

AASHTO Technology Implementation Group
Nomination of Technology Ready for Implementation
2005 NOMINATIONS DUE BY FRIDAY, SEPTEMBER 9, 2005

Sponsoring DOT	1. Sponsoring DOT (State): Utah																				
Primary Technical Contact	2. Name: Blaine D. Leonard Organization: Utah Department of Transportation Address: 4501 South 2700 West City: Salt Lake City State: UT Zip Code: 84114-8410 E-mail: bleonard@utah.gov Phone: (801) 965-4115 Fax: (801) 965-4564																				
Technology Description	3. Name of Technology: EPS-Block Geofoam (block-molded expanded polystyrene geofoam) used as light-weight embankment fill.																				
	4. Briefly describe the technology. EPS-Block Geofoam (block-molded expanded polystyrene geofoam) used as light-weight embankment fill. EPS-block geofoam was used extensively by the design-build contractor on the I-15 Reconstruction Project in Utah between 1997 and 2001 to mitigate settlements over soft foundation soils, particularly around existing utility lines. With approximately 107,000 m ³ of EPS-block geofoam installed on the project, the I-15 project is the largest single use of this material to date in the United States. Since it's installation, UDOT has carefully monitored the performance of the geofoam embankments, and has gathered up to five years of settlement and deformation data. Data for both the primary consolidation and long-term creep settlements is unique, and increases our understanding of the material and it's application. In addition, lessons learned from this project will be beneficial to other agencies as they prepare to install EPS-block geofoam.																				
	5. Briefly describe the history of its development. The use of geofoam-type materials as light-weight fill reportedly began in the early 1970's in Norway and has been used extensively in Norway since that time. The Japanese began using the material in 1985, and by the mid-1990's their use of the material comprised 50 percent of the world geofoam usage. In the United States, it's use began in the late-1980's, and has grown throughout the 1990's, but it's use is still relatively isolated. Highway projects in Indiana, New York, Washington, Hawaii, Wisconsin, and Wyoming have utilized EPS-block geofoam, in addition to the extensive UDOT I-15 application.																				
State of Development	6. For how long and in approximately how many applications has your organization used this technology? UDOT participated with it's design-build contractor in installing 107,000 m ³ of EPS-block geofoam between 1997 and 2001 at six significant locations along the I-15 Reconstruction project. A 10-year monitoring program was initiated during construction, and data from the first half of that program is now available. One other minor installation of geofoam has been undertaken by UDOT, and several, smaller non-state projects have also made use of the material.																				
	7. What additional development is necessary to enable routine deployment of the technology? No additional development of the technology is necessary. Specific actions needed by another transportation agency are outlined in item 10.																				
	8. Have other organizations used this technology? If so, please list organization names and contacts.																				
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Organization</th> <th style="text-align: left;">Name</th> <th style="text-align: left;">Phone</th> <th style="text-align: left;">E-mail</th> </tr> </thead> <tbody> <tr> <td>Indiana DOT</td> <td>M.A. Zaheer</td> <td></td> <td></td> </tr> <tr> <td>New York State DOT</td> <td>W.S. Jutkofsky</td> <td></td> <td></td> </tr> <tr> <td>Washington DOT</td> <td>T.M. Allen</td> <td></td> <td></td> </tr> <tr> <td>Hawaii DOT</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Organization	Name	Phone	E-mail	Indiana DOT	M.A. Zaheer			New York State DOT	W.S. Jutkofsky			Washington DOT	T.M. Allen			Hawaii DOT			
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Potential for Payoff	<p>9. What benefits has your organization realized from using this technology? Include cost savings, safety improvements, transportation efficiency or effectiveness, environmental benefits, or other advantages over other existing technologies.</p> <p>It has been estimated that UDOT saved nearly \$3 million at one location along I-15 by avoiding the relocation of a major gravity utility line. In addition to this, the relocation of the line would have taken many months, on a project that was very time intensive. There were five other sites where geofoam was used, with varying constraints and benefits. EPS-block geofoam was the selected material in these instances at least partially because it was faster and more efficient than other ground improvement techniques. Since the I-15 project was on a very fast-track schedule, the use of geofoam helped facilitate the ahead-of-schedule completion of the project, with monetary and non-monetary benefits to UDOT, the contractor, and the traveling public. Some of these costs have not been quantified.</p>
Implementation Potential	<p>10. Please describe what actions another transportation agency would need to take to adopt this technology.</p> <p>Development of construction specifications and project-specific details. Several versions of construction specifications are available (UDOT I-15, NCHRP Report 529, and the Geofoam Research Center) and various construction details have been disseminated, but a state DOT would need to synthesize these into documents that meet their needs and internal requirements. In addition, evaluations of various soil improvement or construction options will be needed at each location to confirm that EPS-block geofoam is the appropriate application in each case.</p> <p>11. What is the estimated cost, effort, and length of time required for procurement or adoption by another transportation agency?</p> <p>EPS-block geofoam is readily available from a number of manufacturers around the country. Sample specifications and installation guidelines are also easily obtained, and can be quickly customized by the agency. No specialized equipment is needed to install this material. During design, some additional analysis will be required to determine if geofoam is a good solution in the particular instance being evaluated, and published guidelines are available to aid in that analysis. The material is simple to use, and requires very little training. The overall effort to implement this technology is relatively small.</p> <p>12. What organization(s) currently supply and provide technical support for this technology?</p> <p>Utah Department of Transportation, Research Division Feral Highway Administration Resource Team, Geotechnical & Hydraulics Team National Cooperative Highway Research Program Geofoam Research Center, Syracuse University Manhattan College Several private consultants</p> <p>13. Please describe any legal, regulatory, social, intellectual property, or other issues that could affect ease of implementation.</p> <p>None.</p>
Willingness to Champion	<p>14. Is the sponsoring DOT willing to promote this technology to other states, if partially supported by the AASHTO Task Force on Technology Implementation? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
Date Submitted	<p>15. Date: September 8, 2005</p>

16. Please include image(s) of sketches or photographs, if available Image(s) are attached.*

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