



**Massachusetts Bay  
Transportation Authority**

# Red Line Derailment

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# Red Line Vehicle Investigation

## Background:

- On June 11th, 2019 a Red Line No. 1 Car derailed at the JFK station
- This derailment caused significant damage to infrastructure and created service disruptions over the summer



# Red Line Vehicle Investigation

- Engineers have determined the cause of the derailment
- Derailment occurred because of an axle fracture on car 1602
- Analysis concluded that the axle fracture was **NOT due to:**
  - Age of axle
  - Material flaw or defect in axle
  - Failure of bearings that allow the axle to rotate

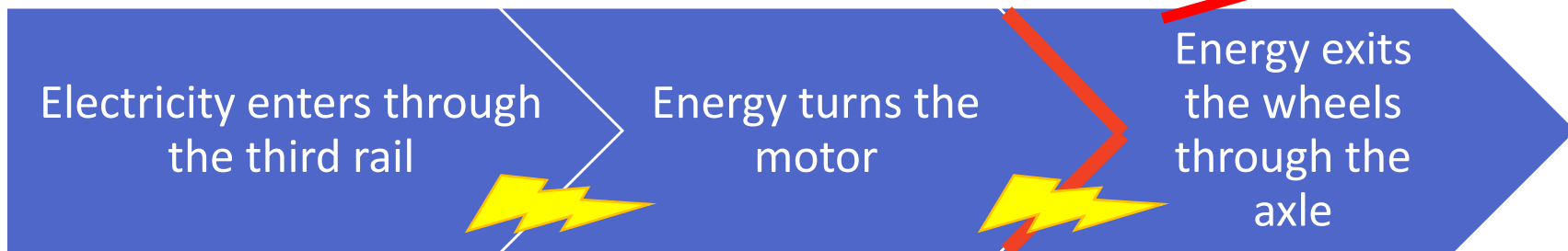
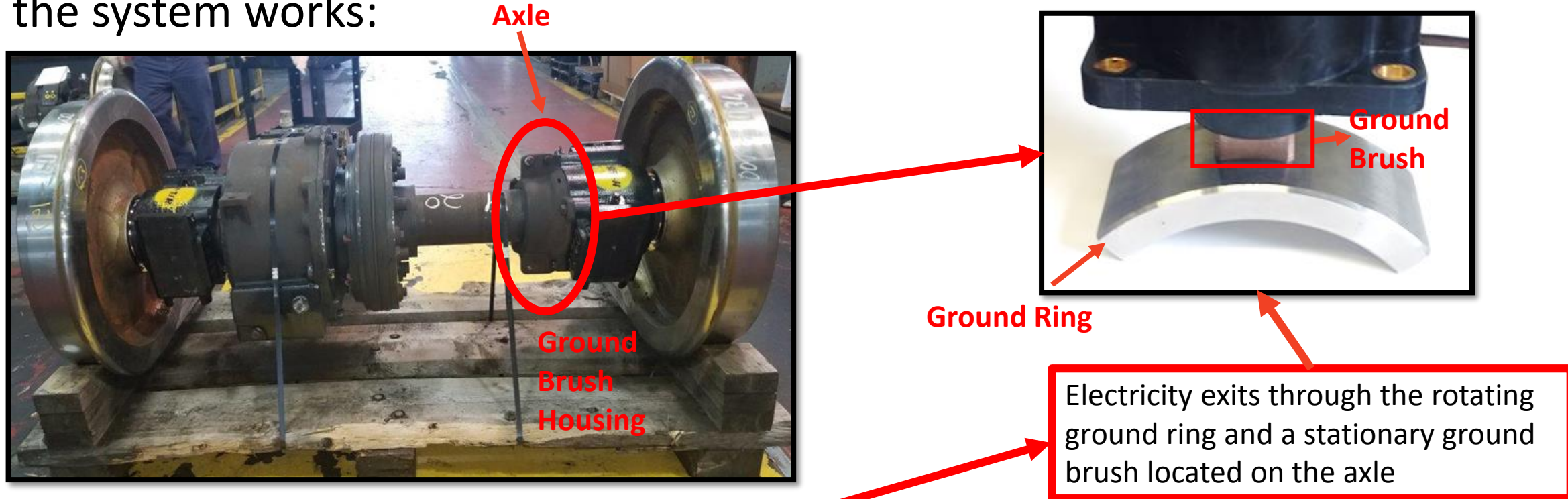


Failed axle



# Red Line Vehicle Investigation

How the system works:





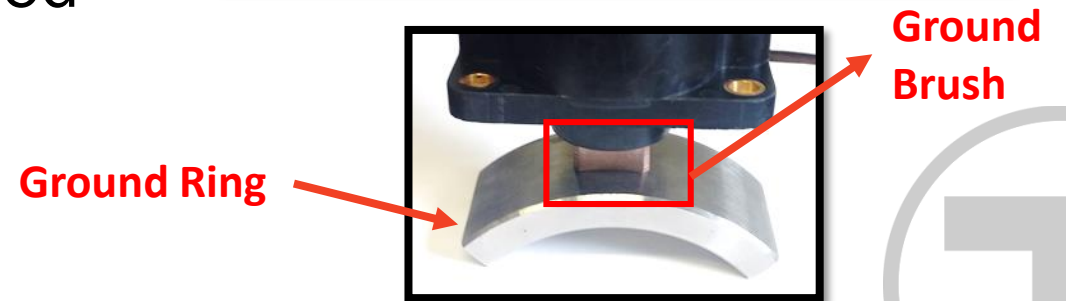
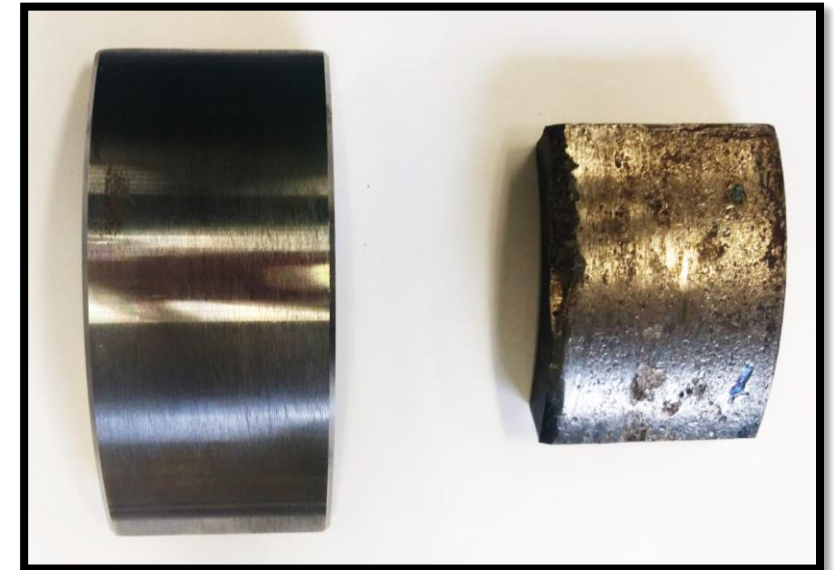
# Red Line Vehicle Investigation

The incident was caused by:

- Poor electrical connectivity between the ground brush and ground ring caused stray electrical arcing on the surface of the axle
- Over a prolonged period, this weakened the axle and caused the failure

**Good Ground Ring**

**Failed Ground Ring**



# Red Line Vehicle Investigation

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## Preliminary Corrective Actions:

- Immediately after incident an ultra-sonic inspection was completed on all of the Red Line car fleet
- Orange, Blue and Green Lines ultra-sonic inspection will be completed in three weeks
- Ground ring inspections were completed on entire Red Line No. 1 and No. 2 Fleet
- Ground ring inspections on remainder rail fleet is underway

## Going forward:

- 8,500 mile preventative maintenance inspection procedure modified to include detailed ground ring inspection
- Annual engineering axle inspection modified to include full ground ring inspection
- All rail car axle ultra-sonic inspection interval is changing from two years to yearly



# Red Line Service Resumption Update

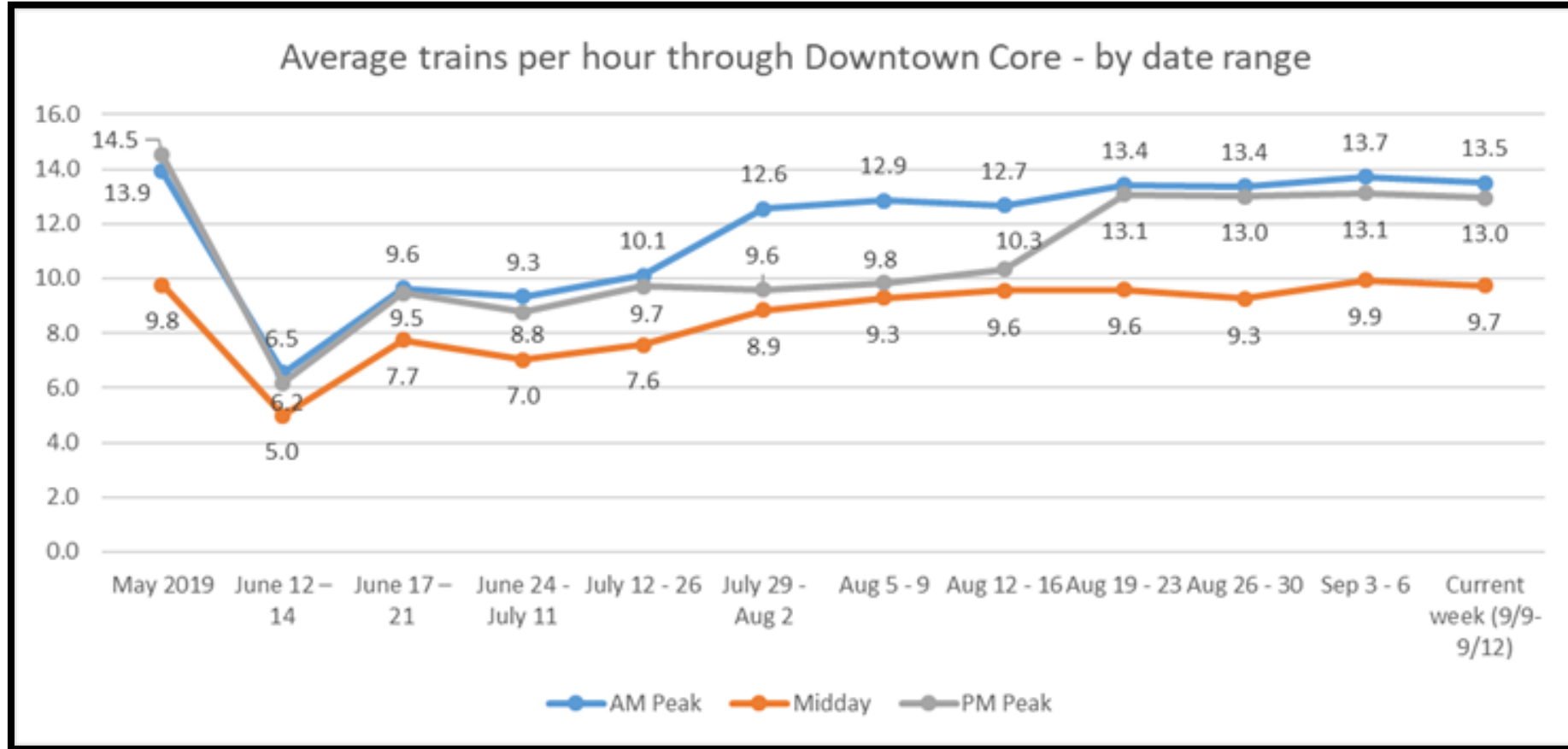


Service Restoration being completed in four phases:

1. Remote control of Columbia Junction switches and access to Cabot Yard – **Completed** July 11<sup>th</sup>
2. Restoration of signal control between Broadway to JFK-**Completed** July 31<sup>st</sup>
3. Restoration of signal control between Fields Corner to JFK-**Completed** September 11<sup>th</sup>
4. Restoration of signal control between North Quincy to JFK-expected completion in October



# Red Line Service Resumption Update



- The Red Line is **running at normal capacity with 28 trains** during rush hour
- With continuous improvement **train frequency of approximately 13 1/2 trains per hour** during the AM rush
- Train frequency of 13 trains per hour during the PM rush

