



Customer Services, Operations, and Safety Committee

Board Information Item IV-B

March 11, 2010

**Manual vs. Automatic Operation and
Operational Restrictions**

Washington Metropolitan Area Transit Authority
Board Action/Information Summary

| | | |
|---|--------------|--|
| <input type="radio"/> Action <input checked="" type="radio"/> Information | MEAD Number: | Resolution: <input type="radio"/> Yes <input checked="" type="radio"/> No |
|---|--------------|--|

TITLE:

Manual vs. ATO & Operation Restriction

PURPOSE:

Provide the Board a briefing that identifies the performance impacts of operating in manual mode versus automatic train operation.

DESCRIPTION:

The briefing provides a comparison between manual and automatic train operations for the two time periods in Metro history where the trains were operated in manual mode. It also includes identifies Metro imposed restrictions and their impact on performance.

FUNDING IMPACT:

No impact on funding

RECOMMENDATION:

NA



Manual versus Automatic Train Operation and Operational Restrictions

Customer Service, Operations, and Safety Committee

March 11, 2010

Provide the Customer Service, Operations and Safety Committee a briefing on the performance impacts of operating in manual versus automatic train operation.



Background

- Metro was designed for automatic train control operation (ATO) and went to manual train operation after the June 22, 2009 accident for safety reasons.
- Last time Metro went into a long period of manual train operation was in March 1999. This was done to ensure safe operations while vital train control relays were analyzed as part of the Emergency Rail Rehab Program (ERRP).



Comparison of ATO vs. Manual

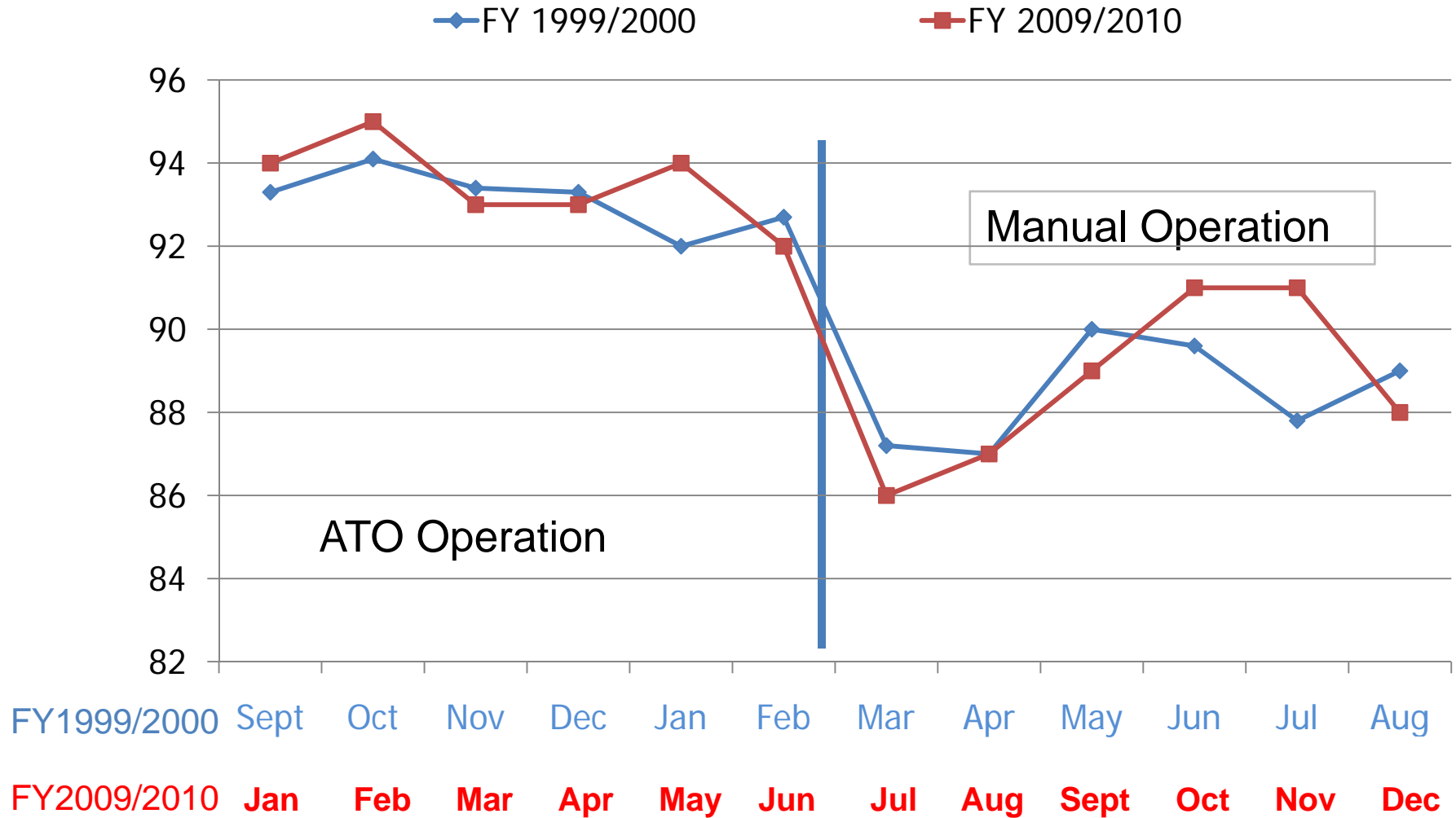
- On time performance drops approximately five percentage points when converted from ATO to manual operation

| | ATO (Avg. 6 months prior) | Manual (Avg. 6 months) | Difference |
|----------------------|------------------------------|----------------------------|------------|
| FY1999/FY2000 | 93.1% | 88.4% | 4.7% |
| FY2009/FY2010 | 93.5% | 88.8% | 5.0% |

- Why:
 - Operators need additional time to manually stop at the stations and open/close the doors
 - Controllers in the Rail Operations Control Center must closely monitor the system to ensure sufficient space between trains



Comparison of ATO vs. Manual





Changes of Operational Conditions

- Operational conditions changed between the period “FY2009/2010” and “FY1999/2000” as follows:
 - Ridership increased 35% on average weekday ridership
 - Fleet size increased 50%
 - Train consist pattern changed: 4s/6s vs. 6s/8s
 - Restrictions put in place by Metro



Restrictions In Place

| RESTRICTIONS | FY09 AUTOMATIC | FY10 MANUAL |
|--|-------------------|----------------|
| Absolute Blocks | | X |
| Placement of 1000 Series in middle of Trains | | X |
| Restricted Speeds | | X |
| All Trains Stopping at End of Platform | | X |
| Loss of Shunt Tool | | X |
| Track conditions | X | X |

- Absolute blocks lengthen headways between trains
- Speed restrictions diminish on-time performance
- End of platform stopping increases dwell time resulting in decreased on-time performance
- 1K cars in the belly of trains results in mixed consist and creates logistical issues
- Performance of uniform consists results in 17% higher Mean Distance Between Failures



Impacts

Manual Mode

- On-time performance drops
- Mean distance between delays and failures decreases as a result of increased incidents caused by propulsion, brake, pneumatic and door subsystems
- Increased operator complaints related to the physical demands of manual operation
- Manual mode increases the Master Controller wear/tear and failure incidents primarily due to the increased movement of mechanical components
- Metro is under NTSB urgent recommendation to implement a real time detection system before returning to automatic train control operation

Automatic Mode

- Greater consistency in headways resulting in improved on-time performance
- Smoother consist operation
- Fewer hardware failures that are preserved by ATO operation