
TRANSIT SAFETY RESEARCH PROGRAM**ASSESSMENT OF FACILITIES FOR QUALIFICATION TESTING OF RAIL PASSENGER EQUIPMENT and SIGNAL AND CONTROL SYSTEMS**

AGENCY: Federal Transit Administration (FTA), DOT

ACTION: Notice for Request for Proposals (RFP)

SUMMARY: The scope of this effort includes identifying tests required for all types of passenger rail equipment and the signal systems which control them to qualify or be accepted for service, assessing the adequacy of the Transportation Technology Center's (TTC) facilities for performing each of these tests, and defining required upgrades to TTC's facilities or recommending alternative facilities for tests that cannot currently be performed at TTC.

FTA's research activities are authorized by 49 USC 5312, Research, Development, Demonstration, and Deployment Projects. Safety is one of FTA's five Strategic Research Goals. Under this goal, FTA has set forth an objective to increase safety for the passengers and workers of rail transit systems in the U.S. by establishing a framework to support the qualification or acceptance testing of passenger rail vehicles (commuter/transit railcars) and signal and control systems on existing test site.

FTA seeks applications for research proposals that will support the achievement of this goal and its associated objectives.

DATES: An applicant must electronically submit a proposal to <http://www.grants.gov> by January 31, 2011 for consideration. All potential applicants are advised to begin the <http://www.grants.gov> registration process immediately, if they have not previously submitted Federal assistance applications through <http://www.grants.gov>, in order to be able to meet the deadline. FTA expects to award funds to successful contractor(s) through a cooperative agreement by Summer 2011. In the event of a system problem or technical difficulty with the application submittal, the applicants should contact the FTA Program Manager for delivery instructions (see FOR FURTHER INFORMATION, CONTACT section below).

ADDRESSES: The website <http://www.grants.gov> allows applicant organizations to electronically find and apply for competitive opportunities from all Federal agencies that award Federal assistance. This website is the single access point for over 1000 Federal assistance programs administered by the 26 Federal agencies.

FOR FURTHER INFORMATION CONTACT: Technical, program management and administrative questions should be directed to Program Manager: Roy Chen, Office of Technology (TRI-20), E43-440, Federal Transit Administration, U.S. Department of

Transportation, 1200 New Jersey Ave, SE, Washington, D.C. 20590; email address: Royweishun.chen@dot.gov, or by phone at 202-366-0462.

SUPPLEMENTARY INFORMATION

Objectives

This project will identify and document all of the requirements for qualification or acceptance testing of passenger rail vehicles and signal and control systems which must be performed prior to their deployment in service in the U.S. In addition, an assessment of the adequacy of the facilities currently available (or those in the planning or construction phases) at the Transportation Technology Center (TTC) in Pueblo, CO for conducting these tests will be performed. For tests for which the requisite facilities do not exist at TTC an assessment will be performed to determine whether an alternative site capable of performing the tests exists or if upgrades to TTC are recommended to establish the lacking capability. For the cases in which upgrades to TTC are recommended, an estimate will be made of the costs associated with the necessary upgrades.

Background

The passenger rail transportation industry in the U.S. is undergoing significant growth. Much of the interest in passenger rail is owing to congestion on the interstate, suburban, and urban highway systems. There is widespread interest and support at the state and federal government levels for all varieties of passenger rail. Throughout the country there are plans for new and expanded transit, commuter, and intercity passenger rail service.

In order to qualify for use in service to the public, new passenger rail equipment requires extensive testing. For example, vehicle dynamics testing is required to assure that derailment tendency is minimized and ride quality is maximized. Testing of on-board signal equipment is required to assure compatibility with wayside equipment. Brake testing is required to assure that braking rates are sufficient to satisfy the expectations of the train control system. Safety and serviceability need to be highly assured before a new type of equipment transports the public.

In addition to qualification testing (which is most often prescribed by regulation), vehicle acceptance testing is frequently requested by agencies which procure passenger rail vehicles and signal and train control systems. Acceptance testing differs from qualification testing in that the former is elective (by the agency) and most often appears as a requirement in a procurement specification. Acceptance testing may comprise portions or a subset of qualification testing.

Qualification/acceptance tests for new rail equipment often requires specialized equipment and significant portions of track. This specialized track and equipment can be expensive to develop and maintain. TTC was developed in order to conduct such tests efficiently, as well as to help evaluate new technologies to enable the rail industry to

provide its services to the country in an increasingly safe, efficient, and cost-effective manner.

In addition to physical testing, computational models have become practical and reliable tools for understanding the dynamic behavior of vehicles and performance of components over the last few decades. Simulations can supplement testing and provide a less expensive method of assessing safety performance over a range of conditions that might not be tested otherwise, thus providing a more comprehensive safety evaluation. As such, some qualification requirements now specify some degree of simulation using a suitably validated model. Often in these cases, testing is necessary to characterize the system or subsystem performance in order to build and validate a model.

TTC was founded 40 years ago and since its inception has undergone upgrades and enhancements as needed. For example, the Railroad Test Track was electrified and refurbished ten years ago in order to test Amtrak's high speed train, the Acela. Portions of the Tracked Air Cushion Track have been modified to include the addition of a crash wall sized to allow collision testing of full-scale freight and passenger equipment. A full-scale carbody compression testing facility has recently been completed. The Transit Test Track includes third rail electrification. The Perturbed Test Track facilitates the conduct of Association of American Railroads (AAR) Chapter XI testing of freight cars. Currently, several additional upgrades and enhancements are in progress or planned, most importantly in the area of communications-based train control.

As worldwide advancements in rail technology have produced faster, more efficient, and more reliable trains, the requirements for testing have evolved and become critical to the successful introduction of new equipment. There is a need to assess the capability of TTC to meet the current testing needs of the passenger rail industry, in order to plan and implement possible additional enhancements.

Project Description

The grantee shall execute the following work items in support of this grant agreement:

1. Identification of Qualification/Acceptance Testing Requirements for Passenger Rail Equipment

The Contractor shall review Federal Railroad Administration (FRA) regulations (existing and proposed), recent railroad and transit authority equipment procurement specifications, and documentation from previous qualification tests of passenger equipment conducted at TTC.

From these reviews, the contractor shall develop lists of existing qualification tests for passenger rail equipment as they pertain to the following operating modes:

- Rail transit equipment operating on the general freight railroads, such as intercity, regional, commuter and inter-urban.

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- Rail transit equipment operating on a private, protected right-of-way, such as heavy rail, subways, metros, and light rail.
 - Rail transit equipment operating on a street, median or sidewalk, such as streetcars and some cases light rail.

A separate list shall be prepared for tests performed to evaluate the performance of the rail vehicle and one related to signals and train control, power collection and distribution, and passenger safety systems.

Vehicle qualification tests include, but are not limited to:

- vehicle/track interaction tests for derailment tendency, hunting stability, and ride quality,
- tests for structural crashworthiness and occupant protection,
- glazing tests for impact resistance, and
- braking tests for service and emergency brake rates and stopping distances.

Safety systems qualification tests include, but are not limited to:

- dynamic and electrical performance tests of pantograph and truck shoe (third rail) electric power collection;
- performance tests of traction include slip slide control; and
- performance tests of on-board and wayside signal systems such as:
 - Communications Based Train Control Systems
 - Positive Train Control Systems
 - Audio-Frequency Track Block Signal Systems
 - Underlying Block Signal Systems for CBTC and PTC, and
- passenger safety systems such as emergency exits, lighting, communications, interlocks and door controls.

The results of this task shall be described in narrative form in the final report. In addition, the results shall be presented in tabular form wherein the particular test requirements are identified with operating mode to which they apply.

Certain test requirements identified in this task may not specifically apply to a particular operating mode and may be better categorized in terms of the maximum speed of the proposed operation. In this case, and where appropriate, the Contractor shall present the testing requirements in tabular form similar to that described above except that the discriminating criterion is the maximum operating speed. The following speed ranges are offered as a starting point:

- less than 80 mph,
- between 80 mph and 150 mph, and
- greater than 150 mph.

2. Literature Review to Determine Existence of Additional Testing Standards

In addition to FRA, other industry organizations promulgate standards for testing of passenger rail equipment and signal and train control systems. A partial list of these organizations includes:

American Public Transportation Association (APTA)
<http://www.apta.com>

Institute of Electrical and Electronics Engineers (IEEE)
<http://www.ieee.org/index.html>

Association of American Railroads (AAR)
<http://www.aar.org>

American Railway Engineering and Maintenance-of-Way Association (AREMA)
<http://www.arema.org/>

International Electrotechnical Commission (IEC)
<http://www.iec.ch/>

American Welding Society
<http://www.aws.org/w/a/>

Many of these organizations publish standards and/or recommended practices and most are available on the Internet. Generally, these documents are not provided free of charge.

The Contractor shall perform a literature review to identify all industry standards for which qualification testing is required. The results of the literature review shall be described in narrative form in the final report as well as the tabular format described above for Task 1.

3. Assess TTC Capabilities

For each of the tests identified in Tasks 1 and 2, the Contractor shall assess whether facilities at TTC exist for performing each. The Contractor shall develop and apply a means for ranking the capability of TTC to perform each of these tests. At a minimum, this ranking shall identify whether the TTC facilities are satisfactory (no upgrades or improvements are necessary to perform the test), in need of upgrading or do not exist. The results of this task shall be described in the final report, and will include the results presented in tables similar to those described for Tasks 1 and 2, augmented with the assessment of TTC's capability to perform each test.

4. Identify Candidate Upgrades to TTC and Alternative Testing Facilities

For each of the tests for which the facilities at TTC require upgrading or do not exist, the contractor shall assess what is needed to upgrade or create the required facilities. For each of these tests, the contractor shall also identify alternative facilities in the U.S. presently capable of performing such tests. Alternative facilities to be considered include, but are not limited to:

- The Center for Advanced Technology for Large Structural Systems (ATLSS) at Lehigh University, Bethlehem, PA,
- CTL Group in Skokie, IL,
- MGA Research in Burlington, WI, and
- BAE Systems in Phoenix, AZ.

The results of this task shall be described in the final report.

5. Recommendations

From the results of Tasks 1, 2, 3 and 4, the contractor shall develop recommendations for upgrading the facilities at TTC. For each of the recommended upgrades, the contractor shall develop a rough-order of magnitude (ROM) costs estimate. The results of this task shall be described in the final report, including a table of the facility to be upgraded, the associated test, and the associated ROM cost of the upgrade. For those tests for which the capability of the facilities at TTC are not ranked satisfactory and upgrades are not recommended, the contractor shall recommend alternative facilities identified in Task 4 which are capable of performing each test and document these recommendations in the final report.

6. Final Report and Status Presentations

The contractor shall prepare and deliver to FTA a written draft report documenting the activities and work performed in the conduct of Tasks 1 through 5 sixty days prior to the expiration of the period of performance. The draft report and supporting documentation must be provided to the FTA project manager in an electronic/web-ready format, as specified by FTA.

The FTA will review the draft report and return a marked-up version to the Contractor for the purpose of developing the final report within 30 days of receipt of the draft. Within 30 days, the Contractor shall provide the final report in an electronic/web-ready format, as specified by FTA. For additional details in the report organization, element, style and accessibility compliance please refer to http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html under Project Reporting Requirements.

The anticipated period of performance of this effort is 14 months from the date of grant award.

Access to appropriate individuals and facilities at TTC will be facilitated by FTA and FRA.

To aid in proposal preparation, it is expected that the Contractor will provide two presentations related to this activity for FTA staff in Washington, DC. One interim presentation should occur midway through the period of performance and most suitably after completion of Task 3. The second presentation will occur on or about the time when the final report is to be delivered to FTA. These requirements are in addition to any site visits which are required during the conduct of Tasks 3 and 4.

Award Information

FTA will fund one application under this program. The maximum available funding is \$300,000. Future funding will depend on U.S. Congressional Appropriations. The FTA will participate in activities by attending review meetings, commenting on technical reports, maintaining frequent contact with the project manager and approving key decisions and activities including redirecting activities if needed.

Cost Sharing or Matching

Federal transit funds are available to research projects at up to 100 percent of the project cost. However, cost sharing will be an evaluation criterion.

Eligibility Information

Eligible recipients include State and local government agencies, public and private transit agencies, universities, non-profit organizations, consultants, legally constituted public agencies, operators of public transportation services, and private for-profit organizations.

Proposal Content

This announcement includes all of the information that you need to apply. The following forms are available on grants.gov and are required to be completed:

1. SF 424 Mandatory
2. Other Attachments Form

SF 424 Mandatory

Most of SF 424 is self-explanatory. The application should answer the following items as follows:

- 1a – Application
- 1b – Annual
- 4a – Leave blank

4b – 26

Other Attachments Form:

1. The application should attach a pre-application (not more than 15 pages in length) as outlined in Chapter II (Item 9.b) of FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines: http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html.

This pre-application should also address the six criteria laid out below in the Application Review Information section. The project budget justification should include identification of any matching funds and their source. The Formal Application described in the Circular is not being requested at this time.

2. The application should attach information on the qualifications of key personnel, including biographies.

Anyone intending to apply should initiate the process of registering on <http://www.grants.gov> by December 30, 2010 for consideration. All potential applicants are advised to begin the <http://www.grants.gov> registration process immediately, if they have not previously submitted Federal assistance applications through <http://www.grants.gov>, in order to meet the deadline.

Application Review Information

A review panel will be convened to review each proposal. Project proposals will be evaluated based on the following criteria:

1. Proposed Research, which includes the applicability of the proposed research to the requirements, the uniqueness, and the expected results. The proposed project must identify all the requirements for qualification or acceptance testing of passenger rail vehicles and signal and control systems, why it is of national significance, the uniqueness or relationship of this project to other research, and how the proposed research will address the issue of passenger rail safety.
2. Qualifications of Key Personnel, which includes knowledge of and prior experience with passenger rail vehicle qualification testing, passenger rail vehicle technologies and associated infrastructure such as signal and control systems.
3. Technical Management Plan, which includes the management approach for planning, scheduling, administering, coordinating and conducting the work effort.
4. Past Performance on activities relevant to the proposed work.
5. Cost and Cost Sharing.
6. Plan for evaluation and data collection. The proposal must address how success will be measured (e.g. before and after studies).

Award Administration Information

The anticipated notification date for successful applications is March 2011. Following receipt of the notification letter, the successful entities will be required to submit the Formal Application as outlined in Chapter II (Items 10-25) of FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html: through the FTA Transportation Electronic Award Management (TEAM) system website.

FTA will manage the cooperative agreement through the TEAM system website. Before FTA may award Federal financial assistance through a Federal grant or cooperative agreement, the entity must submit all certifications and assurances pertaining to itself and its project as required by Federal laws and regulations. Since Federal fiscal year 1995, FTA has been consolidating the various certifications and assurances that may be required of its awardees and the projects into a single document published in the Federal Register. Fiscal year 2008 Annual List of Certifications and Assurances for FTA Grants and Cooperative Agreements and guidelines is published in the Federal Register and posted on the FTA website at: http://www.fta.dot.gov/funding/apply/grants_financing_7411.html.

Recipients will be required to manage their projects in accordance with FTA Circular 6100.C: Transit Research and Technology Programs: Application Instructions and Program Management Guidelines: http://www.fta.dot.gov/laws/circulars/leg_reg_4121.html. This includes requirements on project management and administration including quarterly reporting, financial management, and payment.

Technical References:

Federal Railroad Administration regulations related to pre-revenue qualification testing of rail vehicles:

http://edocket.access.gpo.gov/cfr_2009/octqtr/pdf/49cfr238.111.pdf

Federal Railroad Administration regulations related to qualification testing of rail vehicles operating at speeds greater than 90 mph:

http://edocket.access.gpo.gov/cfr_2009/octqtr/pdf/49cfr213.345.pdf

Federal Railroad Administration: Positive Train Control (Overview)

<http://www.fra.dot.gov/Pages/784.shtml>

Federal Railroad Administration: Positive Train Control (Final Rule)

[http://www.fra.dot.gov/downloads/Safety/PTC_Final_Rule_20100112_\(FedReg\)_final.pdf](http://www.fra.dot.gov/downloads/Safety/PTC_Final_Rule_20100112_(FedReg)_final.pdf)

National Transportation Safety Board PTC Symposium

http://www.nts.gov/events/symp_ptc/symp_ptc.htm

Interoperable Communications-Based Signaling as a Basis for Positive Train Control

<http://www.fra.dot.gov/downloads/Research/rr0911.pdf>

North American Joint Positive Train Control Project

<http://www.fra.dot.gov/downloads/Research/rr0905.pdf>

Communication Timeout and Latency Effect on Positive Train Control System for the IDOT Corridor

<http://www.fra.dot.gov/downloads/Research/rr0824.pdf>

FRA Report: Technical Criteria and Procedures for Evaluating the Crashworthiness and Occupant Protection Performance of Alternatively-Designed Passenger Rail Equipment for Use in Tier I Service

http://www.fra.dot.gov/downloads/safety/RSAC_REPORT-%209-16-10.pdf

FRA Regulations Pertaining to Brake System Safety Standards for Freight and Other Non-Passenger Trains and Equipment; End-Of-Train Devices

http://www.access.gpo.gov/nara/cfr/waisidx_09/49cfr232_09.html

FRA Regulations Pertaining to Grade Crossing Signal System Safety

http://www.access.gpo.gov/nara/cfr/waisidx_09/49cfr234_09.html

FRA Regulations Pertaining to Installation, Inspection, Maintenance, and Repair of Signal and Train Control Systems, Devices, and Appliances

http://www.access.gpo.gov/nara/cfr/waisidx_09/49cfr236_09.html

FRA Notice of Proposed Rulemaking: Vehicle/Track Interaction Safety Standards; High-Speed and High Cant Deficiency Operations

<http://www.federalregister.gov/articles/2010/05/10/2010-10624/vehicletrack-interaction-safety-standards-highspeed-and-high-cant-deficiency-operations>