

Washington Metropolitan Area Transit Authority (WMATA) SafeTrack Project



Contact:

Rodney Lehman, EM-5.22 rodney.lehman@em.doe.gov
301-903-6104

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Statement:

A number of well publicized accidents involving the Washington Metrorail system occurred in the decade leading up to 2016. The Washington Metropolitan Area Transit Authority (WMATA), the local agency responsible for operating the transit system, responded by implementing the SafeTrack project in May 2016. This project was a large-scale rehabilitation of the track system and other safety systems used in the nation's second busiest metro subway system. A review by the GAO discovered issues with the front end planning of the project including a lack of analysis and collection of asset data, an insufficient analysis of alternatives performed and no project management plan developed prior to the start of the project. Also, it was reported that there was a lack of stakeholder involvement and communication prior to commencing repairs. However, as the project progressed, significant improvement in the management of the project were noted along with much better communication with stakeholders of impending service disruptions.

There were numerous lessons learned generated from the execution of the SafeTrack project. Many of these, including proper front end planning, are applicable to some of the operation and capital asset projects being undertaken by the Department of Energy's Office of Environmental Management (EM). Many of the requirements found lacking in the SafeTrack project are clearly required in EM projects as delineated in DOE Order 413.3B.

Discussion:

Background

The Washington Metro, the second busiest transit system in the nation, normally operates for 135 out of 168 hours per week. This operational tempo leaves little time for needed corrective and preventative maintenance. Repair time is limited to late night time hours during the week and weekends. Clearly the maintenance done was insufficient to properly care for a large, complex rail system. Based on numerous significant safety incidents, WMATA, the agency responsible for the Metrorail system, announced in May 2016 that it was undertaking SafeTrack, a large-scale rehabilitation project for its rail infrastructure. Several serious incidents including a collision in June 2009 and a short circuit in January 2015, resulted in subway car accidents with several deaths and numerous injuries. Investigation by the Department of Transportation's oversight agent, the Federal Transit Agency (FTA) and the National Transportation Safety Board (NTSB) found a failure to institutionalize and employ system wide test procedures and a poor safety culture. In 2015, a new General Manager of WMATA initiated a variety of efforts to begin major repair efforts. Following another accident in March 2016, the entire system was shut down for an entire day and emergency inspections of the system's third rail power cables was undertaken. This prompted the announcement of the SafeTrack project in May 2016. The intent of SafeTrack was to replace over 45,000 crossties and 35,000 fasteners, along with inspection and repair of other safety systems. The stated final goal of the project is to bring Metrorail to a state of good health that can then be maintained within normal maintenance cycles.

Discussion

In order to address concerns raised by the FTA and the NTSB, the SafeTrack project was initiated to use expanded hours to clear maintenance backlogs. In addition, sixteen "safety surges" were planned to utilize long duration shutdowns of large segment of lines to perform intensive work on specific areas of track. Although the primary intent of SafeTrack is correction of track issues, extended outages were also used to address other safety issues raised by NTSB and FTA. Since the inception of the project, questions have been raised about how the project was planned and initially executed.

In their report of March 2017, the General Accounting Office (GAO) stated that the front end planning of the SafeTrack project did not meet leading project management practices. GAO reported that WMATA did not comprehensively collect and analyze data on its existing assets prior to project startup, they did not perform a complete analysis of alternatives, nor did they develop a project management plan prior to commencing work. WMATA, in their defense, claimed that the urgency of beginning the work precluded following these project management best practices.

WMATA did collect information on its track status based on inspections undertaken, but primarily focused on specific issues such as crossties rather than all track related infrastructure. WMATA's Office of Inspector General found that the agency's asset database did not have adequate controls and oversight in place to be able to manage their assets, among other concerns. WMATA was forced to hire contractors to inspect and record information on tracks, because they could not rely on the asset data in their own database.

Most project management systems require that a policy should be in place for evaluating project alternatives. WMATA did consider different plans to improve the track infrastructure, however, they did not quantify costs and impacts associated with each option. Three alternatives were considered including 8, 10 and 22 month work schedules involving different levels of service disruption. The 10 month option was ultimately selected, however, a full evaluation including the effects of this option on extending long term life of track assets, reducing future maintenance costs and the impact on future Metrorail ridership was not performed. In addition, the budget and costs of this alternative was not fully quantified.

Most major projects prepare a project management plan prior to commencement of that project. Leading project management practices emphasize the importance of proper planning, including the Project Management Institute (PMI) that states that a comprehensive plan should be developed prior to execution so that it is clear how the project will be executed, monitored and controlled. In addition, critical information should be developed that include the project's scope, schedule, cost, and quality standards in a formal plan. WMATA did not develop a plan stating that because it was a not a new construction project, a comprehensive plan was not needed. Since that time, a SafeTrack Project Management Plan was developed and submitted to FTA for approval.

Communication with stakeholders is an important tenet of project management. PMI states that agencies should identify stakeholders, communicate and work with the stakeholders to address issues in the hopes of getting positive engagement as a project progresses. WMATA stated that the urgency of the project necessitated accelerating the SafeTrack project and precluded advanced notifications to local communities, transit agencies and jurisdictions. This left some officials with less than 30 days' notice to implement work around plans in their areas where subway service would be disrupted. However, as progress was made on the project, coordination with local stakeholders on upcoming surges improved greatly.

On the positive side, during the implementation of SafeTrack, the project succeeded in collecting and documenting information found during their outages, and generating and implementing lessons learned from previous surges into upcoming surges. WMATA also developed an effective quality control and assurance framework that was successfully used on the project. Update meetings were regularly held during which issues and corrective actions which arose during previous outages were used to develop successful solutions to similar issues as they arise during current surges.

Conclusion

The Washington Metrorail system experienced a number of significant safety accidents and incidents in the past 10 years. In order to alleviate concerns and issues discovered by NTSB and the FTA, the agency implemented the SafeTrack project to accomplish a substantial amount of repair work to track and other systems in a short period of time. The project used extended night and weekend hours, and instituted safety surges, which resulted in extended disruption of services for particular lines over the course of a 10 month period of time. Although critical of the front end planning of the project including insufficient Analysis of Alternatives, a lack of existing useful asset data and information, and no formal comprehensive Project Management Plan describing monitoring and control of the project, significant

improvements in the management of the project was noted as the project progressed. In addition, due to the urgency of implementing the repair work, initial communication with stakeholders was limited. Again, as the project moved forward, the project was successful in better communicating upcoming disruption of service with local jurisdictions, and in using collected data and lessons learned as the surge repairs were completed. However, the disruption to schedules, the constant maintenance, and the recurring issues have resulted in a net loss of ridership below 2008 levels. In order to persuade riders to return to the system, WMATA is considering providing refunds for peak rides that are delayed by 30 minutes or more, and also more frequent communication.

Recommended Actions:

The following are key lessons learned from the WMATA SafeTrack project. Each one is followed with a reference to applicable sections from DOE Order 413.3B and other DOE documents that addresses each item:

- Evaluate Alternatives – Three alternatives were considered, but a formal analysis including cost and impact of each alternative was not quantified.
 - DOE O 413.3B – Appendix A, Table 2.1, Conduct an Analysis of Alternatives (AoA) that is independent of the contractor organization responsible for the proposed project that is consistent with best practices of GAO.
- Project Assessment (Front End Planning) – Collection and use of data was insufficient and did not align with best practices.
 - DOE 413.3B, Appendix C, Section 1 – Sound, disciplined, up-front planning required for successful project execution.
 - DOE O 413.3B, Appendix A, Section 4.b – the approval of a project at CD-1 marks the completion an iterative process to define, analyze, and refine project concepts and alternatives. This requires a systems engineering methodology that integrated requirements analysis, risk identification and analysis to evolve a cost-effective preferred solution.
- Project Management Plan – No project management plan was developed prior to commencing project.
 - In DOE O 413.3B - Appendix A, Table 2.1 – Approve a preliminary Project Execution Plan (PEP) required for successful project execution.
- Interaction with Stakeholders – WMATA stated that urgency of starting the repairs precluded advanced notice to local jurisdictions, other transit agencies, and the public
 - In DOE O 413.3B - Appendix C, Section 1 – Effective communication among all project stakeholders required for successful project execution.
- Effective Quality Assurance – WMATA collected data during course of work, developed lessons learned for quality improvement during course of project. WMATA developed new organization wide quality control and assurance framework.
 - DOE O 413.3B, Appendix C, Section 22 – Quality Assurance begins at project inceptions and continues through all phases of the project.
- Effective safety culture – WMATA has prioritized safety over schedules and communicated that to their staff.
 - DOE P 420.1, Department of Energy Nuclear Safety Policy
 - DOE P 450.4A, Integrated Safety Management Policy

Critical Decision(s): CD-0 to CD-2

Facility Type(s): All

Work Functions(s): Project/Program Management

References:

1. Washington Metropolitan Area Transit Authority Improved Planning of Future Rehabilitation Projects Could Prevent Limitations Identified with SafeTrack, GAO Report GAO-17-348, General Accountability Office, March 2017.
2. Martine Powers and Faiz Siddiqui, Metro rushed critical planning for SafeTrack project, federal auditors say, Washington Post, March 14, 2017.
3. SafeTrack, Washington Metropolitan Area Transit Authority website, www.wmata.com/service/SafeTrack.cfm