Green Line Derailment Update
MBTA Fiscal and Management Control Board

October 17, 2016
Overview

• Green Line Incidents Since January 2015

• Short-Term Actions

• Long-Term Actions

• Next Steps
What is a Derailment?

• “Derailment” is a technical term used when any wheel of a train comes off the top of the rail.
Green Line Incidents (Jan 2015 – Oct 2016)

10* Main line rail incidents since January 2015
9 of 10: We have high confidence in the root causes
1 of 10: Is still under investigation

(October 3, 2016, Copley)

* 2 additional main line derailments occurred during non-revenue service.
MBTA in Context

National Transit Database 2016
## Green Line Incidents (Jan 2015 – Oct 2016)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Root Cause</th>
<th>T8 C-Truck</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/15/2015</td>
<td>Coolidge Corner Station</td>
<td>Large Snow and Ice Mound</td>
<td>No</td>
</tr>
<tr>
<td>7/7/2015</td>
<td>Sutherland Street Station</td>
<td>Track Condition and Operating Speed</td>
<td>Yes</td>
</tr>
<tr>
<td>7/12/2015</td>
<td>Longwood Station</td>
<td>Track Condition and Operating Speed</td>
<td>Yes</td>
</tr>
<tr>
<td>8/17/2015</td>
<td>Boston University Central Station</td>
<td>Track Condition and Operating Speed</td>
<td>Yes</td>
</tr>
<tr>
<td>11/8/2015</td>
<td>Copley Station</td>
<td>Human Error and Switch Alignment</td>
<td>No</td>
</tr>
<tr>
<td>1/30/2016</td>
<td>Beaconsfield to Reservoir</td>
<td>Vehicle Defect – HPCU Failure Causing a Stuck Wheel</td>
<td>Yes</td>
</tr>
<tr>
<td>3/19/2016</td>
<td>Copley Station</td>
<td>Track Condition and Operating Speed</td>
<td>Yes</td>
</tr>
<tr>
<td>5/13/2016</td>
<td>Government Center to Park Street</td>
<td>Switch Defect</td>
<td>Yes</td>
</tr>
<tr>
<td>8/1/2016</td>
<td>Park Street Station (GL)</td>
<td>Track Condition and Operating Speed</td>
<td>No</td>
</tr>
<tr>
<td>10/3/2016</td>
<td>Copley Station</td>
<td>Under Investigation</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Green Line Derailment Update

Type 8 Background

• To provide accessible service, the MBTA procured 95 Type 8 Low Floor Vehicles from AnsaldoBreda.

• Shortly after entering service in March 1999, the Type 8 fleet began experiencing center truck derailments.

• August 2001: Type 8 fleet removed from service.
What Was the Problem?

• To meet the low floor requirement, the Type 8 required a “stub” axle center truck.

• However, this design was based on ideal track conditions and was overly sensitive to track condition variations.
What Was the Problem?

Rail and Wheel Interaction

- The cornerstone of the performance of any train relies on:
  - Steering
  - Handling
  - Comfort
  - Noise
  - Wear
Corrective Actions, 2003 to 2007

- Modifications to track conditions and gauge face angle.
- Center truck design changes and wheel flange angle changes.
- In coordination with the DPU, the MBTA pursued a Phased Corrective Action Plan to open all lines for Type 8 service.
  - Mar 2003: B Line Service resumes
  - Dec 2003: C Line Service resumes
  - Aug 2004: E Line Service resumes
  - Feb 2007: Service to Lechmere resumes
  - Fall 2007: D Line Service resumes
Actions Since July 2015

- Derailment incidents continued, though fewer in number. Beginning in July 2015, short and long-term actions were taken, focusing on three main areas:

1. Track Maintenance and Engineering
2. Operations and Rules Enforcement
3. Vehicle Maintenance and Engineering
Short-Term:

- In-depth analysis of available engineering data (Optical and Track Geometry data).
- Speed restrictions implemented at critical locations.
- Work began immediately to upgrade the track and rail head.
- Increased inspection frequency focused on risk areas (switches, track lubricators, curves).
Green Line Derailment Update

Track Maintenance and Engineering

Long-Term:

• Initiated first widescale rail head grinding program on the Green Line in 9 years.

• Initiated deep review of MBTA track maintenance standards.

• Developed Application for track geometry data analysis.

• Enhanced preventative track maintenance.

Optical Rail Wear Survey (Performed Twice Yearly)  
Track Geometry Survey (Performed Quarterly)
Short-Term:

- Training and regular reminders to observe posted speed.
- Unannounced speed reviews are being conducted on a regular basis.
- All signage reviewed and repaired as needed.
- Portable radar speed monitoring equipment deployed to support speed monitoring.

Long-Term:

- Permanent installation of radar speed monitoring equipment.
- Implement real time, constant speed monitoring.
Short-Term:

- Wheel Profiles and Truck Condition inspections continue (each wheel is inspected every 90 days).

- Conducted video survey of rail/wheel interaction on the entire Green Line.

- Initiated detailed Dynamic Modeling of the Green Line Type 8 vehicles and infrastructure to support rapid confirmation of incident causes.
**Long-Term:**

- Utilize the dynamic model built to continuously monitor risk.
- Implement Flange Lubrication System on Type 8 center trucks.
- Overhaul the Type 8 trucks.
Next Steps

- Ongoing partnering with DPU and FTA on corrective action.
- Strictly enforce operating rules.
- Implement all long-term actions.
- Maintain focus on safety and reliability improvements to track and vehicles.
- Continue to explore innovative and impactful technical solutions.
Thank you