

**AASHTO TASK FORCE
ON
SHRP IMPLEMENTATION**



**SUPERPAVE
LEAD STATE TEAM
TRANSITION PLAN**

JANUARY 31, 2000

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EXECUTIVE SUMMARY

The States collectively spend more than \$10 billion annually to pave the nations highways with hot mix asphalt (HMA). Significant improvements in HMA performance will save users both time and money. Superpave (Superior Performing Asphalt Pavements) is a system developed to give highway engineers and contractors the tools they need to design pavements specifically for the environment and traffic loads experienced in service.

Superpave was one of seven technology groups developed under the Strategic Highway Research Program (SHRP). SHRP was completed in 1993 and presented an immediate implementation challenge to the nation's highway delivery system. To achieve successful implementation, all stakeholders needed to be involved, including the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the HMA industry.

AASHTO created the "Task Force on SHRP Implementation" to take those actions needed to further the implementation of the SHRP research. In 1996, the Task Force created the "Lead State Program" to share collective team member expertise on a formal basis with other states interested in taking advantage of the SHRP research.

The Task Force and, by extension, the Lead State Program are scheduled to complete their missions in the year 2000. The purpose of this transition plan is to identify and recommend the institutional framework and supportive system necessary to advance the technology absent the Superpave Lead State Team.

It must be noted that the Superpave Lead State Team was not alone in facing the challenge of implementation. The FHWA, through its Office of Technology Application, provided the critical and central institutions needed to facilitate national implementation. Among others, these included Expert Task Groups (ETG's), the Superpave Technology Delivery Team, the Superpave Centers, Mobile Asphalt Laboratories, and a National Pooled Fund Equipment Purchase.

As for the Asphalt Industry, they provided training, established User/Producer Groups and actively participated in all other noted activities.

The result of these activities has been dramatic. In 1999, the states awarded more than 3,000 Superpave projects, nearly ten times more than just two years previous and representing 46% of the market share. In 2001, the Superpave share of the market is expected to exceed 80%.

Unfortunately, in passing the 1998 Surface Transportation Act, Congress did not provide sufficient funding to FHWA to support the Superpave System. At the urging of the Task Force, AASHTO created a new funding and management system, now known as the TRB Superpave Committee. The TRB Committee is charged with providing advice and assistance on the conduct of the Superpave deployment and development program to both AASHTO and the FHWA. The ETG's have been reconstituted and now report to the TRB Committee.

Critical linkages and cross membership between the Committee, the FHWA, TRB, NCHRP, the ETG's, Industry, Academia, the Superpave Centers and key AASHTO committees are in place.

The TRB Committee has developed a long range research plan through 2005. The resulting enhancements are intended to bring Superpave to maturity. That being an HMA system that integrates the binder and mix requirements into a performance based quality control specification system which will be clearly understood by practitioners, both public and private.

While many of the institutional and funding mechanisms needed to bring Superpave to its full maturity are now in place, much remains to be done. An action plan for the Task Force to complete in its final year has been developed. Beyond 2000, the remaining work will need to be guided by the TRB Superpave Committee and supported by all the historic partnering institutions. These include AASHTO, FHWA, TRB, the States, Industry and Academia.

THE PAST

The Strategic Highway Research Program (SHRP) was established by Congress in 1987 as a five year, \$150 million research program to improve the performance and durability of our nation's roads and to make those roads safer for both motorists and highway workers. At the time SHRP concluded in 1993, it had developed 130 products in support of its mission.

Superpave—(Superior Performing Asphalt Pavements) was one of these. Indeed Superpave consumed one third, or \$50 million of the total SHRP budget. Asphalt pavements account for more than 90 percent of all paved highways in the United States with annual expenditures that top \$10 billion. It was and remains clear that if significant improvements could be achieved in the performance of these pavements, the nation could save huge amounts of money both in repair costs and user delay costs associated with earlier than necessary repairs and rehabilitation projects. The Superpave system was developed to give highway engineers and contractors the tools they need to design asphalt pavements to perform better under extremes of temperature and heavy traffic loads. The result was a system that includes an improved method for specifying asphalt binders and mineral aggregates, a hot mix asphalt design and analysis system and, when fully mature, a sophisticated model which can be used to predict pavement performance among competing mix designs.

Superpave Standards

SHRP had a definitive deadline and it focused on the delivery of standards which could be immediately used to begin implementation. Once that was accomplished, the Strategic Highway Research Program and its organizational structure, ceased to exist.

The question of who “owns” Superpave, while critical to its successful implementation, is not universally understood by the implementing industry; whether public, private, or academic. The answer is AASHTO. The AASHTO Highway Subcommittee on Materials (SOM) has the authority to publish and keep current, specifications for materials used in the construction and maintenance of all transportation facilities, and specifications for standard methods of sampling and testing such materials. Acting for AASHTO, the Subcommittee on Materials has assumed the responsibility for publishing and updating all Superpave standards. As such, any plan for implementing current and future improvements to the Superpave system must include a strong linkage to the Subcommittee on Materials and its Technical Sections to which the Superpave Standards are assigned.

In recognition the SHRP program would create an unprecedented need for the rapid development of new standards, AASHTO and the Subcommittee took two complimentary actions. AASHTO hired a staff person to facilitate and provide support to the various contributors to SHRP research implementation, particularly the Subcommittee on Materials. The Subcommittee created a new class of standards, labeled “provisional standards.” These are intended as “dynamic” standards for immediate use by the states with the understanding they would likely be revised or updated more frequently than the mature standards. Ultimately, when more fully mature, these provisional standards will be balloted as “full” standards. Some have already reached that point and have been established as such. The AASHTO staff person has been critical to the facilitation and management of the process in support of the Subcommittee on Materials.

AASHTO

At the completion of the SHRP research phase, AASHTO recognized the benefits that implementation of the SHRP products would provide its member Departments. Thus, AASHTO established a “Task Force on SHRP Implementation.” Its mission is to develop plans and proposals furthering the implementation of SHRP research, working as needed with the committees of AASHTO, the member Departments, the Federal Highway Administration and private sector organizations. Further, it was to propose, as necessary, to the Executive Committee and the Board of Directors of AASHTO such actions as it believed would further the implementation of SHRP, including proposals for securing necessary resources, for their consideration and appropriate action.

It is composed of executive level managers of member Departments from each of the AASHTO Regions.

Lead State Program

In 1996, the AASHTO Task Force on SHRP Implementation established the “Lead State Program” and invited more than 30 states to join lead state teams in seven technology groups; Superpave being one of them. A “Lead State” was defined as a transportation agency that had used a SHRP technology on a sufficient scale to gain expertise on that technology and its procedures. The Lead State then volunteered to share its expertise, on a formal basis, to help those states who wanted help and to serve as examples for all the states.

In September of 1996, the first Lead State Conference was held in St. Louis, Missouri. The Superpave Lead State Team included Florida, Indiana, Maryland, New York, Texas and Utah. Its mission, developed at the conference, was as follows:

“The Lead States will assist in the uniform implementation of the Superpave system by documenting and sharing experiences, furthering development, and providing guidance related to the practical application of the technology.”

The Superpave Lead State Team included members beyond employees of the named states. The FHWA, the asphalt industry, the Superpave Centers and the research community were also represented. The inclusion and participation of all these stakeholders was considered critical to the success of the program.

Lead State Program Transition

As with the SHRP, the Lead State Program was to have a beginning and an end. In establishing the program, AASHTO agreed that at some reasonable point in time, national implementation should have matured to a level where a Lead State Program was no longer necessary. It was thus decided that the Lead State Program would conclude in the year 2000.

It is the purpose of this paper to describe and recommend, if necessary, the institutional framework and support systems necessary to advance the technology, absent the Lead State Program.

Keys To National Implementation

Federal Highway Administration

It can easily be said the FHWA fully embraced the SHRP program and has played a pivotal role in its implementation. The FHWA is uniquely positioned to facilitate technology transfer and in the case of SHRP, they understood how they could contribute and they did!

First, they got some substantial help from Congress. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) authorized an additional \$108 million for SHRP implementation and for the continuation of the 20-year Long-Term Pavement Performance (LTPP) program. The realization that new technology would not implement itself was essential. There was a critical need to coordinate implementation activities.

Through its Office of Technology Applications (OTA), the FHWA took a series of actions in support of Superpave:

- Superpave Technology Delivery Team
The Team directs FHWA's Superpave implementation efforts and works to improve coordination with State highway agencies. Team members represent FHWA's engineering, research, technology transfer, and field offices.
- Asphalt Technical Working Group (TWG)
The Asphalt TWG, which included representatives from highway agencies, asphalt producers, contractors, academia, and FHWA, provided guidance on ways to encourage the adoption of the Superpave system by the highway industry. It was chaired by FHWA.
- Binder Expert Task Group (ETG)
The binder ETG assisted the Asphalt TWG by providing more specialized guidance on the testing and adoption of the Superpave binder specification. It was composed of government, industry and academic experts and again chaired by FHWA.
- Mix Expert Task Group (ETG)
The mix ETG also assisted the Asphalt TWG by advising on the implementation of Superpave mixes and provided recommendations to the AASHTO Subcommittee on Materials to improve the standards. It was constituted similarly to the binder ETG.
- Superpave Models/Software (ETG)
This ETG provided advice on the development and distribution of the Superpave software and the refinement of the Superpave performance prediction model.

In concert, these groups played a critical role in moving the technology toward implementation and improvement. The FHWA recognized that state experts needed to be involved to lend credibility to other states and needed real world, hands on experience. Its an unfortunate fact-of-life that for most states, out-of-state travel is severely restricted. To overcome this obstacle, FHWA funded all travel to group meetings by state representatives.

The TWG, among many other activities, set national goals for binder and mix implementation, established as 1997 and 2000 respectively. The Binder and Mix ETG's gained a position of national recognition and respect. They established themselves as the experts to which the Subcommittee on Materials looked for advice on appropriate modifications and improvements for balloting by the SOM.

Together, these groups have been critical to implementation and improvement of the system. On their collective advice, the FHWA has expended significant research funding to fill critical gaps in the SHRP research. Based on LTPP experience, the Binder ETG has recommended revision of the low temperature algorithm. They have also worked to identify and resolve differences in test results on similar test equipment made by different manufacturers. And, they have influenced the direction of NCHRP research into the accommodation of modified asphalts into the test protocols. The Mix ETG has provided the leadership to revise the N-Design Table for SOM specifications. They developed a protocol for the evaluation and approval of new gyratory compactors. In addition, they developed guidance for the use of RAP in Superpave mixes and clarified the 20 year ESAL design life.

These lists of accomplishments are by no means exhaustive, but merely intended to present an indication of the importance of their contributions to the Superpave system.

- Superpave Centers

The FHWA provided both equipment and startup funding to establish five national Superpave Centers. The five Regional Centers provide technical leadership and assistance. The Centers evaluate Superpave equipment and methodologies working with highway agencies to put them into practice. They are also an important source of hands-on training for engineers and technicians at the regional level.

- Mobile Asphalt Laboratories

FHWA funded, equipped and staffed two mobile asphalt laboratories. These were made available to visit the States and construction projects. They have proven to be a valuable resource in validating research results prior to consideration by the SOM for standard revisions.

- National Pooled Fund Equipment Purchase

Few states could afford to purchase all the laboratory equipment needed to support the new technology. FHWA initiated a national pooled fund purchase that could be supported by States SP&R funds. In this way, states could easily obtain an initial set of required lab equipment. And, as most states would ultimately need added lab equipment, FHWA altered its long held policy of restricting the use of federal aid in support of state purchases for new technology equipment.

- Asphalt Institute

Early in the process of implementation, it was critical that a source of training was available. Training was necessary for all aspects of the Superpave system including the system itself, binder testing, mix design, aggregates and mix analysis. For the most part, it was to be found at the Asphalt Institute. Beyond that, the Institute has been very active in the preparation of manuals, publishing articles, membership on advisory groups, and the sponsorship of several national forums focused on the Superpave system. Indeed, the next in this series is scheduled for Denver in April of 2000.

- Asphalt User Producer Groups

Five Regional Asphalt User Producer Groups were formed. These groups, with representatives from the binder producing industry and state highway agencies, worked to encourage common, standardized specifications, binder grade selection, and acceptance plans.

- Lead State Team

The Superpave Lead State Team, created by the AASHTO Task Force on SHRP Implementation, made significant contributions in support of system implementation and improvement. It's mere existence, and the publicity attached to its formation, provided a focus and encouragement for the states to look seriously at implementing the system. Many Team members held multiple memberships on key committees. They were members of the ETG's, the Subcommittee on Materials, NCHRP Superpave research panels, national forum steering committees and others.

Being expert practitioners and true to their mission statement, they prepared "Implementation Guidance" documents in 1997 and 1998. These were widely published and distributed documents which helped other implementing states on the step learning curve.

Ultimately, several members of the Team served on an AASHTO SOM sponsored Task Force to recommend significant changes to four mix standards based on both NCHRP research and the guidance statements. The SOM adopted the recommended improvements and they were published in the May 1999 interim edition of the AASHTO Provisional Standards.

Early in its history, the Lead State Team developed and widely published a list of experts in Superpave and its component systems. States were encouraged to contact the experts for advice in the application of the technology.

States were also encouraged to develop formal implementation plans and sample plans were provided to all the states.

The Team participated in many state, regional and national forums centered on the technology. It also conducted annual bench marking surveys of all the states which measured the progress of implementation and the likely future direction. The annual survey results were widely published in general media, used in presentations by Lead State members and the FHWA and hard copies sent to all SHA Chief Engineers each year. This bench marking effort did much to encourage states to adopt the system and convince various industry partners of the national commitment to its adoption.

Again, this list is not exhaustive, but meant to illustrate the value of the Team and it's relation to others involved.

- Web Sites

Numerous web sites have been set up on the internet. The FHWA, the TRB, the Superpave Centers and AASHTO all created sites where information could easily be accessed by public, private and academic implementors or decision makers.

THE PRESENT

The Technology

By 2000, all but a handful of states will have adopted the binder specifications and most will be using the mix design system. Last year, 1999, the states awarded more than 3,000 Superpave projects, nearly ten times more than just two years previous, representing 46% of the market share. In 2001, the market share is projected to grow to more than 80%. All good news for the state-of-the-practice and for the taxpaying customers.

But, Superpave is not a fully mature state-of-the-art HMA system and will not be for years to come. Much remains to be researched, learned and implemented if Superpave is to fulfill its intended promise. That is, a universal system that can be used to design and place any HMA mix for any application, and can be used to predict in-service performance, thus being capable of supporting a true performance-related procurement system.

A simple performance test is needed to differentiate among competing designs. We need to know more about the performance of modified binders and how to fairly test them in the lab. We need to verify the applicability of the aggregate consensus properties. We need to understand and be able to avoid occasional mix tenderness during construction.. We need better laboratory tools which can be used to assist in predicting service performance. We need to reduce the variability of current test procedures and replace old, time consuming test procedures with new ones. And, we need to fully develop an integrated modeling system to accurately take all the components and predict in-service performance. We need all this and more!

TEA-21 and Superpave

In a reversal of the support it provided in ISTEA, Congress, when it passed in June of 1998, the Transportation Equity Act for the 21st Century (TEA-21), did not provide sufficient funding to the FHWA for Superpave implementation and continued federally sponsored research.

It was immediately recognized by the AASHTO Task Force on SHRP Implementation that if Superpave, and other technologies, were to succeed, it would require the development of new funding and management relationships. A plan was developed and presented to the AASHTO Board of Directors to be considered at their annual meeting in the Fall of 1998.

AASHTO

In November, 1998, the AASHTO Board of Directors met in Boston. They considered and passed Administrative Resolution AR-5-98 titled, "Conduct of Highway Research Under TEA-21." In the resolution, they recognized that the loss of funding threatened critical research and the implementation of technology important to member Departments. In response, the Board resolved:

1. To fund immediate critical research, formerly funded by FHWA, with unobligated 1999 NCHRP funds.

2. To set aside substantial NCHRP funding in support of Superpave research for the FY 2000 program.
3. To continue support of the Lead States program and to invoice member states a voluntary contribution of \$6,000 for FY 2000.
4. To request that TRB organize and staff a Superpave Oversight Committee in consultation with FHWA and AASHTO and to use NCHRP funding for this purpose.
5. To charge the TRB Superpave Committee to provide an annual accounting of the NCHRP funds expended on Superpave activities and recommend annual budgets for review by the Standing Committee on Research (SCOR) and the Task Force on SHRP Implementation. The Committee was also charged to provide oversight of the Superpave research and implementation activities.

TRB

The Transportation Research Board (TRB) immediately went to work to establish the “TRB Superpave Committee” in response to the AASHTO resolution. The Committee was seen to be the Successor to two existing advisory groups, the TRB SHRP Committee and the FHWA Superpave Technical Work Group (TWG). Its charge would be to provide advice on the planning, activities, and resources needed to successfully complete Superpave implementation.

The TRB Superpave Committee, as established, includes representation from AASHTO member Departments, municipal government, private research, academia, and the HMA industry. It has liaisons to the National Asphalt Pavement Association, AASHTO headquarters, the Asphalt Institute, the FHWA and C-SHRP (the Canadian SHRP organization).

The Committee will undertake four priority activities:

1. Long Range Plan (through 2005)
The consideration and adoption of a long range plan, using a combination of FHWA and NCHRP managed research, to address outstanding elements of the program aimed at bringing the technology to maturity on or about the year 2005.
2. The recommendation of annual research programs within the context of the long range plan.
3. The reconstitution and assimilation of the Binder and Mix ETG's to provide expert advice to the TRB Superpave Committee.
4. Provide periodic reports and advice to AASHTO and its appropriate committees, and to the FHWA with regard to the actions needed to bring the technology to its fully mature potential.

THE FUTURE

Perspective

In 1998, the likelihood that Superpave would reach its full potential was very much in doubt. However, the dedication, commitment and hard work of its past partners to forge new partnerships, identify funding and create a new management and coordination structure have gone a very long way to ensure the improvement and future success of Superpave. In doing so, care has been taken to recognize and account for the absence of the Superpave Lead State Team.

Keys to the Future

For Superpave to reach its full potential, a number of key components must be in place and/or supported.

These include:

- Leadership
- Expert Advice
- Expert User Support
- Long Range Plan for Research
- Standards Adoption
- Visibility
- Communication
- Coordination
- State-of-the-Art Implementation
- Technology Transfer and Training
- Universal Implementation

Most, but not all of these, exist today. The key to success is covering all the bases and providing the needed linkages among the various contributing organizations.

Leadership

The TRB Superpave Committee is clearly positioned to provide national leadership on the future direction of the Superpave system. Its membership is committed and the majority are executive level managers who command a great deal of respect within their parent organizations. Both AASHTO and the FHWA will be looking for and accepting its leadership.

Its members include representatives from and therefore linkages to key Superpave support groups. These include industry, academia, various AASHTO Committees, and representatives from five of the current Superpave Lead States. Beyond that, it has access to the FHWA Superpave Technology Delivery Team, the NCHRP staff, and the AASHTO SHRP Research Coordinator (who provides an excellent link to the AASHTO Subcommittee on Materials).

Expert Advice

The Binder and Mix ETG's have been reconstituted; will be funded by NCHRP and report to the TRB Superpave Committee. Their membership includes experts who know the technology and are committed to its improvement and deployment. They will act as invaluable advisors to the TRB Superpave Committee and to the AASHTO Subcommittee on Materials. As such, they will be in a position to identify gaps or weaknesses in completed research for action by the Committee. They will also be in a position to recommend effective improvement to the AASHTO standards maintained by SOM.

Membership on both ETG's include representatives from the AASHTO Lead State Team.

The Superpave Models/Software ETG has been eliminated. But, the NCHRP panels, which provide oversight to the models research, can and are providing a similar function.

Beyond the ETG's, the Committee enjoys access to the institutional knowledge of the FHWA Superpave Technology Delivery Team, the NCHRP staff, and their continued input and advice.

Expert User Support

Having been initially funded and equipped by the FHWA, the Superpave Centers are maturing into self-sustaining organizations. To some extent, all are currently supported by Regional pooled funds. Some receive added support from individual states and as contractors for research activities of interest to individual agencies as well as contractors for groups of agencies.

Its their vision that as time goes on, their mission should evolve to position them as trainers, communicators, and providers of regional and national research.

As the technology expands through newly completed research, there will be a need for continued training of practitioners. The centers would be a good source for that training. Beyond that, as they see it, there is a need to focus training in at least two other directions, the universities and the local municipal level. They are correct on both counts.

To achieve their vision, they will need to articulate it and "sell it" to their customers. States (and groups of states) need to carefully consider the services they need from the centers and be willing to support them through pooled funds. The FHWA needs to facilitate and manage these pooled funds and the TRB Superpave Committee needs to encourage the required partnerships. Beyond the Superpave Centers, it would seem the newly formed FHWA Resource Centers could and should be expected to become a full partner to implementation.

Their mission is to provide expert technical and program assistance, training and technology delivery to State DOT's and other customers. The TRB Superpave Committee should encourage the development of a plan for the Resource Centers to support the delivery to practitioners of the "Enhanced Superpave System" technologies resulting from ongoing research.

Long Range Plan

The TRB Superpave Committee, drawing on resources and input from many sources, has developed a Long Range Plan to complete essential research on or about 2005. Its likely the plan will be iterative and the Committee will make yearly recommendations to SCOR and FHWA for inclusion in annual research programs. The plan reflects today's hopes for Superpave among transportation agencies and the hot-mix asphalt industry:

Superpave will be a fully integrated asphalt mix design and construction system that (1) recommends binder type (including complex binders) and mixture proportions based on anticipated environmental and loading conditions and layer location; (2) predicts the ability of a mix to withstand rutting, fatigue, thermal cracking, and moisture damage through a series of laboratory tests and mechanistic models; (3) integrates the binder and mix requirements into a performance-based quality control specification system during construction; and (4) will be clearly understood by public and private sector engineers, technicians, and contractors through initial and continuing training and outreach programs.

Standards Adoption

As noted earlier, care has been taken to create effective linkages to the AASHTO Subcommittee on Materials. SOM Technical Section Chairs will be liaison members to the ETG's. One of the more critical links is the existence and support provided by the AASHTO SHRP Research Coordinator. The Committee should encourage AASHTO to continue the position until such time as the research is completed and the provisional standards mature.

Visibility

The Superpave system has been a success story in moving technology from research to practice. One of many reasons has been its very high visibility. There is a danger that as the system is seen to be mature, the visibility will diminish. Efforts like the "FOCUS" magazine, national forums, the Lead States survey and many others will be eliminated or diminished. The partners, including TRB, AASHTO and FHWA, will need to cooperatively develop and execute plans to keep the technology on the "radar screens" of DOT executive managers and Chief Engineers.

Communication

Probably, the biggest threat to the success of any human endeavor is good communication. That is certainly true of Superpave. To be sure, there have developed a multitude of sources for information on the technology. Newsletters and web sites abound, yet it remains difficult for those who need to know a specific level of information to find it. A definitive source of information, probably a web site (with appropriate links), needs to be agreed upon, funded and staffed. AASHTO and FHWA need to cooperate to make it a reality.

Coordination

Given the multitude of facilitators, providers, customers, and users, it's critical that a single entity assume responsibility for coordinating the parties. This to facilitate agreement and understanding among the stakeholders and to minimize duplicative efforts, yet ensure all that needs to get done, gets done.

Implementation

Assuming that the Long Range Plan to complete the requisite research is both comprehensive and completed, implementation remains a challenge. And implementation brings with it at least three distinct challenges.

The first is state-of-the-art implementation by the states. State decision makers will need both comprehensive and timely information to commit to the implementation of Superpave enhancements as they become the state-of-the-art. Their technical staff will need training in order to act on the guidance of their management.

The second is "universal" implementation. Superpave is clearly the HMA system of choice for most State DOT's. It has the potential to be the universal system of choice for all HMA placed in the United States. If it is to achieve its potential, it must be adopted at the municipal and commercial level.

The actual implementation of any good research cannot be taken for granted. The 1991 Intermodal Surface Transportation Efficiency Act authorized \$108 million to underwrite SHRP implementation and for the continuation of the long-term pavement program. If Superpave is to be fully implemented in its mature form, new partnerships and funding mechanisms will need to be developed among the States, AASHTO, TRB and the FHWA.

Visibility, Communication, Coordination, Delivery, and Implementation of the "Enhanced Superpave System"

The delivery of the enhanced Superpave system will take both coordination and considerable funding. Neither will be easy to obtain. There are four major stakeholders who must be not only involved, but committed. They include AASHTO, its member states, the FHWA and the asphalt industry.

Those with the most experience in the system development, its successful deployment to date, the ongoing research, and the implications new research has on both system enhancement and delivery, reside within the FHWA headquarters organization. As the result of funding support from ISTEA, FHWA developed a cadre of experts in both the technology and its delivery strategies. This cadre is in the best position in terms of both knowledge base and experience to assist in the technology transfer of the expected enhancements to the Superpave system.

In a perfect world. Those with the ability to coordinate would also have the financial resources to support the delivery system. Unfortunately, unless and until the next surface transportation act, due in 2003, provides the needed resources to FHWA that is not the case. Therefore, at least for a time, a new funding partnership with AASHTO and its member states will need to be established.

That funding relationship could take several forms:

- A national pooled fund for enhanced Superpave delivery could be established. Such a plan could be proposed by the FHWA, endorsed by the to be created AASHTO Steering Group for Technology Deployment and subscribed to by AASHTO member states.
- The AASHTO Standing Committee on Research has passed a resolution encouraging technical corrections to TEA-21. The corrections proposed would restore significant funding for several technologies to the FHWA. In the unlikely event these corrections actually get adopted, the FHWA would again be positioned to lead delivery of the Enhanced Superpave System. Even so, the proposed funding is not extravagant and some financial support from AASHTO would likely be needed.
- Other forms as yet to be defined.

In recognition of these problems, the TRB Superpave Committee has established a “Training, Outreach, and Education Task Force.” The Task Force will prepare a position paper for consideration by the entire committee when it meets early in the summer of 2000. It is expected that the Task Force will identify the scope of needed activity, an estimate of needed funds, and a means to institutionalize the effort which would include the noted stakeholders.

ACTION STEPS

To maximize return on the SHRP investment, the Superpave system will need to achieve its full potential. In its mature form, Superpave will be a fully integrated mix design system that will:

- Recommend binder type (including complex binders) and mixture proportions based on anticipated environmental and loading conditions, along with layer location.
- Predict the ability of a mix to withstand rutting, fatigue, thermal cracking, and moisture damage through a series of laboratory tests and mechanistic models.
- Integrate the binder and mix properties into a performance-based quality control system during construction.
- Be fully comprehended by public and private sector engineers, technicians, and contractors through initial and continuing education, communication, and outreach programs.

The key components needed to drive and support the full maturity of the Superpave system have previously been discussed. However, in order for some to continue, and others to commence, actions need to be taken in this “Lead State” transition year.

Action Step #1:

Encourage AASHTO to continue support for the key position of its “SHRP Implementation Coordinator.”

This may best be done by the AASHTO SHRP Implementation Task Force prior to its sunset.

By March 2000, the Lead State Team will propose a course of action to the Task Force.

The Lead State Team will encourage the TRB Superpave Committee to request periodic reports on this program. This will be done by March 2000.

Action Step #2:

Support the continuance of the TRB Superpave Committee. This action will be orchestrated similar to Step #1.

Action Step #3:

Respond to the need for programmatic management of a Superpave “research program” and a strategic plan for the performance prediction system.

The TRB Superpave Committee is developing a long range, coordinated and comprehensive research program that addresses the need. It will need to be supported by and augmented by an education, outreach and training program. Indeed, the Committee intends to develop just such a program.

Action Step #4:

A plan must be developed and implemented to measure the performance of in place Superpave projects.

Gary Henderson, leader of the FHWA Superpave Technology Delivery Team, will be working initially with the Maryland and Indiana DOT's to pilot a performance tracking methodology. The Lead State Team will encourage the TRB Superpave Committee to monitor progress. This will be done by Spring of 2000.

Action Step #5:

Encourage FHWA to facilitate and provide administration of the pooled fund support for the Superpave Regional Centers.

The Lead States Team will, by March of 2000, encourage the TRB Superpave Committee to recommend that FHWA accept this responsibility.

Action Step #6:

Encourage the TRB/AASHTO/FHWA partnership devise and implement an outreach program to keep the Superpave technology on the radar screens of SHA executive managers.

The TRB Superpave Committee has recognized the issue as a priority and named an internal task force to develop a plan to accomplish this and other needed outreach, education and training.

No further action is required of the Lead State Team.

Action Step #7:

Establish a definitive source for up-to-date Superpave programmatic, coordination, and management information.

Could and should be included in Action Step #6.

Action Step #8:

Support the Superpave Regional Centers efforts to be a recognized source of Superpave expertise. The work of the Superpave Centers is far from complete. The Superpave Centers should be encouraged and supported as centers of Superpave expertise

As the Superpave system matures and a simple performance test, as well as the performance prediction and modeling system are developed, the centers are in an excellent position to assist in evaluating and supporting the system.

FHWA should be encouraged to identify and manage a base level sustaining funding source. The AASHTO Task Force should make this recommendation which will be prepared for them by the Lead State Team.

Action Step #9:

Encourage FHWA to develop a Superpave implementation support plan by/for their “Resource Centers.” Included in Action Step #6.

Action Step #10:

Encourage FHWA to continue their efforts in technical coordination of Superpave implementation on a nationwide basis. Included in Action Step #6.

Action Step #11:

It is proposed the AASHTO Task Force on SHRP Implementation be transitioned to a new entity called the “AASHTO Steering Group for Technology Deployment.” It has been suggested that while the TRB Superpave Committee will ensure the needed research is completed, it may not be in a position to support implementation. It is further suggested that the expected Technology Deployment Group be encouraged to accept delivery of emerging Superpave technology as one of its programs.

The current AASHTO Task Force on SHRP Implementation should take the lead in doing so. The Lead State Team will assist them as in other action steps.

Action Step #12:

Engage LTAP (or appropriate organizations such as State HMA associations, Asphalt Institute, etc.) to provide Superpave implementation at the local level.

FHWA is exploring several options to facilitate technology transfer to local governments. The Task Force should send a letter of encouragement to Administrator Wykle. Mr. Mack will prepare such a letter for consideration by the Task Force at their Spring 2000 meeting.

LESSONS LEARNED IN THE LEAD STATE PROGRAM EFFORT

The Superpave® Lead State team members and supporters worked were successful in assuring team success. Key methods used by the group that facilitated success are as follows:

The Team started from the top and the bottom. Members from both management and technical working groups were involved from the Program's inception.

Key Contact people were identified in each State. The individuals were chosen for leadership and knowledge in their respective areas of expertise. Identification of these individuals facilitates communications and team interaction.

The Team members interfaced with their respective User/Producer groups. The User/Producer groups provided excellent forums. Members of the group were kept current at each meeting as to the goals and activities of the Lead-State Program.

The Team members enjoyed respect from their industry peers. They knew what they were talking about. Each Team member earned his/her expertise through academic and practical experience. The binder and mix Expert Task Group has been reconfigured and will be under the auspices of the NCHRP. These groups will report to the TRB Superpave® Committee. Their membership includes experts who know the technology and are committed to its improvements and development. Membership on both ETGs include representatives from the AASHTO Lead States Team, HMA industry, private research and academia.

A Superpave® Lead-State Pool of Experts tabulation was published and distributed by means of the "Focus" newsletter, trade magazines and User/Producer newsletters. This concept proved an excellent forum for introducing our services to other governmental agencies, academia, and the private sector. Good visibility and marketing were achieved.

Progress of Superpave® implementation, the major goal of the Team, was tracked through a comprehensive surveys sent out annually. The survey proved an excellent tool for making Team course corrections.

The Lead-State concept was successful to a great extent through strong staff support from AASHTO and FHWA. Without the financial support from AASHTO, no annual meeting would have taken place. It is an unfortunate fact of life that for most states, out of state travel is severely restricted. We need to continue to use States SP&R funds and Federal Aid to support the States purchase of new technology equipment and for maintenance and replacement of said equipment. If Superpave® is to be fully implemented in its mature form, new partnerships and funding mechanisms must be developed among the States, AASHTO, TRB, FHWA, and private grants.

Members of the Lead-State team were supported by their respective managers. They were given time to travel to the workshop meetings. Resources required in fulfilling goal action items were also provided.

The annual meetings which included intense break-out session work provided means for each member to vent frustrations. Rules were established early on that encouraged each member to say what was on his or her mind. These meetings also provided reality checks and a means to measure goals.

Our team was made up members from State Agencies, the FHWA, Regional Superpave centers, and industry. There was a strongly committed attitude of partnering in our group. A significant number of members were involved with NCHRP research projects, held membership on the FHWA Expert Task Groups (now the TRB ETGs). This involvement greatly facilitated communication.

Customers were identified. All workshop brainstorming sessions were focused on meeting the needs of those agencies and businesses adopting Superpave®

A willingness to help other states (customers) was evident from the start. Indeed, this willingness was required as a major strategy in fully implementing Superpave® nationwide. Members volunteered to be listed on the pool of experts list and to avail themselves through User-Producer groups.

The group realized early on that the process was dynamic. We knew that processes and specifications had to be fine-tuned. The new technology had to be put through the paces in practical use. Identified deficiencies were then addressed.

Using facilitators was a key element to the group's success. Working break-out sessions remained focused on the many elements that led to goal development.

By 2000, all but a handful of States will have adopted the binder specifications and most will be using the design system. For 1999, the States will award more that 3000 Superpave® projects, nearly ten times more than just two years ago. This represents 46% of the market share. In 2001, the market share is projected to grow more to more than 80%.

The States are in desperate need of a simple performance test that can differentiate between competing designs. The applicability of the aggregate consensus properties require verification. We need the tools for avoiding occasional mix tenderness during construction and which can be used to assist in predicting service performance.

Given the multitude of providers, customer/users, it was critical that a single entity assumed responsibility for coordinating the parties. Facilitating agreement and understanding among the shareholders, minimizing duplication of efforts, and insuring that goals are achieved is critical to success. Our team was fortunate in having a strong, dynamic leader who accomplished this.

What About Negatives? What Could We Have Done Different?

Numerous action items were adopted during each meeting. All team members were very busy on their respective jobs. A method of getting all members of the team to communicate their respective progress periodically during the year would have insured more goals being fully met. This could easily have been done with E-mail. The computer e-mail list server could have served very well in this capacity. It was not used. As part of an integrated communication system, e-mail, or tele-conferencing would have greatly facilitated on-going team communication.

The Lead-States recognized the value of the new Superpave® technology early on. Other states took a go-slow attitude to that of waiting until the system was perfect. Reasons for the reticence of other states and municipalities' slow adoption of Superpave® were not fully addressed. A major goal of the team should have been to identify and address this resistance to fully adopting Superpave®. We should have more fully focused on this problem during the early implementation phases.

Asphalt/pavement experts within each state should be directly involved and empowered in a Lead-State concept. States assigning the wrong people to teams will encounter numerous problems in adopting and implementing new technology.

Better Public Relation efforts could have been adopted. Some States, agencies, and mix producers undoubtedly had unrealistic expectations. During the initial phases perceptions by a significant number of municipalities and contractors led to the belief that the technology was a "cook book" affair and that engineering wasn't allowed. This group believed that Superpave® was being "crammed down their throats".

Probably the biggest threat to the success of any human endeavor is the lack of communication. That is certainly true and is applicable to Superpave®. To be sure, many sources of information on the technology were developed. Newsletters and web sites abound, yet it remains difficult for those who require a certain level of information to find it. A definitive source of information, probably a redesigned and amalgamated web site with appropriate links needs to be agreed upon. This web site would obviously require funding and staffing. AASHTO and FHWA should cooperate to make it a reality.

The partners, including TRB, AASHTO, and the FHWA must cooperate in developing and executing plans to keep the technology on the radar screens of State DOT executive managers and Chief Engineers.

APPENDIX A

APPENDIX A

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APPENDIX B

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APPENDIX C

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APPENDIX D

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