

**Southeastern States Pavement Management Conference**

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**ASSET MANAGEMENT: WHAT'S IT ALL ABOUT?**

As pavement managers and engineers you have quite literally provided the way for our customers to make productive use of the greatest network of highway facilities the world has ever known - - a network that has brought freedom of choice, opportunity, and an enhanced quality of life to our nation.

America's system of roads has become so ingrained in our day-to-day living that our customers seem to take it for granted, and there is no highway component taken more for granted than our pavements - - except, of course, when they don't provide the smooth ride that is expected. Let's face it, our customers care about pavements only if the road is rough and the ride is poor - - then they notice.

There was a time in recent years when our customers were noticing us more than we would have liked. Many of our early pavements on the Interstate System were not lasting as long as we had hoped. There were a variety of reasons for this, including our own success in attracting far more traffic and heavier loads than had been anticipated. (This brings to mind something that has always bothered me about the highway business. Have you ever noticed that ours is the only enterprise considered a failure when our customers line up to use our service? Think about it.)

At any rate, many of us remember the problems, and can attest to the strides in recent years - - the progress that has been made as a result of a national commitment - - through SHRP – the Strategic Highway Research Program, through the efforts of individual states, through our openness to new ideas in mix designs. You, as pavement managers and engineers have every reason to be proud as our pavements continue improve and the satisfaction of our customers continues to grow.

One of the most significant strides you have made has been the ability to monitor and manage the pavements we have, the condition they are in, their expected remaining life, and the cost of improvements that will be needed. This ability is embodied in pavement management systems, which just about all state transportation agencies and many local governments have implemented in one form or another. Pavement management systems have become the central tool available to you and your colleagues in fulfilling your responsibilities as guardians of this nation's multi-billion dollar investment in asphalt, concrete, and their supporting elements.

While they are used differently in different agencies, virtually all pavement management systems play a critical role in defining present conditions as well as guiding decisions on future investments.

These systems are not flawless. They can never completely displace engineering judgement based upon experience. But they do enable us to deal with a vast body of information, to make sense out of that information, and to establish an objective basis upon which to make, and to defend pavement investment decisions.

Of course, I'm preaching to the choir. So what's the purpose of the sermon, since most of us have seen the light about the value of pavement management systems? My real purpose is to sell you on a related idea.

Just as you as pavement managers and engineers have come to rely on pavement management systems as the technical framework for your work, similarly those responsible not only for the pavement, but for the preservation and enhancement of the total surface transportation infrastructure - - they too have the need for an objective and defensible analytical framework to guide their decisions.

Those in important leadership positions within our transportation agencies are charged with looking at the big picture - - across the entire agency - - weighing the need for investments in new facilities versus preservation, in managing demand versus expanding capacity, in operational efficiencies versus capital improvements, in one geographic area versus another, in higher order trunk line systems versus local access routes, and among the numerous components that comprise a highway network. These are the investment needs and choices that routinely confront our Commissioners, Directors, and Secretaries of Transportation, and their top planners, chief engineers, the directors of finance.

Just as with pavements in the days before pavement management systems, the absence of comprehensive analytical tools doesn't mean that investment decisions don't get made - - of course they get made, primarily on the basis of perceptions, pressures, and predisposition. And just as with pavement management systems, it would be naïve to believe that such subjective factors would completely fade away with the advent of new computerized systems. But just as with pavement management systems, the availability of a comprehensive framework can add a fourth "p" to perception, pressure and predisposition - - a "p" for the perspective that comes only when the whole picture can be seen and understood and informed decisions made.

So what is the pavement management system equivalent that is becoming available to our senior officials as a basis for more objective and defensible investment decisions? In a nutshell, it is "transportation asset management." And my goal here this morning is to convey to you the significance of asset management not only to decision-makers inside and outside of your agency, but also its significance to you as pavement managers and engineers.

There are many definitions of transportation asset management that have been offered. I must confess that I prefer the very simple and straightforward formulation in the recently published Transportation Asset Management Guide developed under the NCHRP. The Guide defines transportation asset management as "a strategic approach to managing transportation infrastructure." Short and to the point, the key term here is "strategic." It connotes comprehensive, long term, and driven by policy goals as opposed to piecemeal, short range, and driven by expediency.

As the varying definitions imply, different people see asset management differently. To some, asset management focuses upon high-level tradeoffs among modes of transportation. To others, the term "asset" includes everything and everyone of value, including human resources and information technology. To some, asset management addresses the dichotomy between capacity expansion and system preservation. To others, it is primarily about preserving and enhancing infrastructure.

If Transportation Asset Management is to become a widely accepted and applied concept, it is important, I believe, to achieve a common understanding of certain core

principles, while providing ample flexibility beyond such principles to accommodate a wide range of individual needs and circumstances.

We at Parsons Brinckerhoff, and I personally, have had the good fortune of working on the recently completed NCHRP-sponsored Transportation Asset Management Guide. We worked in partnership with and under the lead of Cambridge Systematics, and with the guidance of a national panel from FHWA, AASHTO, and State DOTs. And as you might suspect, one of our most significant challenges was to come up with a common definition, a common framework, and core principles when, in fact there is so much diversity within our transportation community. But our team was determined NOT to come up with a cookie cutter approach, or one-size-fits-all methodologies.

Evidently, we succeeded, since we were pleased to learn very recently that after polling the states, the new guide has been adopted as an AASHTO document. While of course the guide is not a mandate, its adoption by AASHTO certainly implies a degree of support for a state-of-the-art approach worthy of consideration by all state DOTs.

Many states are, in fact, well along their journey of embracing and implementing the concepts of transportation asset management. Though some may use different terminology, and a variety of adaptations, the important point is that they are converging around a set of principles that seem to have very broad applicability.

As noted in the Guide, among the hallmarks of transportation asset management are that:

- It is policy driven
- It is performance-based
- It considers alternatives and tradeoffs
- It evaluates competing projects and services
- It employs systematic processes and criteria
- It depends upon objective information and analysis

The point is made in the Guide that at its core transportation asset management is a process of resource allocation and utilization. Resources can include funding, people, information, materials, equipment, or real estate. The new guide offers a framework in which quality information, including an inventory of assets, condition assessment, and predicted deterioration, is brought to bear at 4 distinct stages:

1. Establishing policy-level objectives and measures of performance
2. Development of specific plans and programs from among a range of options, and a resource allocation strategy that will achieve desired levels of performance.
3. Implementation of projects and services consistent with adopted policies and performance targets
4. Measurement of performance results, and feeding back to evaluate and refine earlier decisions.

In addition:

- The Guide offers examples of best practices and state of the art benchmarks that can serve as a backdrop for assessing current practices and outcomes
- The Guide includes a self-assessment tool to determine where you and your agency may be today, what are your strengths and weaknesses, and where you may wish to go tomorrow.
- The guide suggests an implementation plan with a tailored approach to address your unique requirements.
- The guide provides an impetus to getting started NOW implementing the principles of asset management, and NOT spending years building new technical tools and systems.

In working on the Guide, it occurred to us that there are three key reasons why transportation asset management is emerging as such an important tool for allocating and utilizing resources more effectively.

The first has to do with heightened expectations. Our transportation customers, who are also taxpayers and voters, have become more outspoken about how well government is or isn't doing its job - - how their tax dollars are being used, and what is the quality of service they are getting and expect to get. Combined with heightened expectations are the pressures to downsize, cut costs, innovate, outsource, deliver on time and under budget - - the relentless squeeze of having to produce more with less, while operating in a political fishbowl. One inevitable result of all this is the need for transportation officials to demonstrate compelling reasons for the budgets they propose and resource allocation decisions they make. Transportation asset management, if it accomplishes little else, provides a rational basis for such proposals and decisions.

A second factor has to do with a new generation of leadership in our transportation agencies - - leaders who are less enamored of past practices, and more inclined to ask the tough questions and think outside of the box. These leaders will increasingly appreciate the value of analysis tools that can better support and defend the resource allocation decisions they must make.

A third factor behind the recent impetus toward transportation asset management involves the maturing of individual management systems, such as those for pavements and bridges, and innovations in information technology including sensing, communications, and GIS that facilitate an integrated, cross-cutting and systematic approach.

While these factors may help explain the growing general interest in asset management, from your perspective, as pavement managers and engineers, a better question is what does all of this mean to you? What can asset management do for you? What might it do to you?

Well, let's not kid ourselves. Any time we have a stand-alone system that we have developed pretty much on our own, that is serving our needs, and getting the job done to our satisfaction, it is at the very least a little difficult to yield even a small measure of autonomy, although it may be for the greater good. Under an asset management framework, pavement management is one of several single-function systems that would

need to somehow be integrated to facilitate crosscutting analyses. This can make us leery and just a bit guarded.

So let's pose a few candid questions that can help us decide whether a broader asset management approach can actually be helpful to pavement managers. First of all, is our pavement management work afforded the priority and recognition it deserves? Are the fruits of our labor being used to their fullest potential across our agency? Is senior management aware of and using the policy level analyses that could help them in making their strategic decisions? Are we attracting sufficient investment in the preservation of our pavements? Are we getting sufficient funding to support our pavement management system? Sure, it's nice to be somewhat autonomous, but is there also an issue of relevance? And if we yield a bit with respect to the former, can we gain significantly with respect to the latter? Yielding a bit of autonomy in return for greater relevance may be a deal worth considering.

There is a diagram included in the new asset management guide that shows a pyramid, with adjacent two-way arrows running vertically and horizontally. The pyramid depicts a hierarchy of stakeholders ranging from elected officials and agency executives at the top, to front line agency staff at the base who support the whole structure. The arrows depict the vertical two-way flow of strategic and tactical information between the front office and the front lines of the organization, and a horizontal flow of information among individual functional areas to satisfy needs for common data without duplication.

Such sustained, omni-directional communication among stakeholders is a vital part of successful asset management. Open lines of communication in an atmosphere of trust and support are an obvious requirement of a collaborative enterprise such as asset management - - a requirement that is often the most difficult to fulfill.

This open pyramid model of asset management, if applied successfully, can accommodate the concerns among managers of independent systems, such as pavement management. The connections and access to top management and to sister systems do not necessarily compromise or weaken ownership or control. If accomplished in a sensible way, such individual systems can integrate with the whole while still retaining a vital sense of individuality so important to meeting their own unique needs. And such integration can also improve the visibility and presumably the relevance of these functional systems.

In a nutshell, what we are saying is that you as pavement managers and engineers and the information you bring to the table are vitally important to the success of transportation asset management, that you need not lose control over your systems by becoming an integral part of an asset management approach, and that in fact, you may end up in a stronger position if your access and relevance to management-level decision-making is improved.

Now, where might all of this lead? No one really knows, but in any case, it is fun to speculate. So let's shift gears for a moment and imagine that today is June 23<sup>rd</sup>, 2013, and we have been asked to report on the results of our research about the evolution of transportation asset management over the past ten years. Here is our imagined report.

(Cough) "Well ladies and gentlemen, more than ever, our customers are demanding that their roads be safer, less congested and better maintained than ever before.

Yes - - our customers are forthcoming about what they expect, and demanding about getting it done. They expect more output for less input - - better roads at less cost. Some things never seem to change. But, there is some good news to report in this 10-year retrospective. In fact, the way we do business in transportation asset management has changed quite a bit in those states that have focused on making positive changes and have managed to stay on the leading edge.

So what is new and different in these leading states? Let's begin in their district offices and maintenance garages - - places where the proverbial rubber meets the road. Nowadays, with expanded emphasis on operational efficiency and advanced technology, these places are so high tech that you'd think you were in an air traffic control center. One state started calling them "infrastructure operations centers" - - IOC's - - and that's beginning to catch on. It's quite a place compared to what it used to be.

For example, from your desk top PC, or from your in-vehicle monitor, or on a large, wall mounted plasma-screen display in the main operations room, you can instantly call up incredible amounts of information on any asset you're responsible for - - any stretch of road, any group of bridges, any individual sign, any culvert or retaining wall. You can identify exact locations, current and anticipated future condition, prior work performed, improvements needed by when, relative priority, and availability of funds.

By integrating databases for pavements, bridges, signs, signals, lighting, safety, the works - - overall priorities, work scopes, and funding can be developed to address all of the deficiencies along a single section of roadway. This means on a high volume route, you have the option of planning to go in once, with the same maintenance of traffic set-up, and take care of multiple problems along the same stretch of highway, instead of the old way of separate work orders, separate contracts and separate shutdowns to accommodate each type of work separately. Remember what our customers have been telling us for years about shutting down their roads for repair - - "get in, get out and stay out" is the order of the day. It turns out that the travel time savings to our customers and the budget savings to our DOTs by taking care of multiple items concurrently in the same work zone have more than paid for the required integration of our asset information systems.

Some assets - - particularly those that are safety critical such as signal systems and bridges- - are now self-diagnosing. They analyze themselves with sensors, they anticipate problems in advance and initiate a preventive solution, and if an urgent problem arises an emergency call-out is automatically triggered. In some cases, such as icing on trouble-spot bridges, they treat themselves. So-called smart infrastructure is an exciting new asset management tool.

Pavement data gathering and distress analysis through mobile sensors and advanced software has reached a level of accuracy we had difficulty achieving just a few years ago. And while most bridge inspection still involves a hands-on approach, advanced technology in sensing, recording and analyzing bridge condition information has come a long way in improving the accuracy and reliability of the data.

These states make a point to collect just the data they know they will need and use - - and they do it using advanced technology that fits in with the way they do business.

Their people really like it because the elusive promise of reduced paper work has actually been achieved.

Of course, information is recorded in all affected databases just once. That's another great advantage of finally having fully integrated systems after years of frustration with stand-alone systems that couldn't communicate. Finally, all parts of the agency are singing from the same sheet of music.

These states regularly do both strategic assessments for long-range planning and multi-year programming. Information from the field goes to headquarters where planning, engineering and finance people do a lot of number crunching and analyses looking at projected deterioration, costs, benefits, and tradeoffs within a wide array of investment strategies. The analyses ranges across all program categories - - bridge, pavements, safety, drainage, and roadsides - - and all geographic areas, in order to come up with an optimum mix of investment strategies.

Even with all this good information, the sparks still fly among senior staff when the debate kicks off in each year's budget cycle on where to allocate funds. Bridge repair and safety always have the inside track, but now, using these asset management analysis tools, pavements, drainage, and roadsides have a better chance than ever of attracting resources on the basis of objective life cycle asset management information.

The debate over strategies and performance objectives is facilitated by well-established performance measurement systems. Performance measures level the playing field by providing solid information on how things really are. Without them, we were flying blind, not knowing where we've been, where we are, or where we're heading.

And these states select performance measures that are as clear and useful on the front lines as they are in the front office, and which can readily be supported with basic information that is inherently a part of their asset management systems. The result is that decision making up and down the line is made within a framework of consistent and reliable information - - which is the key to success.

Recommended plans, programs and budgets are, of course, heavily influenced by target levels of service established in concert with elected officials, transportation commissions, and customers, and the financial resources they are willing to make available.

Yes, the ultimate decisions on how much to spend for operating, managing and preserving physical assets are still made by transportation commissions, governors, and legislatures. And I'm not saying that politics doesn't enter the picture any more - - you wouldn't believe me if I did. But now, using life cycle asset management analyses, fed by reliable data, policy level decision-makers have the opportunity to make reasonable and defensible choices on the basis of an objective, business-like approach.

But, if political expediency threatens to dominate decision-making to the point of throwing everything out of whack, with transportation asset management working for you, you can now quantify the impacts in economic and in operational terms that everyone can understand, and have a better chance of achieving a relatively balanced and prudent program, even in the face of political pressures.



And here's another amazing thing. The same asset management approach that drives planning, programming and budgeting - - the very same body of information - - is used at the operational level by maintenance managers to carry out their activities. Sure, some of the specific tools are different. But when the strategic decisions are made and the real work is ready to begin out in the field, it all ties together.

Can you believe it? The folks in the front office are listening to the folks in the field. And the folks in the field finally see that policy makers are listening and really care about system preservation and operations and maintenance.

Well, when you think about all this, maybe it's not surprising that these states are, in fact, managing to do a bit more with a lot less. And it's happening because they implemented the right mix of technology and teamwork as building blocks of their transportation asset management systems."

And that is my report from June 23, 2013.

In summary, it is clear that asset management is as much a philosophy and a frame of mind as it is individual systems and software. The systems and software are important and will facilitate the process, but they are not enough, and arguably not the most important part. Perhaps the most important part is the philosophical commitment to a strategic, holistic and rational approach to infrastructure preservation and enhancement that can adapt to our individual needs and circumstances.

Recently, the Government Accounting Standards Board, known as GASB, began requiring departments of transportation to file annual financial statements reflecting the condition of transportation infrastructure. Two reporting options were offered. Nearly half the states have chosen the more difficult and more demanding modified approach which provides an asset management option as opposed to the so-called depreciation option, which while noticeably easier to apply, yields less useful information. In an NCHRP-sponsored survey of the states, PB Consult, a sister company of Parsons Brinckerhoff, found that more than 80% of those states using the asset management approach acknowledged the greater value of this method for making finance and management decisions.

As part of implementing a transportation asset management strategic plan, NCHRP research is underway to improve technical tools and an FHWA pilot training course has been developed to help spread the word about the benefits of transportation asset management. And soon, FHWA will make available to the DOTs and others a training program that can be focused on the specific needs of individual organizations.

Whether we are stewards of pavements, or of any other critical components of our transportation system, I believe we will increasingly appreciate the benefits of being a part of something bigger than ourselves, that brings about better results, without compromising our ability to successfully carry out our own more focussed missions.

That is what transportation asset management is about. And you as pavement engineers and managers, who have already led the way with the deployment of pavement management systems, are in a position to play a critical role as transportation asset management becomes the accepted way of strategically managing infrastructure.