An issue on infrastructure maintenance

Pervious concrete gaining popularity

Nebraska has seen its first pervious concrete placed (other than demos) in a 20-house residential project in Lincoln. On May 1, 2006, Constructors Inc. out of Lincoln placed 120 yards of pervious concrete as a driveway/alley (400 ft x 16 ft) for the Liberty Village housing development at 22nd and Vine Street. Ready-Mix of Lincoln supplied the pervious concrete.

The developer wanted to use this kind of pavement because his housing development was adjacent to a flood control project presently being constructed through the middle of Lincoln and the UNL campus.

What is pervious concrete? It is basically your typical concrete without the sands added to it. By taking the fine sands out of a concrete mix it creates a product that looks like a rice crispy bar, full of air voids to channel the water through it and back into the ground below.

With the clay soils in Eastern Nebraska, a drainable rock sub-grade (6-12 in. deep) is needed underneath the top layer of pervious concrete (6 in. thick) to be used as a temporary retention pond to give the underlying soils time to absorb the rainwater. With a sandier soil like we have in the Western part of our state, pervious concrete may be able to be placed on grade.

This environmentally friendly pavement allows rainwater to run right through it and back into the ground without having to go through a city’s sewer system. An overflow drain-tile system can be built into the sub-grade below the permeable pavement to prevent possible saturation from heavy rains due to clay soils. If needed, this drain tile system can be tied into the sewer system at one end of the roadway or parking area, but the intent is to allow as much water as possible to flow back into the ground below.

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Mark your calendar for MINK6
October 18-19, 2006
St. Joseph, MO

Join county engineers and local road officials from the four “MINK” states (Missouri, Iowa, Nebraska and Kansas), plus FHWA and DOT representatives, as they discuss funding and road safety and maintenance issues. Topics will include when to pave a gravel road, avoiding EPA fines for erosion at work sites, SAFETEA-LU provisions affecting local agencies, access management in rural areas, and more. Look for an agenda in the mail soon.
Pervious concrete, continued from page 1

Is this type of pavement something new? Pervious pavements have been in use in the U.S. for about 35 years. It began as a storm water management tool in our warmer climate states that do not go through freeze/thaw cycles. Highly developed areas such as parts of Florida actually require a certain percentage of permeable pavement with new developments to keep from overburdening their sewer systems.

With the use of a drainable sub-grade, freeze/thaw states have begun using pervious concrete more often. Numerous Midwestern states have projects scheduled for this summer.

The College of Civil Engineering at Iowa State University is presently conducting research of pervious concrete to see if it meets the durability and freeze/thaw tests required to make this a viable product in states with freeze/thaw climates. Their early results are showing it can meet durability requirements and withstand our climates, if properly designed.

There is a push nationally to start educating more contractors and concrete suppliers on the proper placement and mix designs of pervious pavements. Developers and design-types throughout the Midwest are finding more uses for pervious pavements to help meet various environmental requirements and other needs.

It will not happen overnight, but pervious pavements are coming to a development near you.

This past March I attended a class in Baltimore, Maryland, to get certified as a Pervious Concrete Technician. Please call me at the Nebraska LTAP office if you have questions, I enjoy talking pervious.

Want to learn more?
The Kansas Ready Mixed Concrete Association is offering pervious concrete training in Topeka on September 20. For more information call Kerry Navinskey at: (785) 235-1188.

[You can reach Dennis Smith at (402) 472-5748 or by email at drsmith@unlnotes.unl.edu]

Reprinted and adapted with permission from Nebraska LTAP.

See the difference: Pervious concrete in the foreground shows no water retention.

Porous asphalt—Another choice for permeable pavements


Parking lots and other paved areas are often implicated as one of the causes of storm water problems. As these impervious surfaces “seal” the surface of the land, every drop of rainfall on the paved surface is forced to run off, contributing to flooding problems and washing the dirt and pollutants from these surfaces into streams and waterways. At the same time, water has often been regarded as the “enemy” of asphalt, causing numerous subbase failure problems, potholes, cracking, and general pavement degradation. Great
efforts are often taken to assure that water does not enter the roadway material, especially in areas with numerous freeze/thaw cycles.

Strangely enough, porous asphalt offers the opportunity to address both of these problems in many parking lot and paved area applications. With the proper design and installation, porous asphalt parking areas can provide cost-

to have special paving equipment or skills. With the proper information, most asphalt plants can easily prepare the mix and general paving contractors can install it.

Cost
Porous pavement does not cost more than conventional pavement. On a yard-by-yard basis, the asphalt cost is approximately the same as the cost of conventional asphalt. The underlying stone bed is usually more expensive than a conventional compacted subbase, but this cost difference is generally offset by the significant reduction in storm water pipes and inlets. Additionally, because porous pavement is designed to “fit into” the topography of a site, there is generally less earthwork and no deep excavations.

When the cost savings provided by eliminating the detention basin are considered, porous pavement is always an economically sound choice. On those jobs where unit costs have been compared, the porous pavement has always been the less expensive option. Current jobs are averaging between $2,000 and $2,500 per parking space for parking, aisles, and storm water management.

Construction
Invariably, when an infiltration-related Best Management Practice (BMP) fails, it is due to difficulties and mistakes in the design and construction process. This is true for porous pavement and all other infiltration BMPs.

Porous asphalt does not cost more than conventional asphalt and does not require special equipment.

Carelessness in compacting the subgrade soils, poor erosion control, and poor-quality materials are all causes of failure. For that reason, we provide detailed specifications on site protection, soil protection and system installation.

On every project, we meet with the contractor before construction and discuss the need to prevent heavy equipment from compacting soils, the need to prevent sediment-laden waters from washing onto the pavement, the need for clean stone, etc. We verbally review the installation process with the project foreman. During construction, we routinely stop by the site or provide construction advice. Successful installation of any infiltration BMP is a hands-on process that requires an active role for the designer. While we have prevented failures with this approach, most of the problems we have seen at other infiltration BMPs are a result of construction problems. Often the failure does not lie with the contractor or with poor soils, but instead is due to a lack of specific guidance for construction procedures.

Because construction sites are inherently messy places, we have often found it best to install the porous pavement towards the end of the construction period. By doing this, there is less risk of creating problems. On many projects, we will excavate the stone bed area to within six inches of the final grade and use the empty bed area as a temporary sediment basin and storm water structure. Care must be taken to prevent heavy equipment from compacting the soils, but sediment can accumulate. In the later stages of the project, the sediment is

continued on next page ➤
Porous asphalt, continued from page 3

removed, the bed is excavated to final grade, and the porous pavement system installed. This also avoids the need for a separate sediment basin during construction.

Maintenance
We recommend that all porous pavement surfaces be swept twice per year with an industrial vacuum sweeper. Unfortunately, like many storm water maintenance requirements, this advice is often overlooked or forgotten. Fortunately, even without regular maintenance, the systems continue to function. (We routinely send grad students and recent-hires out in hurricanes to confirm this.)

When runoff is conveyed from adjoining areas or roof surfaces into the bed, we often use a drop inlet box or other structure to reduce the amount of detritus and sediment that is conveyed to the bed. This structure also requires regular removal of sediment and debris.

Deicing and freezing issues
One of the most common questions we receive relates to concerns about freezing conditions. Freezing has not been an issue, even in very cold climates. We were quite surprised when the owners of early installations first told us that there was less need to snow-plow on the porous pavement surfaces. The underlying stone bed tends to absorb and retain heat so that freezing rain and snow melt faster on the porous pavement. The water drains through the pavement and into the bed below with sufficient void space to prevent any heaving or damage, and the formation of “black ice” is rarely observed. The porous surfaces tend to provide better traction for both pedestrians and vehicles than conventional pavement. Not a single system has suffered freezing problems.

Obviously the use of sand or gravel for deicing would be detrimental to the porous surface. However, salt may be used, and the surface may be plowed if needed. Most sites have found that light plowing eliminates the need for salt since the remaining snow quickly drains through the asphalt. This has the added benefit of reducing groundwater and soil contamination from deicing salts.

Where it doesn’t work
Because porous asphalt has reduced fines, it has less shear strength capability, and therefore is not recommended for situations such as airport taxiways or slopes over six percent. We have not used the material for roadways, although it has been applied more extensively in Europe. There are also locations where the threat of spills and groundwater contamination is quite real. In those situations (such as truck stops and heavy industrial areas), we have applied systems to treat for water quality (such as filters and wetlands) before any infiltration occurs. The ability to contain spills must also be considered and built into the system. Finally, we have avoided the use of porous asphalt in areas where the pavement is likely to be coated or paved over due to a lack of awareness, such as individual home driveways.

Variations on the theme: porous walkways and playgrounds; porous concrete
More recently, we have applied the asphalt to situations such as walkways and playgrounds, including paths at Swarthmore College in Philadelphia, and an urban playground at the Penn New School in Philadelphia. At Swarthmore College, the paths are not part of an infiltration bed but are merely intended to reduce impervious cover. The Penn New School project works to reduce the volume of storm water discharge. Both of these applications are “retrofits” in urban areas that were previously paved. Although we have used other materials such as porous concrete for both sidewalks and parking areas, the asphalt is less expensive and easier to install, and it remains our first choice. Even in hot southern climates, such as the University of North Carolina in Chapel Hill where two large commuter parking lots have recently been installed, the porous asphalt has performed quite well.

Summary
Bituminous asphalt for parking lots has proven itself to be one of the most effective and affordable techniques for addressing storm water management from development. It performs in both hot and cold climates and in a variety of situations. To date our installations include schools and universities, corporate offices, industrial sites, shopping centers, parks, libraries, a prison, and even fast food restaurants. Porous asphalt is cost-effective, long-lasting, and an ideal solution to reducing the environmental effects of pavement.

Reprinted with permission of the National Asphalt Pavement Association from their Hot Mix Asphalt Technology magazine, September/October 2003. The KUTC thanks Marc Elmore of the Kentucky Transportation Center from whom we received this story for reprint.

Correction
In our last issue we inadvertently omitted a Kansas County Road Scholar from our list of recent graduates at the supervisory level. Congratulations to Robert Reed of Coffey County for this accomplishment. We apologize for the error.
KU Transportation Center founder honored at retirement party

Friends and colleagues gathered on May 11 to honor the career of Joe Lee, professor of civil, environmental and architectural engineering. Joe retired from the University of Kansas after 33 years of service.

While at KU, Dr. Lee founded the KU Transportation Center (KUTC), which serves as the umbrella organization for two technology transfer programs: LTAP, serving local road and bridge departments, and RTAP, serving public transit agencies. Kansas’s LTAP and RTAP were among the first of these programs in the United States. The KUTC also hosts a variety of transportation research projects.

The KUTC has hosted many international visiting scholars and transportation professionals over the years. The KUTC also had a cooperatively-funded program to provide best practices in transportation to Taiwan, developed by Dr. Lee.

What’s new with the Kansas Collaborative

[In our last issue we introduced the work of the Kansas Collaborative and what it’s doing to save money for local governments. Here’s an update on two of their efforts.]

1R project. This project will provide advance notice to local governments of 1R road work planned in their areas by KDOT. Early communication will allow local governments to coordinate and budget for additional projects.

The Collaborative’s Transportation Breakthrough Team is working out the details for the program. Local officials on that team include Suzanne Loomis (Newton), Hub Caspar (Coffey County), Mike Graf (Ellis County) and Norm Bowers (Johnson County).

A map of planned 1R projects is completed for District 3 and maps should be ready for the other KDOT districts this month. Once completed the maps will be shared with local governments.

GIS project. The purpose of this effort is to increase the use of GIS among local governments in Kansas. The GIS Breakthrough Team facilitated six workshops statewide to identify needs, reaching 90 percent of their target audience. The team is working with the state’s existing GIS Policy Board to address those needs.

To date, the team has developed a GIS listserv with 325 participants and a document that outlines ways counties can use GIS.

For more information about the Kansas Collaborative, contact Joel Wright, TeamTech, (913) 492-4797.
Many local governments have large networks of rural and county roads that often consist of what are called low-volume flexible or built-up pavements. These are best described as conglomerates of a base course and wearing courses of chip seal or other asphalt overlays that have been built up over many years. Performance of these roads is typically inconsistent because of the diversity of materials used in their construction, making maintenance needs difficult to predict and plan. In addition, many of these roads often go without any maintenance at all because of budget constraints. In many cases, problems with these roads go all the way down to subgrade deficiencies.

A proven method of converting conglomerate pavement sections into durable roads that last many more years is by recycling old asphalt pavement and the base course into new roadway using a process called Full-Depth Cold In-Place Recycling (or “CIR”) with self-cementing fly ash. CIR is similar to subgrade stabilization in that self-cementing fly ash is used as the cementing agent to stabilize granular materials.

CIR is in use in several states, where it has been shown to produce longer road life at significant savings. The method also provides environmental benefits, as the process recycles deteriorated asphalt pavement and fly ash produced by electric power plants.

A demonstration of this process on approximately 2.5 miles of roadway was conducted in August 2004 by Jackson County, MO, in collaboration with Kansas City Power & Light Company and Lafarge North America Corporation. Dr. Anil Misra, Professor of Civil Engineering at the University of Missouri-Kansas City, served as an independent researcher to provide information to Jackson County for the development of specs and in the evaluation of the finished product. This demonstration project was given the Coal Combustion Products Partnership (C2P2) 1st prize award by the U.S. Environmental Protection Agency in 2005.

During the months that preceded construction, Dr. Misra and his graduate students made several trips to the demonstration site to obtain samples of the asphalt pavement and layers of base. While there, they performed Dynamic Cone Penetrometer (DCP) testing to establish baseline conditions.

The asphalt and base layer samples were transported back to the laboratory for material characterization and mix design testing, where the question quickly became one of whether the method used in the lab to crush the pavement was representative of the large equipment in the field. Once a comparable method was established, Dr. Misra’s laboratory went to work on determining optimum fly ash and moisture levels in order to attain maximum strength and density of the fly ash-treated RAP road base.

The research team was at the site to take DCP readings on the new road base as it cured—both immediately after compaction and after 24 hours had elapsed. These DCP readings were used to verify the design assumptions and are being analyzed to develop construction specifications and design and quality control guidelines.

For more information, contact Dr. Anil Misra, P.E., Professor of Civil Engineering University of Missouri-Kansas City, Phone: (816) 235-1285, Email: MisraA@umkc.edu.

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How projects are selected for K-TRAN research

By Lisa Harris

Proposals for K-TRAN research projects go to Area Panels in the following subject areas:
- Planning, administration and computing
- Operations: pavements, materials, construction and maintenance
- Geometric design, drainage and environmental
- Structural
- Traffic operations; driver and pedestrian safety
- Multimodal: rail, aviation, public transit and freight
- Local government

Each panel has a representative from KDOT, KU, KSU, and FHWA's Kansas Division. These panels start the prioritization process.

KDOT’s Area Panels

Priority is usually given to projects favored by the Area Panels and the Research Technical Committee and, ultimately, to projects that have the most far-reaching impact on transportation in Kansas.

This Council includes the Secretary of Transportation, Assistant Secretary and State Transportation Engineer, the FHWA Division Administrator, the deans of engineering KU and K-State, the Chief Engineer of the Kansas Turnpike Authority, a county engineer and a partner of a large consulting firm.

By mid April, K-State and KU faculty and administrators are notified of their funded projects. Official notification is sent by KDOT, and the work begins. It typically takes several years to complete and publish a K-TRAN research project, once approved. In some cases KU and K-State faculty collaborate on projects.

Where do you come in?

Some K-TRAN projects have been requested by local governments. A recent example is research on the...
How much parking is enough?

Parking and the provision of parking is an often-overlooked aspect of the transportation system. But parking plays a key role in the economic and social vitality of cities and commercial centers. The extent to which most cities address this issue is by ensuring their zoning regulations mandate an ample supply of parking for any new development. There are sound reasons for this approach: the cities want to ensure that shoppers are not discouraged by a lack of parking and that spillover parking does not inundate neighborhoods. But when is enough parking too much of a good thing? In fact, can there be such a thing as too much parking?

A growing number of cities and towns around the country are answering yes to this last question. They are beginning to recognize that too much parking can be as bad as too little and are taking steps to regulate the demand and the supply of parking. Some cities now mandate a parking maximum and not a minimum, as is the norm. They point out that the detrimental effects of too much parking are hard to measure but they are nonetheless quite real.

Clearly too much parking wastes land and carries with it a sizable economic penalty, especially in terms of wasted opportunities. But more important, too much parking often saps the vitality of an area by creating large dead zones where people do not want to be. There is also a growing recognition that it is not just the amount of parking that is important. How it is arranged relative to the buildings, who owns it, and how it is operated are all factors that affect the extent to which parking will have a positive or adverse effect on the surrounding land uses.

Study compares conventional vs. mixed-use shopping centers

To get a better handle on some of these issues, in 2003 we started a two-year study of parking at six commercial centers around New England. Our primary goal was to compare parking at mixed-use, walkable centers to that at shopping centers with more conventional development patterns. The three study sites are all compact, mixed-use districts with significant amounts of retail, entertainment, commercial and residential uses within the boundary of the site. Most of the parking at all three sites is owned and operated by the municipalities, which charge for parking in their facilities. The three study sites are also surrounded by residential districts and are connected to these districts by a dense network of streets with very good pedestrian facilities. Therefore, there is the potential for people from these surrounding districts to access these centers on foot or by bicycle.

In contrast, the three control sites are generally less compact and more homogenous in terms of use. For example, one of these centers has retail, entertainment and commercial uses but each use is generally set apart in its own individual pod, separated by areas of parking. Most of the parking at these three sites is owned by individual businesses and is provided free of charge. Two of the sites are adjacent to fairly dense residential districts, but the pedestrian and bicycle connections to the sites are not very good. One center is located in a very low-density suburban area with little viable pedestrian access.

One final and interesting distinction between the study sites and the control sites is than all three study sites had significant numbers of on-street parking spaces, while the control sites had little or none.

Results

Fewer spaces needed at mixed-use sites. The results of our analysis show that the study sites use much less parking and use the parking more efficiently than did the control sites. On average, we found that the peak parking use (generally during the holiday shopping period) at the control sites was about...
parking also serves to dampen the vibrancy of urban centers—it is essential for the mixed-use study sites. In other words, the amount of parking provided at the control sites was more than twice than needed even during the peak shopping period. This is a tremendous waste of land and is also environmentally unsound, as it means that a significant amount of unnecessary impervious surface is to be found at these developments. This amount of unused parking also serves to dampen the vibrancy of urban centers—it is essentially a double whammy, since parking itself is a negative in terms of attracting human activity and, at the same time, parking takes up land that could be put to more productive use.

Mixed-use sites promote “park-once” use. The study sites have a few advantages that allow them to operate smoothly at a much higher occupancy level. One important difference is that the study sites have paid municipal lots and garages that serve the whole center and not individual businesses. This consolidation of parking affords a great deal of efficiency. For example, at one of the sites, the consolidated parking is in demand constantly from early morning to well into the night with the type of users changing from shoppers in the day to diners at night. In contrast, at one of the conventional sites where each lot is dedicated to a specific type of business, some lots are full during the day but empty in the evenings, while others have the opposite pattern. The end result is that many more spaces are needed to serve a given level of activity, and there are a large number of spaces that are used for just few hours each day—a very wasteful use of land.

Surprisingly, in spite of the differences in parking use between the study and control sites, the parking regulations for the towns that host these sites all mandate about the same level of parking in their zoning regulations. The average requirement is about 5.5 spaces per 1000 sq ft of floor area. This is more than 2.5 times the amount of parking that is actually used even during peak shopping time. This is indicative of the overly cautious approach some communities have adopted in providing for parking. Other studies have shown the same results—many towns and cities are demanding far too much parking, thus wasting land, increasing development costs, deadening our urban centers, discouraging walking and riding, and adding to the runoff into our streams and rivers.

Recommendations
Based on this study we suggest the following strategies for reducing the negative impact of parking:

Reduce minimum parking requirements. The towns in our study man-

Mixed-use sites have paid municipal lots and garages that serve the whole area [with a range of uses and “peak” times] and not just individual businesses.
Nail down slipping soil

Machine launches steel rods into earth to prevent slides.

Summit County (Ohio) Engineer Greg Bachman believes he has found the solution to the county’s landslide problem: nails. Really, really big nails driven into hillsides at speeds of more than 200 mph. Bachman has convinced the County Council that a technique called “soil nailing” is the solution for landslides that have been troubling parts of the county since last summer’s heavy rains and flooding. It will be the first time the nailing technique, which involves the insertion of 20 ft steel rods into unstable soil, will be used in Ohio, Bachman said.

Using high-pressure compressed air, a nail launcher with a movable arm blasts the rods into an embankment in a grid pattern at extremely high speeds. The Council agreed to hire Grand Junction, Colorado, contractor Soil Nail Launcher Inc. to perform work on seven embankments in the county that have had landslides or are at risk of having them. The process works because the soil consolidates around the rods, keeping it from slipping away, thus preventing slides, Bachman said. The nailing works best in areas where there is a high clay content in the soil.

“The nails are driven in quickly and with so much focused force there is virtually no visible damage to the surrounding area,” he said, including none of the potential waterway sediment pollution caused by traditional excavation methods.

While the technique had not previously been used in Ohio, it has been used successfully in California, Oregon and Colorado by the U.S. Forest Service and by the Colorado Department of Transportation, Bachman said. There are numerous potential applications of the soil nail technology as a low-cost solution to geotechnical hazards.

According to the company’s Web site—http://soilnaillauncher.com—the nail launcher was originally developed as a secret weapon. The British military developed the compressed-air launcher to deploy nerve gas canisters as far as seven miles away. When nerve gas warfare was abandoned, a private company acquired the device and modified it to launch steel bars.

Traditional methods of soil stabilization for the seven problem areas in Summit County could cost between $900,000 and $3.5 million, Bachman said, but the company has agreed to perform the nailing work for no more than $300,000.

“We’re saving money doing it this way as opposed to traditional methods,” said Councilman Tom Teodosio.

How does it work?

The Soil Nail Launcher can accelerate a 1.5 in. diameter, 20 ft long steel bar at 220 miles per hour (see above). The bar enters the earth without significant abrasion. The soil particles then collapse onto the bar, providing surprisingly high pull-out resistance—many times greater than for driven bars and rods.

The Soil Nail Launcher is typically mounted on a tracked excavator. It can be mounted on about any vehicle or crane basket frame. It weighs about two tons, making it portable and able to reach remote locations.
A practical approach to small-patch asphalt recycling

By Ken Skorseth, SD LTAP Field Services Manager and Arlie Long, LTAP Technical Assistance Provider

What do you do when you have a small area on an asphalt-surfaced road or street that needs full depth repair? Would it be nice to recycle it or do some type of reclamation that processes the material to make it reusable as subbase or base? Here is another scenario: Would you like to make a clean utility cut in a road or street by milling the material, remove it and then bring it back as base aggregate after the utility work is done? Maybe you just need a machine that will loosen very hard, compacted base or aggregate surfacing in order to remove or reshape it.

There are two problems in the situations just mentioned: Small jobs are hard to contract and the equipment available is often too large or too small. Small milling heads on skid loaders are only suitable for very small jobs in special situations. On the other hand, the large mills and recycling machines are really only suitable for projects of considerable size.

There is one possible solution. A machine is available that will do all these things. It is a commercially-manufactured reclamation and milling attachment that fits on a standard front end loader. The SD LTAP recently contacted one city and one county that have purchased these machines. Both gave good reports on the performance of these machines.

Mr. Phil McKaskill, Huron (S.D.) Street Superintendent, commented that their machine paid for itself on one job done three years ago. That job involved water main replacement on 40 blocks. They were able to mill the existing asphalt and base aggregate and haul it to a stockpile. After the utility replacement was done, the recycled material was brought back as base. They have also used the machine for trimming an asphalt surface. In that case, Phil cautioned you must use water to cool the cutting bits.

Mr. Ray Roggow, Union County Highway Superintendent and Emergency Manager, commented that their machine is paying for itself this year on one road-widening job. This is being done prior to crack and seal and asphalt overlay of an old concrete pavement. The shoulder aggregate has been in place since the 1930s and is very hard to cut out and shape. They use their reclamation machine to mill up the aggregate to a uniform depth and haul it to a stockpile. After the utility replacement was done, the recycled material was brought back as base. They have also used the machine for other applications such as trimming an asphalt surface. In that case, Phil cautioned you must use water to cool the cutting bits.

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We do caution our readers these machines have their limitations. Both managers told us these machines do not replace large rotomills or recycling machines used on large projects. They use them for spot repair, preparing utility cuts, or, as in Union County’s case, for a special need on a road widening job. Both of these machines have a cutting width of four feet.

The machines have US manufactured engines for which parts and service are easily obtained. The cutting bits are standard, replaceable, carbide-tipped items which are also commonly used in other recycling equipment or on grader bit systems. They, too, are easy to obtain.

As more and more spot repair and rehabilitation and utility replacement has to be done on aging asphalt pavements, this may be a machine and a process your department can use. For more information on this machine, contact Ken Skorseth, South Dakota LTAP, at (800) 422-0129, or contact the manufacturer, Asphalt Zipper, in Utah at (888) 947-7378 or sales@asphaltzipper.com.

The KUTC thanks Ken Skorseth and South Dakota LTAP for granting us permission to reprint this article. Photo by Arlie Long.
Parking, continued from page 9

town centers. The problem is that these centers are still isolated from the rest of the community and cannot be accessed without a car. Places like this are unlikely to see reduced parking demand, but will use the parking pro-
vided more efficiently because of the mix of businesses sharing the same lot.

Re-insigate on-street parking. Our study showed that on-street parking was the most valued by customers and often the most convenient. In addition, on-street parking cuts down on the size of the off-street lot that is needed, thus reducing the amount of impervious surface. However, in the interest of efficient traffic flow, many towns have eliminated on-street parking and do not provide on-street parking in new development.

On-street parking brings other benefits in that it serves a traffic calming function, making a town center feel safer to pedestrians and more like a real center to drivers and pedestrians alike. On-street parking clearly delineates the street as a place rather than just somewhere to pass through.

Consider shared municipal lots: Our study suggests that effectively-run municipal parking systems provide many advantages in a commercial center. Lots shared among different types of businesses are used much more efficiently and do not have as many hours where they sit empty. In addition, consolidated municipal parking promotes a “park once” mindset, which benefits all the businesses in a center.

Finally, the parking revenue from municipal parking systems can be used to landscape, beautify and maintain the streets and other public realms of the center. The issue of charging for parking is a contentious one, but our study and others suggest that customers are not resistant to paying a reasonable rate for parking.

Few cities and towns have a comprehensive plan for the provision of parking in their commercial centers. However, we believe many town centers could benefit immeasurably from having a considered and coordinated approach to managing parking demand. The current system of over-supplying parking appears to waste land and resources, is environmentally unsound, and dampens the economic and social vitality of commercial centers. The good news is that our study shows that relatively small changes (such as improving pedestrian connections) can go a long way in reducing the amount of resources that are devoted to parking and in creating more vibrant centers in our cities and towns.

For additional information, contact the authors: Norman W. Garrick, Ph.D. (norman.garrick@uconn.edu) and Wesley E. Marshall, P.E., (wesley.marshall@uconn.edu) at the University of Connecticut Department of Civil & Environmental Engineering.

Adapted with permission from the Winter 2005 issue of Technology Transfer, a newsletter of the Connecticut Transportation Institute Technology Transfer Center.

Soil nailer, continued from page 10

Bachman said he has an informal confirmation from the Federal Emergency Management Agency that the county may be able to get some of the costs reimbursed, since Summit County has been declared a disaster area because of storms.

While most of the sites haven’t had severe slides, they have had continuous slipping over the years, with repeated cracking in pavement, Bachman said. “They’re slow-moving ones where we’ve had to go and repave the road and it cracks by the next week,” he said.

A free DVD showing footage of the soil nail launcher in action can be obtained by sending your name and address to bbarrett33@aol.com.

This article was adapted from “Summit plans to nail down troubled soil,” posted Thursday, June 24, 2004, on the Soil Nail Launcher’s Web site.
The pitfalls of allowing bicycling on sidewalks and bike/ped paths parallel to the road

... by Lisa Harris .................

When roads are heavily traveled and seem unsafe for bicycling, it makes sense to allow bicyclists to travel on sidewalks, right? In fact, some communities are building wide sidewalks alongside busy roads specifically to accommodate both bicyclists and pedestrians. But is this a good idea? The professional literature says no, unless the potential problems can be adequately addressed.

Below is an excerpt from a publication of the Institute of Transportation Engineers (ITE) that warns against mandating or encouraging sidewalk bicycle operation.

From the Traffic Control Devices Handbook published by ITE. Problems with Parallel Separated Paths. "It is frequently assumed that a separated parallel pathway along an arterial street or highway will provide a superior facility for bicyclists than the provision of on-street accommodations. While a parallel path may be aesthetically appealing, and may serve pedestrians well, the use of sidewalks or parallel separated paths for bicycle accommodation creates the following problems:

These paths will operate as sidewalks, and will be used in both directions, despite signing to the contrary. Bicyclists coming from the right will not be noticed by drivers emerging from or entering cross streets and driveways...

Travel in the direction opposite the flow of traffic is particularly hazardous during hours of darkness, because bicyclists may be blinded by oncoming motor vehicle headlamps.

At intersections, drivers will not be looking for bicyclists, who will be traveling much faster than pedestrians, to enter the crosswalk area.

At approaches to intersections, parked vehicles interfere with the visibility of bicyclists to road users. Also, at driveways sight distances on sidewalks and sidepaths are often impaired by buildings, property fences, vegetation, and other obstructions.

Stopped cross street motor vehicle traffic or vehicles exiting side streets or driveways may block the sidepath or sidewalk.

These paths are typically not safe for higher-speed use. Due to the speed differential, conflicts between bicyclists and pedestrians are common. Fixed objects such as parking meters, utility poles, sign posts, bus shelters and benches, trees, hydrants, and cross-sloped sidewalk ramps also pose a hazard to bicyclists.

The development of extremely wide sidewalks or sidepaths does not necessarily add to the safety of bicycle travel, as wide sidewalks and paths will encourage higher speed bicycle use, magnifying the potential for conflicts at intersections and driveways, and conflicts with pedestrians and fixed objects.

Many bicyclists will use the roadway instead of the sidewalk or sidepath because they have found the highway to be safer, more convenient, or better maintained. Bicyclists using the roadway are often subjected to harassment by motorists, who feel that in all cases bicyclists should be on the sidepath or sidewalk instead. [Some states, like Kansas, require bicyclists to use side paths when available. Kansas Statute 8-1590 states “wherever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway.”]}

There is the potential on sidewalks for bicyclists to accidentally ride off the curb, possibly causing a fall or collision with traffic on the roadway. While pathways may reduce the possibility of such collisions by using the recommended 1.5 m (5 ft) separation between the path and the roadway, such pathways will still be vulnerable to most of the other problems listed here.

Experience has shown that the use of STOP or YIELD signs on sidewalks and pathways to reduce conflicts at driveways and cross streets has little or no benefit. Bicyclists will not comply with unreasonable restrictions on their right of way, especially if the adjacent roadway has no such limitations. This may also breed disrespect for other traffic control devices that are far more important for traffic safety.”

How to address these concerns?
The Web site www.bicyclinginfo.org contains principles of shared use path planning and designs along with recommendations. Click on their “design & engineering” link, and then “shared use paths.”


Reviews

. . . by Lisa Harris . . . . . . . . . .

Gravel Road Maintenance, Meeting the Challenge,
University of Minnesota Center for Transportation Studies. This new toolkit features a DVD showing footage of how to properly maintain a gravel road. It is narrated by Ken Skorseth, South Dakota LTAP, who is the author of the popular Gravel Roads Maintenance and Design Manual. That manual is one of the most requested resources at Kansas LTAP. If you maintain gravel roads and you have a DVD-player, make sure you get a copy of this new and excellent resource.

Riparian Roads and Restoration, USDA Forest Service and the US DOT Federal Lands. This CD is an electronic short course about roads and riparian areas.

Dangerous Travelers: Controlling Invasive Plants Along America’s Roadways, USDA Forest Service and the US DOT Federal Lands. This DVD provides video footage of best management practices to assist road maintenance crews in controlling the rapid spread of invasive plants. Includes plant identification, inventory systems, mapping, maintenance techniques, and cleaning of equipment.

School Administrator’s Guide to School Walk Routes and Student Pedestrian Safety, Washington (State) Traffic Safety Commission, July 2003. This guidebook explains laws and liabilities associated with school walk routes, provides a background on student education; identifies potential partnerships to improve student pedestrian safety, suggests processes for maintaining school walk routes, presents guidelines for considering enhancements, and recommends procedures for schools working with public works departments to implement pedestrian safety improvements. 73 pages.

Calendar

See our web site for even more calendar listings.
Go to www.kutc.ku.edu and click on “Training Calendar.”

. . . 2006 . . . . . . .

September 20
PerVIOUS Concrete:
It Rains, It Drains in Topeka
Call Kerry Navinskey at 785-235-1188
September 22
Overview of Human
Resources Mgmt E
2 locations in Kansas
to be offered by the KS
Association of Counties
Call Randall Allen at 785-272-2585 for dates
of classes.

October 2-6
Kansas City Metro
Chapter APWA Snow
Roads
Call Joseph Johnson,
Chapter President, at 913-339-6700 X 131

October 10
APWA Kansas Chapter
Fall Meeting
in Topeka
Call Kenzil Lynn at 785-827-3603

October 10-19
MINK Regional Local
Roads Meeting
in St. Joseph, MO
Call Gary Rosewicz at 785-537-6330

November 19-21
KANSAS Association of
Counties Annual
Meeting (and KCHA
Fall Meeting)
in Topeka
Call 785-272-2585

November 19—Chanute
November 20—Topeka
November 21—Hutchinson

October 18-19
Snow and Ice Control
(1)
Oct 23—Topeka
Oct 24—Hays
Oct 25—Salina
Oct 26—Emporia
Oct 27—Chanute

November 7
9th Annual Concrete
Streets and Local Roads
Seminar in Overland Park
Contact: MO/KS ACRA
at 913-381-2251

November 8
Overview of Engineering Functions
in Kansas Counties and
Cities in Hutchinson

November 9
**Click, Listen & Learn:
S.O.S. for Sidewalks

November 20—Emporia
November 21—Hutchinson

November 26—Emporia
November 27—Chanute

December 19—Hutchinson
December 20—Topeka
December 21—Norton

February 15, 2007
**Click, Listen & Learn:
Traffic Calming Design
Guidelines

Service Excellence in
Public Works to be offered by the KS
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Call Randall Allen at 785-272-2585 about
scheduling.

Unless otherwise indicated, for information on calendar items (or to suggest a topic for an LTAP workshop), contact: Rose Lichtenberg, LTAP Training Coordinator, 785/864-2594, rosemary@ku.edu.

**To arrange for an APWA “Click Listen and Learn” downlink at your location, call APWA’s Education Department at 816/848-2792. Cost is $150 per downlink for APWA members; otherwise $200. Presentations are also available on CD for $49 for APWA members; otherwise $59.

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or fax to 785/864-3199

CDs/DVDs .................
You are free to keep these unless otherwise noted.

❑ DVD—Travel Road Maintenance, Meeting the Challenge
  University of Minnesota Center for Transportation Studies.
❑ CD—Riparian Roads and Restoration
  USDA Forest Service and US DOT Federal Lands.
❑ DVD—Dangerous Travelers: Controlling Invasive Plants Along America’s Roadways
  USDA Forest Service and US DOT Federal Lands.

Publications ..........
You are free to keep these unless otherwise noted.

❑ School Administrator’s Guide to School Walk Routes and Student Pedestrian Safety

Equipment ..............
We offer turning movement counter boards for loan to local highway agencies. Call us at (785) 864-5658 to arrange a loan. There could be a waiting list for these items.

❑ Turning Movement Counter Board DB-400, Jamar Technologies, Inc.
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❑ Turning Movement Counter Board TDC-8, Jamar Technologies, Inc.
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The Kansas Local Technical Assistance Program (LTAP) is an educational, research and service program of the Kansas University Transportation Center (KUTC), located in the University of Kansas School of Engineering. Its purpose is to provide best practices to local highway agencies and translating into understandable terms the latest technologies in the areas of roads, streets and bridges.

The KUTC Newsletter is one of the KUTC’s technology transfer activities. Published quarterly, the newsletter is free to counties, cities, townships, tribal governments, and others with transportation responsibilities. Editorial decisions are made by the KUTC. Engineering practices and procedures set forth in this newsletter shall be implemented by or under the supervision of a licensed professional engineer in accordance with Kansas State Statutes regarding the technical professions.

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