



February 4, 2008

Mr. J. Richard Capka
Administrator
Federal Highway Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Mr. Capka:

This is the second letter report of the Transportation Research Board's (TRB's) Committee for Pavement Technology Review and Evaluation. The committee was established at the request of the Federal Highway Administration (FHWA) to provide strategic advice and guidance to FHWA in the conduct of its Pavement Technology Program as authorized under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The committee membership has been drawn from the executive and senior professional levels of state highway agencies, private industry, and academia and represents a broad range of expertise in disciplines relevant to pavement materials, engineering, technology transfer, and management. A roster of the committee is attached. The committee held its second meeting on October 29 and 30, 2007, in Washington, D.C. This letter report presents the committee's assessment of the program as developed in a closed session at the end of the meeting and completed through correspondence. As before, the report was reviewed by an independent group of peers in accordance with the policies and procedures of the National Research Council. The assessment and recommendations of this report represent the committee's best collective judgment based on the information provided and discussed at the meeting.

We take this opportunity to acknowledge and compliment Mr. Peter Stephanos and Mr. Gary Henderson and their staff for their sustained hard work in streamlining the Pavement Technology Program since we last met in December 2006. We are pleased to see Mr. Stephanos assume a leadership role as the new Director of FHWA's Office of Pavement Technology. His prior experience at the Maryland State Highway Administration enables him to view perspectives of both the federal and state governments and to understand the issues that state highway agencies and FHWA must deal with while working to implement new pavement technologies.

At our first meeting, the committee had posed a number of questions aimed at gaining a better understanding of how FHWA's various entities interacted with each other in the conduct of the Pavement Technology Program, how various activities in FHWA's Strategic Pavement Technology Program Roadmap were prioritized, and how input from relevant stakeholders was sought in establishing the program's goals and priorities. The "read-ahead" material provided to the committee prior to the second meeting addressed several of those questions. We found this material helpful and request that FHWA continue this practice for our future meetings. The process could be further

improved by ensuring that the read-ahead material supports or relates to specific items on the meeting agenda, which could be further elaborated and explained through presentations and discussion at the meeting.

FALCON Teams

The committee was impressed with the concept of the Focus Area Leadership and Coordination (FALCON) teams. It is a significant step forward and can be a catalyst for change. Each of the six FALCON teams leads efforts in a specific technical area of the Pavement Technology Program. Each consists of members from various FHWA offices, divisions, and centers and may include people from other federal agencies as well. The inclusion of Federal Lands personnel in each of the teams is a good idea since they work closely with the states. We are interested in learning what the FALCON teams have been able to accomplish in moving toward their stated goals at our next meeting.

The FALCON team members come from various units, where they have their own job responsibilities. How do those responsibilities affect their responsibilities and activities in the FALCON teams? Integration of various FALCON team agendas could also pose a challenge. We are interested in learning how the FALCON teams have been coping with the issues in coordinating and managing their activities. How the FALCON teams interact with the Pavement Forum and what the role of the Pavement Forum has become with the new FALCON teams structure now in place are unclear.

Stakeholders' Involvement

The committee discussed at length the issue of stakeholders' involvement and how FHWA could enhance the effectiveness of stakeholders' input in the planning and conduct of its Pavement Technology Program. We all agree that stakeholders' input should be sought often and at all levels from the very beginning under a structured approach, asking the right questions from the right people at the right time. With this approach, FHWA could solicit input on strategic direction and goals from policy-level personnel from state highway agencies and industry. Once goals have been established, FHWA could involve appropriate external technical personnel to develop the plan by determining what research activities would advance the state of practice to achieve the goals and what performance measures would provide meaningful feedback on the effectiveness of the plan. This approach would ensure alignment between the work being done on the plan and the goals. The entire process would need to be appropriately structured and formalized to fit within the requirements of the Federal Advisory Committee Act.

Each of the six FALCON teams underscored the importance of buy-in by the states and the private sector for the success of program activities. The main topic of discussion, however, was the challenges and issues associated with achieving buy-in rather than specific strategies for bringing it about. FHWA needs to explore opportunities for achieving greater acceptance by the states. Engaging stakeholders at every step of the process while setting goals and priorities would certainly facilitate the achievement of buy-in. The Environmental Stewardship team, for

example, discussed challenges to its goal of green highways, but what input the states had provided to FHWA's green highways initiative was unclear. This FALCON team has a member from the Environmental Protection Agency, which is beneficial. Environmentalists may view green highways from a perspective broader than the use of recycled materials.

The committee remains unclear about how and at what stage the FALCON teams involve external stakeholders in developing their plans and goals. We were informed that, under the present arrangement, the FALCON teams prepare a list of proposals concerning potential activities. The proposals are evaluated and rated and are then reviewed by office directors for selection and approval. There appears to be no formal mechanism for seeking external stakeholders' input in the process. The committee suggests that the FALCON teams seek input through a structured approach rather than an ad hoc process.

As we noted in our first report, although the Committee for Pavement Technology Review and Evaluation provides a useful mechanism to FHWA in seeking formal strategic external input, it should be augmented by other mechanisms to reach out more broadly to specific stakeholder groups in order to address their issues and needs. Legal considerations might restrict FHWA in seeking external stakeholders' input as freely as it would like. However, FHWA might be able to seek helpful advice without going through a rigid procedure. One approach that appears to be used only marginally at present might be to take advantage of the expertise of the members of the pavement-related TRB committees. Such an approach could be managed efficiently by requesting input and feedback through the structure available at TRB. This would allow for input from a broad spectrum of the pavement community, since several hundred informed and interested persons are active on TRB pavement committees and would be willing to contribute. To tap this resource, FHWA would only need to identify pertinent committees and pose pertinent questions to them. TRB input in response to such questions that was essentially informal and directed at individuals would not be affected by the Federal Advisory Committee Act, since no committee would have been engaged to advise government.

Strategic Plan

At its last meeting, the committee reviewed and commented on FHWA's Pavement Technology Program Roadmap. We considered the roadmap to be an important strategic document for establishing the program's goals, priorities, and milestones and had suggested improving it by making priorities explicit and goals more specific. Apparently, the strategic plan presented at this meeting has essentially replaced that roadmap. While the committee approves what it heard about FHWA's pavement and materials strategic planning and endorses the approach taken, it wants FHWA to consider roadmaps that the pavement industry and related organizations have produced. The extent to which FHWA has considered those roadmaps in the development of its strategic plan is not clear to the committee. We continue to emphasize that an alignment of FHWA's strategic plan with the roadmaps developed by the asphalt and concrete pavement industries would be beneficial and would help in the plan's acceptance by stakeholders. Such an alignment may also provide efficiencies by leveraging work that is currently under way or already completed.

While the presentations by the FALCON teams indicate a better alignment between the work being done and the goals of the program, FHWA should be aware of the momentum of the work currently under way and its potential impact on the program's new strategic direction and goals. In view of the scarce resources available, the current program should be reevaluated and a determination made as to whether its continuation is desirable or the resources could be better allocated to higher-priority areas.

Fiscal Year 2008 Activities

With regard to activities planned for Fiscal Year 2008, the committee was informed that, out of \$52 million allocated for pavement technology activities in SAFETEA-LU, only \$18 million was under the direct control of FHWA. The remaining \$34 million (amounting to 65 percent of the total funds)—almost twice as much as was under FHWA's control—was either earmarked or designated to specific program areas. We spent almost all of our time at the meeting discussing FHWA's \$18 million program; the activities being supported by the earmarked \$34 million were left completely out of the discussion. In view of this proportionately much higher allocation, we believe it important to keep track of activities in the earmarked programs. The Western Research Institute (WRI) at the University of Wyoming, for example, receives a significant amount of earmarked funds both exclusively (\$3 million per year) and as part of a consortium of five institutions (a portion of \$5 million per year) for research on asphalt chemistry and technology. While we would have much preferred that FHWA assume some leadership responsibility and accountability for earmarked programs, we must accept the fact that FHWA has no control or leverage over them under the present arrangement. Finding a way to leverage the activities of those programs would be beneficial. The establishment of a stakeholder committee for WRI is a good step. We hope that other earmarked programs will follow and involve stakeholders in their process. We request that all programs covered by the \$52 million in Title V, and not just FHWA's Innovative Pavement Research and Deployment (IPRD) Program, be discussed at our future meetings. We note that, even for its own IPRD Program, FHWA does not have much leeway in how it spends its \$18 million allocation. About two-thirds of this money is designated for specified activities, leaving only about one-third as discretionary funds.

The discussion of specific projects did not make clear how FHWA keeps track of pavement research activities done elsewhere and reported in the Transportation Research Information Service and Research in Progress databases. Activities undertaken by state highway agencies and their contractors as well as universities and private organizations could have a significant impact on technologies implemented across the country. The state of California, for example, has some major projects in progress on warm-mix asphalt and pavement noise. Pavement noise studies are also under way through a National Cooperative Highway Research Program (NCHRP) project and a state-led pooled fund. Significant asphalt research programs are in progress under the sponsorship of the National Center for Asphalt Technology, and a number of state-led pooled fund studies are focusing on various aspects of portland cement concrete pavement. The committee is interested in learning how FHWA accounts for such activities in the development of its pavement research and technology programs. Other topics of interest include whether there

are compelling reasons for the emphasis on friction for safety in comparison with other factors and whether the importance of splash and spray is being overemphasized.

Performance Measures

At its last meeting, the committee emphasized the need for developing appropriate measures of performance as part of the process of gauging success and progress toward reaching the roadmap's goals and milestones. We continue to emphasize that the real measure should be based on the outcome rather than on how many states are trying out a particular technology. We acknowledge that performance measures are not easy to develop and may take a long time to mature. The measures described in FHWA's strategic plan are a good start and appear to fit the plan's stated objectives. Furthermore, performance measures are evolving, and FHWA should continue to refine them. Again, the involvement of stakeholders is needed both for the development of performance measures and for their acceptance by the pavement community.

Almost all FALCON teams discussed state surveys in the context of developing performance measures. Surveys are helpful in seeking input from state stakeholders, but care should be taken to limit their number and to focus their design to avoid burdening respondents. Instead of sending them to all states, a representative sample of the National Highway System could be selected. The committee agrees with FHWA's plan to use the surveys to identify individual states for more in-depth follow-up discussion.

Deployment and Implementation

The committee discussed at length the strategies and issues concerning implementation and deployment of new pavement technologies. The important steps in this regard are to identify what is needed by the states to implement new technology; focus on what is necessary to achieve the goals; and provide the funds to develop specifications and standards and the equipment, data, and training to get the job done. FHWA has a central role to play throughout this process by assuming leadership, coordinating with all partners, and guiding the implementation of the technology. Again, seeking stakeholders' input before anything is implemented will make the stakeholders a part of the process at the outset. Another reasonable goal is to reduce the time necessary to implement a new technology from the 10 to 15 years it presently requires.

Lessons learned from experience are always helpful in avoiding past mistakes. What we learned from the Superpave implementation experience, for example, should be helpful as we embark on the deployment of the Mechanistic-Empirical Pavement Design Guide (ME-PDG). FHWA recognizes that other pavement design systems might serve a state's needs adequately or that a state may have developed its own version of the ME-PDG. Keeping track of what the states have done and how it has satisfied their needs would be helpful. FHWA is also aware that state highway agencies need incentives to try something new to help manage the risk of failure and is ready to offer incentives to them. We are interested in finding out more about the kinds of incentives that FHWA plans to offer in this regard.

Implementation of a technology is greatly facilitated if its benefits to the users are convincingly demonstrated. Therefore, the reasons for change and how the new design guide would allow states to build pavements more quickly, more cheaply, and better should be articulated. Before Superpave, for example, there were a number of pavement failures, which motivated states to try something new. Superpave also enjoyed significant high-level support from the American Association of State Highway and Transportation Officials (AASHTO) because it offered clear, demonstrable benefits. Similarly, building executive-level support for the ME-PDG and articulating its benefits, particularly to nonengineers, is essential in facilitating its implementation. In addition, we need to keep in mind that while the ME design allows us to do things that we could not do with the old design system, it is still only a part, albeit an important one, of the whole process. We need good construction techniques and good quality control procedures to go with ME design in order to realize its full benefits.

The concept of lead states, which proved so successful in implementing Superpave and other Strategic Highway Research Program products, should be helpful in implementing the ME-PDG. The lead states model appears to be effective in convincing and persuading states through peer acceptance. It helps states avoid duplication and conserve their resources while facilitating their buy-in. The lead states effort for the ME-PDG, however, has not yet realized its potential. Once the lead states process matures, FHWA could serve as the central point in the collection and dissemination of information to other states and users. We expect the ME-PDG, as it is tested and implemented by states, to spur development of design catalogs. Sharing this information with other users and all those involved would be productive. We also expect the design guide to continue as a living document for an appreciable period, during which it will be updated and revised. A number of NCHRP projects are already under way to modify and improve it.

Several states have found FHWA's Highways for Life Program helpful in implementing new technology. The Highways for Life Program allows one to think outside the box, and its use in helping implement the ME-PDG should be encouraged.

Training

The importance of training in the context of deployment and implementation of new technology cannot be overemphasized. Every FALCON team highlighted the need for training in discussing workforce capabilities. However, only about 9% of the program's funds are associated with training. This is not adequate in view of the need. The National Highway Institute (NHI) is the primary FHWA resource for provision of training. The amount of training needed, however, appears to be far greater than that presently provided by NHI. It also appears that department of transportation personnel at the federal and state levels are the primary users of NHI's training opportunities. We need to encourage the private sector to take advantage of these opportunities. We should also keep in mind the training needs of local governments and provide opportunities for addressing those needs. The committee is not fully informed about NHI as a component of the IPRD Program but believes that FHWA may have to look beyond NHI for training providers, since training involves more than an NHI course. We encourage FHWA to ensure that pavement expertise at NHI is adequately maintained and that there is a close interaction between NHI and

the pavement technology groups at FHWA.

A shortage of trained personnel is developing at state highway agencies as experienced personnel leave or retire. Budget constraints, however, are making it difficult for states to send people to training sites. Also, training appears to be one of the first casualties of budget cutbacks. This is a sad state of affairs but a reality that should be acknowledged and addressed. Linking opportunities such as training workshops with AASHTO subcommittee meetings might help mitigate the problems faced by states because of budget and travel restrictions.

In addition to NHI, the university transportation centers (UTCs) have been involved in providing training. Since the UTCs work closely with state highway agencies, an expansion of their role in providing training to users may be worth considering. This recommendation may be extended to the various technology transfer centers engaged in providing pavement technology training not only to state highway agency personnel but also to local government personnel, industry, and consultants. With regard to the mechanism for delivering training, the committee encourages online self-paced delivery systems in addition to conventional mechanisms.

Long-Term Pavement Performance Program

The committee discussed the status of the Long-Term Pavement Performance (LTPP) Program. At its first meeting, the committee had expressed concern that a number of Special Pavement Studies (SPS) test sections dealing with structural factors for flexible pavements (SPS-1) and rigid pavements (SPS-2), installed in the later years of the LTPP Program, would not reach their expected design life by 2009, the year the program is mandated to end. There also appears to be no provision for continuing studies with forensic test sections. While we recognize that work on forensic sections will require additional funds that may not be available to FHWA, we encourage FHWA staff to explore support from state highway agencies to help with these studies. We believe that the monitoring of at least some of the SPS test sections should continue beyond 2009 because they are expected to provide useful data for improving and updating the pavement design guide. Other important LTPP Program activities that, in the committee's judgment, should not be abandoned include maintaining and updating the LTPP database and the materials reference library. The committee recognizes that the LTPP Program was mandated as a 20-year program and cannot continue indefinitely, but this should not mean an end to every activity that was initiated. We do need to ensure that, if we fund any activity, we do so for the right reasons. Perhaps the activities whose continuation is necessary could be blended with the activities of the FALCON teams. We are pleased to learn that the American Concrete Pavement Association has received a reassuring response from FHWA about its commitment to continue the monitoring of SPS test sections that are determined to be necessary. We hope that FHWA will also find a way to continue maintaining the LTPP database and the materials reference library.

Our second meeting provided a productive forum for a face-to-face dialogue with FHWA on the Pavement Technology Program. We believe that FHWA staff, under the leadership of Mr. Stephanos and Mr. Henderson, have made a concerted effort to revamp the Pavement Technology Program both in its planning and in its conduct and have made good progress. We are particularly

impressed with the concept of FALCON teams and the way they are structured, and we look forward to hearing about their accomplishments at our next meeting. We continue to emphasize the importance of stakeholder input and believe that integrating states and the pavement community more closely into the process holds the key to gaining support and fostering implementation. We hope that just as working for safety has unified the states and the federal government in seeking a common goal, all pavement stakeholders can work together in seeking long-life pavements. We look forward to continuing our dialogue on this important endeavor at our next meeting, which is scheduled for fall 2008.

Sincerely,

Carlos M. Braceras
Chairman, TRB Committee for Pavement
Technology Review and Evaluation

TRB Committee for Pavement Technology Review and Evaluation

Note: Names of members present at meeting are in boldface.

Chair

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Colin L. Lobo
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