**[Guide for Preventing and Mitigating the Risk of Bridge and Tunnel Strikes by Motor Vehicles](https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4950) [[1]](#footnote-1)**

**Posted Date: 10/30/2020**

* **Project Data**

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| **Funds:** | **$500,000** |
| **Contract Time:** | **30 months** |
| ***(includes 1 month for NCHRP review and approval of each interim report and 3 months for NCHRP review and for contractor revision of the final report)*** | |
| **Authorization to Begin Work:** | **6/1/2021 -- estimated** |
| **Staff Responsibility:** | **Dr. Waseem Dekelbab    Phone: 202/334-1409    Email:**[**wdekelbab@nas.edu**](mailto:wdekelbab@nas.edu) |
| **RFP Close Date:** | **1/5/2021** |
| **Fiscal Year:** | **2020** |

**BACKGROUND**

Bridge/tunnel strikes inflict serious damage to vehicles (including commercial motor vehicles, recreational vehicles, buses, and agriculture and industrial equipment) and highway bridges/tunnels, cause injuries and fatalities in initial and secondary crashes, impose detours and costly delays on other highway users, and require expensive incident responses from bridge/tunnel owners, state departments of transportation (DOTs), and public safety agencies. Attempts to prevent bridge/tunnel strikes include signing, lighting, height detection systems, and actuated warning devices. These measures have achieved limited success.

Lack of comprehensive information on the number, location and severity of bridge/tunnel strikes contributes further to the problem. By one estimate, more than 3,200 bridge/tunnel strikes occurred during the period of 2007 – 2017 at a cost approaching $1 billion, but this estimate does not include all states. Many bridge/tunnel strike collisions are unreported and may go undetected until the next scheduled bridge/tunnel inspection. Even reported collisions may not be reported as bridge/tunnel strikes, because no standard “check box” exists on crash report forms. Lack of information limits understanding of the frequency, impact, causation, and potential mitigation of bridge/tunnel strikes.

After the I-5 Skagit River Bridge collapse in Washington in 2013, the National Transportation Safety Board, in NTSB Safety Recommendation H-14-008, recommended development of:

"A best practices guide that the states can use to prevent bridge strikes by overheight vehicles. At a minimum, the guide should include:

1. a framework for collecting bridge strike data and for ensuring communication of these data among the state agencies responsible for conducting bridge inspections and those responsible for issuing oversize load permits, to support the development of countermeasures;
2. practices for using the data to develop operational changes;
3. methods for evaluating bridge strike countermeasures; and
4. a review of countermeasures that have proven effective in reducing the number of bridge strikes by overheight vehicles in the states and in other countries."

**OBJECTIVE**

The objective of this research is to develop a guide to help state DOTs, public safety agencies, and the motor carrier industry prevent and mitigate the risk of bridge/tunnel strikes by motor vehicles. At the minimum, the research team shall:

1. develop a sustainable national clearinghouse for collecting and analyzing data, and communicating bridge/tunnel strike data and bridge/tunnel clearance information. This clearinghouse will be used to store and maintain data collected under this project and future data collected by other agencies after completion of this project;
2. identify and evaluate the nationally and internationally implemented countermeasures to prevent bridge/tunnel strike;
3. develop a risk-based data driven approach to evaluate the risk of bridge/tunnel strike;
4. develop prevention and mitigation strategies that consider bridge/tunnel design, policy and operation, and utilizing technologies to prevent bridge/tunnel strike;
5. analyze the relationship between the vehicle permitting processes (including roadway network dimensions, oversize vehicle routing systems, routing compliance for oversized loads, and pilot car escort guidance ) and bridge/tunnel strike;
6. develop training and outreach materials for motor carrier industry, traffic operation groups, vehicle permitting, and public safety agencies; and
7. develop a roadmap for state DOTs and other transportation agencies to implement and maintain the national clearinghouse for data collection after completion of this project.

Accomplishment of the project objective will require at least the following tasks.

**TASKS**

*Task descriptions are intended to provide a framework for conducting the research. The NCHRP is seeking the insights of proposers on how best to achieve the research objective. Proposers are expected to describe research plans that can realistically be accomplished within the constraints of available funds and contract time. Proposals must present the proposers' current thinking in sufficient detail to demonstrate their understanding of the issues and the soundness of their approach to meeting the research objective.*

**PHASE I—Planning**

*Task 1.*Conduct a literature review of relevant research and current state of practice related to strike of bridge/tunnel and other highway structures; existing countermeasures including prevention and mitigation strategies; and roadside and onboard vehicle technologies. The review shall include published and unpublished research conducted through the NCHRP; FHWA; and other national, international, state, and pooled-fund sponsored research.

*Task 2*. Identify the data required, to be collected in Phase II, in order to achieve the research objective. The research team shall plan to collect field data, as needed, if data are not available.

*Task 3.* Synthesize the Tasks 1 and 2 to identify the knowledge gaps related to bridge/tunnel strikes, vehicle permitting processes, prevention and mitigation strategies, technologies, and data availability and quality. These gaps should be addressed in this research or as budget permits in the recommendations for future research.

*Task 4*. Propose a methodology to achieve the research objective, to be fully developed in Phase II.

*Task 5*. Propose a preliminary outline for the guide.

*Task 6.* Prepare Interim Report No. 1 that documents Tasks 1 through 5, includes the data archiving and sharing plan (see Special Note C), and provides an updated work plan for the remainder of the research. This report must be submitted to NCHRP no later than 4 months after contract execution. The updated work plan must describe the process and rationale for the work proposed for Phases II though IV.

*Note: Following a 1-month review of Interim Report No. 1 by the NCHRP, the research team will be required to meet with the NCHRP project panel to discuss the interim report. Work on Phases II though IV of the project will not begin until authorized by the NCHRP. Phase I shall be limited to $40,000.*

**PHASE II—Data Collection and Methodology Development**

*Task 7*. Collect and analyze data to achieve the research objective. Data should be augmented by documented research according to the approved Interim Report No.1. The research team is expected to collect and supplement unavailable data. The collected data shall be stored in a data clearinghouse to be hosted by the research team during the research.

*Task 8*. Execute the proposed methodology according to the approved Interim Report No.1.

*Task 9*. Provide a detailed description of every chapter and section of the proposed guide and complete a sample chapter of the proposed guidance selected by NCHRP. This chapter should be publication-ready.

*Task 10.* Prepare Interim Report No. 2 that documents the results of Tasks 7 through 9 and provides an updated work plan for the remainder of the project. This report is due no later than 12 months after approval of Phase I. The updated plan must describe the work proposed for Phases III and IV.

*Note: Following a 1-month review of Interim Report No. 2 by the NCHRP, the research team will be required to meet in person with the NCHRP project panel to discuss the interim report. Work on Phases III and IV of the project will not begin until authorized by the NCHRP. Phase II shall be limited to $300,000.*

**PHASE III—Guidance Development**

*Task 11.* Develop the guide according to the approved Interim Report No.2.

*Task 12*. Prepare Interim Report No. 3 that documents the results of Task 11 no later than 6 months after approval of Phase II. The updated work plan must describe the work proposed for Phase IV.

*Note: Following a 1-month review of Interim Report No. 3 by the NCHRP, the research team will meet with the NCHRP project panel to discuss the interim report, if necessary. Work on Phase IV of the project will not begin until authorized by the NCHRP. Phase III shall be limited to $100,000.*

**PHASE IV—Final Products**

*Task 13.* Present draft final deliverables to appropriate AASHTO technical committees for comments and propose any revisions to NCHRP.

*Task 14.* Prepare final deliverables including:

1. a guide for preventing and mitigating the risk of bridge/tunnel strikes by motor vehicles;
2. a final report that documents the entire research effort;
3. the training and outreach materials for motor carrier industry, traffic operation groups, vehicle permitting, and other transportation agencies;
4. the roadmap for state DOTs and other transportation agencies that describes how to implement and use the developed national clearinghouse for data collection after completion of this project;
5. the national data clearinghouse including the data collected under this project; and
6. a stand-alone technical memorandum titled “Implementation of Research Findings and Products.” See Special Note E for additional information.

The draft deliverables are due no later than 2 months after approval of Phase III.

*Note: Following receipt of the draft final report, the remaining 3 months shall be for NCHRP review and comment and for research agency preparation of the revised final report. Phase IV shall be limited to $60,000.*

**SPECIAL NOTES**

A. The research team should include individuals with direct practical experience related to roadside and onboard vehicle technologies, permitting process, data management, and writing guidance and outreach materials.

B. The research team should anticipate making presentations to appropriate technical committees at two annual meetings of the AASHTO Committee on Transportation System Operations.

C. To ensure the national clearinghouse and data produced under this project are accessible, a data archiving and sharing plan shall be prepared by the agency performing the research. The plan must be submitted with Task 5 and shall include a description of expected activities, schedules, limitations, milestones, and required resources. Researchers should describe briefly the expected schedule for data production and archiving in the NCHRP permanent repository, the format of the final dataset, the documentation to be provided, and whether or not any analytic tools and/or results also will be provided. The plan must include a description of actions planned to ensure quality. Moreover, the plan must specify the resources required to archive and distribute the data expected to be obtained in the course of performing the research. In general, public release of data will not occur before full review and approval by the NCHRP project panel.

The data archiving and sharing plan must include the following sections:

* Background and significance.
* Expected data formats.
* Description of data archiving and quality assurance plan.
* Description of data sharing plan including roles and responsibility.
* Schedule for data archiving and public release of data.
* Milestones for the implementation of the plan.
* Resources and budget.
* Roles and responsibility for collecting, storing, maintaining and disseminating future data after completion of this project.

D. Proposals should include a task-by-task breakdown of labor hours for each staff member as shown in Figure 4 in the brochure, "Information and Instructions for Preparing Proposals" (<http://onlinepubs.trb.org/onlinepubs/crp/docs/ProposalPrep.pdf>). Proposals also should include a breakdown of all costs (e.g., wages, indirect costs, travel, materials, and total) for each task using Figures 5 and 6 in the brochure. Please note that TRB Cooperative Research Program subawards (selected proposers are considered subawards to the National Academy of Sciences, the parent organization of TRB) must comply with *2 CFR 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards*. These requirements include a provision that proposers without a "federally" Negotiated Indirect Costs Rate Agreement (NICRA) shall be subject to a maximum allowable indirect rate of 10% of Modified Total Direct Costs. Modified Total Direct Costs include all salaries and wages, applicable fringe benefits, materials and supplies, services, travel, and up to the first $25,000 of each lower-tier subaward and subcontract. Modified Total Direct Costs exclude equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs and the portion of each lower-tier subaward and subcontract in excess of $25,000.

E. The NCHRP is a practical, applied research program that produces implementable products addressing problems faced by transportation practitioners and managers. The benefits of NCHRP research are realized only when the results are implemented in state DOTs and other agencies. Implementation of the research product must be considered throughout the process, from problem statement development to research contract and beyond completion of the research. Item 4(c), "Anticipated Research Results," must include the following: (a) the "product" expected from the research, (b) the audience or "market" for this product, (c) a realistic assessment of impediments to successful implementation, and (d) the institutions and individuals who might take leadership in deploying the research product. The project panel will develop and maintain an implementation plan throughout the life of the project. The research team will be expected to provide input to an implementation team consisting of panel members, AASHTO committee members, the NCHRP Implementation Coordinator, and others in order to meet the goals of *NCHRP Active Implementation: Moving Research into Practice*, available at <http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP_ActiveImplementation.pdf>.

F. Item 5 in the proposal, "Qualifications of the Research Team," must include a section labeled "Disclosure." Information relevant to the NCHRP's need to ensure objectivity and to be aware of possible sources of significant financial or organizational conflict of interest in conducting the research must be presented in this section of the proposal. For example, under certain conditions, ownership of the proposing agency, other organizational relationships, or proprietary rights and interests could be perceived as jeopardizing an objective approach to the research effort, and proposers are asked to disclose any such circumstances and to explain how they will be accounted for in this study. If there are no issues related to objectivity, this should be stated.

G. Proposals are evaluated by the NCHRP staff and project panels consisting of individuals collectively very knowledgeable in the problem area. Selection of an agency is made by the project panel considering the following factors: (1) the proposer's demonstrated understanding of the problem; (2) the merit of the proposed research approach and experiment design; (3) the experience, qualifications, and objectivity of the research team in the same or closely related problem area; (4) the plan for ensuring application of results; (5) how the proposer approaches inclusion and diversity in the composition of their team and research approach, including participation by certified Disadvantaged Business Enterprises; and, if relevant, (6) the adequacy of the facilities.

***Note: The proposer's approach to inclusion and diversity as well as participation by Disadvantaged Business Enterprises should be incorporated in Item 12 of the proposal.***

H. Copyrights - All data, written materials, computer software, graphic and photographic images, and other information prepared under the contract and the copyrights therein shall be owned by the National Academies of Sciences, Engineering, and Medicine. The contractor and subcontractors will be able to publish this material for non-commercial purposes, for internal use, or to further academic research or studies with permission from TRB Cooperative Research Programs. The contractor and subcontractors will not be allowed to sell the project material without prior approval by the National Academies of Sciences, Engineering, and Medicine. By signing a contract with the National Academy of Sciences, contractors accept legal responsibility for any copyright infringement that may exist in work done for TRB. Contractors are therefore responsible for obtaining all necessary permissions for use of copyrighted material in TRB's Cooperative Research Programs publications. For guidelines on TRB's policies on using copyrighted material please consult Section 5.4, "Use of Copyrighted Material," in the Procedural Manual for Contractors.

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| |  | | --- | | **Proposals should be uploaded via this link:**[**https://www.dropbox.com/request/IKNk6NjcGDY9ctV9MBCk**](https://www.dropbox.com/request/IKNk6NjcGDY9ctV9MBCk)**Proposals are due not later than 5:00 p.m. Eastern Time on 1/5/2021.** |   This is a firm deadline, and extensions are not granted. In order to be considered for award, the agency's proposal accompanied by the executed, unmodified Liability Statement must be in our offices not later than the deadline shown, or the proposal will be rejected.   |  | | --- | | **Liability Statement**  The signature of an authorized representative of the proposing agency is required on the unaltered statement in order for TRB to accept the agency's proposal for consideration. **Proposals submitted without this executed and unaltered statement by the proposal deadline *will be summarily rejected.***An executed, unaltered statement indicates the agency's intent and ability to execute a contract that includes the provisions in the statement.  Here is a printable version of the [Liability Statement (pdf).](http://www.trb.org/NotesDocs/Liability.pdf) A free copy of the Adobe Acrobat PDF reader is available at [http://www.adobe.com](http://www.adobe.com/). |   **General Notes**  1. According to the provisions of Title 49, Code of Federal Regulations, Part 21, which relates to nondiscrimination in federally assisted programs, all parties are hereby notified that the contract entered into pursuant to this announcement will be awarded without discrimination on the grounds of race, color, religion, sex, national origin, or disability.  2. The essential features required in a proposal for research are detailed in the current brochure entitled [**"Information and Instructions for Preparing Proposals"**](http://onlinepubs.trb.org/onlinepubs/crp/docs/proposalprep.pdf) *(updated July 2019)*. **Proposals must be prepared according to this document, and attention is directed specifically to Section V for mandatory requirements. Proposals that do not conform with these requirements will be rejected.** [**This brochure is available here.**](http://onlinepubs.trb.org/onlinepubs/crp/docs/proposalprep.pdf)  3. The total funds available are made known in the project statement, and line items of the budget are examined to determine the reasonableness of the allocation of funds to the various tasks. If the proposed total cost exceeds the funds available, the proposal is rejected.  4. All proposals become the property of the Transportation Research Board. Final disposition will be made according to the policies thereof, including the right to reject all proposals.  5. Potential proposers should understand that follow-on activities for this project may be carried out through either a contract amendment modifying the scope of work with additional time and funds, or through a new contract (via sole source, full, or restrictive competition). |

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