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| Sponsor | Nominations must be submitted by an AASHTO member DOT willing to help promote the technology | 1. Sponsoring DOT (State): Texas Department of Transportation
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| 1. Name and Title: Darran Anderson
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| Organization: Texas Department of Transportation |
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| 3. Is the sponsoring State DOT willing to promote this technology to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative? Yes or No: Yes |
| **Technology Description (10 points)** | The term “technology” may include processes, products, techniques, procedures, and practices. | 4. Name of Technology:Thin Overlay Mixtures (TOMs) |
| 1. Please describe the technology.

Thin Overlay Mixtures (TOMs) are high-performance asphalt overlay mixtures engineered to be placed at a nominal thickness of ½” to 1” using conventional laydown construction. The primary use of TOMs is for pavement preservation in order to restore surface friction for skid resistance, to improve ride quality, noise reduction, and extend the service life of pavement. TOMs are comprised of high-quality aggregates with a finer gradation band than conventional asphalt overlay mixtures. TOMs also use high amounts of polymer modified asphalt, which provides good durability and long-term performance. TOMs are designed using a new “balanced” mix design approach, in which the mixture must meet both rutting and fatigue cracking performance testing criteria. |
| 6. If appropriate, please attach photographs, diagrams, or other images illustrating the appearance or functionality of the technology. (If electronic, please provide a separate file.) Please list your attachments here.Attachment 1: 2011 TxDOT Short Course Presentations – Thin Friction Course Overlays (Later renamed Thin Overlay Mixture –TOMs) Attachment 2: 2014 Annual Texas Asphalt Pavement Association (TxAPA) Meeting PresentationAttachment 3: Asphalt Pavement Magazine (NAPA) – July/August 2014 “Texas Thinlay Sound Solution” Article (http://www.nxtbook.com/naylor/NAPS/NAPS0414/#/18)Attachment 4: Austin District’s Guidelines on the Use of for Thin Overlay Mixtures (TOMs)Attachment 5: 2014 TxDOT Standard Specification – Item 347 “Thin Overlay Mixtures”  |
| **State of Development** **(30 points)** | Technologies must be successfully deployed in at least one State DOT. The AII selection process will favor technologies that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use. | 1. Briefly describe the history of its development.

TOMs were first developed in-house by the Austin District of TxDOT in 2007. Conventional 2” dense graded asphalt overlays were not offering the service expected on needed overlays and the development of TOMs provided a means to stretch funding and extend the service life of overlays. After successful test section performance in 2007, the Austin District proceeded to full implementation in 2008 with excellent long-term performance to date. Since the development of the first 1” TOM in 2007, a ½” Ultra-Thin mixture (TOM-F) and 1” Permeable Friction Course (PFC-F) has been development using the same performance-based balance design methods. These different mixtures have offered a number of options to address a variety of resurfacing needs, especially safety and noise reduction. |
| 1. For how long and in approximately how many applications has your State DOT used this technology?

Since 2008, the Austin District has performed 64 TOM projects of various sizes, which translates to 357,000 tons or 962 lane miles. Since 2010, 10 other TxDOT Districts have performed more than 25 projects, which translate to 177,000 tons or 476 lane miles. |
| 1. What additional development is necessary to enable routine deployment of the technology?

No additional development is required, as this new technology will be instituted as a standard statewide specification in the new 2014 TxDOT Standards Specifications for Construction and Maintenance. These specifications are set to be published at the end of 2014. With that, we continue to research new ways to improve TOMs, such as using higher polymer modified asphalt, to continue to maximize performance.  |
| 1. Have other organizations used this technology? Yes or No: No (not to my knowledge) If so, please list organization names and contacts.
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| Organization | Name | Phone | E-mail |
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| **Potential Payoff****(30 points)** | Payoff is defined as the combination of broad applicability and significant benefit or advantage over other currently available technologies. | 1. How does the technology meet customer or stakeholder needs in your State DOT or other organizations that have used it?

First and foremost, this technology provides high surface friction, which translates to improved safety for the traveling public, especially during wet weather events. Secondly, this technology delivers a high-performance overlay, given the balanced design and durability of these new mixtures, which has led to lower life-cycle costs and extended service life of the pavement. Lastly, on average the initial cost of TOMs is about 30% less than conventional mixtures and lower routine maintenance costs, such as cracking sealing and patching. These cost savings have allowed our District to fund and treat more roadways and, as a result, this technology has allowed us to preserve the capital investment taxpayers have made in our pavement infrastructure. |
| 12. What type and scale of benefits has your DOT realized from using this technology? Include cost savings, safety improvements, transportation efficiency or effectiveness, environmental benefits, or any other advantages over other existing technologies.TOMs provide a significantly higher skid resistance than conventional overlays, which has lowered the risk of crashes. Given the cost savings of TOMs relative to conventional overlays, the Austin District has realized a cost savings of an estimated $17 million in initial material and construction costs since TOMs were fully implemented in 2008. This does not include the unrealized cost savings in reduced routine maintenance for TOMs versus conventional overlays. With this savings, the Austin District has been able to fund other preventative maintenance strategies, like our annual seal coat program. According to TxDOT’s Operational Excellence Office, there is a potential for $9 million annually in savings for the Department (<http://www.txdot.gov/government/legislative/excellence/cost-savings/thin-overlay.html>). The Austin District’s pavement condition scores have improved from 82.5% roadbed miles in good or better condition in FY 11 to higher than 90% in FY 12 and FY 13. The high performance and the additional funding of preventative maintenance as a result of the TOMs are two influential reasons for the improvement to the pavement infrastructure condition, not to mention the enhanced safety of the traveling public. |
| 1. Please describe the potential extent of implementation in terms of geography, organization type (including other branches of government and private industry) and size, or other relevant factors. How broadly might the technology be deployed?

Given TOMs can be constructed using conventional methods and equipment, and performing overlays for preventative maintenance of pavements is very common for state and local governments, there is a high probability for this technology to transfer successfully to all levels of government entities maintaining roadways. However, the guidelines for design, project selection, and construction must still be implemented properly.  |
| **Market Readiness (30 points)** | The AII selection process will favor technologies that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential. | 1. What actions would another organization need to take to adopt this technology?

First, a survey of local materials meeting the required quality for TOMs would have to be conducted in order to determine the feasibility of implementation. Second, an organization must obtain the means to conduct performance testing, which includes testing equipment, to implement the performance-based balance mix design procedure for TOMs. Next, an organization must have the means to determine the appropriate roadways for TOMs, which are structurally sound pavements. Lastly, an organization should partner with local asphalt industry in performing test sections to develop expertise and familiarity with constructing TOMs.  |
| 1. What is the estimated cost, effort, and length of time required to deploy the technology in another organization?

The only cost associated with implementing TOMs is the one-time equipment purchase of a Hamburg Wheel Tracking Test and Overlay Tester devices. (This is assuming most organizations have all the standard laboratory equipment required for asphalt testing.) This equipment cost can range from $110,000 to $140,000. The period of time from the first mix design and test sections to full implementation was around 1.5 years. Since we developed the design protocol and project selection criteria, other Districts within TxDOT have been able to implement the new technology almost immediately.  |
| 1. What resources—such as technical specifications, training materials, and user guides—are already available to assist deployment?

Attached with this application is a guideline for project selection, mix design, and construction for TOMs, which we developed for TxDOT use. Also, attached is Item 347, which will be the new statewide 2014 TxDOT standard specification for TOMs.  |
| 1. What organizations currently supply and provide technical support for the technology?

In addition to TxDOT, Texas A&M Transportation Institute (TTI) and PaveTex Engineering (local commercial laboratory - Austin) can provide technical support in designing and implementing this technology.  |
| 1. Please describe any legal, environmental, social, intellectual property, or other barriers that might affect ease of implementation.

Since TOMs were developed by TxDOT as a public governmental organization, this technology is public domain.  |
| ***Submit Completed form to*** | [***http://web.transportation.org/tig\_solicitation/Submit.aspx***](http://transportation1.org/tig_solicitation/Submit.aspx) |