EXCESSIVE HOURS AND FATIGUE RISK IN THE LONG ISLAND RAIL ROAD TRACK DIVISION – Final

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I. EXECUTIVE SUMMARY

To help the Metropolitan Transportation Authority (MTA) improve its management of overtime work assignments, in recent years the Office of the MTA Inspector General (OIG) has completed several audits and investigations on the topic of excessive work hours, particularly at the Long Island Rail Road (LIRR). Previous OIG audits have often focused on the high financial cost of inefficient overtime practices, while OIG investigations have repeatedly identified workers who claimed overtime pay while absent from their jobs. However, there is another aspect of workers' earning high amounts of overtime pay: the risk that employees pose to themselves, their colleagues, and the railroad's assets by working implausibly long and continuous hours.

This risk is illustrated by a tragic incident. In June 2017, an LIRR Track Foreman was fatally struck by an LIRR passenger train near the Queens Village Station. After conducting an investigation, the National Transportation Safety Board (NTSB) stated:[1]

> Based on the foreman's and the watchman/lookout's work schedules for 2 days prior to the accident, they were unable to receive restorative sleep for 2 consecutive nights prior to the day of the accident. The FRA [Federal Railroad Administration] analyzed these work schedules and found that both employees were in a fatigued state prior to the accident. Fatigue can cause workers to take shortcuts (workload shedding), delay reactions, and make poor decisions.

After its thorough review, the NTSB deemed the foreman and watchman fatigued. As a result, the NTSB concluded that because roadway workers are not covered by FRA regulations limiting the hours of service allowed for other railway personnel, they are at higher risk for

[1] See National Transportation Safety Board Railroad Accident Report, *Long Island Rail Road Roadway Worker Fatality, Queens Village, New York, June 10, 2017*, adopted on April 29, 2020, page 16.

fatigue-related accidents involving the movement of trains through their work zones. The NTSB recommended that the MTA implement work schedules developed using biomathematical models to help reduce the likelihood that track workers would be fatigued on the job.[2]

For its part, the FRA addressed the issue of employee fatigue by issuing a new rule in July 2022, after conducting nationwide research on the subject. As part of this rule, the FRA recommended that each railroad establish a fatigue risk management program (FRMP) to address violations of fatigue risk thresholds, provide education and awareness sessions for employees on fatigue risks, and limit long work hours. The LIRR is currently developing its FRMP and expects to finalize and submit it to the FRA by the July 2023 due date.

To contribute to this discussion, OIG studied which groups of LIRR employees regularly work a large number of hours and are frequently at a high risk of fatigue, what factors drive up the number of excessive hours worked, and what the MTA can do to reduce these work hours and therefore the risk of injury. OIG's analysis covered the 18-month period ending in June 2022.

A. Summary of Findings

- **Many Track division employees work a high number of hours, often consecutively.** During the review period, 267 Track employees worked 24 hours or longer on 4,375 occasions. For example, one worker was on duty continuously for 24 hours or more 64 times. Another employee was on duty for 84 consecutive hours on one occasion. Further, the 20 employees who most often reported working long hours spent 39% of their hours working 24 hours or more, with 1,055 instances of such shifts.

- **Many workers are at risk for severe fatigue.** By using a biomathematical model, OIG found that employees of the LIRR Engineering department (which includes the Track division) worked 7% of all their reported hours at risk of severe fatigue during the 18-month period. The 20 employees with the most frequent long shifts, who were all Track employees, worked 37% of their assigned hours with a severe fatigue risk.

- **The LIRR faces many operational and contractual challenges in managing excessive hours.** Employees are able to work long, potentially unsafe hours for several reasons, some of which are agency-driven and some of which derive from contractually obligated work rules. Some of these contributing factors include a large number of high-priority

[2] A biomathematical model applies mathematical principles to biological processes. In this instance, such models use a series of equations to quantify risk based on multiple factors.

capital projects requiring labor, in combination with relatively low staffing levels due to a past hiring freeze and the subsequent pandemic. In addition, the agency faces significant scheduling restrictions, such as management's inability to limit how many shifts an employee works and the fact that no Track positions are regularly scheduled to work on the weekend – when much of the track work is performed – which results in an additional need for overtime work.

This report presents the high work hours and fatigue risk statistics calculated and analyzed by OIG, the factors causing these high hours, and several potential solutions that the LIRR and the MTA should pursue to reduce on-the-job fatigue and enhance employees' safety.

B. Summary of Recommendations

- The LIRR Track division should consider modifying employee schedules, increasing worker availability by providing more training on key types of equipment, and better aligning staffing levels with the projected workload.

- On a regular basis, the LIRR should calculate the percentage of employee work hours during which the employees were at an elevated risk for fatigue and report this data to LIRR executive management.

- The LIRR should consider incorporating the approaches recommended in this report into the FRA-required FRMP.

- MTA and LIRR leadership should begin the process of negotiating contract terms with the track workers' union that will help address worker fatigue and safety, e.g., by authorizing management to limit the length of shifts based on fatigue risk.

C. Summary of Agency Response

The LIRR accepted all four recommendations, stating that safety is the agency's number one priority and that the railroad welcomes suggestions for helping to address the risk of fatigue. The agency asserted that it has begun to take some steps to reduce excessive hours, including by introducing new types of employee schedules, increasing staff training, and improving planning and coordination of work shifts. The LIRR agreed to monitor employees' levels of fatigue risk and to consider incorporating the approaches suggested in this report into the agency's FRMP. Additionally, the agency is developing proposals to the unions for modifying or eliminating work rules that contribute to excessive hours and worker fatigue.

II. BACKGROUND

A. LIRR Track Division

The LIRR Engineering department (Engineering) is responsible for the design, construction, maintenance, and rehabilitation of the physical assets of the railroad, excluding trains. Engineering is comprised of six divisions: Communications, Facilities, Power, Signals, Structures, and Track. The Track division is responsible for the maintenance of the rail and related components, as well as the track bed on which these components lie. Track also has a major role in capital projects.

1. Overnight and Weekend Work

Because track work can disrupt the LIRR's passenger service, the optimal time to perform significant maintenance, repairs, or construction is during overnight and weekend hours. However, all Track employees' regular shifts fall during regular workday hours, Monday through Friday. For this reason, any work needed at night or on the weekends must be done by track workers completing extra (overtime) shifts in addition to their regular work hours.

2. Hours of Service

While some Engineering employees fall under the U.S. Department of Transportation's Hours of Service (HOS) regulations, which limit the number of hours that may be worked, employees of most Engineering divisions, including Track, do not. Additionally, the collective bargaining agreements (CBAs or union contracts) for Track employees require overtime to be offered to the most senior Track employees first and do not allow LIRR management to limit employees' hours or choice of shifts, even if it would result in multiple shifts being worked consecutively.

Due to the nature of their work and the CBA work rules, Track employees can work many hours, including overtime hours. In fact, Track employees, who make up 27% of the Engineering workforce, accounted for 39% of all Engineering overtime hours in 2022. This translated to Track employees earning over $23 million in overtime pay that year.

B. FRA Research, Guidance, and Rule

1. 2019 Report on Railroad Worker Fatigue

In 2019, the FRA published a report on worker fatigue that analyzed data provided by 10 U.S. railroads to examine the relationship between accidents and incidents and fatigue among maintenance of way employees.[3] The FRA's analysis considered 12 different fatigue thresholds, including 90 or more hours worked in 10 days, shifts longer than 16 hours, and, by using a biomathematical model, schedules exceeding an agency-designated Fatigue Score Tolerance Level.[4] These factors were used to assess fatigue risks in the 10 railroads' work schedules. The FRA concluded that if any one of these fatigue thresholds is exceeded, there is a higher risk of accidents or incidents due to fatigue. The researchers also found that typically, if a given work schedule is in violation of one factor, it tends to violate other fatigue thresholds as well. As a result, the FRA recommended in its report that each railroad have a fatigue risk management program (FRMP) to address violations of the fatigue risk thresholds, provide education and awareness sessions for employees on fatigue risks, and limit long work hours.

2. FRA Regulation on Fatigue Risk Management

In July 2022, the FRA formalized its earlier recommendation by adopting a new rule that requires each railroad to create and adopt a FRMP as part of its system safety program.[5] Among other requirements, the FRMP must assess: (1) health and medical conditions that impact fatigue levels among railroad employees, (2) fatigue risks caused by scheduling issues that may prevent an employee from getting a sufficient quality and quantity of sleep, and (3) characteristics of each job category that can affect fatigue levels and risk for fatigue. The rule also suggests that railroads consider such policies as increasing the number of consecutive hours of off-duty rest and avoiding abrupt changes in employees' rest cycles.

The LIRR expects to finish its FRMP and submit it to the FRA by the July 2023 due date. Although this safety program is still being developed and the details are unavailable to the OIG, agency officials told this office that the FRMP will include plans for fatigue risk assessments and employee medical screenings.

Notably, the FRA's rule does not require railroads to include in their FRMPs the use of biomathematical models as a method to reduce worker fatigue because the FRA determined that

[3] The FRA published the *Data Analysis for Maintenance-of-Way Worker Fatigue* report in March 2019. Maintenance of Way workers are railroad employees who install and maintain the track, the surface under the track, and/or the various types of railroad equipment on or near the track.

[4] Fatigue Score Tolerance Level is a parameter of the FRA report's biomathematical model. In relation to this parameter, the FRA's guidance allows railroads to use a threshold of 72/20. This means that the fatigue threshold is exceeded if an employee's score on the Fatigue Assessment Tool by InterDynamics (FAID) is more than 72 for 20% or more of the employee's time on duty. In other words, the FRA's guideline is that employees should not work more than 20% of their shifts with a FAID score above 72.

[5] See 49 CFR § 270.

these models and methods were not practical for organizations, such as railroads, whose employees often do not have work schedules planned well in advance. As part of OIG's current review, it contacted various railroads, including the Washington Metropolitan Area Transit Authority, which has been at the forefront of attempting to use biomathematical models to reduce worker fatigue when creating employee schedules. However, OIG's research revealed that these methods are typically used only as a review tool to evaluate whether fatigue was likely present during a schedule that has already been worked. Railroads have not used biomathematical methods to determine beforehand whether individual workers can work planned shifts without an undue risk of fatigue.

C. The FAID Model

The LIRR is currently licensed to use the Fatigue Assessment Tool by InterDynamics (FAID), which is a proprietary biomathematical model that evaluates schedules based upon biological determinants of fatigue. FAID is one of the six scientific models that evaluate work schedules for the effects of fatigue and one of the two models that are approved by the FRA. The model can be used to assess both proposed schedules and actual work shifts that employees have already completed. For example, to determine the likely level of fatigue for an employee who worked a specified schedule, the model takes into account such factors as (1) the time of day the work occurred, (2) the duration of the work and rest breaks, (3) the assigned employee's work history in the preceding seven days, and (4) biological limits on recovery sleep.[6]

FAID results (called "scores") identify the times when employees who have worked a given schedule will most likely encounter elevated risk of on-the-job fatigue. The model also provides the highest FAID score reached during each shift worked by an employee, known as the "peak FAID score." A high FAID score indicates higher fatigue exposure, which could present such risks as a higher probability of impaired work performance, a lower likelihood of getting restorative sleep, and greater subjective sleepiness. The FRA states that FAID scores above 80 indicate a *severe* level of fatigue, and FAID scores between 70 and 80 indicate an *extreme* level of fatigue.

The LIRR currently uses FAID to help identify fatigue risks in the schedules of employees who fall under the HOS regulations, specifically train crew personnel and dispatchers. The agency then uses this risk information to educate these employees on how to reduce the risk of becoming fatigued on the job.

[6] In 2016, the National Center for Biotechnology Information published a study on optimal sleep duration and sleep loss. According to the study, it takes four days of sufficient sleep to fully recover from losing one hour of sleep.

III. FINDINGS

A. Many Track Employees Work a High Number of Hours, Often Consecutively

OIG analyzed LIRR Engineering employees' work hours for an 18-month period from January 2021 through June 2022, using fatigue risk metrics based on the FRA's 2019 report. Specifically, OIG's analysis identified instances when employees were paid for working at least 90 hours in a single week; 24 hours or longer continuously; and/or at least 48 hours continuously. OIG also analyzed the 20 longest shifts worked by individual Engineering employees.[7]

For each of these criteria, OIG analyzed the total number of hours the employees reported working during the 18-month period (Hours Worked), the total number of hours an employee exceeded the selected criterion, and the percent of total hours spent working above the criterion. OIG applied these analyses to hours worked by the following four groups: the Engineering department, the Track division, the five gangs that worked 24 hours or longer the most often (Top 5 Gangs), and the employees who worked 24 hours or longer the most often (Top 20 Employees). Notably, all of the Top 5 Gangs for the time period were in the Track division, and all of the Top 20 Employees were members of the Track division.

1. Criterion I: Over 90 Hours Per Week

OIG found 2,362 instances when an Engineering employee reported working 90 hours or longer in a week. Track employees had 1,010 instances of working at least 90 hours per week. Additionally, the Top 5 Gangs had 378 instances when an employee in one of these gangs was on duty at least 90 hours in a week, amounting to 13% of their time; *see* Figure 1, below. Finally, the Top 20 Employees spent 28% of their hours working during 90^{+}-hour weeks. For these employees, there were 286 instances in which an individual was assigned to work at least 90 hours in a week. Notably, the Top 20 Employees represent only 4% of the Track division, but they accounted for 28% of the weeks during which a Track employee worked 90 hours or longer.

[7] The analysis excluded emergencies and weather incidents because these scenarios are out of the LIRR's control. However, during the review period, emergency and weather overtime hours represented only 8% of the hours worked by the gangs who most frequently worked 24 or more hours continuously.

Figure 1: Percent of Reported Hours Worked During 90-Hour Work Weeks, by Group

Group	Percent
Engineering	5%
Track	8%
Top 5 Gangs	13%
Top 20 Employees	28%

Case Study 1 illustrates how much an employee may work in a single week.

Case Study 1 (Part 1)

Between Wednesday, April 27, 2022, and Tuesday, May 3, 2022, a Machine Operator (Machine Operator A) in the Track division spent 107.5 hours out of the 168 hours in a week at work, as Figure 2 shows. This left only 60.5 hours, 36% of the week, for other activities of daily life, including rest.

Figure 2: Machine Operator A

Day (Start of Shift)	Start Date	Shift	Reported Work Hours	Activity	Location
Wednesday	4/27/2022	7:30 AM - 3:30 PM	8 hours	Capital Project	Montauk
Thursday	4/28/2022	7:30 AM - 3:30 PM	8 hours	Capital Project	Main Line
Thursday	4/28/2022	7:30 PM - 5:30 AM	10 hours	Capital Project	Main Line
Friday	4/29/2022	7:30 AM - 3:30 PM	8 hours	Capital Project	Montauk
Friday	4/29/2022	9:00 PM - 6:00 AM	9 hours	Capital Project	Hillside Yard
Saturday	4/30/2022	7:30 AM - 8:00 PM	12.5 hours	Capital Project	Main Line
Sunday	5/1/2022	5:00 AM - 5:00 PM	12 hours	Third Track	Main Line
Monday	5/2/2022	7:30 AM - 3:00 PM	8 hours	Track Maintenance	Main Line
Monday	5/2/2022	10:00 PM - 6:00 AM	8 hours	Rail Replacement	Main Line
Tuesday	5/3/2022	7:30 AM - 3:30 PM	8 hours	Track Drainage	Main Line
Tuesday	5/3/2022	3:30 PM - 7:30 AM	16 hours	Capital Project	Belmont Park

2. Criterion II: At Least 24 Continuous Hours

The number of hours worked in a week is one potential risk factor for fatigue; another is the number of continuous hours worked. OIG found that the Engineering employees worked at least 24 continuous hours on 5,255 occasions; as Figure 3 shows, those work hours accounted for 3% of the time they worked during the 18 months. Track employees, specifically 267 track workers, worked for 24 hours or longer on 4,375 occasions. Thus, for 11% percent of the hours that all Track employees reported working, they were on duty for 24 hours or longer. The Top 5 Gangs spent at least 23% of their hours working 24 or more continuous hours and had 2,119 instances of continuous hours of this length. Finally, the Top 20 Employees spent 39% of their hours assigned to work 24 hours or more, with 1,055 instances of shifts of this length.

Figure 3: Summary of Consecutive Hours Worked (24+ Hours)
January 2021 – June 2022

Group	Reported Work Hours	24+ Hours	Percent
Engineering	4,659,704	162,496	3%
Track	1,241,075	136,728	11%
Top 5 Gangs	300,436	70,201	23%
Top 20 Employees	85,922	33,380	39%

The Top 20 Employees in the Track division represent 4% of Track workers but were responsible for 24% of these continuous hours worked by Track personnel. Thus, it is clear that extended instances of consecutive work hours are particularly concentrated among certain groups of Engineering employees.

Case Study 2 gives an example of employees working many shifts of 24 hours or longer.

Case Study 2

During the 18 months OIG reviewed, a Utility Worker[8] (Utility Worker A) in the Track division reported working a total of 64 shifts that lasted 24 hours or longer – specifically, he worked 19 shifts that were 24 hours long and 45 shifts that were longer than 24 hours. For instance, Utility Worker A was scheduled to work 24 continuous hours on a track drainage

[8] Utility worker is a track worker position that includes additional responsibilities for driving a non-revenue work vehicle.

project from 10:30 PM on Friday, June 17, 2022, until 10:30 PM on Saturday, June 18. In another instance, Utility Worker A reported working on a capital project from 8:00 PM on Wednesday, August 4, 2021, until 9:00 AM on the following Saturday, August 7 – that is, for 61 hours straight. The employee spent these 61 hours assigned to several locations surfacing track and working with third-party contractors.

3. Criterion III: 48 Continuous Hours or Longer

OIG's analysis also identified continuous shifts at least 48 hours long. Although the number of hours employees were on duty during shifts of 48 hours or more is less than 1% of the total hours worked by the Engineering department, it is significant that the Track division was responsible for a majority of these shifts. During the 18-month review period, Track employees reported working 48 hours or longer 227 times, accounting for 92% of all such shifts worked in the Engineering department. Of these extended shifts worked by the Track division, the Top 20 Employees accounted for 34% of all the hours. While the incidence of employees scheduled to work 48 or more consecutive hours may not be widespread, the burdens of these shifts tend to fall on the same few groups, and the potential safety implication of working such long continuous hours is concerning.

OIG found that the longest shift reported was 84 hours without scheduled rest.[9] Significantly, LIRR work rules do not permit employees to sleep during their assigned work shifts. Figure 4 lists the 20 longest shifts for the time period reviewed.

Figure 4: Top 20 Longest Shifts Worked
January 2021 – June 2022

Title of Employee	Shift Length
Maintenance of Way (M W) Utility Worker	84 hours
Engineer Work Equipment	72 hours
Machine Operator	70 hours 30 minutes
M W Utility Worker	70 hours 30 minutes
M W Utility Worker	68 hours
Track Worker (A)	66 hours
M W Utility Worker	66 hours

[9] Because OIG's analysis excluded emergencies and weather incidents, several instances of long work hours do not appear in these charts, including a 104-hour shift scheduled due to a severe storm.

Title of Employee	Shift Length
Foreman Track	63 hours
M W Utility Worker	61 hours
Engineer Work Equipment	60 hours
Gang Foreman ET TCPQ	60 hours
Gang Foreman ET TCPQ	59 hours 1 minute
Engineer Work Equipment	59 hours
M W Utility Worker	59 hours
Foreman Track	58 hours 30 minutes
Welder	58 hours
M W Utility Worker	58 hours
Track Worker (A)	58 hours
Machine Operator	58 hours

Case Study 3 describes the 84-hour shift worked by a Track employee.

Case Study 3

At 7:00 AM on Thursday, March 3, 2022, a Utility Worker (Utility Worker B) reported to the job site. Utility Worker B performed work on the Third Track of the LIRR's Main Line until 3:00 PM. Then at 3:00 PM, Utility Worker B began working on a capital construction project near Belmont Park. The employee reported working on this project from 3:00 PM on Thursday until 7:00 PM on Sunday, March 6. Throughout this continuous shift, according to his timesheet, the employee did various tasks for the project, including building track and switches and installing equipment. This employee was paid for working 84 consecutive hours from 7:00 AM on Thursday to 7:00 PM on the following Sunday, with no scheduled rest periods between shifts.[10]

B. Track Workers Are at Risk for Severe Fatigue According to Model

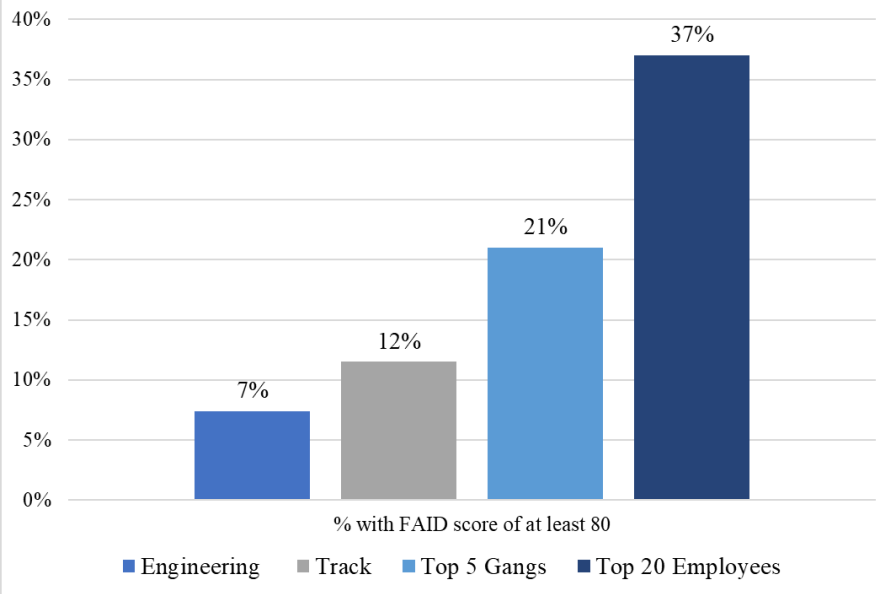
The LIRR has used the FAID model to assess potential fatigue among employees covered by federal HOS regulations. For accident investigations, as well as for HOS analyses for train crew members, the LIRR has used a FAID score of a "72/20 threshold" as a benchmark: Less than 20% of the employee's time on duty should be performed with a FAID score of 72 or higher.

[10] While this employee had a right to take 30-minute meal breaks during the *middle* of his shifts, he did not have any rest breaks scheduled *between* his shifts.

To analyze potential levels of fatigue, OIG chose to evaluate the schedules that employees had worked by using a FAID score of 80 (the severe level of risk) as its threshold to illustrate the percentage of hours during which employees were at risk of fatigue.[11] OIG does not expect LIRR employees to meet the standard of a FAID score less than 80 at all times, because it may not be operationally practical, e.g., during unscheduled operations and emergencies. However, OIG's analysis sheds light on how commonly employees are at work while potentially experiencing severe levels of fatigue.

OIG entered into the FAID model the actual hours that Engineering employees worked from January 2021 through June 2022. FAID then assigned a score to every hour worked.[12] Figure 5 shows the percentage of time that the four groups of employees worked with a FAID score of at least 80. The Top 20 Employees who worked the most continuous hours were at risk of severe fatigue during 37% of the hours they worked during the review period.

Figure 5: Percentage of Hours with a FAID Score of At Least 80, by Group January 2021 – June 2022



[11] Using a FAID score of 80 as a threshold is a straightforward way of analyzing and presenting the FAID data. It is also a conservative benchmark compared to the FRA and LIRR's threshold of 72/20, because if 20% of the hours are identified as being above a FAID score of 80, the schedule is undoubtably out of compliance with the threshold. Notably, the FRA stated that a FAID score less than 80 does not mean that a given work schedule is appropriate from a fatigue risk management point of view.

[12] Accidents and emergencies *are* included in the schedules that OIG entered into FAID. Because FAID takes into account employees' previous work schedules for assessing the current schedules, it would not be practical to exclude these hours. Additionally, even though the LIRR cannot avoid scheduling emergency and weather-related overtime work, employees can still get fatigued from working these hours, including during the shifts that *follow* emergency and weather-related overtime.

Unsurprisingly, the groups with the highest number of continuous work hours had higher percentages of hours worked with a FAID score of 80 or above. Given that the Top 20 Employees and Top 5 Gangs worked with a FAID score of 80 or above for more than 20% of the time, these employees would certainly be considered fatigued by the lower FRA-recommended 72/20 threshold during much of this period. Although Engineering and Track showed a lower percentage of hours with a FAID score of at least 80, as shown by the work hours and FAID scores of the Top 20 Employees and Top 5 Gangs, a significant number of employees within these larger groups work unsafe hours according to the FRA's threshold.

FAID Applied to Case Study 1

Case Study 1, above, describes the schedule of Machine Operator A during the week of April 27, 2022 through May 3, 2022. OIG also entered this employee's work hours data into FAID and obtained his FAID scores. Figure 6 summarizes OIG's findings.

Figure 6: Machine Operator A, with FAID Scores

Day (Start of Shift)	Start Date	Shift	Hours Worked	Hours at FAID Score of 80 or Above	Peak FAID Score
Wednesday	4/27/2022	7:30 AM - 3:30 PM	8 hours	40 minutes	129
Thursday	4/28/2022	7:30 AM - 3:30 PM	8 hours	3 hours 13 minutes	110
Thursday	4/28/2022	7:30 PM - 5:30 AM	10 hours	8 hours 14 minutes	133
Friday	4/29/2022	7:30 AM - 3:30 PM	8 hours	6 hours 56 minutes	123
Friday	4/29/2022	9:00 PM - 6:00 AM	9 hours	9 hours	145
Saturday	4/30/2022	7:30 AM - 8:00 PM	12.5 hours	9 hours 18 minutes	134
Sunday	5/1/2022	5:00 AM - 5:00 PM	12 hours	11 hours 57 minutes	142
Monday	5/2/2022	7:30 AM - 3:30 PM	8 hours	6 hours 51 minutes	122
Monday	5/2/2022	10:00 PM - 6:00 AM	8 hours	8 hours	142
Tuesday	5/3/2022	7:30 AM - 3:30 PM	8 hours	8 hours	132
Tuesday	5/3/2022	3:30 PM - 7:30 AM	16 hours	12 hours 19 minutes	165

During the 107 hours and 30 minutes Machine Operator A worked that week, he spent 91 hours and 8 minutes working with a FAID score of 80 or above, at risk of severe fatigue. As Figure 6 shows, his peak FAID scores for his shifts ranged from 110 to 165. Machine Operator A had a FAID score of 80 or above for the entire length of 3 of the 11 shifts, for a total of 25 hours. Only 16% of the hours he worked during the week were below a FAID score of 80, and

only 2% of his work hours, or 1 hour and 35 minutes, had a FAID score below 70. This means that for 99% of the time Machine Operator A worked during this week, he was at risk of severe or extreme fatigue.[13]

Notably, Machine Operator A – a member of the Track division – was not a Top 20 Employee and did not work for a Top 5 Gang during the 18 months OIG analyzed. However, he still spent 52% of the 1,789 hours he worked from January 1, 2021 through June 30, 2022, with a FAID score of 80 or above. Although the Top 5 Gangs and the Top 20 Employees account for a large proportion of the excessive hours in Track, many other Track employees also have work schedules that put themselves at undue risk of severe fatigue.

C. LIRR has Increased Its Management of Overtime

In recent years, the LIRR Engineering department improved its procedures for planning, authorizing, and monitoring overtime work assignments. Engineering officials credited these improvements with lowering overtime hour totals by 36% in 2021 as compared to 2020, resulting in $16.2 million in savings.

The improved oversight takes on many forms in the Track division. First, division supervisors must fill out a pre-approval form for any overtime work they deem necessary. Then, after the work is completed, Engineering management reviews the schedules. In addition, the Chief Engineer and other senior managers review a monthly report listing the employees who have worked 24 hours or longer, and the LIRR President attends quarterly update meetings. While these reviews keep upper management informed of the schedules worked by employees, they do not directly impact scheduling before it occurs.

After the completion of a work shift, employees' overtime hours are verified and approved by a supervisor and gang foreman, who are responsible for signing the daily labor sheets. The Manager of Engineering and Compliance spot-audits the labor sheets against employees' swipes in the electronic timekeeping system, which is a new requirement. Any errors or discrepancies the manager finds will be addressed and corrected. The Assistant Chief of Planning and Operations told OIG that the additional records created by the timekeeping swipes have been an effective deterrent against overtime abuse, which had been an issue for the LIRR before the electronic timekeeping system was implemented.

[13] FAID considers many factors when assessing a shift, including the work schedules an employee had for the prior seven days. A FAID score that is high during a regular 8-hour shift, such as Machine Operator A's shift on Wednesday, April 27, indicates that the employee's work schedule during the previous seven days is contributing to the calculation of a high level of fatigue for the regular shift.

These additional controls can indirectly impact overtime hours; however, they do not focus on reducing the excessive hours that employees can work in a week.

D. MTA and LIRR Established Task Force to Help Address Worker Fatigue

In response to the NTSB recommendation which came about because of the 2017 Queens Village tragedy, and in anticipation of the new FRA rule requiring the development of a fatigue risk management program, the MTA and the LIRR set up a task force to discuss implementing the FAID model for its roadway workers' schedules. However, in 2022, the task force determined that since the unions' contractual agreements give the employees the right to choose to work any overtime shift for which they are trained and available, LIRR management is, in effect, not able to use biomathematical models to restrict union members from selecting and working extra shifts.

The track workers' union has acknowledged that employees' schedules can lead to increased fatigue risks. The General Chairman of the track workers' union wrote to the Chairman of the NTSB in April 2021 to address the NTSB's report. In the letter, he stated that the union has been working with the LIRR's Engineering department to create overlapping shifts – which would prevent employees from selecting consecutive shifts in some circumstances – and help with scheduling in other ways to address the risk of potential fatigue. In addition, he wrote that during its monthly meetings, the union would communicate and discuss the detrimental effects fatigue has on the safety and well-being of workers.

E. LIRR Faces Challenges in Managing Overtime and Excessive Hours

In interviews with 10 LIRR Engineering managers, OIG learned that many interconnected factors cause the excessive hours worked by Track employees, including workload, work rules, and staffing levels.

1. Overtime assigned mainly by seniority, with no limits

In accordance with the work rules required by union contracts, overtime must be offered to the most senior Track employees first, even if it would result in many hours worked consecutively. Each employee is trusted not to take on more than they are capable of, but cannot be stopped from taking on additional shifts, even if management thinks it may be too many consecutive hours for one person to work.

Employees are entitled to work any hours that are available to them, as per the union's overtime assignment agreement, although they are not allowed to sleep on the job. However, based on OIG's interviews, it appears that managers do not proactively walk through work sites to determine if workers are sleeping. Further, management is not always aware of what hours individuals have already worked prior to selecting new shifts. Track employees often work overtime in gangs other than the ones to which they are principally assigned, and thus the supervisors for the next shift might not know how long the employees have been working and that the worker could be at high risk for fatigue. Additionally, there is a two-week lag in the processing of timesheet data, and therefore information on past work hours would not be readily available for supervisors or managers to review when making scheduling decisions.

2. Workers' "ownership" of equipment

Another challenge faced by LIRR Track managers is that by formal agreement, some workers have first rights on operating certain types of equipment (referred to as "owning" the equipment), and few workers are trained on these specialized pieces of equipment, such as cranes and Hi-Rail trucks. If this equipment is needed during an overtime tour, the employee who "owns" it has the right to work the overtime hours in order to operate the equipment. Even if this worker is inclined not to take this overtime shift, managers told OIG that they sometimes face difficulties finding other qualified employees who are available to fill these shifts.

Track managers asserted that the agency does not have sufficient staffing available for employees to leave their job assignments in order to receive training on the specialized equipment. Additionally, the training for many types of specialized equipment is provided not by a centralized training unit but instead on the job by, and at the discretion of, a Track employee who is already trained (and who "owns" the equipment). This process further limits the available training opportunities. Managers told OIG that employees who have received training but do not "own" the equipment usually do not have enough experience to operate the equipment properly and efficiently. For this reason, even when the usual personnel are reluctant to work extra shifts operating equipment they "own," some managers are reluctant to assign others with less experience – even when the alternative is that the more experienced employees are at high risk of fatigue.

3. Low staffing levels and increased workload from operations and projects

In discussions with OIG, Track managers described the difficulties of completing work with the division's current staffing levels. In 2018, Track had 390 field employees, but by 2021

the figure had fallen to 352, a 9.7% decrease. The LIRR instituted a hiring freeze in 2019, and the Covid-19 pandemic impacted the MTA shortly afterwards.

OIG learned that the LIRR is in the process of hiring new employees but is having difficulty filling all of the vacant positions, especially since the agency has recently raised its desired headcount to address increased operational needs. With the recent opening of the Grand Central Madison terminal and the completion of the Third Track project, the LIRR is increasing train service by 41% and its track mileage by 40 miles. These expansions will cause an increase in the railroad's maintenance needs, which will further strain the Track workforce by adding many more work shifts to be filled. In 2022, in anticipation of the increased workload, the LIRR increased the Track division's headcount to 457 field employees. However, there are still vacancies to fill within the division. In the meantime, the open positions need to be filled by employees working overtime shifts, which leads to some employees working many hours.

Additionally, while the agency has increased its planned staffing levels to handle the anticipated increase in workload, it apparently has not studied how many employees would be required to avoid the numerous extended shifts, over consecutive days, that some Track personnel currently work. Once the agency is able to fill its vacant positions, Track management should take the opportunity to determine what its optimal staffing level should be in order to accomplish the division's goals while reducing the risk of fatigue.

Notably, although the LIRR had substantial success in lowering overtime hours between 2020 and 2021, overtime started to increase again in 2022. In 2021, Engineering employees worked 734,538 overtime hours. In 2022, this figure grew 20%, to 883,806 hours of overtime work. Similarly, for the same period, Track employees' overtime increased 24%, from 279,469 hours to 347,365 hours. The Assistant Chief of Planning and Operations told OIG that the increases in overtime in Engineering and Track were driven by the increased demand for labor on construction projects such as Third Track and East Side Access. In fact, all the managers OIG spoke with reported that a large volume of high-priority capital projects requires Track employees working many hours on overtime to meet the construction schedule. Additionally, the managers stated that all capital projects are given equally high priority by the MTA and must all be completed within the timeframes provided by the MTA.

4. No regular positions for weekends or nights

The schedules worked by Track employees also impact the amount of overtime worked. The union contract gives preference to Monday through Friday as the workers' regular shift days. Despite the fact that much of the track work must be performed on weekends (when there

is less train traffic and more track access), no regular Track shifts include Saturday or Sunday. Notably, the current contract clearly allows for a weekend day to be a regular workday when agency operations require it; in fact, OIG had recommended to LIRR senior management in 2009 that the agency establish some Track positions with regular weekend shifts. However, the LIRR does not use that option because, as LIRR officials informed OIG, Track had tried to offer a few positions with a Tuesday – Saturday workweek but workers did not choose to work these shifts. As a result, the large volume of capital and maintenance work that is performed during the weekend is done exclusively on overtime – and only after track workers' regular weekday shifts. This adds to the high number of hours that many employees work.

Theoretically, if the LIRR established some regular shifts that include weekend days, the increased track access on the weekend would presumably allow for more work to be completed in the same length of time and would result in a decreased need for overtime work hours.

OIG also learned that the Track division does not schedule regular, non-overtime nighttime positions for non-emergency roles; this restriction resulted from a 1997 arbitration ruling. While Track does have a night crew that is on standby for emergencies, its members fill the jobs while on overtime hours because no track workers have chosen these positions as their regular (non-overtime) shift.

This situation raises another issue: Track currently posts more positions than there are employees. This approach allows employees to choose more desirable positions for themselves and leaves vacant other positions that the agency needs filled, such as the emergency night tours and, potentially, the positions with weekend workdays that OIG proposed in 2009. Further, even if Track management would limit the number of job postings, they currently do not prioritize positions and therefore would not readily know which positions to post.

5. Limited overlapping of shifts

In 2009, OIG recommended that the LIRR try to overlap more overtime shifts to limit the opportunities for employees to choose to work one shift immediately following another. By scheduling some overtime shifts to end after the next shifts begin, the agency could prevent many instances of employees working long continuous hours. In the years since OIG made this recommendation, the agency has reportedly made some efforts to implement it. However, during the current review, agency officials told OIG that Track has been unable to use this technique with significant frequency. Track managers told OIG that the high volume of work and the agency's low staffing levels have forced them to avoid overlapping shifts so that the maximum number of workers would be available for every shift.

6. Lack of centralized office to coordinate overtime assignments

The challenges described above all drive the number of overtime hours the Track division employees are needed to complete the maintenance and construction work schedule set by the railroad. Some Track managers told OIG they would be better able to mitigate the impacts of these constraining factors if Track were to establish a centralized manpower office. They believe that a manpower office, which would be able to maintain an ongoing understanding of the division's overall staffing needs, could plan and coordinate shifts more effectively than is currently possible. In OIG's opinion, LIRR management should consider this concept; having such an office as a centralized resource for the Track division might allow Track first to analyze how its staffing has been used and then plan upcoming shifts to meet operational and capital needs while preventing excessive continuous hours.

IV. CONCLUSION

The LIRR's contract with the track workers' union will expire in June 2023, and negotiations for the next contract should begin in the spring of 2023. Therefore, the agency has an opportunity this year to negotiate changes that could help prevent excessive hours and the resulting risk of severe on-the-job fatigue. As part of every union negotiation, the MTA and its agencies prepare and share lists of all the provisions they would like to add, change, or delete in a contract that is soon to be negotiated. As OIG's analysis makes abundantly clear, allowing Track management to exert some control in preventing excessive hours could improve safety for workers and LIRR passengers, and this issue should be seriously considered during the upcoming negotiations.

This is an opportune moment for agency management to work with labor representatives to find solutions to recognized safety-related challenges. In the meantime, while LIRR managers face significant limitations regarding the scheduling of work hours, they still have access to a number of tools to better manage employees' hours and help prevent fatigue. In addition, these tools could be incorporated into the FRA-mandated FRMP that the LIRR is currently developing.

V. RECOMMENDATIONS

1. To help prevent worker fatigue and improve safety, the LIRR Track division should consider taking steps to reduce excessive hours, such as:

    a. Make a concerted effort to overlap more shifts.
    b. Create some positions that include a weekend day as a regular workday.
    c. Train more employees on the types of equipment that can be "owned."
    d. Establish formal training on specialized equipment that is not solely reliant on the availability and willingness of current operators to train others.
    e. Evaluate the efficiency of posting openings that are consistent with staffing levels.
    f. Identify the optimal number of Track employees in order to avoid excessive hours.
    g. Create a centralized manpower office in the Track division to plan and coordinate overtime assignments.

    Agency Response: Agreed. The LIRR stated that it has begun to increase its efforts to reduce excessive hours. For example, the agency noted that it had previously been unsuccessful in its attempts to set up positions that include a weekend day as a regular day shift; however, with the opening of Grand Central Madison, the LIRR reached an agreement with union leadership to allow the posting of such positions, and the agency has had some success in filling these positions. Regarding training, the railroad stated that in future equipment procurements, the agency will include training services from the original equipment manufacturer to improve its ability to train new operators without relying on the incumbent "owner" operators. Further, Engineering started the process of establishing a centralized manpower office, with roles including the planning and coordination of work shifts. The department anticipates creating this new office by the third quarter of 2023.

2. The LIRR should monitor the level of employee fatigue risk by revising its 24+ hour shift report sent monthly to LIRR executives, specifically by including the biomathematical model scores for the hours worked by the listed employees.

    Agency Response: Agreed. The LIRR stated that it plans to monitor its employees' levels of fatigue risk by including FAID scores in its FRMP, rather than its monthly 24+ hour shift report. The agency's new program will go into effect in mid-July 2023.

3. The LIRR should consider adding to its FRA-required Fatigue Risk Management Program the proposed approaches and suggestions included in this OIG report.

   Agency Response: Agreed. The LIRR stated that it will consider incorporating the approaches and suggestions contained in this report into the agency's FRMP.

4. The MTA should work to negotiate explicit contract terms with the Track union that will help decrease the potential for worker fatigue and increase safety, by such means as allowing management, based on fatigue risk, to limit the length of shifts and to increase scheduling flexibility for qualified employees working with specialized equipment.

   Agency Response: Agreed. The MTA is currently developing proposals to the relevant LIRR unions for modifying or eliminating existing contractual work rules that contribute to excessive consecutive hours and worker fatigue. The current contracts for most LIRR unions are effective through June 15, 2023, after which time they become amendable, and the MTA will engage in collective bargaining with the relevant labor unions.