



TRAVEL-LOG

Delaware T² Center

Economic Downturn Affects T² Center Programs

By Lawrence H. Klepner

The public and private sectors as well as families and individuals are adjusting to our nation's economic downturn by cutting expenses, and (with any luck) spending their remaining funds more effectively. I want to update you on our plans for our next fiscal year that will begin on July 1, 2009.

The two principal sources of our funding are the Federal Highway Administration and the Delaware Department of Transportation. For the last several years, these two agencies have approved our work plans and budgets in the range of \$400,000 to \$425,000. DelDOT has directed us to cut our FY '10 budget request by an overall ten percent. Therefore, we anticipate it will total about \$387,000.

Budget reductions do not come without consequence. Some of our savings will come by reduc-

ing internal operating expenses. We will, however, also reluctantly lower the number of on-site instructor led workshops.

We estimate that we will schedule 2-3 fewer workshops in 2010 than in 2009 or 2008. On the other hand, we will experiment with newly emerging training techniques that are web based and at least theoretically cheaper to put on. It may turn out that the number of training events we present next year will increase. The quality of web-based training has so far been uneven, and we will do our best to sponsor events that will truly meet your needs.

We have taken the position, and DelDOT agrees that we should not lower our effort to provide technical assistance directly and in person to Delaware's local governments. Since 1992, Alan Kercher and now Matt Carter have crisscrossed the state visit-

ing our towns and cities that have very limited financial resources and often no professional engineering staff. Some of the types of assistance we have offered include pavement management, crash reduction plans, utility control policies, and many, many others. These services will continue unabated. In another article, Matt Carter describes how we will soon contact you regarding our traffic sign visibility program that will help you comply with new federal and state regulations.

In time, prosperity will return. Federal and state revenues will grow, and full funding to our center will be restored. Until then we will do our best to hold your trust and hope for your patience and understanding. We would appreciate your thoughts on how we can all get through the next few years together.

Design/Build as a Contracting Option

Traditionally, transportation construction was completed in a familiar, sequential pattern of design, bid, and build (DBB). Increasingly, project owners have looked to the alternative of design/build (D/B) for some projects in order to gain advantages of cost, schedule, risk management, and flexibility.

For those unfamiliar with the difference, the traditional DBB approach begins with selection of a design consultant, then the iterations of design and owner review, acceptance of the design, permitting, preparation of detailed contract plans and specifications, a second procurement for the construction contractor, and then the construction itself. In D/B, these steps are consolidated into a single procurement of an established team of engineers and contractors who can complete many of these steps concurrently with the potential to save time or

money (sometimes both) and/or gain other benefits such as design flexibility, innovation, or better risk management.

We typically hear about D/B for large mega projects like the Minneapolis I-35 bridge replacement. But in some instances, there can be advantages for small projects, too. For example, a project to upgrade sidewalks might benefit by issuing a D/B contract with a pre-set guaranteed maximum price (GMP), whereby the responding D/B teams would propose how much of a given area they could complete within the established specifications for the GMP.

If you'd like to learn more about alternative contract delivery mechanisms, contact Matt Carter at matheu@udel.edu or (302) 831-7236.

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Greater Emphasis on Sustainable Technologies Coming Our Way?



Recycled shingles are of increasing interest for use in hot mix asphalt, but so-called tear offs are still avoided in lieu of manufacturer's waste or off-spec product due to quality control concerns. But research and trials continue...

Transportation technologies already lead the way in use of recycled materials, but could we see a significant step forward over the next few years in the use of recycled products? The trend of current research and trials across the country suggest yes.

Increased sustainability has been a transportation goal for some time, particularly in areas where virgin materials such as aggregate are less abundant or have been partially depleted. But even where virgin supplies remain available, other factors drive a desire for sustainability, including cost and the public's desire to see practices that reflect EPA's Reduce, Recycle, Reuse mantra.

To some degree or another, most transportation officials are familiar with recycled asphalt products (RAP), recycled concrete aggregate, in-place recycling, and reuse of tires, shingles, slag, fly ash, and foundry sand, just to

name some.

Most recycled material pose challenges to materials engineers, material producers, and contractors. Scrap tire use has had to overcome contamination issues (dirt, water, other debris) and steel belt interference, but has made gains as a transportation material. While tear off shingles (those old shingled removed from roofs) are still largely avoided due to quality control issues (nails, asbestos containing material concerns, other debris), manufacture's scrap are used in many states as 5% of the makeup of hot mix asphalt (HMA), thereby reducing the need for virgin asphalt cement. Fly ash is commonly used in concrete to make it stronger, more durable, and more resistant to chemical attack.

As transportation officials, when we hear RAP, we understandably think HMA, where the use of RAP was pioneered. But RAP is also used

as road based material and increasingly, as substitute for virgin aggregate in surface treatments. Project owners in California, for example, have completed a number of all-RAP slurry seal applications and are progressively working out the bugs out of the technology.

Another leg in the sustainability mantra is Reduce and the evolving Warm Mix Asphalt (WMA) technologies hold great promise in reducing the energy demands of producing, transporting, and placing asphalt pavement. Through a variety of different methods, WMA allows production temperatures to be 50-100°F lower than traditional Hot Mix Asphalt, with the added benefit of lower pollutant emissions.

These and other sustainable initiatives continue to emerge as innovation in transportation is seemingly bounded only by the imagination of the practitioners in the field.

At right, slurry seal applications are typically used as a surface maintenance technique or as a friction course on oxidized pavement; increasingly, experiments suggest that slurry seal can be completed with 100% RAP. Below, shredded scrap tires are used effectively in rubberized asphalt cement, lightweight fill, and retaining wall reinforcement.



Delaware T² Center Purchases Sign Retroreflectometer

The Federal Highway Administration (FHWA) has enacted changes to the Manual on Uniform Traffic Control Devices (MUTCD) that require new retroreflectivity (a measure of a sign's ability to be read by sensitive driving populations during nighttime and other non-optimal conditions) maintenance standards for signs. Since the MUTCD applies to "any street, highway, or bicycle trail open to public travel," local governments should begin preparing for compliance and the T² Center can provide technical assistance as you do so.

By January 2012, local jurisdictions must establish and implement a sign assessment or a sign management method and all regulatory, warning, and ground mounted signs must be in compliance by January 2015.



With the purchase of a retroreflectometer, the Delaware T² Center will be able to help in several ways. We plan to conduct multiple

training sessions to teach managers and inspectors about options and techniques to comply with the new regulations, using the retroreflectometer for hands-on training. We'll also directly assist towns with the retroreflectometer to measure comparison panels, calibration signs, and control signs, as well as direct measurement of in-place signs.

As part of the FHWA R&D Deployment funding, the T² Center was able to purchase the retroreflectometer and a telescoping arm for approximately \$11,000. Most Delaware municipalities cannot justify the cost of the instrument for the small number of signs they maintain and so the methods they would use to comply with the MUTCD might lead them to higher maintenance costs. With this new equipment, we will now be able to help those towns optimize their useful sign life by using a mix of allowable methods that best suits their particular needs.

A brief overview of the new sign retroreflectivity requirements can be seen on our website at <http://www.ce.udel.edu/dct/t2/t2.htm> under Technical Briefs and Case Summaries. For further information or updates, contact Matt Carter @ matheu@udel.edu or (302) 831-7236.



The new sign retroreflectometer purchased by the Delaware T² Center will help municipalities meet the requirements of the MUTCD through training and direct measurements.



Retroreflection = Reflection? A Quick Lesson

Retroreflectivity—rolls right off your tongue, doesn't it? Why such a complicated word when you could just say "reflectivity?" Well, because they're not the same.

For many, the figures at right help de-mystify this cumbersome word that we in the transportation arena have begun to hear at every turn. For our purposes, light can reflect in three primary ways. The first is the very familiar mirror reflection—if we look direct

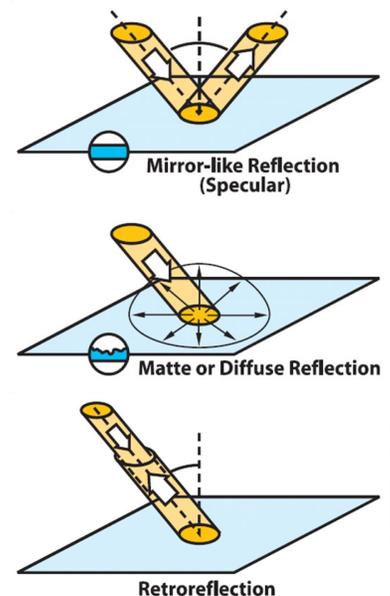
perpendicular at the mirror surface we see ourselves, but if we look at an angle, we see those objects to the left or the right, up or down.

Diffuse reflection is a phenomenon of light when it hits a matte or dull or other less than reflective surface and, instead of reflecting, tends to scatter or diffuse.

Neither of these reactions is helpful to us for seeing traffic signs at night. That's why

sign sheeting materials are designed to be retroreflective, wherein the light source (in this case, from our headlights) is reflected back along the same axis with a minimum of scattering. This allows the sign to be located safely out of the line of travel and yet be visible at night.

So, while the misuse of the term reflection is understandable and, at best, a misdemeanor, the difference is real and it does matter.





“Good fences make good neighbors,” and dated photographs can establish good/bad behavior and sort out facts as a basis for claims.



Construction Management: Use of Photos and Video to Limit Construction Claims

Believe it or not, there are times when a contractor is due an increase in project price or an extension of the schedule because of changed or unforeseen conditions, and a smart project owner knows to accept these when appropriate. However, the project owner wants to eliminate illegitimate or exaggerated contractor claims and there are a number of construction management methods that can be exercised that will help do just that.

One area to focus on is the use of photographs and video to document contemporaneously the conditions before, during, and after a project. Most construction inspectors recognize the value of detailed field notes recorded daily in a bound journal (often referred to as a “diary”), but many have still not adopted pictures or video into their project oversight activities.

Suitable digital cameras can be purchased for under \$200, making them an affordable tool for most projects. Most digital cameras even have some form of video capture capability - some are impressive. Photographs taken before, during, and after construction can be instrumental when separating fact from fiction with claims.

Video cameras themselves typically start more in the \$500 range and so are not as widely appropriate for generic project use. However, video in any form (digital camera or video camera) is a convenient way to capture pre-construction details with commentary regarding location

and condition of curbs, sidewalks, pavement, trees, etc. Video is sometimes superior when documenting reckless contractor activities or (more positively) unique approaches to field challenges.

Tremendous resolution is typically not required - you’re not going to frame any of these in all likelihood - and file size increases rapidly with resolution. In most situations, a given photograph needn’t be more than 1 MB and can often be in the 200 kilobyte range. Even if data storage is not a problem, shooting only in high resolution may limit your ability to use the photos for other purposes, such as web sites, reports, or presentations.

Increasingly, digital photos automatically capture some important information (assuming your camera is properly set), such as date and time (either on the picture or as embedded information), but it is also important to capture photographs that will tell the story of what was happening at that time. For example, capture the activity with a street sign in the frame at least periodically, so it’s clear where the activity is. Try at least once per day to capture a series of photographs that illustrate what equipment and personnel are on site and what activities took place that day.

Even with a sizeable memory card (an 8 GB card can be had for under \$40), you’ll likely download photos and video to your computer for storage at least once a week. Depending upon the nature and size of the project, give some thought to

how you will file your media. If the project is complex or has a lengthy schedule, you may gather 100-200 photographs per week, along with sporadic video. You’ll want to be able to find specific shots that are reflective of your need. You may wish to order the media chronologically, with daily or weekly folders, or you may wish to break the project into components (curb, sidewalk, pavement, signage).

Your computer may have software that allows you to add comments, tags, or captions to your photos and video. If so, you may wish to add comments or captions to your selected media to remember names of personnel or to note an activity of concern that may not be obvious at a later date.

Now, if everyone (you, your contractor, your engineer, etc.), is on top of their game, you may never use your photos or video except for nostalgia. But if your contractor submits a claim, you’ll want evidence to sort it out. Perhaps the claim is warranted, but you doubt the number of personnel or types of equipment that he claims were on site and in use for that activity - your photos and video, together with good diary notes, can help settle the argument.

Construction’s like the old poker saying: “trust everyone at the table...but cut the cards.” Ideally, your contractor is a trusted partner. But, digital cameras and video cameras have become cheap insurance.

Asset Management-You Need It Now! Working Smarter, Faster and Cheaper

By Alan S. Kercher, P.E., Kercher Engineering, Inc.

The old public works battle cry of “doing more with less” has never been more true than today. As municipal budgets and state financial assistance are cut, effectively managing your infrastructure assets is more important than ever. Failure of municipal infrastructure directly impacts our economy, our safety and our quality of life. The breadth and depth of infrastructure continues to expand and at the same time, it continues to age and deteriorate. This multi-dimensional problem creates a tremendous strain on budgets that are already stretched much too far. It is a very complex dilemma that demands a well thought-out, systematic solution commonly referred to as, “infrastructure asset management.”

An infrastructure asset management system (IAMS) provides the process for optimizing the maintenance, repair and replacement of all assets owned and operated by a municipality. IAMS covers all activities managed by public works departments from providing information on daily activities such as generating work orders to scheduling next month’s maintenance activities to developing annual budgets to long range planning through analysis of long-term performance of all assets.

Plan for Today

The maintenance management component of an IAMS includes a work order process involving database tracking of work required and completed related to labor, equipment and material usage. Major components of the maintenance program include planning, organizing, scheduling and controlling all activities. This includes both reactive as well as proactive maintenance. A service request feature allows agencies to track complaints from the initial call-in to completion of the work to citizen and management notification that the work was completed.

Plan for the Future

The planning capabilities of an asset management system allow an agency to predict future maintenance and replacement needs. Based upon the predicted maintenance and replacement needs, both short-term and long-term budgets are developed. Since virtually no agency has the financial capability to meet all future needs, prioritization analysis tools utilizing risk analysis methodologies allow the municipality to identify the future consequences of today’s funding decisions and provide for better planning to meet future needs.

Save Money

Asset management allows municipalities to systematically select the right repair at the right time at the right location in order to minimize the life-cycle costs of its assets. Properly implemented maintenance management systems improve labor, equipment and material efficiency resulting in significant cost savings. Long range planning tools provide the necessary information for decision-makers to make cost-effective funding decisions for future repairs and replacement of assets.

Reduce Community Complaints

Keeping track of asset conditions, reacting to service requests in a timely fashion and developing an efficient maintenance management program will greatly reduce the community’s frustrations. Additionally, by having a proactive maintenance and replacement program, unanticipated asset failures will be minimized.



Asset Management can address some or all of your strategic infrastructure—pavement, curbs, sidewalks, signage, drainage, water, wastewater, parks, buildings, and so on.



For information on how effective asset management can pay for itself for your municipality, please contact the Delaware T² Center.

In November, the T² Center will be hosting a one-day conference on Asset Management at the University of Delaware.



Bob McGurk and Kate Smagala are gaining hands-on insight into the engineering field



Rich Toulson illustrates work zone design specific to the urban streetscape needs of City of Newark personnel.



Engineering Interns Help T² Center Help Towns

In response to the Municipal Engineering Circuit Rider Program, some towns have asked for assistance getting started with asset management programming. With the help of supplemental funding from the Safety Circuit Rider Program, the Delaware T² Center was able to tap into the student resources of the University of Delaware and find two Engineering Interns to help us help the towns. From a pool of more than a dozen talented students, Kate Smagala and Bob McGurk were selected to assist in the development of strategic planning documents the towns can use in their street, sidewalk, and signage decisions for the next 3-5 years.

Bob and Kate are collecting data in the field, including dimensional data, sidewalk conditions, pavement distress modes, signage adequacy, and



stormwater drainage. They will then compile and analyze that data to develop strategic plans for upgrade, rehabilitation, and maintenance and develop low cost safety recommendations that have shown success elsewhere. They'll then assist in the development of reports the towns can use in their planning for capital and operational funding over the next few years.

The summer-long program has several goals important to the T² Center. It will respond to municipal needs for strategic planning for their transportation infrastructure. It will demonstrate the effectiveness of motivated and professional engineering students as part of the T² Center's mission and provide a foundation for future supplemental funding requests. And, it will provide a meaningful opportunity for students to explore the engineering field through hands-on application with real world implications.

Work Zone Safety Training Held at Newark Department of Public Works

The T² Center coordinated a work zone safety training session at the City of Newark Department of Public Works facility on May 27, 2009. The half day session was taught by Rich Toulson, DelDOT's Chief Safety Officer and attended by approximately 60 personnel.

Rich led the engaged crowd through an overview of Delaware's adaptation of Part 6 (Temporary Traffic Control) of the Manual on Uniform Traffic Control Devices

(MUTCD) and then spent the remainder of the session experimenting with various street configurations that the Newark folks typically encounter and discussing how the MUTCD could be best applied.

Because of the varied disciplines represented in the audience (DPW, Parks, Water, Electric, etc.), the questions were broad ranging and allowed Rich to illustrate a number of challenging work

zone constraints and ways to overcome them.

Rich reminded the audience that work zone design is intended to protect workers, but must reasonably accommodate all modes of travel, including bicyclists and pedestrians. The better these travelers are prepared for what is ahead in the work zone, Rich pointed out, the more likely they will get through it without hurting themselves or others.

Upcoming Events

The T² Center is planning the following events for the remainder of 2009 and early 2010. We will announce exact dates, locations, and other information as we finalize details.

- National Highway Institute (NHI) Course 133078 – Access Management Location and Design
- NHI Course 134006 – Highway/Utility Issues
- Cementitious Mixtures for Concrete
- Chemical Additives for Concrete
- 4-F Environmental Workshop
- Work Zone Training
- Asset Management Training for Local Government
- Sign Retroreflectivity (MUTCD)
- Tort Liability

T² Center Request Form

Your feedback and interests help us increase the T² Center’s effectiveness, so please complete and return this form or email us—all compliments, criticisms, and ideas are welcome!

_____ Please add my name to the T² Travel-Log subscription list—subscriptions are free
 _____ via U.S. Mail
 _____ via email

_____ I have an idea for a future T² newsletter article
 Topic: _____
 _____ I volunteer to author this article—please contact me

_____ Please consider these topics for future training sessions
 Topic: _____
 Topic: _____
 Topic: _____

_____ I would like to learn more about the T² Center and how its free services can assist my municipality or agency—please contact me
 Name: _____
 Agency: _____
 Address: _____

 email: _____

Please return this form to:

Delaware T² Center, Delaware Center for Transportation
 360 DuPont Hall, University of Delaware, Newark, DE 19716



Participants at the workshop and at the nighttime field demonstration for the May 21-22 Precast Concrete Pavement Systems



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**Helping to
Bridge your
Transportation
Gaps**

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The Technology Transfer (T²) Program is a nationwide effort financed jointly by the Federal Highway Administration and individual state departments of transportation. Its purpose is to interchange the latest state-of-the-art technology into terms understood by local and state highway or transportation personnel. The Delaware T² Center Travel-Log is published semi-annually by the Delaware Technology Transfer Center at the University of Delaware. T² Center articles also appear semi-annually in the TransSearch - the newsletter of the Delaware Center for Transportation. Any opinions, findings conclusions or recommendations presented in this newsletter are those of the authors and do not necessarily reflect views of the University of Delaware, Delaware Department of Transportation, or the Federal Highway Administration. Any product mentioned in the newsletter is for information purposes only and should not be considered a product endorsement.



Taking advantage of the winter "downtime," contractors, engineers, scientists, and planners from DelDOT, the T² Center, and the private sector gathered at Kent Polytech Career Training and Conference Center for a series of winter workshops designed to share lessons learned, developing trends, and changing requirements.



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