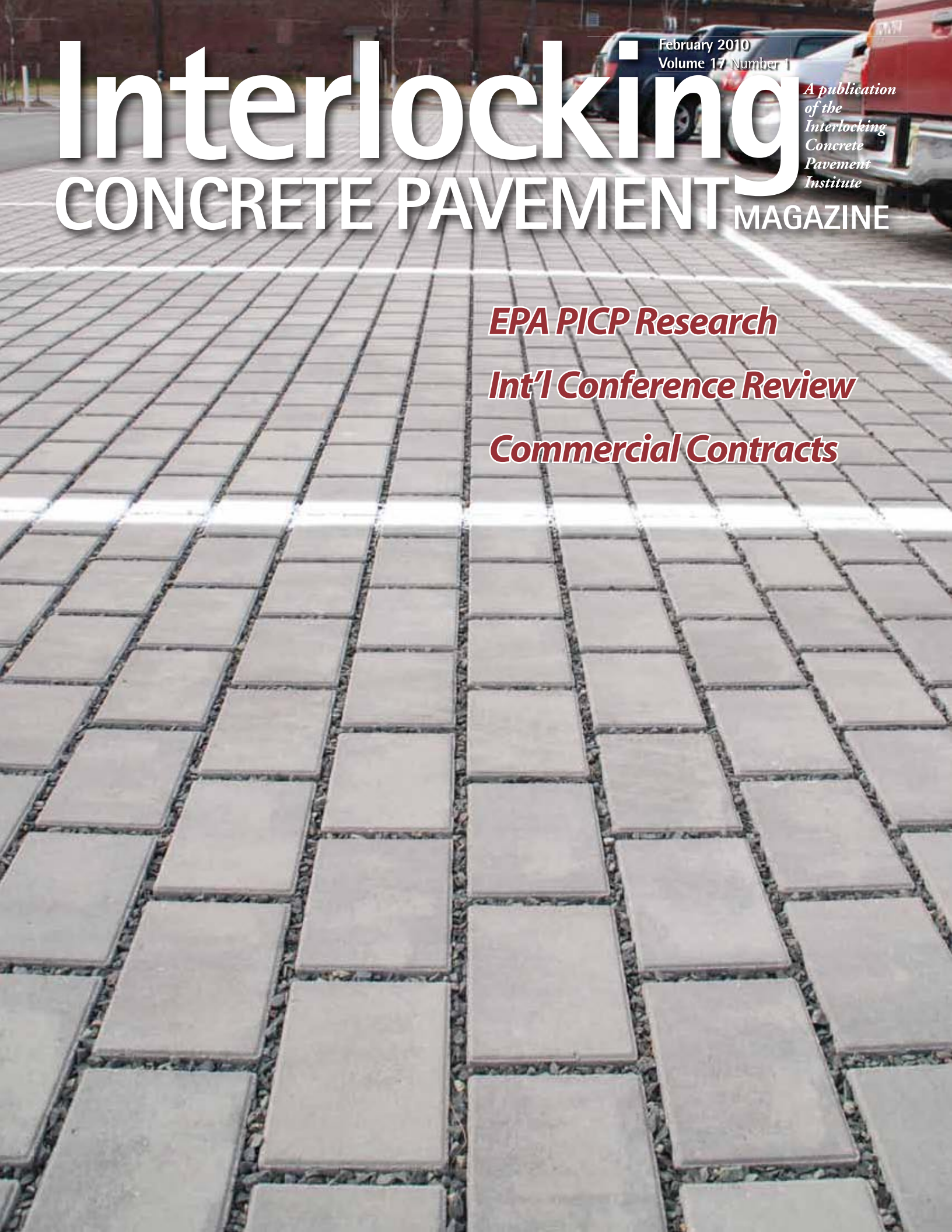
February 2010
Volume 17 Number 1

Interlocking CONCRETE PAVEMENT MAGAZINE

A publication of the Interlocking Concrete Pavement Institute



EPA PICP Research

Int'l Conference Review

Commercial Contracts

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ISSN 1087-9862

Canada Post Agreement No. 41567031

Interlocking CONCRETE PAVEMENT MAGAZINE

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Interlocking Concrete Pavement Magazine is published quarterly by the members of the Interlocking Concrete Pavement Institute (ICPI) for producers, suppliers, contractors, specifiers and users of interlocking concrete pavements.

The opinions expressed in *Interlocking Concrete Pavement Magazine* articles are those of the authors and do not necessarily represent the position of the editor or ICPI.

For further information about this publication or about membership in ICPI, write to the appropriate address, call (703) 657-6900 or fax (703) 657-6901.

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From the Editor David R. Smith

Beyond Hardscaping

Interlocking Concrete Pavement Institute has developed more resources for increasing interlocking concrete pavement use in commercial and municipal markets. This initiative is energized by the need to increase the per capita use of interlocking concrete pavements in the U.S. and Canada. Unlike Europe, North America does not have centuries-old construction training tradition for segmental pavement. The current 2 sf/person (0.185 m^2/person) consumption here speaks to the potential ahead. That potential is magnified by project owners and design professionals seeking sustainable, cost-effective solutions to building and site materials and systems.

Since 1995, ICPI members have sponsored hundreds of ICPI Level I Concrete Paver Installer Certification courses. The result has been over 18,000 certified installers. The course emphasizes residential construction, but lays out some basic engineering principles and best construction practices that apply to residential and commercial permeable interlocking concrete pavement (PICP) and to commercial/municipal paving projects.

The Level I course provides background and a prerequisite for two new ICPI courses which are the PICP Installer Technician Certificate Course and the Level II Concrete Paver Installer Certificate Course on commercial construction. The PICP course covers residential and commercial applications with an emphasis on commercial projects. The topics include job planning, site and soil characteristics, subbase/base materials, edge restraints, bedding and jointing materials, permeable pavers, estimating and maintenance aspects.

Level II covers a breadth of engineering concepts and construction methods for a range of applications. This include stabilized bases, overlays/inlays, bedding sand testing, paving slabs, roof applications, rigid applications, crosswalks, concrete grid pavements and mechanical installation. In addition, a significant part of this course focuses on estimating methods and

Continued on p. 26

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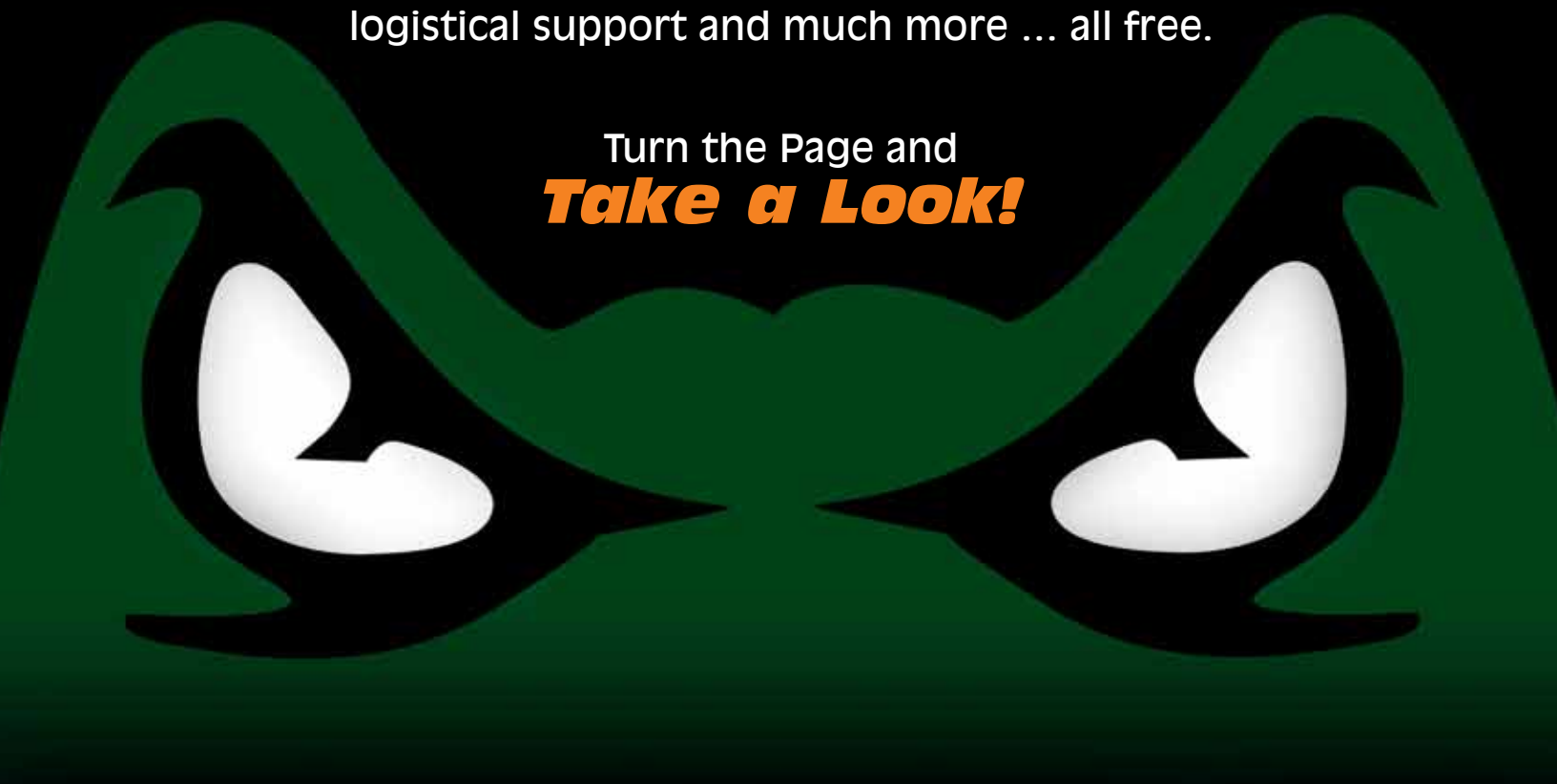

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US EPA Tests Permeable Pavements

The U.S. Environmental Protection Agency National Risk Management Laboratory in Edison, New Jersey dedicated a 110-car parking lot last October to research the long-term performance of permeable pavements. The innovative test area evaluates permeable interlocking concrete pavement (PICP), pervious concrete and porous asphalt. Each 38 x 140 ft (11." x 42.7 m) area accommodates the parking of employee cars next to conventional (impervious) asphalt driving lanes. The side-by-side comparison enables performance evaluation of the surface types under identical climatic conditions and operations. The parking lot will be almost completely full during work days.

Besides evaluating expected reductions in runoff flows, volumes and stressors (compared to impervious surfaces), the project aims to measure surface infiltration changes with time and use. A key aspect of the research is monitoring long-term processing of stressors in the soil subgrade as well any associated risks to groundwater. Changes in water table levels will also be measured to evaluate the positive impacts of groundwater recharge before and after the permeable pavement. In addition, the work includes monitoring temperatures at the surface, in the pavement materials and in the subgrade soil. Research will also look for possible mitigation of the urban heat island effect.

According to project manager Michael Borst of the Urban Watershed Management Branch, maintenance information will be collected with a special emphasis on surface cleaning with vacuum equipment, deicing salt use, and snow removal.

Municipalities need to know how to maintain these pavements. Surface cleaning will be done on part of the pavements on a regular basis. Other areas will not be cleaned. Both areas will be evaluated for surface infiltration monthly. This will help us identify appropriate cleaning intervals for this type of use. We anticipate developing straightforward evaluation methods using observation and infiltration measurements to make it simple for municipalities to monitor and maintain these systems.

Mr. Borst also noted that older urban areas within many cities across the U.S. are serviced by

The EPA employee parking lot includes similar sized PICP, pervious concrete and porous asphalt test areas separated by impervious asphalt driving lanes. Runoff from the asphalt will be compared to that from the permeable surfaces.

The new parking lot replaced an old concrete floor remaining from a demolished World War I building. The 5,230 sf (494 m²) PICP test section at right was supplied and installed by ICPI members.

combined sanitary and storm sewer systems. When the sewage treatment plant can t process the combined flows, raw sewage is discharged into rivers and lakes, thereby damaging water supplies and decreasing recreation opportunities. Separating the storm and sanitary sewers can be prohibitively expensive. Therefore, retrofitting cities using infiltration-friendly permeable pavements becomes a viable, low-cost alternative for cities to comply with the Clean Water Act and the National Pollutant Discharge Elimination System.

The project is built over sandy-clay soils with an average measured infiltration rate of 1" to "4 in./hr (40 to1"0 cm/hr). Each permeable parking test area is divided into four sections with, and five sections without, impermeable liners. This enables evaluation of runoff detention and treatment within underdrained or no-exfiltration designs as well as infiltration evaluation within the soil subgrade. Water from the enclosed (lined) sections drains into pipes and is sampled and tested for environmental stressors.

Designed with help from Morris Ritchie Associates, Inc., Engineers/Planners/Surveyors/ Landscape Architects of Towson, Maryland, the subbase for all of the permeable areas made use of crushed recycled concrete demolished from a decades-old, multi-acre floor. Part of it served as the parking lot surface in the same area as the new lot. The old recycled concrete was crushed and screened on the EPA property then placed to form a 24 to 48 in. ("00 to 1200 mm) thick layer. The subbase depth was intentionally made thicker than required for typical permeable pavements with the intention to capture and evaluate runoff from the biggest storms as well as that from everyday rainfalls.

All of the permeable pavements were built according to individual industry guidelines. The PICP includes a layer of ASTM No. 57 stone under a No. 8 stone bedding layer. The 3 1/8 in. (80 mm) thick concrete pavers were supplied and installed by ICPI members. The paver joints are also filled with No. 8 stone.

US EPA staff Amy Rowe, Emilie Stander and Thomas O Connor will be evaluating the reams of data from this site. Besides flow and volume measurements, water quality data will be collected on total suspended solids, pathogens, nutrients (nitrogen and phosphorous forms), metals (cadmium, chromium, copper, zinc, lead) as well as organic carbons (from oils and grease). A water quality lab-

Continued on p. 8

Crushed, washed and graded No. 2 subbase was recycled old concrete. The black flaps protruding from this material are the impermeable liners used in alternating areas. The liners are also lined with geotextile for projection.

US EPA Tests Permeable Pavements *Continued from p. 7*

oratory is a short walk from the parking lot making water quality analysis convenient.

Since the mid-1990s, much research has been conducted on the hydrologic and water quality aspects of PICP, pervious concrete and porous asphalt. For PICP, an abbreviated list of research below provides a broad range of information on infiltration performance, water volume and pollutant reductions plus maintenance.

Central Florida University:
Manoj Chopra, Martin Wanielista

Coventry University, U :
Christopher Pratt, Stephen Coupe, Alan Newman

annover University, Germany:
S nke Borgwardt

Morton Arboretum, Lisle, Illinois:
Andrew Sikich, Patrick elsey

North Carolina State University:
William unt, Eban Bean, elly Collins

Toronto and Region Conservation Authority:
Tim van Seters, Glenn MacMillan

University of Connecticut:
John Clausen

University of Guelph:
William James

University of Washington:
Derek Booth

Besides the US EPA project in New Jersey, reports on research and monitoring projects are expected in coming years from the following academic institutions and agencies. The list below is by no means comprehensive as there are other federal, state and local agencies initiating PICP monitoring projects.

Denver Urban Drainage Flood Control District:
enneth Mc enzie

Elmhurst College, Illinois:
Eugene Losey

Middle Tennessee State University:
eather Brown

University of California at Davis:
Masoud ayhanian, John arvey

University of New ampshire Stormwater Center:
Robert Roseen

University of Tennessee, noxville:
John Tyner

PICP and impervious asphalt are separated by a slot drain to collect runoff from the asphalt and compare it to the PICP infiltrate.

City of Chicago Department of Transportation:
Janet Attarian (including air pollutant reduction using photocatalytic cement)

Low impact development (LID) and best management practices (BMP) manuals by many states and cities have incorporated PICP as well as other permeable pavements into them. Some of these guidelines are outdated since much of the research noted above has occurred within the past five years. Recent exemplary guidelines include Environmental Site Design specifications by the Maryland Department of the Environment and a draft design guideline by the irginia Department of Conservation and Recreation. A growing body of knowledge and practical experience provides additional design guidance for these state and local regulatory agencies to issue updated information. The US EPA project is perhaps the most comprehensive and significant due to its unique design and comprehensive approach to long-term data collection and analysis. ❖

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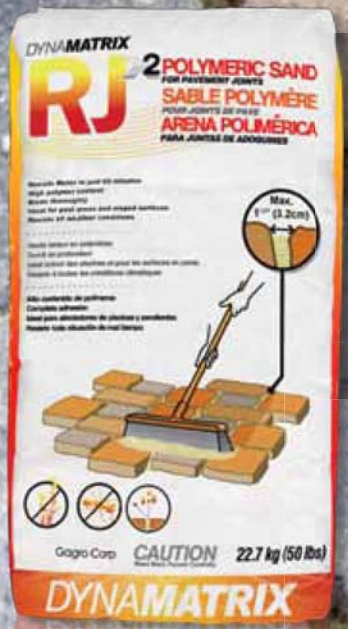

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Design Professional Office Sets PICP Example

The best advertising for LID design capabilities takes place with PICP on the site of landscape architects Cawrse & Associates in Chagrin Falls, Ohio.

Cawrse Associates, a 30-year-old Chagrin Falls, Ohio Landscape Architecture and Land Planning firm, used 8,000 sf (800 m^2) of PICP as part of updating their office facility for their practice. They set an example of low-impact development when designing a new office building behind their former office. Besides PICP, the site features a bioswale, bioretention basin and a rain garden fed by roof runoff.

To verify PICP effectiveness, the U.S. Geological Survey (USGS) installed monitoring systems under the parking lot. Sensors were placed at various depths within the open-graded aggregate base to measure the moisture. A flume measures the drainage quantity and timing exiting the pipe under the PICP. Data from this will be compared to that from a rain gauge to monitor the delay between rainfall and subsurface drainage. The Chagrin River Watershed Partners, Inc. (CRWP) awarded Cawrse Associates a grant for the project to help defray the PICP, rain garden, bioswale and bioretention basin costs.

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Design Professional Office Sets PICP Example *Continued from p. 10*

8,000 sf (800 m²) of PICP shown under construction here collects and delivers parking lot runoff to a bio-swale. Other LID techniques effectively capture most rainwater, filter and infiltrate it resulting in very little additional post-development runoff.

The key elements of the design include:

PICP that allows water to infiltrate into the groundwater aquifer. Excess filtration is diverted into subdrainge piping and discharged into the bioswale.

Rain Garden captures roof runoff from the building downspouts and piped to the rain garden to recharge the groundwater through infiltration and filtered by roots of water tolerant native plants.

A bioswale that receives site runoff and subsurface drainage slowed by native plantings and gravel riffles with rock weirs to increase infiltration before reaching the bioretention basin. The sides of the swale are planted with a no-mow seed mix and a low-maintenance, water-efficient native plants.

A bioretention basin works as a semi-wet pond with a forebay, mudflat/saturated areas with native plants placed according to wetness conditions that absorb and filter the water. This allows infiltration of most runoff on the site instead of flowing downstream. The perimeter of the basin is planted with a native no-mow seed mix.

An open Space/Conservation Easement This area remains undisturbed, which will allow the natural drainage flow to remain uninterrupted and the ground to remain as a pervious surface.

The PICP consists of 3 1/8 in. (80 mm) thick pavers on a 2 in. (50 mm) thick setting bed of ASTM No. 8 stone. The 14 in. (350 mm) thick base consists of open-graded aggregate base stone. Water that does not infiltrate the subgrade enters a 4 in. (100 mm) diameter perforated pipe which runs down the center of the drive lane. This pipe drains into the bioswale which drains into the bioretention basin. Flush concrete curbing contains the pavers around the perimeter of the parking lot.

Completed in 2008, the CWRP started a two-year monitoring program to measure water quality and quantity. The monitoring is supported by the USGS Ohio Water Science Center, the Northeast Ohio Regional Sewer District, the U.S. EPA National Research and Monitoring Laboratory, and with additional funding from the Lake Erie Protection Fund. The Cuyahoga County Board of ealth is providing assistance with sample collection for the duration of the sampling program. CRWP will be presenting results from monitoring program over the next two years to CRWP members and to the planning and engineering community in Northeast Ohio through workshops and training events. ❖

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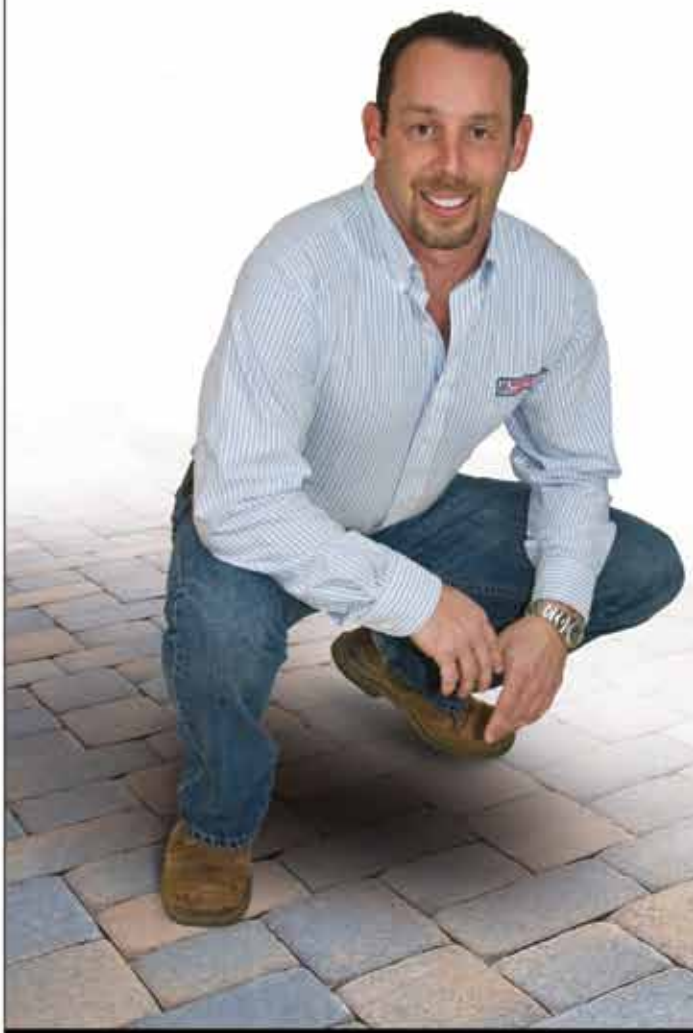

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Commercial Contracts Overview: Part 2

Editor's Note: In recognition of opportunities for developing the commercial market, the Interlocking Concrete Pavement Institute created a Level II installer certificate course for those interested in or presently doing commercial segmental concrete paving jobs. The course roll out is planned for March 19-20, 2010. Part 1 in the November 2009 issue and now Part 2 here are excerpted from the course materials on some key features of commercial contracts. In Part 1, contract components were covered with emphasis on the 2004 MasterFormat *project manual structure, general conditions and estimating general conditions. In Part 2 below, bid bonds, performance bonds, labor and material (payment) bonds, insurances and liens are discussed.*

While there are common aspects to most commercial contracts, each contract is as different as the next regarding specific contract relationships and requirements, not to mention a wide ranging scope of work and segmental paving systems. Much of this article relies on information from the The Manual of Practice *authored by the Construction Specifications Institute. This is a valuable resource for contractors and material suppliers as well as specification writers and design professionals.*

Some Bond Basics A bond is an agreement among three entities. The bonding company (called surety) guarantees to a project owner or general contractor (called the obligee) that a contractor or subcontractors (called the principal) will perform on a contract, i.e., complete the job in a timely manner as specified in that contract. A bond has another key role in the construction world, prequalification of contractors. A construction company that can purchase a bond (from a bonding or surety company) essentially says that the construction company has been examined by the bonding company and found to have the ability to complete the requirements of a specific project contract.

In simple terms, a bond is an insurance policy carried by the contractor. A project owner can lay claim (i.e., sue for payment) on that bond if the contractor does not complete a project as directed in a contract. Obviously, the ability of a contractor to purchase a bond depends on the financial strength of that contractor as well the company's track record in completing projects.

There are three types of bonds: bid bonds, performance bonds, and labor and material (payment) bonds. Requirements for each are typically specified in the general conditions of the contract and may exist as separate documents. The price a contractor pays for bond premiums are included in the project bid proposal.

A **bid bond** protects the project owner against withdrawal of a favorable bid. The bond is provided with a bid proposal from a contractor. Therefore, requirements for bid bonds are often in the instructions for bidders, i.e. the bid package. A bid bond guarantees that the bidding contractor offering a price proposal will enter into a contract for the bid amount, assuming that the project owner accepts the contractor's bid proposal. It is a way for project owners to keep a contractor from backing out of a bid proposal offer after they are opened and prices are compared.

When there is more than one bid proposal, there can be price gaps among them due to differences in estimated costs or inadvertent omission or errors in estimating. A bid bond prevents a contractor from backing out after seeing the other contractor's price proposals for a project. If the contractor must back out, the bid bond includes a dollar penalty or percentage of the bid that must be paid. Failure to provide a bid bond when required leads to rejection of the bid. For publicly bid projects, there is often a minimum dollar value of the proposed improvements required before a contractor must submit a bid bond with a price proposal.

Interestingly, if an owner accepts the lowest bid and that contractor refuses to enter into a contract, the owner can request the difference in the lowest bid up to the minimum penalty amount from the bonding company. There are some legitimate bases for a contractor withdrawing a bid. These can include the bid not being accepted in the time specified in the bid documents, the bidder demonstrates that a legitimate mistake was made by the project owner in the bid or contract, or the if the owner unilaterally changes the terms and conditions under which the bid was submitted.

A **performance bond** guarantees to a project owner that a general contractor or prime contractor will perform the contract. The contractor can be subject to events such as accidents, poor weather conditions, labor strikes and material shortages and subcontractor nonperformance. From the project owner's perspective, contracting represents a significant risk and a bond purchased by the contractor shields the project owner from that risk. The precise definitions for defaulting on performance by the contractor are in the performance bond documents.

Should a contractor default on performing on a contract, the surety or bonding company will investigate the reasons why an owner is making claims against the contractor. Once the rationale for the claim is validated by this investigation, there are several options depending on the situation. If the contractor is doing satisfactory work (meeting the contract) but is not being paid by the owner, the bonding company would pay the contractor to complete the project. This requires careful management by the bonding company.

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New Entry in ThePaverDictionary.com

WetLook Stabilizing Sealer[1] [wet-look **stey**-buh-lahyz-ing **see**-ler]

***Noun*:**

1. a liquid applied immediately after the pavers have been installed to stabilize the joint sand and seal the paver surface as a 2-in-1 application.
2. a liquid that fuses the joint sand into a tough elastic matrix and simultaneously seals the pavers with an attractive darkened "wet" look.
3. gives paver installers the BP Pro Advantage and allows them to increase profits.
4. is VOC compliant throughout North America.

Origin:

2007; BP Pro

Synonyms:

None

Commercial Contracts Overview: Part 2 *Continued from p.16*

If the owner terminates the contract (usually due to non-performance of the contract), the bonding company can hire another contractor to complete the work or have the owner hire another contractor to complete the project. The bonding company will likely have to pay the difference between the unpaid balance remaining original contract and the price paid to complete the work by the new contractor.

A performance bond does not protect the owner from his own defaults, only those by the contractor. If the owner is found to breach a contract and removes a contractor from the project, the surety company may have a legitimate defense to not pay claims on the bond including costs to hire a replacement contractor. Also, any changes in the scope of work in the contract require consent by the surety company. If a project owner changes the scope of work once the project is underway without surety company agreement, then any contractor issues with those changes may not be insured by the surety company.

A **labor and material or payment bond** guarantees that subcontractors and material providers will be paid. The owner buys protection against work stoppages due to non-payment or other reasons by the general contractor. The bond generally covers the cost of completed work and materials, not to anticipated work or materials purchased by subcontractors that hasn t been installed.

Bond forms Publicly owned projects offer standard bond language in contracts usually required by state and/or local laws. These are often found in the general conditions of the contract or can be accessed on the Internet. For private projects, one of four forms is often used. They are published by the American Institute of Architects (AIA), the Associated General Contractors (AGC), the Engineers Joint Contract Documents Committee (EJCDC) or the Design Build Institute of America (DBIA). Each is different and each has different legal consequences when used. If there is no standard written bond form provided in the contract, legal counsel should be sought by the project owner on bond forms. The paver installation contractor or subcontractor should obtain copies of all executed bond forms and carefully review the legal obligations of the owner, general contractor and subcontractors with an attorney experienced in construction bonds and construction contracts.

Other Insurance The general conditions of the contract should state the insurance coverage required by the general contractor and subcontractors. These include insurance for the construction contract held by the general contractor and general liability insurance coverage required for the general contractor and subcontractors. General liability insurance includes general aggregate limits, each occurrence limits, medical expense limits, fire damage limits, liability on completed products and operations, and personal injury limits. There is also required amounts for property damage and bodily injury coverage for vehicles and equipment. Contracts may require property insurance to protect from financial loss due to earthquakes, floods, items stored off-site, equipment and machinery, and loss of use. Finally, workers compensation insurance for all employees of the paver installation contractor must be included as required by federal and state/provincial laws.

Fundamentals of Lien Law According the American Subcontractors Association booklet, *Lien Bond Claims in the 50 States*, a lien is an encumbrance or claim on real property for some debt or obligation. A lien is a claim attached by a contractor to the title of real estate owned by the project on which a contractor has not yet received payment. A lien creates indebtedness on the property owner such that when the property is sold, payment from the sales proceeds go first to any persons or entities that have placed a lien on the property. State laws call these types of attachments to a real estate title a mechanics or a materialmans lien.

The threatening part of a lien to a project owner is that a sale can be forced of the property for the lien to be paid. Most states have strict time limits on filing often no later than 90 days after the work was performed. Some states require a court hearing to evaluate the validity of the lien prior to forcing a property sale. All liens can be perfected or paid upon sale of the property on which the contractor made an improvement. For some projects, liens are filed upon contract execution as a way for contractors to lay claim to the value of their work within that property if not paid in a timely manner and/or according the contract conditions.

There are other types of liens such as a mortgage lien held by a bank for financed or refinanced property (so the owner can obtain cash), and a tax lien for unpaid real estate taxes owed to the local town, city or county, state or federal government. In addition, some governments can attach liens when they enter the property to make improvements that if not made will threaten public, health safety and welfare. An example is demolition and clearing of a long abandoned property. Generally, mechanics liens have a higher payment priority than mortgages.

Lien laws and procedures vary among all states. The advice of an attorney licensed to practice law in the state in which the property is located is essential in attaching liens to a property. Courts require strict compliance to lien statutes and an attorneys assistance can assist with compliance to legal processes. What further complicates liens is that there are different legal procedures for attaching a lien to private property and to publicly owned property. Most states and provinces prohibit liens on public property and the bonding company must be sued for payment provided that there is a performance or payment bond on the project.

A list is provided below for use in discussions with the attorney. In addition, the Internet often provides access to lien statutes, procedures and forms.

Who may claim: Who has a right to issue a lien? Can this be done be by the general contractor, the subcontractor, material suppliers, laborers/unions, builder, artisan, those who lease equipment and machinery to a project?

The lien placement: Laws will vary on where and with whom the lien is placed: the land, the building, boats, engineer, architect, landscape architect, appraiser, title insurance agent, railroads, or property owned by a religious or charitable organization.

Required notice and timing: State laws vary with regard to notifying the property owner and timing of lien placement.

Lien recording: Laws vary on timing as well as the court jurisdiction.

Other provisions: Some states allow bonds to substitute for liens and others allow arbitration rather than more costly litigation to resolve liens in the courts. Also, there are procedures to release a lien once the debt is paid directly to the contractor without a property sale, or payment as a result of a sale of the property.

Right to waive a lien: This decision should be carefully considered as some contracts include this as a condition. Generally, waiving rights (partial or full) to a lien should only be done when paid.

In conclusion, commercial contracts can include many legal provisions that may or may not be advantageous to general contractors and subcontractors including those that install segmental concrete pavement systems. It is always wise to consult with an attorney and an insurance agent experienced with commercial construction contracts prior to bidding and engaging in any project. ❖

HNA Joins GIE+EXPO in October 2010

Louisville, , USA America s 14th largest trade show, GIE E PO, has announced co-location of ardscape North America (NA) with GIE E PO in Louisville, October 28 30, 2010. The addition offers new education and business growth opportunities to the thousands of lawn and landscape professionals attending the GIE E PO and new attractions for over 2,400 design-build contractors, architects and engineers that attend ardscape North America annually.

ardscape North America is sponsored by the Interlocking Concrete Pavement Institute (ICPI). The show is the hardscape industry s premier event attracting manufacturers, designers and contractors of segmental pavement systems, segmental retaining walls, water features, outdoor kitchens and fireplaces for residential and commercial applications. Adding NA at GIE E PO adds many new dimensions, states Warren Sellers, GIE E PO Show Director. NA brings thousands of new attendees to Louisville with the buying power for on-the-job equipment, as well as exposure to all of the educational opportunities available throughout the show week.

Raised paver and SRW patio construction is demonstrated at the Hardscape North America show

The combination of the green industry, power equipment and permeable/interlocking concrete pavements together in one place exemplifies the movement towards integration of softscaping and hardscaping in sustainable environmental designs. ICPI Chairman Ed Fioroni confirms the benefits of bringing ICPI s show to GIE E PO. Its a great marriage for attracting new contractors, landscape designers and irrigation professionals to our show while providing our attendees all there is to see on the equipment side. Today our industry is expanding beyond residential into much larger projects for cities and greener environments and this is the perfect venue for providing the latest tools and training needed to help contractors grow.

NA offers valuable certification, certificate and hands-on educational sessions for hardscape and landscape professionals two days before the start of GIE E PO covering topics ranging from segmental retaining wall installation to permeable interlocking concrete pavement construction. We re looking forward to helping landscapers learn the proper installation procedures and to take advantage of all the combined shows have to offer. adds Bill Schneider, President of Advanced Pavement Technology in Oswego, Illinois. ere they see the tools they need while learning from in-depth sessions as well as seeing hands-on installations in progress at the outdoor demonstration area.

As an NA exhibitor, we are looking forward to being in Louisville, says Craig Willike, General Manager of Pavestone. Its an exciting destination for the contractors we want to see at the show, and its easy to get to from a multi-state area. Bill arley, Outdoor Power Equipment Industries president comments, As our environment changes so do the industries that design, build and maintain it. aving NA alongside GIE E PO gives another solid reason why attendees should plan to attend. They want to see new products, learn new ways to improve their business and head back home energized to work on building their businesses. We re looking forward to the dynamic synergy that GIE E PO and NA brings in 2010.

For more information visit www. ardscapeNA.com. ❖

Industry News

NC State to Host PICP Maintenance Workshop

Following the success of the May 2009 workshop (see the August '09 issue), the NC State University Department of Biological and Agricultural Engineering, Advanced Pavement Technology, Elgin Sweeper and ICPI will be hosting a PICP maintenance workshop on June 4, 2010 from 8:30 a.m. to 2:30 p.m. The seminar location is the Naval Postgraduate School, ME Auditorium, 702 Dyer Road, Building 255, Monterey, CA 93943. For more information and registration visit www.bae.ncsu.edu/stormwater/training/permeable_pavement.html. The session includes presentations and outdoor maintenance demonstrations. Registration is $125 by May 14 and $150 after May 14. ❖

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Oil Eater quickly and safely removes grease, oil and grime from concrete pavers, asphalt, walls and tools, as is or with pressure washing. The solvent is non-flammable, water-based, biodegradable, contains no acid, abrasive or petroleum solvents and will not harm the skin. It penetrates rapidly, rinses off easily and leaves no residues. Oil Eater is available in a 1 gallon (4 liter) bottle, 5 gallon (19 liter) bucket and in 30 and 55 gallon (114 and 208 liter) drums. For further information, visit www.oileater.com call 800-528-0334. Samples are available upon request. ❖

Ar entina Con erence e ie

Over 200 persons from 27 countries convened last October in Buenos Aires, Argentina for the triennial 9th International Conference on Concrete Block Paving. osted by the Argentinean Concrete Block Association, the Argentinean Portland Cement Institute and endorsed by the Small Element Pavement Technologists, the program featured 5" peer-reviewed technical papers presented over 2 1/2 days. In addition, the conference was preceded by a half-day seminar on the basics of interlocking concrete pavement for design professionals.

The conference director, Timoteo Gordillo, President of the Block Association, created a bi-lingual program with ideas and insights that helped advance the industry in countries with developing markets and those with mature markets. e provided the keynote address with a history of the international conferences and workshops since 1980 showing the organizers and venues. The current and past 12 conferences have generated "23 technical papers with over 1500 delegates. e also gave a tongue-in-cheek history of some of the conference organizers and more colorful presenters, and illustrated unconventional uses of concrete pavers.

Like the 200" San Francisco conference, permeable interlocking concrete pavement (PICP) research and case studies led the program with 15 papers. One paper presented was about a runoff pollutant and temperature monitoring project on a PICP parking lot at Rainey Endowed School in Northern Ireland. (This historic school began with private funds and now with public funds selects only top students.) The monitoring demonstrated significant reductions of hydrocarbons and metals as well as cooler ambient temperatures.

Civil engineer Timoteo Gordillo, President of the Argentinean Concrete Block Association organized the bi-lingual 9th International Conference on Concrete Block Paving in Buenos Aires.

Research was supported by a nearby permeable pavement manufacturer. The two students, Joshua Smyth and Ross Campbell, conducted the research won an essay competition on permeable paving. Their prize was to present their research findings at the conference. This came across to many conference delegates as a means to involve the younger generation in sustainable design while exposing them to the global industry interests. Their science teacher, Ray irkpatrick, and consultant Dr. John napton (formerly a professor with Newcastle University in the U), helped direct the contest and advised the students in their research. Both teachers proudly witnessed the students presenting their paper at the conference.

The international conference included an exhibit area for international companies supporting the segmental concrete industry.

One of the most challenging papers was by Stephen Coupe from the United ingdom who presented the integration of horizontal ground source heat pumps with PICP as a means for energy conservation. e described an ECO ouse demonstration project with a lined PICP reservoir that stored water from which heat was drawn via pipes for floor heating to reduce energy use. While in its early stages, the project demonstrated the potential for energy savings from integrating these two technologies. A larger construction area was shown, a large parking lot at a paver manufactur-

ing plant with pipes that could support heating and cooling office buildings (see photos).

Seven papers presented were generated from research by the Interlocking Concrete Pavement Institute. These papers and presenters included:

An overview of the new PICP Installer Technician Certificate course (David R. Smith)

Bedding sand selection criteria for vehicular traffic (David R. Smith)

Pavement performance prediction using pavement condition surveys and pavement life-cycle costing (Dave ein, P. Eng.)

An update on the emerging ASCE/ANSI standard on interlocking concrete pavements by Applied Research Associates (Dave ein, P. Eng.)

Crosswalk performance research by the University of Waterloo (Dr. Susan Tighe)

PICP research by North Carolina State University (Dr. William unt) and

An overview of ICPIs Permeable Design Pro software (D. J. Swan). This enabled comparison to another program called Permpave recently developed by David Pezzaniti with the University of South Australia and Dr. Brian Shackel from the University of New South Wales Australia.

Several PICP case studies were presented including large PICP projects in Belgium (Dr. Anne Beeldens), Australia (Dr. Shackel) with infiltration studies that demonstrated sufficient surface infiltration rates in roads and parking lots after many years of use. ICPI member Charles Taylor presented a PICP case study on Elmhurst College in Elmhurst, Illinois (see the November 2008 issue of this magazine at www.icpi.org), the first of a comprehensive campus plan to convert all parking surfaces to permeable systems.

Most PICP around the world is being applied in commercial parking lots and in low-volume roads. Papers on structural testing and modeling by Dr. napton and Dr. Markus Oeser from Australia suggested that PICP with stabilized, permeable bases can perform under loads far heavier than that being applied to current PICP projects. Further research testing and development are needed to provide reliable design tables and charts for engineers. owever, initial findings indicate that the future for PICP supporting heavier traffic and thereby expanding its market looks promising.

Some impressive urban and neighborhood renewal projects were presented by speakers from Peru, Argentina, Israel and Colombia thereby confirming the transformative, community-building potential within interlocking concrete pavements. In some cases, dirt roads were paved with interlocking concrete pavement, lifting areas economically and making them accessible in any weather. One presenter from Peru completed

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Ar entina Con erence e ie

Continued from p. 23

Construction of a PICP parking lot in the UK using ground source heat pump technology to support building heating and cooling. The coiled pipes provide a heat exchange with water stored long-term in the PICP base. *Photo provided with permission from Hanson Formpave.*

The same PICP parking lot in the process of receiving concrete paving units. *Photo provided with permission from Hanson Formpave.*

road projects in nine neighbourhoods showing many built by recruiting and training local women who wanted no more mud tracked into their houses.

On industrial applications, Dr. napton provided an update on the British Port Association port and heavy duty pavement design manual. Additional insights on railroad crossings and urban light rail applications were presented by Timoteo Gordillo and Dr. Ilan Ishai from Israel. The performance of concrete pavers in ports was covered by engineers John owe from the U , Alistair Macleod from China and

Claudio errera from Argentina. All have been responsible for the design and construction of millions of square feet (meters) of interlocking concrete pavements.

The sustainability theme was carried through papers from Japan and Brazil on using recycled slag materials and municipal solid waste. Innovative applications included structural tests in India on three-dimensional plastic geo-cells filled with cast-in-place concrete as an expedient pavement, as well as three-dimensional interlocking pavers developed in the U and long-term performance evaluations of reflective, glass-bead paver surfaces in roads for improved night-time pavement/directional visibility. As with all past conferences, several papers on paver test methods were presented by John Cairns (South Africa) and delegates from Argentina and Brazil.

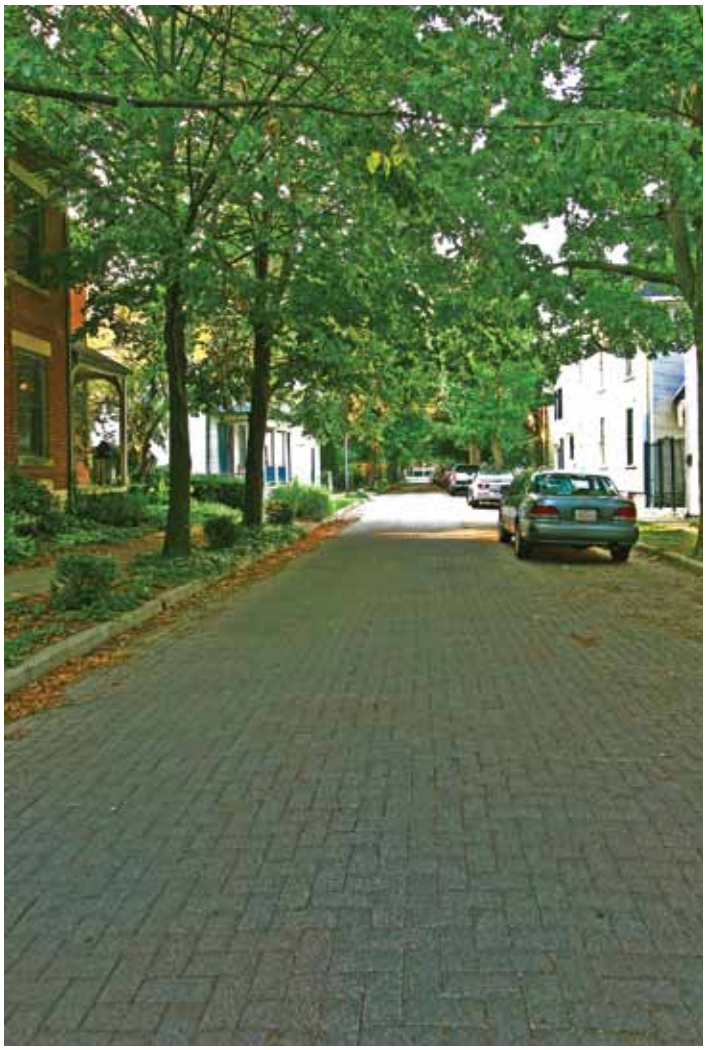
Finally, the conference generated a wealth of information useful to project owners, designers, manufacturers, contractors and consultants around the world involved with interlocking and permeable interlocking concrete pavements. The meeting was further enhanced by an exhibition area for networking during breaks and lunch. The conference demonstrated that the level of sophistication in research, sustainable design, construction and maintenance continues to improve and expand.

The entire conference program and photos can be viewed at www.iccbp2009.com.ar/home.htm. The conference papers in (Spanish and English) will eventually be posted on the www.sept.org with papers from all of the previous international conferences and workshops since 1980. The next interlocking conference on concrete block paving will be held in Shanghai, China in October 2012 sponsored by the China Construction Units Association. ❖

A conference presentation highlighted heating an innovative, energy-conserving house in the UK with a horizontal ground source heat pump drawing heat from a permeable interlocking concrete pavement base.

Photo provided with permission of Hanson Formpave.

Beyond Hardscaping *Continued from p. 2*



Two new contractor courses from ICPI—on PICP and commercial construction—reach past residential hardscaping to help develop what can become the bread-and-butter of the industry: parking lots and streets.

aspects of commercial construction contracts. The courses are for paving contractors who would like to expand into commercial work and contractors currently working in the commercial and municipal arenas. The PICP and Level II participants will be promoted on the ICPI web site, in guide specifications, literature and public relations.

A key to Level I program success has been ICPI paver manufacturing member buy-in across North America. They sponsor courses that support their contractor customers, most of whom built residential hardscaping projects. The courses also helped unify the vocabulary, ideas and best construction practices for concrete segmental paving in the residential sphere.

The new PICP and Level II courses have dual purposes. They provide a wealth of technical information for paver manufacturer representatives who support design professionals and contractors. Paver manufacturers are an important voice in communicating consistent, consensus-based message on technical information and construction best practices to designers and contractors.

The other (and main) purpose is contractor education. The courses are taught by contractors experienced in commercial PICP and other types of segmental concrete pavement. The courses are for contractors who do more (or who would like to do more) than residential hardscaping. The universe of participants in these two new courses may be smaller than the Level I course because the risks in commercial work are greater, but so are the rewards. A key to understanding the risks and reaping the rewards is educating contractors who want to expand their opportunities. This is especially important to survival in these economic times.

There are still millions of residences across North America yet to be hardscaped with attractive driveways and patios. Some will be PICP. uge opportunities to build outdoor rooms paved with segmental concrete, embraced by segmental concrete retaining walls and enhanced with features like kitchens, fire pits, fireplaces, hot tubs, etc. ICPI and its manufacturing and contractor members continue to support development of business opportunities in these markets with the Level I course.

The new ICPI courses represent developing significantly bigger commercial project opportunities within and outside the industry. Besides training contractors already in the segmental concrete pavement business, the courses could train existing asphalt and concrete pavement contractors on the construction and business opportunities. Indeed, the courses could be modified to train municipal construction officials for specifications and for project inspection purposes. Like the deployment of the Level I course, it will be fascinating to see how the PICP and Level II course impact the marketplace.

These two new courses support broader contractor experience in commercial and municipal projects. They will help move the concrete paver industry to the next level. In this wider context, parking lots, roofs, crosswalks, streets, industrial areas, ports and airports with segmental concrete pavement go well beyond the notion of residential hardscaping. So does PICP as a stormwater management/low impact development tool. Given this wider horizon for pavements, we invite our designer, manufacturer and contractor readers to take these courses as well as the Level I prerequisite class. They are all an important part of institutionalizing segmental concrete pavement as the third pavement system in North America just like Europe.

For more information on where and when Level I, PICP and Level II courses will be held, visit www.icpi.org. ❖

Level II Concrete Paver Installer Certificate Course

San Antonio Marriott Riverwalk Hotel
889 E. Market Street
San Antonio, Texas 78205
800-648-4462

March 19 & 20, 2010
8:00 am – 5:00 pm

It is important to review course content before attending; however, on-site registration will be accepted on a space-available basis. Call ICPI at (703) 657-6900 for details.

Tuition:
(tuition fees include a student manual)
US $250 ICPI Members
US $350 Non-Members

Who should attend?

The Level II Concrete Paver Installer Certificate Course is designed for foremen and higher-ranking personnel employed by construction companies installing segmental concrete pavements. These companies might currently be installing commercial applications or they may be planning to expand into this market. Participants should be experienced contractors, and must hold a current ICPI Level I Concrete Paver Installer Certification.

Why Should You Attend?

Knowledge–Industry professionals share knowledge of industry guidelines, practices and advances applicable to the construction of interlocking concrete pavers.

Recognition–Certificates of Completion will be awarded to all individuals who successfully complete the course and pass the examination.

Promotion–Paver installer program training can be a powerful marketing tool for your business by further establishing your credibility as a knowledgeable installer, contractor or industry professional.

On-going support–ICPI reinforces your knowledge by making available technical literature, guide specifications, marketing support, website listings, press releases and other certificate programs.

Course Instructors


Andrew Vear


Ross Causey

Andrew Vear is Vice-President of Southwest Specialties, Las Vegas, NV and Ross Causey is President of Garden Square Landscaping in Kennett Square, PA. Both have decades of experience in a wide range of commercial segmental pavement construction, as well as being veteran instructors of ICPI contractor courses. Both bring a technical and practical perspective to the Level II course that will give you tools to help understand and survive in commercial site construction.

Program Content

- Introduction, Objectives, and Prerequisites
- Pavement Design Overview
- Stabilized Bases
- Bedding Sand Hardness & Durability
- Overlays & Inlays
- Rigid Applications
- Roof Plaza Decks
- Crosswalks
- Concrete Grid Pavements
- Commercial Installation & Mechanical Installation
- Contracts Overview, MasterFormat, General Conditions, Liens
- Construction Details, Plan Reading, Submittals, Retainage
- Estimating Software & On-screen Takeoffs
- Marketing Your Company

To register visit: .ncma.org 2010 Pages IconExpo2010.aspx

Sponsored by ICPI INTERLOCKING CONCRETE PAVEMENT INSTITUTE ®

Concrete Paver Industry Calendar of Events

March 19-20, 2010
International Concrete Exposition
enry B, Gonzalez Convention Center
San Antonio, Texas
www.ncma.org/icon_expo/

March 20-21, 2010
ICPI Level II Installer Certificate Course
San Antonio Marriott Riverwalk
San Antonio, Texas
www.icpi.org

March 20-23, 2010
ICPI Annual Meeting
San Antonio Marriott Riverwalk
San Antonio, Texas
www.icpi.org

August 25-27, 2010
ICPI Summer Meeting
Fairmont Chateau Laurier
Ottawa, ON

October 27-30, 2010
Hardscape North America
www.hardscapena.com
Louisville, entucky

See www.icpi.org for a listing of 2010 ICPI installer certification schools.

ICPI Webinars for Design Professionals, Contractors and Suppliers

For registration details or more information, visit www.icpi.org or call ICPI at 703-657-6900.

April 13, 2010
2:00 p.m. EST
Topic: Geotextiles and Geogrids
Audience: Contractors

May 11, 2010
1:00 p.m., EST
Topic: Guide Specifications for Interlocking Concrete Pavement
Audience: Design Professionals

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