

Cable Stay Bridge Pooled Fund Study  
TAC meeting  
April 26, 2007  
Washington D.C.

Attendees: Tom Domagalski—Illinois DOT  
Ahmad Abu Hawash—Iowa DOT  
Hossein Ghara—Louisiana DOT  
Paul Kelly—Missouri DOT  
Keith Ramsey—Texas DOT  
Pete Clogston—FHWA Missouri Division  
Benjamin Tang—FHWA  
Hal Bosch—FHWA  
Jen Harper—Missouri DOT  
Sunwoo Park—FHWA Contractor (FE Simulation)  
Jerry Shen—FHWA Contractor (Design Guidelines)

Discussion Items:

HNTB report: The HNTB report was published by MoDOT but is going through the process of being published by FHWA. The report has gone through the first round of edits. Many of the revisions are to make the document 508 compliant, which requires that notes be made on all charts and figures for the visually impaired. Assuming most of the revisions are acceptable the second round should go quickly. The cost of publication will need to be funded by the PFS. The estimated cost is \$4-10,000 depending on the number of hard copies requested by the TAC. The estimated date for completion is mid-late summer.

Bill Emerson Bridge Instrumentation:

Almost all equipment has been procured. The system has been tested in the lab, but has not been tested remotely due to computer/internet firewalls within the Turner-Fairbanks lab. There are still a few details to be worked out with the existing Internet connections. Jen will contact Bryan Hartnagel from MoDOT- Bridge Division to try and get the answers Hal needs. System might be ready to be installed in early summer. Plan is to deploy 1-3 years. The system will be removable and able to be placed on another structure. Hossien may have a bridge they are interested in monitoring in the future. (See presentation attachment for further details.)

Finite Element Simulation of Stay Cable Systems with Crossties and Dampers:

Used a finite-element time-history analysis technique. Project looked at the response of the system with various wind profiles and various mitigation techniques. The results have been presented at an international symposium and workshop. Three journal papers are being prepared. The TAC was asked to consider if they wanted to publish as a

report or let the information be presented several papers. (See presentation attachment for further details.)

Development of Guidelines Document:

- ◇ A draft document was produced and a panel convened in January to review. After discussions by the panel it was determined the guidelines document needed to be reworked.
- ◇ The intended audience is designers, manufacturers and owners not aerodynamic specialists. The intent is not to provide specifications and complex mathematical equations but to provide guidance in the design process and refer to the PTI guidelines specifications.
- ◇ Previously references were made to ASCE 7 and ASHTO LRFD as well, but occasionally all three documents conflict.
- ◇ The panel suggested looking at the design for a few of the latest cable stay bridges and see the process they followed. A few of the consultants on the panel are going to work to see if they can get authorization from the states to look at the designs.
- ◇ The document cannot continue to incorporate the latest research; there needs to be a cut-off point in order to finish the guidelines.
- ◇ There are also some “gaps” in knowledge at this point that still need to be addressed. Most notably galloping of the cables, aerodynamic properties of cables with helical fillets and parametric excitation-movement at the anchorage. (See presentation attachment for further details.)

Revisions to PTI: May 7<sup>th</sup> will be a vote on whether to adopt the proposed 5<sup>th</sup> addition. A separate ballot will determine if the old galloping equations will be replaced with the new VSL equations or if there will be no equation. If the equations are completely removed it gives credence to the need for further research on the subject. Per Benjamin, the pooled fund study has been influential in the way PTI has looked at cable stay bridge design.

Budget Status: The pooled fund study has \$114,383 left. There will be some minor expenses with publishing the HNTB report and deploying the monitoring system for the Bill Emerson Bridge.

TAC recommendations: The primary goal at this point should be getting a workable Guidelines Document. To “finish” the second draft without putting effort into the current research gap will probably take the remaining funds and at least a year of effort. That is based on the hope that we can get a volunteer from the panel to help with the effort, otherwise it might be more expensive. The TAC members agreed that Hal should proceed as if no other funding will be available and to get the Guidelines Document ready to publish. If he and other members of his team feel there are gaps in the knowledge, they will put together a list of further research stating why it is needed, how long it will take, and how

much money it would take to accomplish the tasks. It was noted by most members that it can take considerable time to allocate funds.

Other items of Note:

- ◇ Keith mentioned that TX will soon be publishing a report on the fatigue life of strands. They have had 17 wire breaks on the Fred Hartman Bridge. TX has been using an acoustic monitoring system to inspect the cables.
- ◇ Hossien suggested that the cable industry be approached for further funding. He feels it would be in their best interest to help fill some of these research gaps.
- ◇ Some designers have been referring to the HNTB report as a specification document. The intent of the report is to be a research report, not a specification document.
- ◇ After we have the Guidelines Document completed we might want to consider hosting a 1-2 day workshop aimed at designers.

Action Items:

- ◇ Jen will try and track down the internet/connection information for the Bill Emerson Bridge
- ◇ Hal will let Jen know when they will be ready to deploy the wind instrumentation so that it can be coordinated with traffic control.
- ◇ Hal and Jerry Shen will proceed with the Guidelines document
- ◇ Hal will put together a list of research “gaps” stating why it is needed, how long it will take, and how much money it would take to accomplish the tasks.
- ◇ Hal will send out initial guideline document to TAC members.