually direct the assigned crew to report directly to the job site each morning for the duration of the job in order to minimize travel time.

The State-of-Good-Repair (SOGR) subdivision within Structural Maintenance employed five crews who were responsible for rehabilitating LIRR railroad bridges in accordance with the agency's goal to bring these assets to SOGR by 2024.[1] This work entails concrete repairs, rehabilitation of the bridge deck and waterproofing; it often takes several months to complete.

[1] State-of-Good-Repair is defined by the Federal Railroad Administration as a condition in which the physical asset is functioning as designed. The acronym "SOGR" is used in this report to describe both the unit performing the work and the condition it works to bring about. LIRR's bridge goal can be found in "Twenty Year Capital Needs Assessment 2010-2029," Metropolitan Transportation Authority, Draft – August 2009.

Chart 1. Reporting Structure



The West End subdivision is typically responsible for repair work at LIRR facilities in Queens and Nassau County, while the East End subdivision typically handles repairs in Suffolk County. Some jobs take only a short time to complete, and involve routine tasks such as repairs to station doors and windows. Other jobs, which take longer, are designed to bring LIRR assets into a state-of-good-repair, or to enhance customer service and safety. Examples of this work include replacing staircases at LIRR stations and installing security fences around LIRR's assets and its right-of-way to enhance safety.

As explained more fully below, this report reflects our analyses regarding the productivity of workers assigned to projects in Great Neck, Manhasset, and Deer Park, carried out by the SOGR, West End, and East End subdivisions respectively.

PRODUCTIVITY OF STRUCTURAL MAINTENANCE CREWS

On any given day LIRR Structural Maintenance crews are employed in geographically dispersed locations. In our view, this deployment raises two significant issues:

- Are Structural Maintenance crews putting in a productive work day?
- What management tools are supervisors, the Maintenance Engineer, and the principal engineer using to help ensure that workers are productive?

To address these concerns we focused on jobs that were expected to require several weeks or months of construction. At the time of our review in September 2011, the staircase replacement by SOGR at LIRR's Great Neck station was underway, and was expected to require at least several more months for completion. This job became our primary case study. Two other jobs, the installation of a chain link fence in Manhasset and the installation of aluminum stairs at the Deer Park station, were analyzed post-completion for comparative purposes.

Case Study 1: Staircase Replacement at Great Neck Station

The station staircase provides access from Great Neck Road to the westbound platform. According to the maintenance supervisor in charge of SOGR work, the original stairs were constructed of concrete. Over the years, the heavy use of salt to remove snow and ice had caused the stairs to deteriorate. During that time, LIRR maintenance crews would fill in cracks in the concrete with new concrete and layer the stair treads with fiber glass covers and abrasive grit to reduce the possibility of injury on the stairs. However, water continued to seep into holes in the treads and damaged the concrete underneath, including the supporting walls.

In April 2011, the maintenance supervisor for SOGR and the Maintenance Engineer inspected the stairs in response to a complaint, and found that they were in very poor condition. The supervisor explained to OIG staff that he believed that the stairs were in imminent danger of collapse, and recommended that they be replaced. The Maintenance Engineer directed that the work begin immediately. The following were the major work elements:

- Install temporary partitions around the work site to protect the public. Remove the light poles, railing and ornamental iron railing.
- Demolish the existing concrete stairs and partially demolish the concrete walls that supported the staircase. In total, about 40 cubic yards of concrete was demolished.
- Place the demolished concrete in a pit below the staircase so that it would not have to be removed from the site.
- Install new concrete on top of the partially demolished wall.

- Install reinforced concrete slabs that serve as the stairway platforms at street, intermediate, and lower levels, and waterproof the concrete slabs.

- Install new aluminum stairs and railings, as well as a drain line. Reinstall the light poles and ornamental iron railings. Workers had to remove, clean, paint and reinstall these railings.

Work began on April 28, 2011, and continued full-time until full completion on November 9, 2011. The Maintenance Engineer assigned one maintenance crew from SOGR to work on the stair replacement. This crew performed the demolition, all of the concrete work and preparation, and installation of the aluminum stairs. Plumbers from another division in the Structures Department installed the waterproofing and the drain line, and electricians from the Power Department (also part of Engineering) performed the electrical work. The SOGR maintenance supervisor managed this work. Five workers and a foreman made up the crew assigned to this job. They were paid to work the 7:00 a.m. to 3:00 p.m. shift, which is a 7.5 hour workday, with a half-hour paid lunch. Figure 1 shows the staircase at completion.

Figure 1: Staircase Replacement at Great Neck

Late Arrival/Early Departure from Job Site

In August 2007, LIRR installed an Automatic Vehicle Location Monitoring system on its entire fleet of work trucks and supervisory vehicles. A transmitter is mounted in each vehicle and a remote computer records by geographical coordinates every stop made by the vehicle and is accurate to about ten feet. Consequently, it is an excellent tool for tracking vehicles used by LIRR work crews.

The crew assigned to the Great Neck job used two AVLM-equipped work trucks to travel between the Bayside Yard crew quarters (Bayside or Yard) and the job site at the Great Neck train station. OIG analyzed records from the AVLM system for the vehicles that workers used to travel to and from the job site in order to determine how much time they spent there. OIG also conducted six field observations of the work crew assigned to the job, and observed workers entering and leaving their assigned headquarters while the job was in progress.

Chief Engineer's Expectations for Workforce Productivity

We used the chief engineer's expectations regarding LIRR's field crews with respect to when they should arrive at and depart from the job site as a framework to analyze the AVLM records. The chief engineer said that under normal circumstances it would be reasonable to:

- Allow 20 to 30 minutes each morning at the crew quarters so that so that workers could load the trucks and the foreman could give workers a job briefing and safety talk.
- Allow five to ten minutes for workers to buy a cup of coffee.
- Assume that the crew should arrive back at their crew quarters no earlier than 20 minutes before the end of their scheduled shift in order to unload the truck, secure equipment, and wash up before leaving.

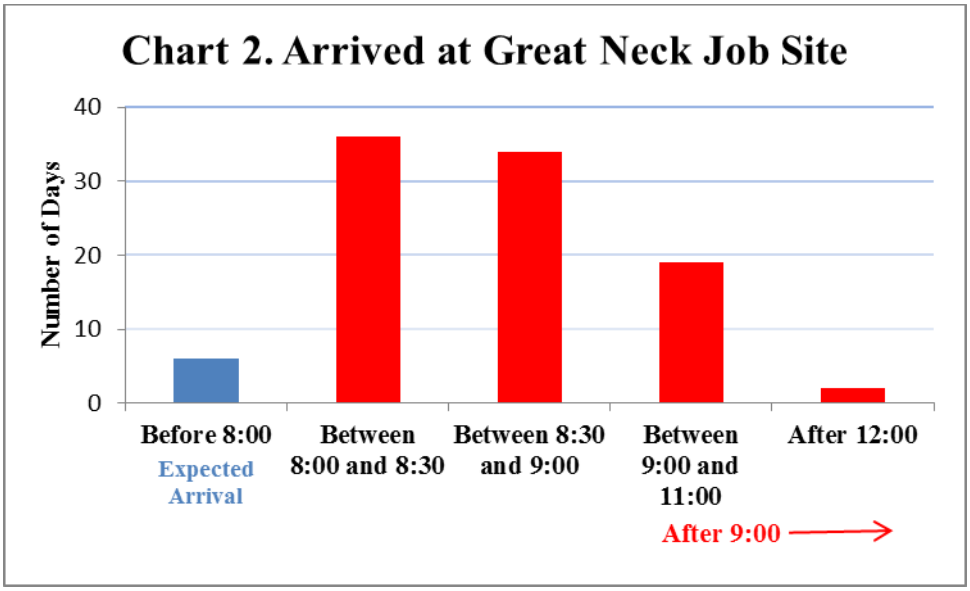
Analysis of Worker Time Spent on Site

Based on the chief engineer's expectations, the Bayside crew assigned to the Great Neck job should have left the Yard no later than 7:30 a.m., may have stopped for ten minutes to get coffee, then traveled to the job site. Because the Great Neck station is only 3.5 miles from the crew quarters, ordinarily just a 15 minute drive, the crew should have arrived before 8:00 a.m. and returned by 2:40 p.m.

OIG compared these expectations to the actual AVLM readings for the crew vehicles from April through November 2011.[2] As Chart 2 makes clear, workers rarely arrived at the site before 8:00

[2]We took care to restrict the analysis only to those days when the crew went to Great Neck in the morning and returned to the crew quarters in the afternoon. We excluded 19 days when the crew drove to another location in the Footnote continued on next page.

a.m.[3] Indeed, the average arrival time was 8:45 a.m. with the crew arriving at the job site between 30 minutes and one hour later than expected on 34 of the 97 mornings (35%) that we analyzed. Remarkably, though, crews arrived between one and three hours later than expected on another 19 mornings (20%); and on two mornings, although expected by 8:00 a.m., the crews actually arrived in the afternoon.



When we questioned the maintenance supervisor about the late arrival time, he had assumed that the travel time between the crew quarters and job site was one half-hour. He further assumed that if the crew encountered traffic on the way to the site, the drive could take 45 minutes. He seemed surprised when we informed him that according to the AVLM history, it should take about 15 minutes to drive to the site from Bayside Yard, which is about 3.5 miles from the job site.[4] Indeed, the crew needed slightly more than 20 minutes travel time on only five of the 26 days that they drove directly to the job site in the morning without stopping.

The maintenance supervisor also stated that it might have taken the crew more than 30 minutes to load the truck on some mornings. He went on to note that because of space limitations at the work site, he could not store materials, nor could he set up a tool shed at the location. Because all of the tools and materials used on this job had to be transported to the site, he told us that he would expect the crew to arrive at the job site between 8:00 a.m. and 8:15 a.m. However, the

morning (e.g. Morris Park) before travelling to the job site, and four days in the afternoon when the crew stopped at another LIRR facility before returning to the crew quarters.

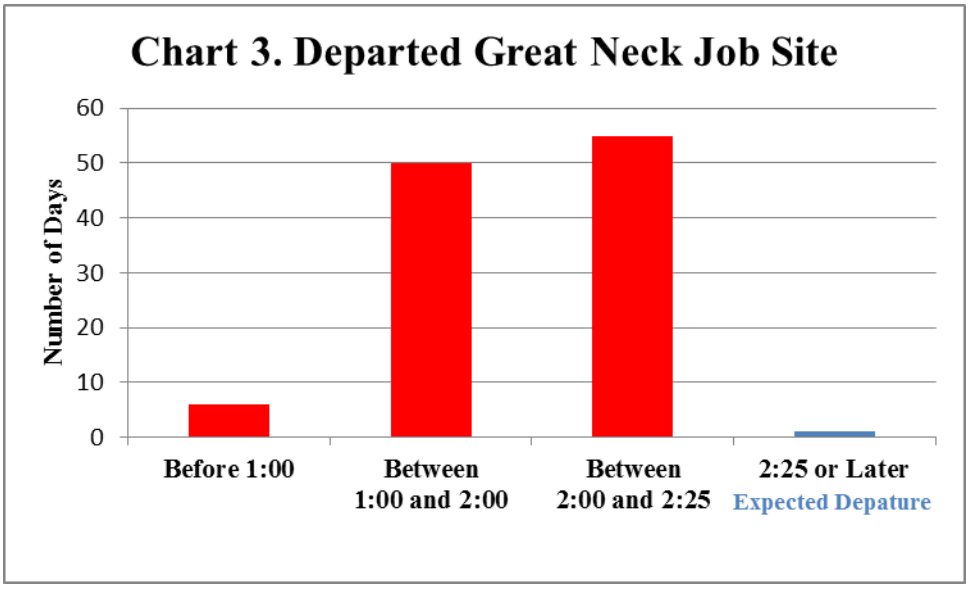
[3]To simplify the presentation, we report the AVLM records for one of the two vehicles used by the crew. During our observations the vehicle records were comparable.

[4]This calculation is based solely on those driving directly to the work site and not stopping for gas, coffee, etc.

supervisor could not adequately explain why on average the crew arrived at the job site after 8:45 a.m.

According to the AVLM records, on most days the crew stopped for less than 15 minutes in the morning, presumably to get food. However, on at least 13 mornings (or 13 percent of all mornings studied), the AVLM records indicate that the crew spent between 20 minutes and 30 minutes at a delicatessen in Bayside. During one OIG field observation we saw workers leave Bayside Yard about 7:45 a.m., and drive about one half-mile to a delicatessen where they purchased food. For the next half-hour OIG observed workers sitting in their trucks apparently eating breakfast. The crew arrived at the job site that day at 8:35 a.m.

Late arrival is only part of the problem. Workers also left the job site earlier than expected. Since it takes about 15 minutes to travel from the job site to the Bayside crew quarters, workers should be leaving the job site no earlier than 2:25 p.m. However, the average departure time was 1:51 p.m. And, as Chart 3 shows, workers almost never left the job site at or after 2:25 p.m. Indeed it was more likely that they left before 2:00 p.m. On 50 of the 112 afternoons studied (45%) the crew left the job site between 1:00 p.m. and 2:00 p.m. to return to the crew quarters.



As one example, on Monday October 17, 2011, OIG observed the crew exit their headquarters at Bayside Yard at 10:02 a.m. and arrive at the job site at 10:16 a.m. It appears that workers were preparing for a concrete delivery that was expected to happen the next day. OIG observed workers tying rebar inside wooden forms. At 12:05 p.m. the crew broke for lunch. They returned to work at 12:55 p.m., 50 minutes later, although their authorized lunch period is only 30 minutes. Shortly thereafter, they began to pack up their equipment. At 1:40 p.m. they departed the job site, and arrived back at Bayside Yard at 1:50 p.m.—meaning they arrived back

at the station from the job site a full 35 minutes before they were expected to leave the job site itself.

We discussed with the maintenance supervisor in charge of the job the issue of the crew's early return to their headquarters. He claimed that at times preparatory work was performed in Bayside Yard, including cutting stair components and fabricating formwork, and that this could explain some of the early departure times. He also told us that he was not concerned that the crew workers returned to the Yard at 2:00 p.m.—one hour before the end of their shift. He believed that workers needed time to unload the truck. However, we questioned why the workers would need an hour in the afternoon, when he had previously told us that workers were expected to assemble tools and materials and load the truck in 20 minutes to 30 minutes in the morning. Also, our own observations at the job site showed that workers loaded the truck in about 15 minutes, suggesting that about the same amount of time was needed to unload it.

It seems clear from the foregoing that the maintenance supervisor and the chief engineer operated under very different expectations regarding to crews traveling to and from job sites. And clearly, this discrepancy presents a problem. LIRR management should set clearly-defined expectations for its field crews regarding job site arrival and departure times, and require that supervisors and foreman enforce those expectations.

Notably, according to the AVLM records, on six occasions the crews left Great Neck to return to the Bayside Yard before 1:00 p.m.—more than *two* hours before the end of their shift. Moreover, as the following example illustrates, when workers leave the job site to return to the Yard several hours before their shift is scheduled to end, it does not mean that the crew performed productively at the Yard when they got there.

On Friday, September 30, 2011, OIG observed the LIRR crew installing concrete stair landings. The workers finished at 11:00 a.m., packed their tools, and left Great Neck at 11:19 a.m. to return to Bayside Yard. They arrived back at Bayside Yard at 11:35 a.m. and entered the trailer which serves as the crew's headquarters. Payroll records indicated that workers claimed that they worked through lunch, which means they were paid time-and-a-half for the 30 minutes they supposedly worked. OIG continued the observation at Bayside Yard from the pedestrian overpass just west of the Yard until about 12:40 p.m., but saw no work going on in the Yard. Because this is a construction job, we question whether the workers performed any job related tasks inside the trailer. The AVLM records showed that the trucks were parked in the Yard for the remainder of the afternoon. The LIRR supervisor had no explanation, and we conclude that lax supervision allowed this downtime to occur.

After allowing time for travel, loading/unloading the truck, and time to buy coffee, we estimate that on average slightly more than one hour each shift, and 660 labor hours in total, was lost on this job because the crew was slow to arrive at the site and/or left the job site well before their shift was scheduled to end. For a six person crew, this represents almost three weeks of lost time—a significant amount of unproductive time that LIRR should eliminate.

The Cost of Great Neck Staircase Replacement

Each day the foreman completes a time and attendance report.[5] That report is signed by his or her supervisor and submitted to the payroll department for processing. The report includes the time worked by each crew member, along with the codes for the location of the site and type of work performed there. To capture the payroll costs of the staircase replacement at Great Neck we segregated the 2011 payroll by the codes for location and type of work. Our analysis found that the project consumed 5,677 labor hours, and took approximately six months to complete. The labor cost for this project, including fringe benefits, totaled $261,428.

We interviewed the maintenance supervisor in charge of the work at Great Neck about his expectations for this job before starting it. He told us that he expected the staircase replacement to be completed in about four months. However he acknowledged that his timeframe was only a very rough estimate, not based on a written scope of work, or schedule of work activities. Further, he had no idea how many labor hours would be needed to complete the job, or how much the work would cost. As noted, the job actually took six months to complete.

Moreover, the Maintenance Engineer explained to the OIG that none of his division's work is planned or monitored using project schedules or budgets, regardless of the potential cost or expected duration of the job. Rather, each supervisor uses rules of thumb to establish a timeframe within which they expect a crew to complete a project, without factoring in or tracking associated costs.

To help us establish an independent estimate of how many days and how much labor it should have taken an LIRR crew to replace the staircase at Great Neck station, we retained a consultant with expertise in construction, engineering, and scheduling. Our consultant provided estimates of labor hours by trade; materials needed, and total cost to complete the project as if the work were performed by a private contractor at prevailing wage rates. In addition, our consultant assumed that the private contractor would use essentially the same construction methods employed by the LIRR crew to replace the staircase.[6] To make this estimate, our consultant reviewed the as-built drawings and field drawings, as well as purchase orders for materials, and conducted a site visit to inspect the completed staircase. Our consultant also attended the interview that OIG conducted with the supervisor in charge of the job.

Based on this evidence, our consultant estimated that the project should take about 2.5 months to complete, and consume 1,714 labor hours. Similar to LIRR work schedules, our consultant's estimate assumes that crews are working on the job for 7.5 hours, and have a half-hour paid

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[5] The time and attendance report is known as the "Engineering Department Daily Labor Distribution Report."

[6] Where our consultant's approach to construction differed from the LIRR's approach was in the demolition of the old staircase. Our consultant's estimate assumed that workers would use pneumatic chipping guns to demolish the concrete. In contrast, the supervisor in charge of the staircase replacement told us that the LIRR crew mainly used manual tools to demolish the stairs.

lunch. However its estimate also assumes that workers are required to report directly to the job site, leave the site at the end of the work day, and are paid at private sector rates.

Because these assumptions are not consistent with LIRR's labor rates, restrictions, and practices, we made adjustments to our consultant's projections to allow for workers traveling to and from the crew's headquarters; stopping to purchase a beverage or food; and handling materials and equipment at the beginning and end of each work day. By factoring in these allowances, the maximum amount of productive time during a regular shift for work at Great Neck is reduced from 7.5 hours to approximately six hours.

Based on our revised assumption that LIRR workers had only six hours of productive time on the Great Neck job, we estimated that the project should have consumed 2,500 labor hours, taken ten weeks (2.5 months) to complete, and cost $98,291 in labor.[7] These figures are significantly below how long the project actually took and how much it cost. Table 1 below presents the OIG estimate as well as the actual time and labor cost of the project charged by the crews.

Table 1. LIRR Great Neck Station Staircase Replacement Estimated vs. Actual

	Labor hours	Total Labor Cost
OIG Estimate	2,500	$ 98,291
Actual	5,677	$261,428

While OIG found that the job should have taken 2.5 months, the job actually took approximately six months to complete, and was almost triple the cost. We estimate that several thousand labor hours and more than $160,000 was wasted. Not only did LIRR spend too much time and money on the Great Neck job, but Structural Maintenance lost an opportunity to complete other critical work. The crew assigned to replace the stairs at the Great Neck Station was diverted from bridge repair, which is especially critical because the line structures category, which includes bridges, is the only LIRR asset group not in a State of Good Repair.[8]

When asked to explain why this job took six months to complete, the supervisor said that one possible explanation was that the workers were occasionally re-assigned to other work.

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[7] Our consultant estimated that the labor cost for a private contractor to replace the staircase at Great Neck would be 131,305. The OIG-estimated cost for LIRR to complete the project is 25 percent lower than our consultant's estimate ($98,291 compared to $131,305), because LIRR labor rates are significantly lower than private contractor rates at prevailing wages. For example, the cost inclusive of fringes and benefits for an LIRR mechanic ranges from $301 to $377 per day. In contrast, our consultant estimated that the wages and benefits for a private laborer were $549 per day.

[8] See "Twenty Year Capital Needs Assessment 2010-2029," Metropolitan Transportation Authority, Draft – August 2009, p. 48.

However, our analysis of AVLM records puts them at the Great Neck site and indicates that workers were rarely reassigned to another job.

Indeed, our analysis of AVLM records and site observations explain some of the poor productivity that we found. As noted, about 660 labor hours were lost on the Great Neck job because the crew was slow to arrive at the site and/or left the job site well before their shift was scheduled to end. This represented 12 percent of the labor hours consumed on the project, and 21 percent of the 3,177 labor hours that were wasted. Left unexplained, however, is the remaining unproductive time.

Because Structural Maintenance does not require its managers or supervisors to employ commonly used management tools, such as project work scopes, schedules, budgets and status reports to plan and monitor the construction work performed by the division, OIG compared the timing of material invoice records to the payroll records for this job to establish milestones for how the job proceeded. While the payroll records indicate that workers began charging the job on April 28, 2011, the invoices for materials indicate that the stair treads and risers were not delivered until July 22, and that concrete was invoiced on August 24, August 25, September 16 and October 26. Evidently, the only work occurring during the 12 weeks between April 28 and July 22, was temporary site protection, demolition, the removal of lights, railing and ornamental railings and some of the formwork for the concrete installation. Also, the crew could have cleaned and painted the ornamental railing. According to the schedule provided by our consultant and adjusted by OIG, this phase of the work should have been completed by the LIRR crew in about four weeks instead of twelve.

While the maintenance supervisor could not adequately explain why the crew needed 12 weeks to demolish the stairs and remove the railings and lights, we did learn that the crew used manual tools to demolish the staircase. In contrast, our consultant estimated that the same work could be performed using pneumatic chipping tools, which would clearly save time and effort. However, because no job progress records were kept for the Great Neck project, it is impossible to know how much time could have been saved by using this alternate approach. Had a job schedule and periodic status reporting been used by management to monitor this job, we would have better information on why demolition was significantly delayed. More generally, project schedules and status reports would have helped us to understand why the whole project took so long to complete.

Productivity Problems Also Found on Manhasset and Deer Park Projects

We were aware that Structural Maintenance crews replaced stairs at other LIRR stations, and performed other construction work such as installing security fencing and repairing platform edges. To determine whether the problems that we found were unique to the Great Neck staircase replacement, or an example of systemic problems within the division itself, OIG analyzed two other construction jobs completed in 2011 by different Structural Maintenance crews working under different supervision: the installation of a chain link fence along a roadway

in Manhasset, and the installation of aluminum stairs at the Deer Park station. On both jobs, workers reported to one location and had to drive to the job site.

As with the Great Neck project, the crews assigned to the Manhasset and Deer Park projects were frequently slow to get to the job site in the morning, and often left earlier than expected in the afternoon. Further, like Great Neck, these projects did not have expected completion dates, and the cost and progress of the work was not tracked and reported by supervisors to management. As a result, we tried to piece together a picture of the job's progress through after-the-fact interviews with the supervisors responsible for the work.

Case Study 2: Demolition and Installation of Fence in Manhasset

Beginning in August 2011, a LIRR maintenance crew from the West End subdivision replaced about 1,000 linear feet of chain-link fence along Thompson Shore Road (Figure 2). The project took about five weeks to complete, and consumed 926 labor hours. Total labor cost based on payroll records was $42,055, including fringe benefits.

Figure 2. Fence Installation in Manhasset

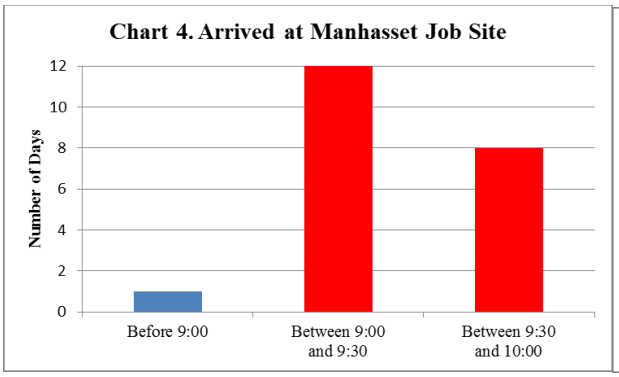
Analysis of AVLM Records

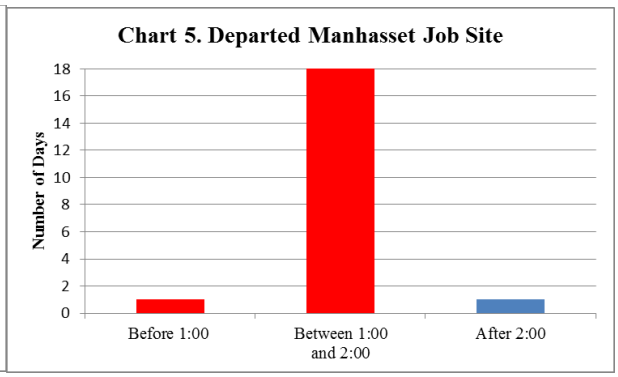
To determine whether the crew was onsite for an appropriate amount of time each shift, we repeated the analysis of AVLM and payroll records conducted for the Great Neck job.

At Manhasset, the crew assigned to this job worked the 7:15 a.m. to 3:15 p.m. shift, and reported to the LIRR facility at Morris Park, about a 50 minute drive from the site. Other than loading fencing and some equipment onto the truck each morning, all remaining work was performed at the job site. Again using the chief engineer's expectations as a guide, the OIG assumed that the crew should have left Morris Park no later than 7:45 a.m., stopped for ten minutes to get coffee, and then arrived at the job site at about 8:45 a.m. In the afternoon, workers should have left the job site a little after 2:00 p.m. in order to leave enough time at the end of the shift to unload the truck.

Accordingly, the crew should be onsite for five hours and 15 minutes per day, and working except for a 30-minute paid lunch period. Nevertheless, our analysis showed that the crew averaged only four hours and 15 minutes per day onsite, including the half-hour for lunch. As a result, we estimate that 120 labor hours was wasted because crews left their headquarters late and returned early. The lost time represents 13 percent of the hours consumed on this project.

As Chart 4 shows, workers arrived at the job site before 9:00 a.m. only once. The average arrival time was 9:26 a.m. and the crew frequently arrived at the job site after 9:30 a.m. When leaving the job site, the crew almost always left unnecessarily earlier than expected to return to the crew quarters. Chart 5 shows that workers left the job site after 2:00 p.m. only once. The average departure time was 1:37 p.m.





Originally, when we questioned the supervisor and the manager about the scope and time period of the work, we were told that 2,000 linear feet of fence was installed at the site. However, we inspected the site after the work was completed and found that only about 1,000 feet of fence had been installed, which evidenced even greater delay. The supervisor had been under the erroneous impression that twice as much work had been completed. He also appears to have had low expectations for how much fencing could be installed each day.

The supervisor told us that he expected that workers would install about 50 feet of fence each day. This appears to be the pace at which the workers completed the job because the fence was installed in 23 days. To ascertain how long it should take to install a chain link fence we called a fence installation service in New York. We were told that the project should be completed in seven work days.[9] Even after adjusting for travel and all other non-productive time, the LIRR crew spent about twice as much time as necessary on this project. The major problem, it seems, lies in the method of fence installation.

To account for the length of the job, the supervisor explained that workers used a manual post hole digger to set the fence posts. However, OIG believes that this method of fence construction was unnecessarily inefficient and extended the length of the job. LIRR's Chief Engineer stated that the process of installing steel posts was manual because the work area did not offer enough room to operate a power augur.[10] He also stated that a two-person power auger would not be appropriate for this job, because it would bind as soon as it hit tree roots, which were abundant in the area, and that provisions would be needed for workers to clear a path for the augur when it binds. However, OIG believes that even if a power augur was inappropriate for this job there are other types of power post-hole digging equipment that would have significantly reduced the amount of labor time needed to complete this project.[11] Ensuring that efficient methods are used during construction is critical for controlling costs.

Case Study 3: Staircase Replacement at Deer Park Station

Between March 15, 2011 and July 5, 2011 a maintenance crew from the East End subdivision replaced the aluminum stairs on both the westbound and eastbound platforms at the LIRR Deer Park Station, (Figure 3 shows the new staircase on the westbound platform.). The project took 2,607 labor hours to complete, resulting in a total labor cost of $84,396 including fringe benefits. The crew assigned to this job worked the 7:30 a.m. to 3:30 p.m. shift, and workers reported to the LIRR facility at Babylon Yard, which is about a 20 minute drive from the job site. Most of the work was done at the site. As it did with Manhasset, OIG analyzed AVLM and payroll records and interviewed supervisory personnel to determine whether the crew spent the expected amount of time at the work site and whether the job progressed at an acceptable pace.

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[9] The fence installer calculated the seven days as follows: three days to demolish the old fence and remove it from the site; one day to set the posts in concrete; and three days to put up the new fence.

[10] An auger is a handheld drilling device that utilizes a rotating vertical screw blade.

[11] While a power augur is a hand-held device, a mini skid loader with an augur attachment is a potentially more powerful tool. A mini skid loader is a tractor-like engine-powered machine with lift arms used to attach a wide variety of labor-saving tools or attachments.

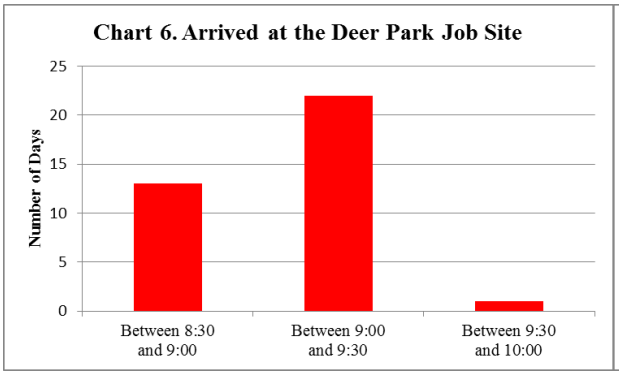
Figure 3. Staircase Replacement at Deer Park

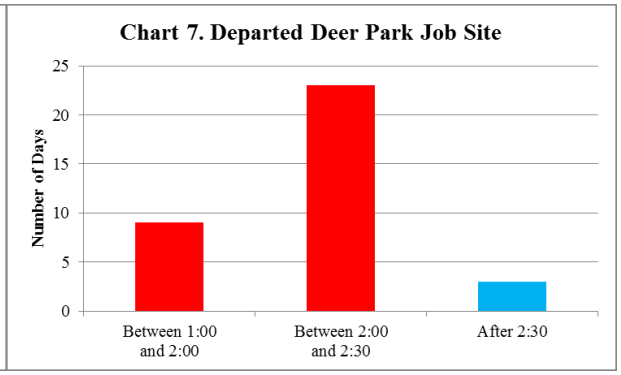
New Staircase on Westbound Platform

Analysis of AVLM Records

Because the crew was supposed to arrive at the Babylon Yard headquarters at 7:30 a.m., and Deer Park is 20 minutes from that yard, the crew should have arrived at the job site at about 8:30 a.m. (allowing for time to load the truck, travel time and coffee purchase). Nevertheless, the crew arrived at the job site between 8:30 a.m. and 9:00 a.m. only 36 percent of the time (Chart 6). On 61 percent of the days the crew arrived at the job site between 9:00 a.m. and 9:30 a.m., and arrived sometime thereafter on the remaining days. The average arrival time was 9:00 a.m. Notably the crew did not arrive on or before 8:30 a.m. on any of the mornings that we studied.

Because crew members are off work at 3:30 p.m., they should have left the job site about 2:45 p.m. in order to leave enough time to drive back to the yard (20 minutes) and unload the truck (20 minutes). However, Chart 7 shows that workers left the job site at 2:30 p.m. or later only three times, but left before 2:00 p.m. more than 25 percent of the time. Indeed, the crew's average departure time was 2:15 p.m. As a result of late arrivals and/or early departures, this crew was onsite an average of five hours and 15 minutes each day instead of an expected six hours and 15 minutes, losing an estimated 334 labor hours. This discrepancy continues the pattern of lack of supervisory attention and low supervisory expectations regarding productivity.





In our view, LIRR management should clarify its expectations for its field crews regarding arrival at and departure from a job site and require that supervisors and foreman enforce those expectations. LIRR's chief engineer agreed with our observation.

In addition, maintenance supervisors should use the AVLM to periodically spot check the location of their crews. Specifically, to ensure that crews are meeting LIRR management's expectations, and to further improve accountability, supervisors should be required to utilize the AVLM to check when crews leave their headquarters in the morning and return in the afternoon.

"WORKING THROUGH LUNCH" PAYMENTS

Our review of the payroll information for the staircase replacement at the Great Neck station found that from May 2011 through July 2011, and periodically thereafter, workers were regularly paid for "working through lunch." Employees who work through lunch are paid at the time-and-one-half rate for the half-hour. Employees who claimed that they worked through lunch on the Great Neck job were paid a total of $5,197.

However, we question the need for LIRR to pay its crew to work through lunch when there was so much downtime on this job. Our analysis of the AVLM records found that on ten of the 43 days that the crew claimed that it worked through lunch, it inexplicably returned to the crew quarters at Bayside Yard *one hour or more* before the end of its shift. On one of these days, Friday September 30, 2011 (see page 11), the crew claimed to have worked through lunch, yet OIG observed workers return to the Bayside Yard trailer at 11:35 a.m., and not leave the trailer for at least the next hour. As a result, we also question whether any work was actually performed during the paid lunch period. We did not find this pattern on the two other jobs that we analyzed.

When we pointed out the frequency of lunch payments for the workers on the Great Neck job LIRR management had no explanation. In 2009, the chief engineer issued a verbal directive prohibiting paid lunches for all Engineering staff except when approved as necessary by an appropriate manager.[12] The chief engineer acknowledged that Structural Maintenance employees would rarely have a valid reason for working through lunch. After we brought the matter to his attention, OIG learned that the chief engineer addressed the issue during subsequent meetings with managerial staff. It seems clear, though, that LIRR needs to strengthen this advisory by issuing a written policy governing lunch payments, and by holding managers accountable for enforcing these policies by ensuring that such payments are justified.

[12] This directive clearly paid off: between 2009 and 2010, for Engineering as a whole, lunch payments declined from approximately $918,000 to $265,000—a reduction of 71 percent. However, the chief engineer acknowledged that the practice had begun to increase again in 2011. That year lunch payments rose 52 percent to $404,000.

PROJECT SCOPES OF WORK, BUDGETS AND SCHEDULES

While a formalized scope of work, project schedule, and budget are rarely needed for a maintenance task to be completed in a few hours or days, OIG strongly believes that the Maintenance Engineer and maintenance supervisors must use these tools to effectively manage construction work performed by the division, such as bridge rehabilitation and staircase construction.

A scope of work typically breaks out the work to be performed on a project into specific tasks. It improves project planning by helping to ensure that all tasks needed to complete a project are identified.

A project schedule helps ensure that activities are properly sequenced, and can be used to monitor the progress of the work. Without a written schedule and estimated end date, supervisors and their managers cannot properly manage the work, and cannot pinpoint problems or bottlenecks in the schedule.

A budget establishes a plan for and limits on project expenditures, including labor, and helps supervisors and managers monitor and control the resources consumed on a project.

By improving the information available to the Maintenance Engineer and the principal engineer during project planning, project schedules and budgets could also help to forestall the use of inefficient construction methods. Any project estimates that seem unreasonable could then be addressed by these managers before the project proceeds.

Written schedules and budgets are also critical for ensuring transparency and accountability. Without projected costs and completion dates to use as baselines against which to compare actual results, management's ability to hold supervisors and work crews accountable is severely compromised. Similarly, project status reporting could help keep management informed as to how a job is progressing.

According to our consultant, the Great Neck staircase replacement should have been a relatively simple job to complete because it did not require either specialty or foundation work. Yet because Structural Maintenance does not use the basic construction management tools discussed above to oversee construction projects, the managers responsible for the Great Neck job could not adequately explain why the project took so long and cost so much. While our site observations and analysis of AVLM records confirm the existence of and provide some explanation for the poor productivity we have described, there are obviously more lessons to be learned and greater transparency and accountability to be achieved, if project scopes of work, schedules, budgets and status reports are maintained and utilized by the division.

We learned that the Projects Division within the Structures Department does use these management tools to monitor its own construction. In 2011, for example, the Projects Division was responsible for New York State Department of Transportation-funded bridge repairs in Queens,[13] the installation of cement foundations as part of a capital project to replace nine substations at various locations on Long Island,[14] and the installation of retaining walls along the LIRR's main line, among other work. The manager of the Projects Division told us that budgets and schedules are required on these jobs, primarily because the work is funded by the MTA capital program, or by a specific federal or state funding source. The inference is that because the funding source is different, the application of different rules and/or greater oversight will result in the same type of work being managed in a more professional way.

The LIRR chief engineer agreed that the Structural Maintenance Division should use work scopes, budgets, schedules and periodic reporting to plan and monitor construction projects performed by their crews.

[13] LIRR employees repaired concrete, waterproofed the bridge deck and replaced the tracks at bridges in Queens and Brooklyn that support freight service.

[14] A substation supplies electrical power to the tracks to support train movement. As noted, LIRR workers fabricated the foundation; outside contractors provided the buildings and the equipment.

RECOMMENDATIONS

In order to ensure that all field crews are productively engaged, LIRR management must set standards for work performance, have adequate tools to measure that performance, and use these tools to measure field crews against these standards. Accordingly, OIG recommends that LIRR management do the following:

Recommendation 1:

Set clearly-defined expectations for its field crews regarding job site arrival and departure times, and require that supervisors and foreman enforce those expectations.

LIRR's Verbatim Response and Status Report:

"*A letter was sent from the Chief Engineer to all Engineering Department employees on June 4, 2012 defining daily expectations and work assignments. In addition, the Chief Engineer met with all the represented Supervisors in early June and reviewed in detail what is expected from them while performing their work assignments. One primary topic included minimizing travel times between headquarter locations and work sites. The Structures Department enhanced its internal controls and now requires that all gangs fill out a Daily Production Report. This report is completed by the Foreman and submitted to the Supervisor on a daily basis. The report details daily work production for the day and is reviewed to ensure that work is taking place as planned and on schedule. In addition, as of May 11, 2012, large scale item information such as ties, surfacing and rail replacement from the Daily Production report is entered into the Daily Mechanized Report. This serves as an asset management tracking system and notes what was replaced, when, where and how many.*"
Status – Complete

Recommendation 2:

Require supervisors to utilize the LIRR's AVLM to monitor their crews on a daily basis

LIRR's Verbatim Response and Status Report:

"A*s an interim step, the Department analyzed who has access to the AVLM system and issued a memo on June 28, 2012, instructing non-registered managers and supervisors on how to gain access to it. The memo further indicated that the AVLM system would be used for investigating MVA accidents, monitoring idling vehicle activity, verifying crew whereabouts and validating overtime and claims. The Department is also currently in the process of updating its Intranet website with a direct link to the AVLM User manual. More importantly, however, the Engineering Department will establish a strengthened centralized management function that will*

be responsible for many of the tasks discussed in this report, including vehicle usage and time and attendance."
Status - Ongoing

Recommendation 3:

Require development of work scopes, budgets, and schedules for construction jobs performed by crews in the Structural Maintenance Division.

LIRR's Verbatim Response and Status Report:

The Department instituted a new procedure – Control of Structural Maintenance Renewal Work on June 12, 2012. The purpose of this procedure is to define the methods and instructions to control activities of Structures in the performance of their large scale renewal work. The procedure requires that the Engineering Project Plan document contain the scope of work, estimate, budget allowance, work order number, risk or community impact statement, base schedule, base material requirements, quality plan and impact if any on Engineering Asset Management Program. By establishing the Engineering Project Plan documentation required for the Maintenance Renewal work, the overall performance will improve. More specifically, the documentation provides for improved planning and execution, improved effectiveness of work management process, enhancement of the communication objects and early identification of issues and critical element.
Status – Complete

Recommendation 4:

Require that each supervisor in charge of a crew performing work prepare a written status report for review by the principal engineer of the Structures Department at least once every 30 days.

LIRR's Verbatim Response and Status Report:

The Principal Engineer of Structures issued a memorandum on June 27, 2012, requiring Structures Engineers to submit to the Principal Engineer monthly written updates for these large scale projects.
Status – Complete

Recommendation 5:

Establish and enforce a written policy and procedure for employees that defines and controls "working through lunch."

LIRR's Verbatim Response and Status Report:

In May 2012, the Engineering Department established a procedure for authorizing "working through lunch". This procedure requires the respective Engineer, which is a level above the Supervisor, to grant field approval for any paid lunch period. Furthermore, on a weekly basis, a summary of approved paid lunch periods will be reviewed by the Assistant Chief Engineers and the Chief Engineer. A formal written procedure was established on June 20, 2012. The strengthened centralized office will periodically review compliance with the policy.
Status - Complete

CONCLUSION

Because LIRR's infrastructure is dispersed over 700 miles of track, on any given day the five- or six-person crews that maintain its stations, bridges and facilities may be scattered among several work locations. Effective management of this dispersed workforce is critical to ensuring productivity and a cost-efficient maintenance operation.

However, OIG's examination of three projects performed by crews from LIRR's Structural Maintenance Division reveals that these workers were not productively engaged, and that their performance problems are systemic. The small size of these crews and their wide spread geographical area of employment do not have to be obstacles to effective supervision, provided that appropriate steps are taken to address the weaknesses that we identified.

To begin, Engineering Department senior management must (1) set clear expectations regarding when crews leave their headquarters in the morning and return in the afternoon, and (2) require that supervisory management enforce those expectations. This action alone could reduce the amount of unproductive time by as much as one hour per day on average with a consequent and significant reduction in costs.

Further, management must require the development and utilization of work scopes, schedules, budgets, status reports, and other appropriate tools for monitoring crew performance on projects designed to bring LIRR assets into a state-of-good-repair, or to enhance customer service and safety. Because these project management and reporting tools have been lacking, managers and supervisors could not adequately plan the work, control costs, take remedial action in timely fashion, or fully explain why projects are not completed in a reasonable time. Also, by improving project management and reporting capabilities, management's ability to measure performance and hold supervisors and crews accountable for their work will be enhanced.

Toward these ends we discussed our findings and recommendations with LIRR management throughout our review, rather than waiting for the report process to be completed,, and then shared with management our preliminary report in early June 2012 for agency comment.

As is clear from the LIRR's written response detailed above, the railroad accepted all our recommendations, noted that it had already implemented many of them, and declared "In short, the LIRR has taken proactive steps to change the way in which these types of projects are managed." We are encouraged by LIRR's response, but will monitor its implementation of our recommendations to ensure that improvements in productivity, managerial effectiveness, and cost efficiency are realized.