NEW YORK STATE
PUBLIC TRANSPORTATION SAFETY BOARD
RAIL SAFETY SECTION
CASE #6345

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INVESTIGATION OF A DERAILMENT
IN INVOLVING THE MTA - LONG ISLAND RAIL ROAD
IN GREENLAWN, NEW YORK
ON JANUARY 24, 2001

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SYNOPSIS

At approximately 1:28 p.m. on Wednesday, January 24, 2001, eastbound train #650 led by engine #403 and four C3 bi-level coaches derailed the L3 and L4 wheels on the trailing truck of engine #403 as the train rounded a curve in Greenlawn, New York. There were no reported injuries and approximately 135 passengers were safely evacuated to the right of way and transported via four-wheel drive vehicles to a staging area where they were able to board buses and continue their journey. Engine #403 sustained minor damage and approximately 1,000 feet of track was damaged.

The Public Transportation Safety Board staff finds that the probable cause of this accident was a wide gauge condition worsened to the point of failure by the engine's weight as the engine rounded the curve. Contributing to the probable cause of this accident was the Long Island Rail Road's decision not to correct this known track deficiency, which was identified six days prior to the accident, in a timely manner.

INVESTIGATION

Accident Scene:

The derailment occurred on the single non-electrified track as the eastbound train was rounding a 4 degree, 32 minute curve at mile post 38.2 on the Port Jefferson Branch. Train movement in this section of track is governed by automatic train control and automatic signals controlled from Divide Tower. Maximum authorized speed in this section of track is 45 mph. The track construction consisted of ballasted full length wood ties supporting the 119-pound RE rail that is secured to the wood ties with Pandrol fasteners. Three lock-pin type spikes are used per tie plate; two lock pins on the gauge side and one lock pin on the field side. The north rail is on the low side of the curve.

The weather was clear and the temperature was approximately 40 degrees at the time of the derailment. There were several inches of snow on the ground along the right of way from an earlier snow storm and the roadbed was frozen from prolonged cold weather.
Accident Description:

At the point of derailment, the train was moving at approximately 43 mph according to the engine's event recorder. The engine was rounding a 4°-32' curve when the two wheels on the north side of the trailing truck on lead engine #403 dropped off the low rail into the gauge of the curved track. The train's event recorder indicated that the engineer reduced power and applied the train's brakes as the two derailed wheels continued within the gauge of the rail, forcing the low (north) rail to roll outward. The forces exhibited on the rail as it rolled outward caused the Pandrol fasteners to snap off and led to the north rail breaking approximately 400 feet east of the point of derailment. The four trailing bi-level coaches remained on the track as the train traveled approximately 1,000 feet from the point of derailment because the rolled rail sprung back and realigned sufficiently for the wheels under these coaches to remain on the track.

Injuries:

There were no reported injuries as a result of this accident.

ADDITIONAL FACTS

The MTA - LIRR adopted the Pandrol system for attaching the rail to the ties in 1974 and it was installed in this area of track in 1981. At the time of installation, the standard arrangement for securing tie plates to wood track ties in curved track areas was to apply two lock pin spikes on the gauge side and one lock pin spike on the field side per tie plate. This was the arrangement in place at the time of the derailment. This arrangement, however, does not conform with current MW-1 standards which were revised in 1990 for new track installation/construction. The revised standards call for the application of two lock pin spikes on the field side as well as two on the gauge side. LIRR Engineering was not able to locate any documentation or explain why this section of track was not retrofitted to the revised 1990 standard except that the standard basically applied to new track installation and/or construction and not pre-existing tracks.

Post accident inspection of the track where the rail spread revealed that lock spikes securing tie plates on seven consecutive wood ties had recently sheared off. These lock pins were most likely sheared by train #650 but may have been weakened by previous trains as they traversed this section of track. The track was curve worn on the high and low side but within Federal Railroad Administration standards. The derailment occurred as the high rail shifted outward under the weight of the train as it moved into the curve. Dozens of Pandrol clips snapped as the derailed wheels rolled over them and the north rail broke at a weld joint approximately 400 feet east of the point of derailment.

PTSB staff reviewed the track testing records from the six previous LIRR Track Geometry Car trips over this section of track dating back to April of 2000. The most recent test trip over this section of track was run on January 18, 2001. The test records indicated progressive widening in the gauge and progressive lengthening of the wide gauge in the vicinity of the curve. In the past nine months, initial gauge readings of 0.80 inches increased to 0.95 inches over a distance of 46 feet in the curve on November 2000 to a reported 1.12 inch wide gauge reading detected in the curve on January 18, 2001.
The most recent testing on January 18, 2001 recorded the wide gauge over a distance of 106 feet. This deficiency exceeds the allowable parameter set in the Railroad’s Manual of Standard Practices for Construction and Maintenance of Ballasted Track - MW-1. MW-1 Section 903 (a) calls for “immediate protection” and “prompt corrective action” when the gauge exceeds 4'-9 1/2". PTSB’s investigation finds that the track supervision responsible for this section of track did not comply with the MW-1 standards as required. The track supervisor should have taken immediate protective action by placing a temporary speed restriction on the track as noted in MW-1 Section 903 and further defined in MW-1 Section 901-A and required by MW-1 Section 902 C2.

In addition to the wide gauge found, there was also a deviation in the cross level of 1" over a distance of 60 feet within the same area. Although these measurements fall beneath the limits set by the Federal Railroad Administration, they exceed the more stringent limits set by the Railroad and are therefore, by there own rules, deficiencies that require “immediate protection” and “prompt” corrective actions.

Due to the weather conditions preceding this derailment, snow cover made visual inspection of the cross ties impossible. The frozen roadbed also prevented the track structure from absorbing some of the lateral movement imposed on the track by the train. The DE-30 engine on the derailed train weighs about 148 tons which is approximately 15 tons more than the GP-38 engine previously utilized by the LIRR. LIRR engineering personnel determined that the “centrifugal forces produced by the DE-30 engines are 12% greater than those produced by the GP-38.” This increase in force resulted in greater lateral movement of the rails on the curved track. PTSB staff finds that the use of the heavier DE-30 engines and bi-level coaches can contribute to an accelerated deterioration of the track structure resulting in the wide gauge. Even though the LIRR was aware of this phenomenon prior to the derailment, and even after required periodic testing with the Track Geometry Car showed progressive wide gauge developing, the condition was not recognized and corrective actions were not taken.

PTSB staff was advised that this section of track had been scheduled for new concrete tie installation in September 2001 as part of the annual programmed track rehabilitation work. LIRR management’s decision to postpone immediate repairs due to the frozen condition of the track bed and the fact that this section of track was scheduled for maintenance work later in the calendar year was in poor judgement. The supervisor responsible for not taking immediate corrective action after detection of the wide gauge received a verbal reprimand and re-instruction in this area. The scheduled maintenance work was accelerated to June 2001.

Following the derailment, LIRR adopted immediate remedial measures that include, at a minimum, installation of Pandrol/Lag tie plates with four lag bolts per plate on every third wooden tie on the high rail side on curves greater than two degrees. They also inspected all curves on the Port Jefferson, Oyster Bay and Montauk Branches and corrected any deficiencies found there; they conducted additional Track Geometry Car tests on all diesel territory branches; and they mandated that all gauge measured one inch or greater by the Track Geometry Car periodic tests would be verified immediately by visual inspection and a 30 mph speed restriction placed on the track until corrective action is completed.
In addition to the immediate corrective actions, the Railroad scheduled the Federal Railroad Administration's (FRA) Gauge Restraint Measuring System Car over all of its diesel territory. The LIRR also has established additional training for track department supervisors and managers; implemented a supervisory biweekly train riding program; reviewed their Track Strategy Plan; updated the MW-1 and CE-1 Standards; and reviewed the track maintenance procedures for track supervisors.

The Public Transportation Safety Board concurs with the immediate corrective actions taken in response to this accident with emphasis on the retraining and review of maintenance procedures with supervisors.

The Public Transportation Safety Board staff finds that the probable cause of this accident was a wide gauge condition heightened by the engine's weight as the engine rounded the curve. Contributing to the probable cause of this accident was the Long Island Rail Road's decision not to correct this known track deficiency which was identified six days prior to the accident in a timely manner.

DRAFT RECOMMENDATIONS

The Public Transportation Safety Board staff recommends that:

6345 - 1 Long Island Rail Road clearly define the specific length of time characterized by the words "immediate" and "prompt" and revise its MW-1 standard to reflect the specified time periods.

6345 - 2 Long Island Rail Road implement a practice that examines Track Geometry Car test reports so as to alert responsible supervisors of progressive deterioration of track so that proactive corrective actions can be scheduled and completed in a timely manner.

PROPERTY RESPONSE

In response to the PTSB staff’s draft recommendations, the Long Island Railroad issued a system wide memorandum dated June 18, 2001 which instructs all track personnel on track gauge tolerances and how to proceed should problems be discovered. This memorandum was the result of a Chief Engineer's Forum held on May 1, 2001, at which extra measures were announced and placed into effect, which are over and above the customary Long Island Railroad standards printed in the MW-1 Section 903 (A), (a) wide gauge. These revised standards will remain in effect and will be incorporated in the MW-1 when reprinted. The revised standards calls for all gauge spots over 1" to be physically verified on the ground by qualified Track Personnel, and upon verification, a 30 mile-per-hour speed restriction is to be placed immediately until repairs are made.

As for the second draft recommendation (PTSB Rec. #6345-2), the Railroad reported that the recent arrival of the new track geometry car (TC-82) with GRMS, (Gauge Restraint Measuring System) will require a total revamping of current track threshold tolerances and remediation practices as well as provide track supervisors with reports on progressive deterioration of track so that corrective actions can be scheduled and completed in a timely manner.

CLOSING
Based on the actions taken by the Railroad in regards to distributing revised procedures to follow when addressing track gauge tolerances and the Railroad’s acquisition of a new track geometry car with GRMS, the PTSB staff makes no further recommendations in this case.

Prepared by: Jerry Shook

SUBMITTAL

This report is hereby submitted by Jerry Shook, Director, Rail Safety Bureau, to the Public Transportation Safety Board for further action.

DATED: August 13, 2001

Jerry Shook, Director
Rail Safety Bureau