CLOSEOUT REPORT

Submitted by the AASHTO TIG Lead States Team for
the following technology:

Use of Self-Propelled Modular Transporters (SPMTs) to Remove & Install Bridges

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Where the names of products or manufacturers appear herein, their inclusion is considered essential to the objectives of this report. AASHTO does not endorse products or manufacturers.

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Introduction

The Self-Propelled Modular Transporter (SPMT) Lead State Team (LST) was selected to promote the nationwide implementation of SPMT bridge moves. The use of SPMTs to move bridges is part of a larger effort to accelerate construction and minimize onsite construction time, thereby reducing user impacts.

The LST held its kick-off meeting on July 26-27, 2007. See Appendix A for the kick-off meeting agenda. Outcomes from the meeting and follow-up conference calls were a market analysis (Appendix B), work plan (Appendix C), performance measures (Appendix D), communications plan (Appendix E), budget (Appendix F), and marketing media (Appendix G). The AASHTO TIG Executive Committee approved the proposed work plan and a budget of $75,000 at its September 27, 2007 meeting.

Tasks of the LST have included development and distribution of a brochure, an introductory PowerPoint presentation, a best applications PowerPoint presentation with a number of application animations, website additions and updates, and presentations at various conferences and meetings across the country.

This closeout report is divided into five sections:

- Marketing Activities
- Performance Measurement
- Transition Plan
- Lessons Learned
- Final Expenditure Summary

Marketing Activities

SPMT Technology offers numerous marketing strengths due to the straightforward, demonstrable, easily comprehendible nature of its value proposition. Saving time, money (in terms of the costs of travel delay), and possibly lives, by removing older structures and replacing them in minutes or hours with new structures constructed offsite is an obvious improvement over conventional methods. The scale of such an operation creates a unique, "made for TV" moment that, if managed for maximum general public exposure, provides a rare opportunity to demonstrate in real time a transportation agency's use of innovation to maximize gain and minimize pain for highway users. Clever applications of the technology address a variety of structure construction challenges, further enhancing the technology's value. The visual, verifiable nature of SPMT bridge moves allows decision-makers to see beyond perceived cost and other barriers to the myriad benefits of adopting the technology, helping to enhance the potential for accelerating adoption. When a local politician can stand beside a typical taxpayer and share in the experience of awe and fascination generated by an SPMT bridge move in action, a unique opportunity exists, not only to improve a construction process, but also to build enthusiasm and trust between owner agency and taxpayer.

See Appendix B for the marketing analysis done for this technology.

Hosted Demonstration Workshops

Location	Date	Total Attendance
Utah DOT 4500 South Bridge over I-215E demonstration workshop with site visit, Salt Lake City, Utah *	10/27/2007	150
SPMT Live Demonstration at International Bridge Conference (IBC), Pittsburgh, Pennsylvania	06/04/2008	> 500
Utah DOT Lambs Canyon Bridge move – informal site visits for State DOT reps, Salt Lake City, Utah	08/9-10/2008	-
Utah DOT East Canyon Bridge move – informal site visits for State DOT reps, Salt Lake City, Utah	08/16-17/2008	-

Location	Date	Total Attendance
Utah DOT 3300 South over I-215E bridge move – informal site visits for State DOT reps, Salt Lake City, Utah	08/23/2008	-

* See Highways for LIFE (HfL) Final Report entitled *Rapid Removal and Replacement of the 4500 South Bridge over I-215 in Salt Lake City*, April 2009, at http://www.fhwa.dot.gov/hfl/summary/ut0409/.

Utah DOT Demonstration Workshop and Site Visits: The LST thanks the HfL Program for sponsoring the 10/27/2007 Utah DOT 4500 South Bridge over I-215E demonstration workshop with site visit.

From the 4500 South Bridge report on the HfL website cited above:

> "On Saturday morning, participants observed the new prefabricated bridge superstructure located near the existing bridge. In addition, they witnessed the SPMT lifting and moving the existing two-span superstructure of the 4500 South Bridge to a demolition area alongside I-215. It took the SPMT two trips (one for each span) to complete the removal of the superstructure. The remaining time on Saturday was spent removing the rubblized materials and preparing the abutments for placement of the new superstructure on Sunday morning. At 1 p.m. Saturday, the workshop portion of the showcase began at a nearby location (see workshop agenda in Appendix B). About 150 participants attended the workshop, which consisted of presentations on the design, construction, removal, and replacement of the bridge by representatives of UDOT, FHWA, the design consultant, and the contractor …"
>
> "On Sunday morning, an SPMT was used to lift and move the new superstructure to its final destination. In addition to showcase participants, many members of the public and representatives from local and national news outlets witnessed the bridge move…"
>
> "UDOT considered the removal and replacement of the 4500 South Bridge using ABC techniques a great success. By using an SPMT, UDOT was able to remove and replace the 4500 South Bridge in one weekend, reducing construction time, minimizing inconvenience to the traveling public, and improving worker and motorist safety while maintaining normal traffic flow. UDOT undertook an aggressive, comprehensive effort to communicate with residents and businesses near the bridge, keeping them abreast of activities during pre- and post-construction phases of the project. A user satisfaction survey clearly demonstrated the satisfaction of the neighboring residents and businesses with the project approach and final product."

In general the state representatives in attendance that UDOT talked with were very impressed by the technology, and talked about how they would try to find applicable projects.

Records are not available for attendance at UDOT's informal site visits during bridge moves. One source reported that 16 different states had visited at least one of the moves; no records exist for which states, beyond the HfL Final Report on the October 2007 move.

IBC Live Demonstration. The live SPMT hardware demonstration at the 2008 International Bridge Conference was a great success. Two units were onsite, one from Barnhart and one from Mammoet. The Barnhart and Mammoet representatives operated the computer-controlled units, and allowed many IBC attendees the opportunity to actually drive the units. Thanks are extended to the International Bridge Conference and Mammoet and Barnhart for supporting this demonstration.

Presentations at Conferences and Meetings

Conference or Meeting Name, Location	Date	Presenter Name, Organization
Maine Highways for LIFE Project "Open House," Bangor, Maine	08/13/2007	Mary Lou Ralls, RNLLC
FHWA Seismic ABC Workshop, San Diego, California	10/11/2007	Mary Lou Ralls, RNLLC
NSBA World Steel Bridge Symposium, New Orleans, Louisiana	12/05/2007	Jim McMinimee, UDOT
TRB Annual Meeting, Washington, DC	01/13-17/2008	Tom Andres, FDOT Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
Missouri DOT Office Meeting, Jefferson City, Missouri	02/26/2008	Jim McMinimee, UDOT Jugesh Kapur, WSDOT
FHWA ABC HfL Conference, Baltimore, Maryland	03/19/2008	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC

Conference or Meeting Name, Location	Date	Presenter Name, Organization
AASHTO Standing Committee on Highways (SCOH) Spring Meeting, Branson, Missouri	05/5-6/2008	Jim McMinimee, UDOT
AASHTO Subcommittee on Bridges & Structures Annual Meeting, Omaha, Nebraska	05/18-22/2008	Jim McMinimee, UDOT – General Session) Mary Lou Ralls, RNLLC – T-4 Construction
FHWA ABC Workshop at International Bridge Conference, Pittsburgh, Pennsylvania	06/04/2008	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
WASHTO-x Video Conference	06/17/2008	Mary Lou Ralls, RNLLC
National Highway Institute (NHI) “Real Solutions” Webinar on SPMT bridge moves	06/25/2008	Jugesh Kapur, WSDOT Mary Lou Ralls, RNLLC
AASHTO Subcommittee on Construction Annual Meeting, San Antonio, Texas	08/06/2008	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
Iowa DOT ABC Workshop, Des Moines, Iowa	08/11-12/2008	Jim McMinimee, UDOT
New Hampshire DOT ABC Seminar, Concord, New Hampshire	09/03/2008	Mary Lou Ralls, RNLLC
Idaho DOT Bridge and Public Affairs Offices Meeting, Idaho	09/08/2008	Jim McMinimee, UDOT
UDOT ABC Phase II Preliminary Development Workshop, Salt Lake City, Utah	09/17/2008	Jim McMinimee, UDOT, sponsor

Conference or Meeting Name, Location	Date	Presenter Name, Organization
WSDOT ABC Workshop, Olympia, Washington	09/30/2008	Jugesh Kapur, WSDOT Mary Lou Ralls, RNLLC
PCI National Bridge Conference, Orlando, Florida (co-authored paper)	10/06/2008	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
15th Annual Caltrans / PCMAC Bridge Seminar, Sacramento, California	10/15/2008	Mary Lou Ralls, RNLLC
District DOT Bridge and Project Development Offices Meeting, Washington, DC	12/4-5/2008	Jim McMinimee, UDOT
Georgia Partnership for Transportation Quality (GPTQ) Workshop, Athens, Georgia	12/19/2008	Jim McMinimee, UDOT
ABC Session at TRB Annual Meeting, Washington, DC	01/11/2009	Mary Lou Ralls, RNLLC
National Concrete Consortium (NCC) Meeting, San Antonio, Texas	04/01/2009	Mary Lou Ralls, RNLLC
FHWA/NYSDOT ABC Seminar, Albany, New York	04/21/2009	Mary Lou Ralls, RNLLC
ASCE/SEI Structures Congress, Austin, Texas	05/01/2009	Mary Lou Ralls, RNLLC
FHWA ABC Workshop at International Bridge Conference, Pittsburgh, Pennsylvania	06/16/2009	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
RIDOT ABC/PBES Seminar, Providence, Rhode Island	07/16/2009	Mary Lou Ralls, RNLLC
MTDOT ABC/Value Analysis Constructability Workshop, Helena, Montana	07/23/2009	Mary Lou Ralls, RNLLC

Conference or Meeting Name, Location	Date	Presenter Name, Organization
University of Buffalo Graduate Course CIE 580, Emerging Technologies in Bridge Engineering, Buffalo, New York	03/01/2010	Hossein Ghara, LaDOTD
SPMT Bridge Moves Session at FHWA Bridge Engineering Conference, Orlando, Florida	04/03/2010	Jim McMinimee, UDOT Mary Lou Ralls, RNLLC
6th US-Taiwan Workshop, Seattle, Washington	09/01/2010	Hossein Ghara, LaDOTD
University of Buffalo Graduate Course CIE 580, Emerging Technologies in Bridge Engineering, Buffalo, New York	11/15/2010	Mary Lou Ralls, RNLLC

Presentation attendees are typically awed by how quickly SPMTs can move bridge spans. They also typically express concerns about *perceived* additional costs for using this technology.

Publications

(Publications listed should include any production of the lead states team which was distributed to or made available for viewing by prospective users of the technology. Typically these may include brochures, posters, video productions, facts sheets, and similar informational pieces. Workshop announcements and similar invitations do not need to be listed or attached in the appendices.)

In addition to the publications listed below, Jim McMinimee was recognized by the *Engineering News-Record (ENR)* as one of the "Top 25 Newsmakers" in 2009 for "accelerating the pace of bridge construction by using self-propelled modular transporters on Utah projects."

Publication Type	Total Produced	Recipients and Distribution Method
AASHTO TIG SPMT Brochure **	~ 500	Presented at conferences & meetings; posted on AASHTO TIG SPMT website

Publication Type	Total Produced	Recipients and Distribution Method
Letters to AASHTO Presidents **	2	Jim McMinimee hand delivered first letter to Pete Rahn at 2007 AASHTO Annual Meeting & mailed second letter offering a briefing; also mailed letter to Victor Mendez
Best Application Animations	5	Presented at conferences & meetings; posted on AASHTO TIG SPMT website
Utah DOT supplementary animations	> 10	Various conferences & meetings
M.L. Ralls, "Accelerated Construction," *Roads & Bridges*, March 2009, pp. 34-37	-	*Roads & Bridges* distribution list
J. McMinimee, M.L. Ralls, "Accelerated Bridge Construction – Designing for Contractors," Editorial, *Structures Magazine*, September 2009	-	*Structures Magazine* distribution list
J. McMinimee, "Utah Plays Leading Role in Accelerated Bridge Construction," *Innovator*, Federal Highway Administration, April/May 2008	-	*Innovator* distribution list
J. McMinimee, "The ABCs of a Rapid Bridge Replacement in Utah," *FOCUS*, Federal Highway Administration, December 2007	-	*FOCUS* distribution list

** See Appendix G for copies.

Performance Measurement

(Describe the degree of success obtained using the performance assessment methods described in the performance measurement section of the approved marketing plan.)

The following table compares responses to the initial and after-action technology experience surveys. See also Appendix D.

While the total numbers of responses for the initial and closeout surveys are similar, of the 52 sent out each time, 28 responded to both, 7 responded to the initial survey only, 8 responded to the final survey only, and 9 did not respond to either survey. Also, the initial vs. after-action responses in some cases contradicted themselves, and in other cases LST members know that the responses are not correct. Therefore, the survey results alone are of limited value. The numbers in parentheses in the table below represent the additional information known to the LST members.

Survey Information	Initial Survey	After-action Survey
# of survey recipient organizations	52	52
# of survey responses received	35	36
# of agencies claiming limited or no knowledge of this technology	7	4
# of agencies fairly familiar with technology but have not yet tried it	13	17
# of agencies currently in the process of trying this technology on experimental basis	3 (7)	4 (13)
# of agencies currently using this technology on a routine or standard basis	8	9
# of agencies who do not believe that this technology will provide substantial benefit	12	11
# of agencies who have tried this technology and do not plan to use it in the future	1	0

Transition Plan

Reference Materials

(Provide a list of the most beneficial reference materials pertinent to this technology.)

Reference	Publisher	URL (if available on web)
TIG SPMT website (being transferred to FHWA SPMT website)	AASHTO TIG	http://tig.transportation.org/Pages/SelfPropelledModularTransporters.aspx
FHWA SPMT bridge moves website (importing TIG website materials)	FHWA	Currently under development
Prefabricated bridge projects website	FHWA	http://www.fhwa.dot.gov/bridge/prefab/projects.cfm
Manual on Use of SPMTs to Remove & Replace Bridges, June 2007	FHWA	http://www.fhwa.dot.gov/bridge/pubs/07022/
Case Study of Lewis & Clark Bridge deck replacement with SPMTs	FHWA	http://www.fhwa.dot.gov/bridge/prefab/spmt.cfm
UDOT ABC website	Utah DOT	http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:1991,

Technology Transfer

(Name and contact information for the primary FHWA office to become the on-going contact for technology transfer for this technology.)

Contact	Office Name, Location	Phone	Email
Claude Napier	FHWA Resource Center	804-775-3327	claude.napier@dot.gov

Primary On-going Implementation Responsibility

(Name and contact information for the technical committee/group/association to assume primary responsibility for continuing implementation of this technology.)

Contact	Committee Name, Organization	Phone	Email
Shoukry Elnahal	Chair, AASHTO Subcommittee on Bridges & Structures' Technical Committee for Construction (T-4)	617-973-7995	shoukry.elnahal@state.ma.us

Other Planning Efforts for On-going Implementation

(Identification of technical committees/groups/associations that have been contacted by the lead states team about assuming a future responsibility involving this technology, and the response received from each organization.)

Contact	Committee Name, Organization	Responsibility Discussed and Response
Claude Napier, leader, EDC ABC/PBES Implementation Team	FHWA Resource Center	Moving TIG SPMT website materials to FHWA's new Every Day Counts Accelerated Bridge Construction (ABC) website under the "Structural Placement Methods: SPMTs" category; Claude has agreed, and the LST has given him the materials for posting
Shoukry Elnahal, Chair, AASHTO T-4	AASHTO Subcommittee on Bridges & Structures Technical Committee for Construction, T-4	Since one of T-4's charges is ABC, Shoukry was asked to consider, in T-4 committee deliberations, the use of SPMTs to move bridges as one of the ABC tools as appropriate for the site; Shoukry has agreed to include SPMTs as one of the ABC tools in T-4 activity

Specific Future Actions

(If there are specific future implementation activities foreseen as desirable or necessary, list that information here.)

Future Activity	Time Frame	Recommended Organization to Perform
Moving TIG SPMT website contents to FHWA's new SPMT website	Currently being done	FHWA Every Day Counts ABC/PBES Implementation Team
Posting SPMT bridge move project examples on the website, including contract documents & specifications	Ongoing activity to post SPMT bridge move projects on FHWA prefabricated bridges website	FHWA Every Day Counts ABC/PBES Implementation Team

On the Web

(If a web site has been identified where later information on this technology can best be obtained, list the url.)

1. FHWA Every Day Counts (EDC) new SPMT website (currently under development)
2. FHWA prefabricated bridge projects website: http://www.fhwa.dot.gov/bridge/prefab/projects.cfm

Lessons Learned

Effective Tools and Methods

(From the viewpoint of your lead states team, which were the most effective marketing tools and methods they used, and why were they believed to be the most effective.)

The most effective marketing tool was the demonstrations of the SPMT capabilities. These were effective because they allowed stakeholders to "kick the tires" and gain comfort with the technology by seeing it in action. Presentations that showed photos, or preferably video, of bridge moves using SPMTs were also effective and a much less expensive way to increase awareness and understanding of the technology.

Utah DOT learned that taking their contracting industry (designers and construction contractors) on scanning tours to SPMT projects in other states was a highly effective marketing and implementation tool.

Partnership with FHWA is critical to the success of implementation of this technology. In addition, the LST would have benefited from partnering more with industry, e.g., Associated General Contractors (AGC) and construction contractors in general.

The use of public events during bridge moves gains local support and generates positive media coverage of the moves. It may be difficult to measure the specific impact of these activities, but undoubtedly the opportunity to attract significant positive media coverage and firsthand public exposure for a transportation agency's use of technology that saves time, money and lives add to the impetus for adoption.

Unique Tools and Methods

(List any particularly creative or unique elements or methods used by your lead states team that other lead states teams should consider using.)

Time-lapse videos of SPMT bridge moves was very effective in showing the speed and flexibility that can be achieved onsite using SPMTs for bridge moves.

The various application animations were created to provide a visual understanding of the potential ways SPMTs can be used to remove and install bridges. These were presented at conferences and meetings, and also posted on the website.

Ineffective Tools and Methods

(From the viewpoint of your lead states team, which tools and methods were much less productive than desired, and provide your team's recommendations concerning future use of these methods or activities.)

The SPMT TIG Lead State Team (LST) struggled to follow the established work plan because it did not continue to effectively communicate via meetings and conference calls as was done initially. LST members were able to continue their individual SPMT promotion activities, but this was not as effective as would have been possible if the LST had continued to function as a unit.

LST members should be selected based on their motivation to implement the technology in their States in conjunction with their expertise in that technology. They must also have their agencies' and managers' support for working on the LST tasks and their commitment to provide assistance as needed.

Also, the initial and after-action surveys were of limited value. Different states responded to each, some responses from states contradicted their other responses, and LST members have information that conflicts with some responses.

Final Expenditure Summary

(Provide an estimate of the final total of expenses (to AASHTO TIG) which were incurred in executing the entire marketing plan.)

Expenses for the SPMT Bridge Moves Lead States Team activities, through closeout, total $42,978. See Appendix F.

Appendix A: Kick-off Meeting Agenda

Florida Department of Transportation
Burns Building Room 315 (Third Floor)
Tallahassee, Florida
July 26-27, 2007

AASHTO Coordinator: Monica Worth
Facilitator/Moderator: Mary Lou Ralls

July 26; 8:00 A.M. to 4:00 P.M.

Meeting Overview (8:00 – 9:00)

- Welcome (*Ananth Prasad,* Chief Engineer Florida DOT/AASHTO TIG Chair)
- Self Introductions (including experience with technology) *(Team)*
- Agenda Review and Goals of the Meeting *(Thomas Andres,* Lead State Team Chair/*Worth* for AASHTO*)*
- Overview of the LST Guidebook *(Ralls)*
- *Background on Other TIG projects (Worth)*
- Overview of the Marketing Plan Development Process *(Worth)*

Brainstorming (9:00 – 12:00)

- Background on use of SPMTs to move bridges *(Ralls)* (9:00-9:30)
    - Presentation
    - TIG survey results
- "Why SPMT, Why Now?" *(Andres/Worth/Ralls)* (9:30-11:00)
    - Discussion of the benefits of SPMTs *(Team)*
        - *Owners' perspective*
        - *Industry's perspective*
    - Who else wants SPMTs Now? *(Team)*
        - *Potential Partners*
- "Why *not* SPMTs Now?" *(Andres/Worth/Ralls)* (11:00-12:00)
    - Discussion of barriers to adoption *(Team)*
        - *Owners' perspective*
        - *Industry's perspective*

Lunch (12:00 – 1:00 p.m.)

Marketing Plan Goals /Audience/Message (*Worth)* (1:00 – 4:00)

- General Goals
    - What are we trying to accomplish?
- Audience Identification
    - Who do we need to reach and convince in order to do that?
        - *Where do they get their information? (Forums/Info Sources)*
        - *How do they get their information? (Promotional Tools/Media)*
- Message Development
    - What do they need to learn to adopt the use of SPMTs to move bridges?
- High Value Goals & Actions
    - Focus Session: How can we most meaningfully "move the needle" on adoption of this technology within 1-3 years?

July 27; 8:00 A.M. to 12:00 P.M.

Review Day One Marketing Plan Input/Decisions (8:00-8:30) *(Andres/Worth/Ralls)*

- Revisions and/or additions

Additional Marketing Plan Input *(Worth)* (8:30 – 11:30)

- Develop Performance Measurement Plan
- Develop Schedule/Milestones, including LST leads
- Develop First Draft of Budget

Meeting Wrap Up/Review *(Andres/Ralls)* (11:30 – 12:00)

- Setup Team meeting schedule
    - Follow-Up Conference Calls

Adjourn

Appendix B: Marketing Analysis

What is the need for this technology?

The Federal Highway Administration (FHWA) has identified reducing construction related impacts to the traveling public as a major priority for the nation's highway program. "Get in, do it right, get out, and stay out" has become a rallying cry for implementing new technologies that accelerate construction, minimize negative impacts on motorists, and improve worker and motorist safety.

Self-propelled modular transporter (SPMT) technology addresses each of these critical needs by providing a means of moving whole bridge structures into and out of place on busy roadways in just minutes or hours, while capitalizing on the use of offsite or nearby prefabrication of new structures to improve the quality of the finished product and enhance the safety of workers. The use of SPMTs provides ultimate flexibility and speed in removing old and installing new bridge structures.

In short, the use of SPMTs may:

- Significantly reduce traffic disruption
- Restore use of existing highways to traffic in significantly less time
- Improve work-zone safety
- Improve constructability
- Lower life cycle costs

SPMT technology accomplishes these high value benefits via several avenues.

During conventional bridge construction, traffic is typically moved from under the structure during certain types of activity to protect motorist and worker safety. Such tasks, impacts, and methods of moving traffic include:

Conventional Bridge Construction		
Work Operation	*Duration*	*Traffic Control Method*
Bridge Demolition	2-3 days	Detour
Beam Placement	45 minutes per beam	Rolling road block or detour
Form Placement	Varies	Lane shifts/closure
Deck Concrete Placement	1-2 days per span	Lane shifts/closure

SPMTs can decrease the duration of traditional construction impacts from days or months to just a few hours.

Rapid Demolition: Because SPMT's can support and maneuver large structures, many spans can be freed from their current positions, lowered and moved offsite very rapidly. The impact of removing an entire bridge span can, in some cases, be reduced from a detour lasting several days to a single 45-minute rolling roadblock.

Safer and More Efficient Construction: Bridge construction with the aid of an SPMT yields similar benefits. Typically, the construction of a bridge requires multiple traffic interruptions during such activities as beam erection, deck forming, and deck

concrete placement. These work operations may require lane shifts/closures or rolling road blocks that are often limited to off-peak hours, which disrupts the flow and efficiency of the contractor's work . Placing multiple beams requires multiple closures. SPMT's, on the other hand, have been used to move entire bridge spans into place in a matter of hours. It may even be possible to place a span on shim stacks near its final location using only 45-minute road blocks, with final adjustments made through the use of jacks.

Reduced Onsite Construction Time: Using SPMTs to remove and install bridges offers the shortest possible onsite construction time. Near-site fabrication of the bridge span(s) allows for simultaneous construction of both the superstructure and substructure. Disruption to traffic can be decreased from months to just minutes or hours. Less onsite construction time results in improved work-zone safety for construction crews and motorists alike (more than 85% of those killed in work zone accidents are motorists). And, public perception of both an agency and its contractor can be improved when the use of SPMT's demonstrates the deployment of innovative technology to reduce construction time.

Improved Quality of Construction: The use of SPMT's allows bridges to be built in the controlled environment of a nearby staging area, allowing the focus to remain solely on construction rather than the need to accommodate traffic. This and a variety of other benefits of the controlled environment leads to improvements in the overall quality of the finished product.

Improved Worker and Motorist Safety: SPMT technology allows construction crews to work in a staging area away from traffic, improving the safety of the work environment and reducing the exposure of motorists to a roadway work zone. Significant worker safety benefits are also derived from the ability to work during the day and near ground level throughout the prefabrication process.

Increased Contractor and Owner Options: SPMT technology fuels flexibility in choosing staging areas, which can be located well away from the final bridge location, depending upon accessibility. "Driving" the structure into place eliminates many issues related to overhead height restrictions that impact crane lifting operations, while the supported SPMT loads provide added safety assurance relative to suspended crane loads. Offsite staging allows the contractor to work during the day and extend work hours as needed in a safer environment. Since onsite foundation and substructure work can be performed concurrent with fabrication of the superstructure at a site nearby, great savings in total construction time can be realized. SPMT's can also be used to relocate existing spans onto new foundations to accommodate mainline widening or new interchange configurations. Finally, "mom and pop" construction companies can use this technology as readily as larger companies because SPMT vendors provide engineering services that assist contractors with issues related to the use of the technology.

Project and User Cost Savings: Despite significant mobilization costs, substantial offset savings can be gained through the use of SPMTs. Fewer maintenance-of-traffic setups, shorter hours for law enforcement officers due to fewer rolling roadblocks, time savings from fewer shift changes for construction crews, the elimination of temporary-detour construction and repair of long-term detours on existing roads, the use of smaller owner and contractor crews, reduced onsite time required for owner agency engineering and inspection requirements due to accelerated construction, a vast reduction in the

myriad user costs associated with construction-related delay, detour, and congestion, and less maintenance and repair costs associated with better long-term performance of the prefabricated structure are among cost savings factors. Contractors realize particular savings, which include lower insurance premiums, increased volume of projects due to the speed of construction and installation, reduced manpower and equipment costs and reduced equipment rental time, among others.

Who are the broad target audiences for the LST?

Indicate the organizations that may benefit considerably from use of this technology.

Agency	Primary Target	Secondary Target
State Agencies	X	
Local Agencies/MPO's/Toll Authorities	X	
Contractors	X	
Consultants (ACEC and state/local)	X	
General Public		X

Who are the decision makers in the primarily targeted agencies?

Agency	Decision-making Office
State Agencies	Secretary
	Chief Engineer
	State Bridge/Construction Engineer
	State Project Manager
	District Engineer/Chief (proj. owners)
	Design/Planning/Constr./Bridge Staff
Local Agencies	State DOT Dist. Engineers
	Local Agency Chief Engineer
MPO's	Executive Director
Toll Authorities	Executive Director
Contractors, General and Bridge	Owner/CEO
Consultants, National/Local and Bridge	Project Engineers and Designers

What information will decision makers want to know to reach a conclusion about trying or adopting this technology?

Information	Interest Level	
	Critical	Desirable
State Agencies		
Secretary/Executive Directors/Chief Engineers		
1. Minimize disruption	X	
2. Faster delivery (econ. benefit to State)	X	
3. Scope of successful SPMT use	X	
4. Cost factors/user costs	X	
5. Public opinion re: minimum disruption		X
State Bridge/Construction Engineers/Project Managers		
All of the above, plus		
6. Constructability	X	
7. Technical Detail	X	
8. Contract/Bid Strategies	X	
9. Simplicity of application	X	
District Engineers		
All of the above, plus		
10. Best applications guidance	X	
Contractors		
All of the above, plus		
Cost factors (+ quick estimates available from vendors; useful in bid process	X	
Future use/trend		X
Resources available through TIG/LST	X	
Simplicity of operation/application	X	
Consultants		
All of the above		
General Public		
Less disruption	X	
Economic benefits (motorists/business)	X	
Decision drivers (Why SPMT?)		X

What are actual and perceived barriers to be overcome to do a trial or to adopt this technology as a standard?

Barrier	Type	
	Actual	Perceived
Mobilization cost		X
Availability of equipment	X	
Effective bid specification language	X	
Effective contract language	X	
Agency stovepiping between divisons/programs/functions	X	
Agency staff orientation, training, and preparation	X	
New technology comes to owner agencies late, without adequate detail	X	
Bridge engineers require detailed specification, regardless of relative simplicity of SPMT operations. Engineering detail must remain a priority throughout the planning/design/construction process, with SPMT plan addressing all these details.		X
Owner agencies getting involved with means and methods		X
Contractors moving away from means and methods specification toward performance contracting		X
Contractors resist sharing profit with vendor, reducing profit by hiring vendor	X	
Contractor issues re: the way prefabrication is planned, from staging to cash flow		X
Materials issues related to definition of prefabrication and cast-in-place; process issues governing these two procedures		X
Room required to stage in a congested environment	X	
Size of project (i.e., too small)		X
Contractors are outfitted with traditional crews & equipment that will do the job (cranes, etc.)	X	
SPMT is a proprietary product		X
SPMT is more “technical” than traditional equipment; but this presents fewer barriers than might be perceived.	X	
Risk is greater with SPMT		X

What marketing opportunities already exist?

Opportunity	Dates
NSBA World Steel Bridge Symposium, New Orleans, LA	December 4-7, 2007
Transportation Research Board (TRB) Annual Meeting, Washington, DC	January 13-17, 2008
FHWA Accelerated Bridge Construction Conference/Highways for LIFE, Baltimore, MD	March 20-21, 2008
NCBC Concrete Bridge Conference, St. Louis, MO	May 4-8, 2008
AASHTO Highway Subcommittee on Bridges & Structures Annual Meeting, Omaha, NE	May 18-22, 2008
International Bridge Conference, Pittsburgh, PA	June 2-4, 2008
6th National Seismic Conference on Bridges & Highways, Charleston, SC	July 27-30, 2008
PCI National Bridge Conference	October 5-8, 2008

Who are our potential partners in marketing this technology?

Potential Partner	Possible Supporting Activities
AGC/ARTBA	Liaison/Intel re: industry realities/outreach to members
FHWA HQ and Divisions	Technical expertise and stakeholder outreach
DOTs:	Case histories and stakeholder outreach
Contractors/Consultants	Case histories and industry stakeholder outreach
Other Associations	
ACEC	Liaison/Intel re: industry realities/outreach to members
National Steel Bridge Alliance (NSBA)	Liaison/Intel re: industry realities/outreach to members
National Concrete Bridge Council (NCBC)	Liaison/Intel re: industry realities/outreach to members

Appendix C: Work Plan

Task #	Task Description	Outcomes
1	**Assist state agencies in achieving two or more SPMT projects continually in the pipeline**	
1.1	Contact States that did not respond to initial survey for their input. Contact States that responded as needed for clarification.	Gave numerous presentations.
1.2	Develop marketing materials for all target audiences (brochure, PPT, website content, etc.)	Developed brochure; introductory PowerPoint presentation; best applications PowerPoint presentation with various application animations; various website content
1.3.a	Identify pool of target State agencies (by survey response, existing use, existing relationships/knowledge of LST and allies, geography, size of bridge program).	Candidates per survey: DC, NH, WI (have plans to implement); DE, ID, MO, NM, NV, VT, WV (want more info); plus, as needed (per LST intel: CA, FL, GA, IL, LA, OH, OR, NY, PA, RI, UT, WA)
1.3.b	Reach out to three States, who have plans to introduce SPMT. Draft letter to initiate contact. Continue outreach to those who want more info.	Jim McMinimee and Jugesh Kapur visited the Missouri DOT's office in Jefferson City on 2/28/08 to promote the use of SPMTs in Missouri's upcoming and extensive bridge rehabilitation and replacement program. They met with Dennis Heckman, Missouri's State Bridge Engineer and key members of his design and construction staff. Jugesh presented the Lewis and Clark Bride deck replacement project that had been completed successfully with SPMTs in Washington State and answered questions from the audience. In the latter half of 2009, Jugesh Kapur was contacted by Matt Farrar, Idaho's State Bridge Engineer regarding a steel truss rehabilitation project coming up in Idaho. Matt wanted to learn from Washington DOT's successful application of SPMTs in the deck replacement project of the Lewis and Clark steel truss bridge. Jugesh discussed the details with Matt and also shared with him the specifications used by Washington DOT that encouraged use of SPMTs and prompted the

Task #	Task Description	Outcomes
		contractor to accelerate the overall project schedule.
1.4a	Convene LST Working Group to address barrier to adoption: Best Applications	Developed best applications PowerPoint presentation and five application animations; posted on website
1.4b	Convene LST Working Group to address barrier to adoption: Bid/Contract Issues	The team is compiling project-specific contract drawings and specifications and submitting to FHWA for posting on the new FHWA SPMT website
1.5	Reach target agencies with opportunity to receive personalized tech assistance in strengthening State's SPMT program (personal outreach by LST peers and presentations at relevant events)	See listing of presentations and responses to #1.3 above
1.6	Secure commitment to work with TIG LST toward goal of two or more SPMT projects in pipeline continually	
1.7	Assign LST members to work with each State prospect for Task 1, design implementation plans, and launch these partnerships	
1.8	Cultivate two incoming AASHTO Presidents for support of TIG SPMT effort, as part of accelerated construction priorities. Prepare a hand-out for possible presentation to Rahn at TRB; Prep web-based briefing for interested States. Invitations to Rahn and John Horsley.	LST letter hand-delivered by Jim McMinimee to incoming AASHTO President Pete Rahn at 2007 AASHTO Annual Meeting; second letter mailed to Rahn, offered a briefing; also, letter mailed to Victor Mendez(see Appendix G)
2	**Solicit State agencies to tap FHWA Innovative Bridge Research & Deployment (IBRD) funds to compel a first use of SPMT technology**	
2.1	Identify pool of potential adopters who can be moved to apply for IBRD funds.	Candidates per survey: DC, NH, WI (have plans to implement SPMT); DE, ID, MO, NM, NV, VT, WV (want more info on SPMTs); CO, CT, DC, IN, MA, MD, MI, NJ, TX, VA, (urban

Task #	Task Description	Outcomes
		populous States)
2.2	Reach target agencies to educate and assist with IBRD process (personal outreach and presentations at relevant events)	See listing of presentations and #1.3 above
2.3	Assign LST members to work with potential adopters and implement technical assistance	
3	**Solicit local agencies/MPOs/Toll facilities to tap LTAP/TTAP/IBRD/HfL programs to compel a first use of SPMT technology**	
4	**Disseminate information and guidance to Contractors to overcome barriers to SPMT adoption**	
5	**Increase general public awareness of SPMT technology in use by State/local agencies and organizations.**	
6	**Disseminate information and guidance about SPMT technology to consultants.**	
7	**Prepare and Submit Closeout Report**	

Appendix D: Performance Measures

(List the methods that your lead states team has determined appropriate for measuring performance output and outcome. The first three performance measures are standard for all lead states teams of the AASHTO TIG. See chapters 3, 5, and 6 of the guidebook for additional information about performance measures.)

Performance Measure	Measurement Method	Performance Outcome
Number of agencies that have adopted the technology as a requirement, option, or alternate as of the date of the closeout report, relative to the number since initiation of the lead states team.	Initial and final surveys of all AASHTO agencies.	8 initial; 9 final
Number of agencies that are planning to adopt the technology as a requirement, option, or alternate as of the date of the closeout report, relative to the number since initiation of the lead states team.	Initial and final surveys of all AASHTO agencies.	15 initial; 16 final
Number of agencies that have tried the technology for the first time as of the date of the closeout report, relative to the number since initiation of the lead states team.	Initial and final surveys of all AASHTO agencies.	3 (7)* initial; 4 (13)* final
Number of SPMT "programs" per State agency:	10 States achieve 2 or more SPMT projects continually in the pipeline	0 initial; 1 (3)* final
Number of State agencies tapping FHWA IBRD program to compel a first use of SPMT technology	5 States applying to IBRD for funds to compel a first use of SPMT	-
Number of Local agencies/MPO's/toll facilities compelling a first	5 local agencies/organizations applying to relevant	-

Performance Measure	Measurement Method	Performance Outcome
use of SPMT technology (through LTAP/TTAP/IBRD/HfL)	assistance programs to compel a first use of SPMT	
Level of general public awareness of SPMT technology in use by State/Local agencies/organizations.	3 press events/incidents of coverage in agencies/organizations working with LST to increase or compel first use of SPMT	Very favorable public response to UDOT bridge move events. First move covered nationally by CNN; 22 of UDOT bridge moves covered locally/regionally, generating support from highest levels of UDOT for increase in use of the technology. -
Disseminate information and guidance about SPMT use and trends to contractors to overcome barriers to adoption.	4 outreach initiatives (mailings, presentations, trade articles)	-
Disseminate information and guidance about SPMT use and trends to consultants to familiarize them with related agency needs and opportunities.	4 outreach initiatives (mailings, presentations, trade articles)	-

* The numbers in parentheses represent the additional information known to the LST members.

Appendix E: Communications Plan

(*A comprehensive listing of transportation agencies, manufacturers, suppliers, and other affected organizations that the team currently plans to communicate with during the marketing effort, including the purpose of the communications Include the office to be contacted when known.)*

Communication Targets	Method(s)	Purpose
State Agency Secretary /Executive Director	Letter, Brochure	Awareness; education; build commitment to spec SPMT and participate in TIG LST technology assistance program
Agency Chief Engineer	Letter, Email, Brochure, Demo /Workshop /Showcase	Awareness; education, build commitment to spec SPMT and participate in TIG LST technology assistance program; provide resources to colleagues at all relevant levels of agency; provide ongoing technical resources to prepare agency to spec successfully.
State Bridge /Construction Engineer/s	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Web Content	Awareness, education, build buy-in to spec SPMT and participate in TIG LST technology assistance program; provide ongoing technical resources and training to prepare agency to spec successfully.
State Project Managers	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Web Content	Awareness, education, build buy-in to spec SPMT and participate in TIG LST technology assistance program; provide ongoing technical resources and training to prepare agency to spec successfully.
Agency District Engineer /Chief (project owners) – State and Local	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Web Content	Awareness, education, build buy-in to spec SPMT and participate in TIG LST technology assistance program; provide ongoing technical resources and training to prepare agency to spec successfully.
Agency Design /Planning /Constr. /Bridge Staff	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Web Content	Awareness, education, build buy-in to spec SPMT and participate in TIG LST technology assistance program; provide ongoing technical resources and training to prepare agency to spec successfully.
MPO Executive Director	PPT Presentation, Email, Brochure, Product Demo, Web Content	Awareness; education; build commitment to spec SPMT and participate in TIG LST technology assistance program
Toll Authority Executive Director	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Web Content	Awareness; education; build commitment to spec SPMT and participate in TIG LST technology assistance program
Contractor Owner/CEO	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Editorial Content, Web Content	Awareness; education; build commitment to use and spec SPMT
Consultant Project Engineers and Designers	PPT Presentation, Email, Brochure, Demo /Workshop /Showcase, Editorial Content, Web Content	Awareness; education; build commitment to incorporate and spec SPMT in appropriate projects

Appendix F: Budget

(See attached Excel spreadsheet for budget.)

Appendix G: Marketing Media

1) Brochure (see attached pdf)

2) PowerPoint Presentations (see attached pdfs):
   - Introduction to SPMT Bridge Moves
   - Best Applications for SPMT Bridge Moves

3) Initial Letter to AASHTO President dated 09/26/2007 (see below)

4) Letter to AASHTO President offering a briefing dated 11/07/2007 (see below)

Initial Letter to AASHTO President:

September 26, 2007

Mr. Pete Rahn, Director
Missouri DOT
Vice President AASHTO
105 W. Capitol Avenue
Jefferson City MO 65102

Dear Mr. Rahn:

I am writing this letter on behalf of the AASHTO Technology Implementation Group (TIG), Self-Propelled Modular Transporter (SPMT) team. We are hoping to provide you with a possible idea for your platform or areas of emphasis as AASHTO President. Your reputation as an innovator indicates our focus area may be of interest.

One of the most exciting, interesting and promising arenas in accelerated construction is the quest to find ways to build structures more quickly. SPMT technology is, very simply, the fastest way to remove and replace structures.

Using SPMT technology, Louisiana DOT completed the removal and replacement of a damaged Interstate bridge in less than three hours. Florida DOT used the technology on I-10, removing and replacing a local road over the interstate with only four night-time closures as opposed to months of in-place construction. My agency, Utah DOT, will remove and replace a structure on Urban I-215 over a weekend this fall.

SPMTs are large vehicles designed to move entire structures. The usual SPMT process is to build the replacement structure in a staging area close to the project, and to use SPMTs to remove the old structure and bring in the new structure. As you can see from the examples above, this technology is proven to replace bridges extremely rapidly. It is also a visually stunning, media-friendly, and very compelling demonstration of agency innovation at work for highway users – an extraordinary process our customers can grasp and appreciate in a matter of seconds.

As you may know, the purpose of AASHTO's TIG is to speed deployment of proven technologies through aggressive marketing and education. SPMT's are one of the proven technologies chosen for emphasis and promotion over the next two years. In that time, our team aims to help 10 state agencies reach a point at which two SPMT projects are in the pipeline on a continuous basis, while a new tier of state and local agencies, MPO's and toll facilities develop10 first-time SPMT uses.

We hope that you will consider using accelerated construction as part of your messaging, with the timesaving and safety benefits of SPMT as a dramatic example. This letter is purposely concise, but there is much additional information to share. If you are interested, the SPMT TIG will provide more information or give you a briefing.

Should you desire to see this technology in action, the TIG and the Utah Department of Transportation invite you to join us for the removal and replacement of a bridge in Salt Lake City Utah on October 27th and 28th, 2007. Please contact me for more information.

Thank you and good luck with your tenure as AASHTO President!

Sincerely,

James McMinimee
Director, Project Development
Utah Department of Transportation
AASHTO SMPT TIG

cc:

John Njord UDOT Executive Director
Carlos Braceras UDOT Deputy Director
AASHTO TIG SPMT LST

Letter to AASHTO President offering a briefing:

November 7, 2007

Mr. Pete Rahn, Director
Missouri DOT
AASHTO President
105 W. Capitol Avenue
Jefferson City MO 65102

Dear Mr. Rahn:

I write to you on behalf of the AASHTO Technology Implementation Group (TIG) Lead States Team (LST) regarding the use of Self-Propelled Modular Transporters (SPMTs) to remove and install bridges. As you are aware, the Utah Department of Transportation (UDOT) recently completed a project to remove and replace a 3 million pound, 172 foot structure in Salt Lake City, Utah over I-215 using SPMTs. The removal and replacement of the structure took place over a single weekend and was an event that captured the minds and imaginations of several thousand in attendance as well as the media.

The TIG SPMT LST would like to offer you and your staff a briefing on its national initiative to increase the use of SPMT technology to move bridges. As you know, the purpose of the AASHTO TIG and Lead States Teams is to promote the rapid deployment of new, high-payoff, ready-to-use technologies. We make this offer to you and the Missouri DOT because of your reputation as an innovator and because of your reputation as an implementer of new technologies and ideas.

The SPMT LST would like to familiarize you with this technology and ask for your assistance in implementing these proven techniques to reduce onsite construction time from months to days. We would like to propose a 45-minute presentation during the first part of December at the Missouri DOT. The presentation would be made to you and your staff by one or two members from the SPMT LST with the rest of the SPMT LST joining via a web meeting.

We understand and appreciate how busy you must be and the SPMT LST would be flexible in regards to any of the proposal, date, etc. If you are interested please tell us what would work for you. Please contact me at (801) 965-4022, (801) 633-6220, or jmcminimee@utah.gov.

Thank you and I look forward to speaking with you.

Sincerely,

Jim McMinimee
Director, Project Development
Utah Department of Transportation
AASHTO TIG SMPT