



Request For Proposal

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REQUIRED SUBMITTAL DATE

November 15, 2024

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1 of 8

TITLE

Process to Create Draft Test Blocks from Field Data – Vibration

OVERALL PROJECT BACKGROUND

The International Safe Transit Association (ISTA) seeks proposals for establishing a standard approach to converting field data into draft ISTA test blocks.

PROJECT PURPOSE AND DESCRIPTION

PURPOSE: The ISTA Research & Standards Councils, through research and correlation efforts, will establish a standard approach to converting field data into draft ISTA test blocks. This RFP will focus on single-axis vibration data.

The need for developing this standard approach for converting field data into test blocks was identified as a gap when the Research Council handed over the results of the data collection projects to the Standards Council. It was clear that the report and associated data was insufficient to smoothly develop recommended test blocks that reflected the research.

There are several unique novel ways to translate field data into test blocks and how to assemble those blocks in a manner that creates an effective test protocol. Throughout the years many different approaches have been leveraged to build industry tests and is a topic of continued discussion every time a test protocol is evaluated. Unfortunately, there's never been a comprehensive and comparative study of all methodologies for the industry to evaluate. This leads to a continual debate on the best way to approach analyzing and translating data into test protocols. This situation presents an opportunity to improve efficiency in the test development process. Additionally, this will enhance ISTA test credibility by formalizing the process and establishing an agreed upon method that is based in research and correlation efforts.

As part of this effort, we will re-visit the Data Collection Standards and the Data Analysis Guidelines to update them with the improved understanding from our last several projects.

Note that we have issued RFPs for both shock/drop and vibration. While we are treating them as separate RFPs, research partners are welcome to bid on both scopes. There may be economies of time and expense if the researcher is awarded both projects, so please submit separate bids and a combined bid, if so inclined. In addition, partnerships with other research organizations are welcome, so joint bids will be considered.

SCOPE OF WORK SOUGHT IN THIS REQUEST FOR PROPOSAL

The scope of the work can be summarized as:

1. Research the different techniques to take field data and convert to a test method.



2. Recommend one technique and include rationale.
3. Utilize recommended technique on ISTA's field data collected in one of ISTA's regional projects.
4. Recommend a validation technique and include rationale.
5. Validate output test method utilizing the recommended validation technique.

The detailed scope development is meant as an iterative process where the ISTA task group works with the selected research partner to take the initially proposed approach and refine it to meet ISTA's needs, while leveraging the knowledge and expertise of the research partner.

It is expected that the Research Partner will work with ISTA to collaboratively finalize a detailed approach that meets the summarized scope. The maximum budget should not exceed \$40,000. If the project is anticipated to exceed that amount, please provide a phased proposal for our consideration.

Example areas of focus as the detailed approach is being developed are:

1. Research the different techniques to take field data and convert to a test method. Literature survey identifying the statistical processing analysis methods available for collected vibration data. Provide a brief explanation of how each works, its strengths, and weaknesses and where its application is best suited. Potential methods should include:
 - Variants of the traditional PSD Method (including the ISTA Vehicle Vibration Guidelines Document)
 - Vincent Rouillard's Method (paper)
 - ITENE's Method (Forum presentation)
2. Recommend one technique and include rationale for the selection.
 - a. The guiding thoughts for this investigation are:
 - There are a number of processing methods – which should we use and why?
 - Are we seeing field damage that matches lab results?
 - We should standardize the approach.
 - b. The Research Partner will select which method will be further examined with an eye to developing a step-by-step analysis method to generate a vibration test block. This selection discussion will include an explanation as to why this method was selected, what limitations are there and if there are product categories or attributes (such as weight, size, geometry, fragility, unitization, etc...) or other distribution factors that best fit this method.
 - c. Develop a detailed procedure to analyze the collected field data and develop a draft test block. Define when to generate a compressed test or uncompressed test, if applicable.
 - d. Document this procedure in such a way that we could standardize and automate the process. This includes documentation of a step-by-step outline or narrative including algorithms to provide full transparency. ISTA will provide an introduction for the research partner to the commercial software developer that ISTA has used for ISTA Digital, ISTA's recently-launched software tool platform. The research partner can then

- engage with the developer regarding them working collaboratively to develop the software tool to assure its compatibility with ISTA's platform.
- e. Define the confidence levels (percentiles) that we should report and use to determine the test block. This includes possibly identifying variable confidence levels or assurance levels for test users to select the profile best matching their product. For example, alternatives might include reporting curves for the 99th, 95th and 90th percentiles. Define what characteristics to use to determine which confidence level/test level should be selected for a given product.
 - f. Define the confidence level that can match with the ISTA time-compressed profile. ISTA often reports field data (uncompressed) as compared to existing ISTA profiles, which are time-compressed. To make that comparison more meaningful, ISTA would like to understand what confidence level of uncompressed field data should be used to compare with ISTA profiles.
 - g. Describe when a transient is a shock event and should not be included in the vibration profile.
 - h. Describe how to compare vibration test profiles to determine how different they are. The context for this topic is that we may collect field data that we then compare to ISTA test profiles to determine if there is sufficient difference to warrant a new profile.
 - i. Other topics to address include:
 - Time compression – how and when do we use this? Do we use the classic approach or drop out the low vibration data?
 - Uncompressed
 - Single level
 - Multi-level
 - Constructed probability
 - Kurtosis
 - Time Replication
 - Sine Sweep
 - Shock on random
 - j. Recommend changes to the ISTA Data Collection Standards and Data Analysis Guidelines to conform with the proposed process of converting field data to draft test blocks.
3. Utilize recommended technique on ISTA's vibration field data collected in one of ISTA's regional projects.
- ISTA will provide a dataset for analysis.
 - Process data to output a draft vibration test block using the draft test block method as documented in item 2c & d.
 - Compare and contrast against the applicable ISTA test profiles using the appropriate confidence level to match with compressed profiles, as determined in item 2f.

4. Recommend a validation technique and include rationale.
Recommend a validation technique to evaluate a relative test comparison of the proposed draft test block to an existing ISTA test. Does the field damage match with the lab damage? In addition, one intent for this task is to evaluate a relative test comparison of the proposed draft test block to an existing ISTA test. Compare vibration profiles and field damage. One goal is to understand when the proposed test is sufficiently different from existing test(s).
5. Validate output test method utilizing the recommended validation technique.
Perform lab correlation work to verify that the draft vibration test block is sufficient for predicting the expected damage. This test block is meant as a predictive tool, not a simulation.

The detailed scope development is meant as an iterative process where the ISTA task group works with the selected research partner to take the initially proposed approach and refine it to meet ISTA's needs, while leveraging the knowledge and expertise of the research partner. It is expected that the Research Partner will work with ISTA to collaboratively finalize a detailed approach that meets the summarized scope. The maximum budget should not exceed \$40,000. If the project is anticipated to exceed that amount, please provide a phased proposal for our consideration.

DELIVERABLES

The Scope of Work states requirements for the project, including the services and the tangible work products to be delivered. However, the approach to achieve the project scope is deliberately broad to allow the Research Partner the flexibility to leverage their expertise in developing a proposal. Proposals should be tailored specifically to the project at hand. ISTA reserves the right however, to modify specific requirements, based on changed circumstances, the proposal selection process, and contract negotiations with the Applicant(s) selected for negotiations, and to do so with or without issuing a revised RFP. In all cases the final contract will be the governing document of the project. The Applicant must provide in its proposal a detailed proposed scope of work showing how it will meet the RFP requirements.

The deliverables, at a minimum, are:

1. A final report that summarizes the output as it relates to the five sections of the summarized scope.
2. Raw data and supporting documentation created as a part of the executing the agreed upon detailed approach. This may include documentation of lab correlation work to verify that the vibration test block is sufficient for predicting the expected damage.
3. Draft versions of the ISTA Data Collection Standards and Data Analysis Guidelines to conform with the proposed process of converting field data to draft test blocks.



4. As part of the detailed approach, provide a software tool to process the field data into a draft vibration test block. The researcher will provide the step-by-step narrative and algorithms and work with the ISTA Digital platform coding team to incorporate this functionality into the platform. The tool must be delivered with full documentation and that ISTA will receive full intellectual property rights, including source code.

Our intent is that the software tool will be exclusively owned by ISTA. However, ISTA is willing to discuss the possibility of granting a license agreement to the research partner, allowing the partner to use the tool for other projects.

5. ISTA will own the software. We anticipate integrating this process into other ISTA tools.

MINIMUM QUALIFICATIONS FOR RESEARCH PARTNER

Knowledge of vibration data collection and analysis methods is required. Knowledge of, and experience with converting field vibration data into a drop sequence is required. The Research Partner must be able to perform lab correlation work. The ability to develop a software tool is preferred.

Please provide the following items as part of the proposal for consideration:

FORM OF THE PROPOSAL

Provide two copies (or one electronic version) of the proposal that must include the following sections:

1. Scope of Work:
 - a. Confirmation of the required scope summary.
 - b. A brief description of the recommended methodology for the analysis.
 - c. A description of the proposed validation.
 - d. Identification of possible partners.
 - e. Confirmation of deliverables.
2. Qualifications:
 - a. A brief description of the proposing firm /research organization/ individual.
 - b. A description of who will manage the project and the various roles of the project team. This section will include a detailed description of the proposed individuals that would be assigned to this project, including role, title, experience, and education.
 - c. Examples of similar research projects conducted in the past 5 years.
 - d. Confirmation of prior business relationship with proposed commercial partners (if applicable), along with their tentative agreement to participate in the study.
 - e. At least three references, including the names of individual contacts and telephone numbers.



- f. Any other qualifications deemed necessary to complete the work if contracted by ISTA.

3. Fees:

Give a total cost estimate for time and materials within the scope and timeline you propose, including payment terms and schedule. Progress payments can be considered, provided the proposal identifies how project progress can be verified. (i.e. upon submission of completed literature search, submission of final templates, etc.)

- a. The proposal must include the total cost to complete the tasks described in the project scope, not to exceed \$40,000. If the project is anticipated to exceed that amount, please provide a phased proposal for our consideration.
- b. The total cost must be broken into the following categories:
 - Literature Survey
 - Data Analysis
 - Laboratory Work
 - Software Tool
 - Reporting
 - Overhead – limited to no more than 25%.
- c. Include any proposed agreements, including detailed fees and billing information, and service level for this project. Include a list of charges that would be passed on to ISTA (e.g., travel, support staff, photocopies, etc.).
- d. Include representative examples of consultant(s) and support staff that might be involved in specific activities. No more than five examples are requested; each example should include the name of the individual and a brief statement of their qualifications.
- e. List any other fees applicable to the work requested by ISTA, acknowledging they must be approved in advance.
- f. Include a risk mitigation plan that identifies risks to the project and how the researcher would mitigate them. This plan may also include a contingency plan for budget overruns.

4. Project Timeline:

A detailed timeline should accompany the project plan. ISTA prefers the project to be completed within one year of the execution of the contract. The plan should also include interim reports for status updates or when specific milestones are achieved.

5. Conflict Analysis (If necessary):

Assurance that the firm has conducted an initial conflicts analysis and has not uncovered any potential conflicts.



SUBMISSIONS

All proposals must be received by **November 15, 2024.**

Address proposals to:

Brian O'Banion

ISTA

1400 Abbot Road, Suite 380

East Lansing, MI 48823

Or by email to bobanion@ista.org

Questions regarding this RFP or your proposal submission may be addressed to Brian O'Banion at the above email address, or telephone 517-325-0416.

SELECTION PROCESS

ISTA will evaluate all proposals and may conduct telephone conferences to clarify information such as approach, timing and costs.

All proposals will be evaluated based on the following criteria. Note that ISTA will weight the criteria, emphasizing the most critical aspects of the proposal:

- a. Overall proposal suitability: proposal must meet the purpose, scope and needs included herein and be presented in a clear and organized manner.
- b. Experience: Potential research partners will be evaluated on their experience as it pertains to the scope of this project.
- c. Previous work: Potential research partners will be evaluated on examples of their work pertaining to similar research projects as well as testimonials and references.
- d. Value and cost: Potential research partners will be evaluated on the cost of their proposal based on the work to be performed in accordance with the scope of this project.
- e. Technical expertise and experience.
- f. The ability of the potential research partners to complete the project according to the proposed timeline.
- g. The willingness of the research partner to execute a services contract and non-disclosure agreement with ISTA, drafts of which are available from ISTA.

RFP TIMELINE

October 17, 2024– Release and distribution of RFP

October 25, 2024 – Respond with interest to bid

October 17- November 15, 2024– Questions and answers exchanged

November 15, 2024 – Deadline for submitting proposals



December 6, 2024 – Selected vendor notified
December 20, 2024 – Contract signed