

**CHECKLIST TO DESIGNATE AREAS OF EVALUATION
FOR REQUESTS FOR PROPOSAL (RFP)**

Research Administration Use Only

	REQUISITION NUMBER 1113	DUE DATE 2/25/2013	TIME DUE Noon EST
MDOT PROJECT MANAGER Matt Chynoweth	JOB NUMBER (JN) tbd	CONTROL SECTION (CS) n/a	

DESCRIPTION

Evaluating Long Term Capacity and Ductility of Carbon Fiber Reinforced Polymer prestressing and post tensioning strands subject to long term losses, creep, and environmental factors

Check all items to be included in RFP			Provide only checked items below in proposal
Check the appropriate Tier in the box below			
<input type="checkbox"/> TIER I (\$25,000-\$99,999)	<input type="checkbox"/> TIER II (\$100,000-\$250,000)	<input checked="" type="checkbox"/> TIER III (>\$250,000)	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Understanding of Service
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Past Performance
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Qualifications of Team
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Quality Assurance/Quality Control
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location: The percentage of work performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activities, then location should be scored using the distance from the consultant office to the on-site inspection or survey activity.
N/A	N/A	<input type="checkbox"/>	Presentation
N/A	N/A	<input type="checkbox"/>	Technical Proposal (if Presentation is required)

The prime consultant must be a Michigan university. The prime consultant/vendor is responsible for the successful completion of the service and is expected to perform at least 40 percent of the services, by dollar value. The basis of payment is Actual Costs as defined in standard MDOT contracts.

If your organization is interested in providing services, please indicate your interest by submitting a proposal following the **research guidelines** near the top of MDOT's Request for Proposals Web page at http://www.michigan.gov/mdot/0,1607,7-151-9625_32842--00.html.

RFP SPECIFIC INFORMATION

Problem Title: Evaluating Long Term Capacity and Ductility of Carbon Fiber Reinforced Polymer prestressing and post tensioning strands subject to long term losses, creep, and environmental factors

OR Number: OR14-024

This is Best Value Selection which means the budget amount submitted with the proposal is a component of the proposal score, not the determining factor of the selection.

PROPOSAL SUBMITTAL INFORMATION

PROPOSAL AND BID SHEET EMAIL ADDRESS –

mdot-rfp-response@michigan.gov with a CC to
mdot-research@michigan.gov

GENERAL INFORMATION

Any questions relative to the Research Problem Statement must be submitted by e-mail to:

mdot-research@michigan.gov. Questions must be received by 5 business days prior to the RFP due date at 5:00 p.m. EST. All questions and answers will be placed on the MDOT RFP Web site as soon as possible after receipt of the questions and at least three (3) days prior to the due date listed above. The names of organizations submitting questions will not be disclosed.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

MDOT AND RESEARCH FORMS REQUIRED AS PART OF PROPOSAL SUBMISSION:

5100D- Request for Proposal Cover Sheet

Schedule of Research Activities Form- Appendix B

Deliverables Table- Appendix A

Initial Implementation Plan Form- Appendix C

5100J- Consultant Data and Presignature sheet is required for signatory on this proposal

Research Proposal Budget Form Worksheet Appendix D (Universities)

Or

Bid Sheet and Budget Exhibits required in [Priced Proposal Guidelines](#) (Consultants)

MANDATORY ELECTRONIC SUBMITTAL

Proposals submitted for this project must be submitted electronically.

The following are Requirements for Electronic Submittals:

- Proposals must be prepared using the most current Research guidelines found at the top of the page- [MDOT – Research Proposal Guidelines](#).
- The proposal must be bookmarked to clearly identify the proposal sections (See Below)
- For any section not required per the RFP, the bookmark must be edited to include “N/A” after the bookmark title.
- Proposals must be assembled and saved as a single PDF file
- PDF file must be 5 megabytes or smaller
- PDF file must be submitted via e-mail to MDOT-RFP-Response@michigan.gov
- MDOT’s requisition number and company name must be included in the subject line of the e-mail. The PDF shall be named using the following format:
 - **Requisition#XXX_Company Name.PDF**
- MDOT will not accept multiple submittals
- Proposals must be *received* by MDOT on or before the due date and time specified in each RFP

If the submittals do not comply with the requirements, they may be determined unresponsive.

The Proposer will receive an e-mail reply/notification from MDOT when the proposal is received. Please retain a copy of this e-mail as proof that the proposal was received on time.

Proposers are responsible for ensuring the MDOT receives the proposal on time.

****Contact Contract Services Division immediately at 517-373-4680 if you do not get an auto response****

Required Bookmarking Format:

- I. Request for Proposal Cover Sheet Form 5100D
 - a. Consultant Data and Signature Sheet, Form 5100J (if applicable)
- II. Understanding of Service
 - a. Innovations
- III. Qualifications of Team
 - a. Structure of Project Team
 - i. Role of Firms
 - ii. Role of Key Personnel
- IV. Location
- V. Quality Assurance / Quality Control Plan
- VI. Resumes of Key Staff
- VII. Pricing Documents/Bid Sheet (if applicable)

Michigan Department of Transportation

SCOPE OF SERVICE FOR RESEARCH SERVICES Michigan Universities only

TITLE: Evaluating Long Term Capacity and Ductility of Carbon Fiber Reinforced Polymer prestressing and post tensioning strands subject to long term losses, creep, and environmental factors

OR#: OR14-024

LOCATION: Statewide

WORK DESCRIPTION: Research on Evaluating Long Term Capacity and Ductility of Carbon Fiber Reinforced Polymer prestressing and post tensioning strands subject to long term losses, creep, and environmental factors

ANTICIPATED START DATE: 10/1/2013

ANTICIPATED COMPLETION DATE: 9/30/2015

MDOT RESEARCH PROJECT ADMINISTRATION MANAGER:

Michael Townley, P.E.
8885 Ricks Road
Lansing, Michigan 48917
E-MAIL: mdot-research@michigan.gov

GENERAL INFORMATION:

1. PROBLEM TO ADDRESS:

Use of Carbon Fiber Reinforced Polymer (CFRP) as longitudinal prestressing, and transverse post tensioning is a viable alternate to the 270 ksi low relaxation steel strands currently used by MDOT in prestressed and post tensioned bridge superstructures. CFRP strands are not subject to corrosion, and have strength characteristics similar to steel. MDOT has used CFRP transverse post tensioning on two structures, and has projects planned for CFRP longitudinal prestressing. This is a material MDOT will be using on future project as well.

The current AASHTO LRFD Bridge Design Specifications do not contain guidance on the design of elements using CFRP prestressing or post tensioning. ACI 440.1R-09 provides guidance on the jacking and final stresses in CFRP strands to stay within a desired ductility range, and also provides guidance on the initial elastic losses of the CFRP fibers and resin. CFRP strands lack the ductility of steel

strands, and therefore, allowable maximum stress values are recommended to ensure ductile behavior of the overall structure, so the failure mode is similar to that of a steel strand structure.

ACI 440 discusses the creep rupture characteristics of CFRP strands, but due to lack of good historical data, discussions of long term losses due to creep, concrete shrinkage, and effects of environmental factors are very general. Bond fatigue, bond lengths for splices, susceptibility to fire damage, and other severe exposure conditions are also not addressed due to the lack of long term testing data. Long term losses need to be taken into account during the initial design, as these values are subtracted from the ultimate capacity of the materials. AASHTO provides detailed methods and empirical equations for determining these losses in steel strands, however, no equivalent equations are available for CFRP strands. For current CFRP projects, detailed finite modeling has been performed to determine the performance of the materials. For CFRP strands to be used as a production design material, methodologies and empirical equations need to be developed to quantify these values, and provide the designer with the guidance on how to properly apply these methodologies.

The long term losses and other environmental effect will also need to be known for load ratings of structures with CFRP elements.

2. RESEARCH OBJECTIVES:

1. Verify the creep rupture values for CFRP strands
2. Develop the appropriate stress levels and strength reduction factors for CFRP strands taking into account long term losses and creep rupture
3. Perform laboratory testing to verify material resistance to bond fatigue, fire damage, and other severe environmental factors
4. Develop methodologies and empirical equations to quantify all long term losses and other related design criteria

3. URGENCY AND IMPLEMENTATION BENEFIT TO MDOT:

MDOT has already deployed CFRP transverse post tensioning on two projects, with the assistance of experts, and finite models. This project will help further deploy this material in projects by providing a design methodology taking into account all factors impacting the strength of the materials.

MDOT will benefit by using non-corrosive materials in our bridges. This provides life cycle cost, and mobility benefits to users of the transportation infrastructure, as corrosion of steel, and its effect on other structures elements is the primary cause of major types of deterioration requiring rehabilitation.

4. RISKS OR OBSTACLES TO RESEARCH:

Risks include the proper selection of shapes and elements for laboratory testing to develop the required results. MDOT will work closely with the researcher to determine the appropriate laboratory testing.

5. DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S):

Experience with FRP composites, experience with finite modeling software, laboratory facilities for full scale load testing, environmental testing capabilities. There is no statistical qualification requirement for this proposal.

CONSULTANT RESPONSIBILITIES:

1. Literature review
2. Laboratory specimen development
3. Laboratory and field tests and monitoring
4. Analytical and numeric modeling
5. Development of empirical equations and design criteria
6. Reporting

Failure of any of the above will be found in noncompliance with the contract.

DELIVERABLES:

The final report will describe research methodology and results, and document the following:

Design criteria for inclusion into the MDOT Bridge Design Manual, and details (if any) for inclusion into the MDOT Bridge Design Guides.

Also included should be empirical equations, and design methodologies for long term prestress losses, and the effect on bending, shear, cracking, deflection, and other requirements to meet equivalent AASHTO guidelines.

MDOT RESPONSIBILITIES:

MDOT will provide technical reviews, and guidance, and solicit input from other states. MDOT is also a participant on the AASHTO Subcommittee on Bridges and Structures, Technical Subcommittee T-6, Composite. This information will be presented to Technical Committee T-6 for discussion on incorporation into the AASHTO LRFD Design Specifications.

MDOT will also supply calculations, and electronic monitoring data of bridges currently in MDOT inventory with CFRP elements.

COORDINATION PROCEDURES

Work will be completed in compliance with the Research Implementation Manual

CONSULTANT PAYMENT

All billings for services must be directed to the Department and follow the current Research Implementation Manual. This document contains instructions and forms that must be followed and used for billing. Payment may be delayed or decreased if the instructions are not followed.

Payment to the Consultant for services rendered shall not exceed the maximum amount unless an increase is approved in accordance with the contract with the Consultant.

Direct expenses, if applicable, will not be paid in excess of that allowed by the Department for its own employees in accordance with the State of Michigan's Standardized Travel Regulations. Supporting documentation must be submitted with the billing for all eligible expenses on the project in accordance with the Reimbursement Guidelines. The only hours that will be considered allowable charges for this contract are those that are directly attributable to the activities of this project.

The use of overtime hours is not acceptable unless prior written approval is granted by the MDOT project manager. Reimbursement for overtime hours that are allowed will be limited to time spent on this project in excess of forty hours per person per week. Any variations to this rule should be included in the priced proposal submitted by the Consultant and must have prior written approval by the MDOT project manager.

Compensation for services will be reimbursed on actual cost basis.

PROPOSAL INFORMATION AND SCORING

Formal proposals are required and shall include the information as outlined in these Guidelines. This section is the information required in the proposal that will be used to score the qualifications of each consultant's proposal. The section numbering correlates to the score sheet. Therefore, the consultant should format their proposals consistent with the outline provided.

1. UNDERSTANDING OF SERVICE: 40 POINTS

Describe understanding of the service intended to be proposed. This information is to be based on the scope of services.

Problem Statement and Background Summary- demonstrates good understanding of problem, looks objectively at problem, specifies problem limits and restricts scope appropriately, and cites relevant literature.

Research Plan- cites specific objectives clearly, technical approach responds to all written and implied requirements, difficult areas are identified and details to overcome are given, represents novel idea or technical approach, plan is feasible, and effort is consistent with scope of problem.

Products and Implementation- proposal clearly defines products to be delivered at completion, includes practical, realistic implementation plan.

MDOT Involvement- MDOT involvement is not excessive and is clearly defined and quantified.

2. QUALIFICATIONS OF TEAM: 30 POINTS –

Describe the structure of the project team including the roles of all key personnel and subcontractors. For each subcontractor describe role in service and include what percent of the task that the subcontractor is expected to provide. Provide résumés for each of the key staff of the prime and subcontractor.

Facilities- proposer has adequate access to equipment and/or laboratory required in study.

Staffing- personnel availability is clearly defined, shows a depth of qualified personnel, proposer has ability to manage a project of this size an sufficient resources to complete study, qualifications are directly related to the requirements of the project, plans for specific key personnel assignment included, and there is a reasonable balance between subcontractor and prime contractor.

Statistical Qualification- The required knowledge level for a research team in statistical analyses, if defined, will be in the RFP under the heading DESIRED QUALIFICATIONS IN AN INVESTIGATOR(S).

Proposals not documenting statistical training and experience levels required in the RFP may be classified as non-responsive.

3. RELEVANT PAST PERFORMANCE: 30 POINTS

The project manager will contact references and review relevant performance evaluations from the past 5 years.

Record of past accomplishment- proposer satisfactorily completed past projects, was cooperative and flexible, and ended past projects according to the original budget and time schedule.

4. QUALITY ASSURANCE/QUALITY CONTROL (QAQC) PLAN: 5 POINTS

The proposer provided an outline of a QA/QC process. The QA/QC Manager is experienced with MDOT standards and practices.

5. LOCATION: 5 POINTS

The percentage of work hours performed in Michigan will be used for all selections unless the project is for on-site inspection or survey activity. The combination of location and percentage of work performed in Michigan should not exceed 5 points.

Percentage of Work To Be Done in Michigan Score	
95% to 100%	5
80% to 94%	4
50% to 79%	3
25% to 49%	2
10% to 24%	1
Less than 10%	0

6. PRICE: 40 POINTS

Cost score is based on the lowest cost proposed divided by the current proposer cost multiplied by 40. Lowest bid shall receive 40 points.

TOTAL POINTS: 150

Research Proposal Budget Form Worksheet

Project Title	
Research Organization	
Date	

									FY1	FY2	FY3	FY4	TOTAL	
SALARIES & WAGES -- MUST COMPLY WITH OMB CIRCULAR A-21														
Specify number of hours to be worked and hourly rate for each individual below:														
Examples of role of individual are Principal Investigator, Technician, Grad Student, etc. Annual wage increases must not exceed 2%														
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
(role of individual)														
Name of individual														
Enter FY	FY1 rate	FY1 hrs	FY2 rate	FY2 hrs	FY3 rate	FY3 hrs	FY4 rate	FY4 hrs						
rate & hrs									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-Total Salary & Wages									\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

FRINGE BENEFITS -- MUST COMPLY WITH OMB CIRCULAR A-21										
Indicate Employee, appropriate negotiated rate for each and description of who the rate applies to. (e.g. - Sam Smith, 25%, Summer Faculty. The rate is negotiated between the university and it's cognizant agency										
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Name										
(Rate Description)										
(% rate)	FY1	FY2	FY3	FY4	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-Total Fringe Benefits					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBCONTRACTOR -- MUST COMPLY WITH OMB CIRCULAR A-21										
A copy of the subcontractor's budget must be attached. An MDOT approved subcontract is required for subcontractor costs in excess of \$25,000 prior to payment of invoices that contain subcontractor work. List all subcontractors on a separate line.										
Subcontractor Name & Amt.										\$0.00
Subcontractor Name & Amt.										\$0.00
Sub-Total Subcontractor					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TRAVEL -- MUST COMPLY WITH OMB CIRCULAR A-21										
Must be in accordance with IDS contract requirements.										
In-State Travel (Destinations within Michigan)										
Provide a separate table itemizing costs.										\$0.00
Out-of-State Travel (Prior approval required)										
Provide a separate table itemizing costs.										\$0.00
Sub-Total Travel					\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

SUPPLIES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: computers, printers, monitors, fax machines, printer paper, toner cartridges, pens, pencils, legal pads, clips, rubber bands, post-it notes, books, notebooks, binders, folders, diskettes, postage stamps, chairs, office furniture, calendars, paper punches, business cards, staplers, waste cans, etc.)

Provide details if cost exceeds \$2,000. Individual line items in excess of \$1,000 require a detailed explanation regardless of total cost

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Supplies		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

CAPITAL EQUIPMENT -- MUST COMPLY WITH OMB CIRCULAR A-21 - Purchased specifically for this project

List items with a value in excess of \$500. Equipment in excess of \$5,000 requires prior approval.

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Equipment		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

OTHER EXPENSES -- MUST COMPLY WITH OMB CIRCULAR A-21 (Few items not allowed are: memberships in professional & scientific organizations, local telephone lines, cell phones, etc.)

Any project expense which does not fall into another category. Provide detailed explanation of the expense and applicable breakdown of costs (e.g. graduate student tuition).

(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
(Description)						\$0.00
Sub-Total Other Expenses		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Total Sub-Totals		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
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INDIRECT COSTS -- MUST COMPLY WITH OMB CIRCULAR A-21

Indirect cost rates are negotiated between the university and it's cognizant agency. Indicate the type of negotiated indirect rate used and the percentage (e.g. On Campus Research, 52%)

(Type)		(%)								
		FY1	FY2	FY3	FY4					
Enter \$ Amt per FY						\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Indirect Costs		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

TOTAL PROJECT COSTS		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
UNIVERSITY MATCHING FUNDS						\$0.00
TOTAL MDOT PROJECT COSTS		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00