e:Pave

News from Interpave

December 2009

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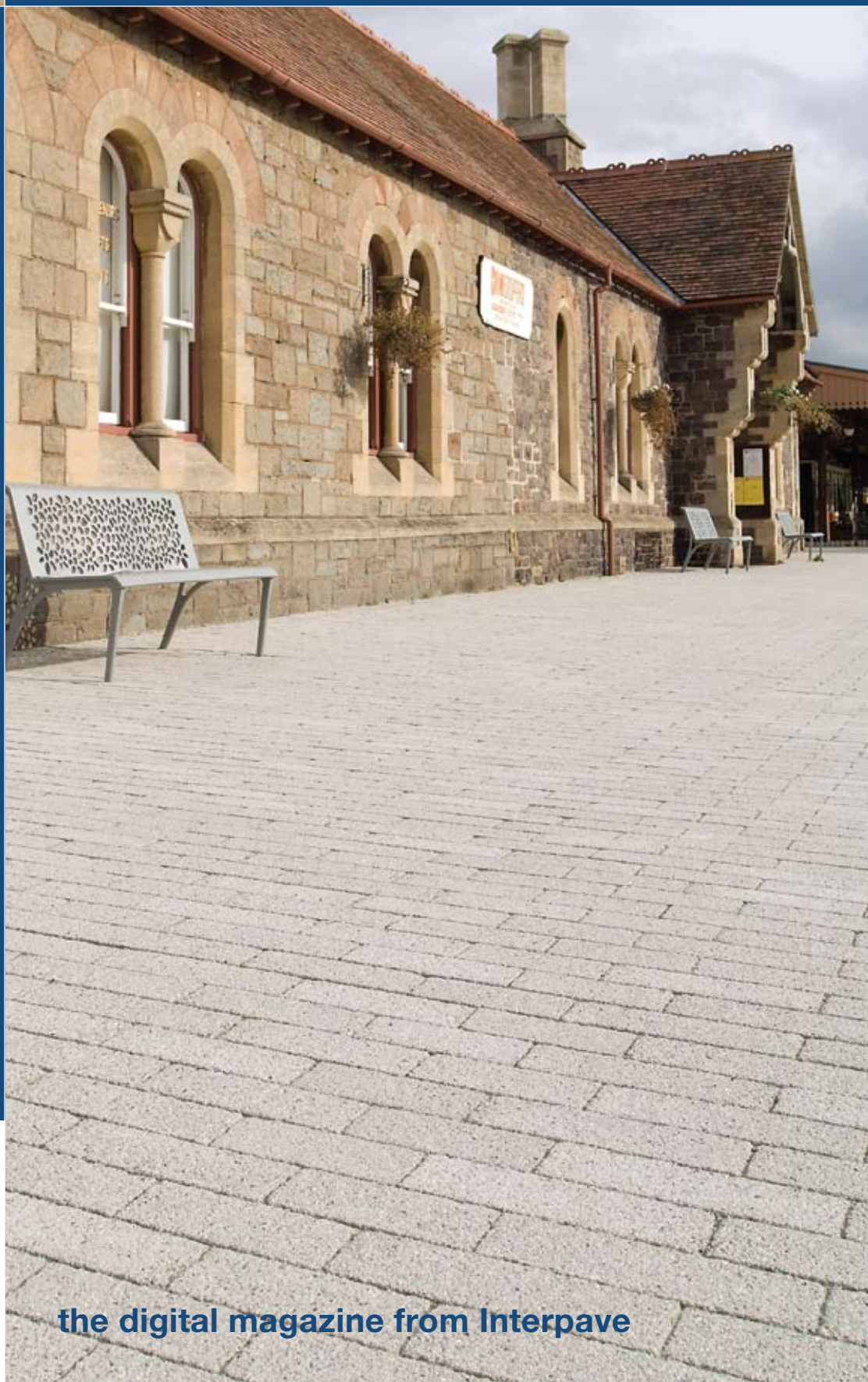

Interpave

THE PRECAST CONCRETE PAVING AND KERB ASSOCIATION

www.paving.org.uk

the digital magazine from Interpave

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green giant

precast concrete sustainable paving

Precast concrete products from Interpave manufacturer members have low environmental impact endorsed by the BRE Green Guide, generally with A or A+ ratings, with a firm commitment for continuing improvements transparent to stakeholders. And they also satisfy the broadest sustainability criteria including:

- Predictable and consistent characteristics for safe surfaces, accessibility for all and long-term durability
- Permeable paving options to take care of rainwater and meet government obligations for SUDS
- Localised material sourcing, manufacture and product supply without shipping, benefiting the local economy
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Update your view of precast concrete paving and kerbs. For the full story visit: www.paving.org.uk/sustainability.php

e:Pave

Contents

Welcome

e:Pave is the digital magazine from Interpave for all those involved with the development and construction process – particularly designers, developers, planners and contractors. e:Pave takes over from Interpave's popular hard-copy magazine Pave-It and covers a wide range of current topical issues affecting the paved environment.

To make sure you receive future issues of e:Pave via email, register now on www.paving.org.uk. If you are viewing e:Pave on-line, look out for the live links within the text to take you straight to articles, related documents and web pages. And, of course, back-issues of Pave-It can still be viewed via the website with a summary of articles in each issue.

Cover – main image:

Concrete block paving replaces asphalt and enlivens Minehead station forecourt

Cover – top left image:

Vibrant coloured concrete block paving suits this Florida aquatic park

About Interpave: Interpave – the Precast Concrete Paving & Kerb Association – represents the leading manufacturers of concrete block paving, flags and kerbs. Its main objective is to expand the use of these materials through education, technical and marketing campaigns. Interpave is a product association of the British Precast Concrete Federation.

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Updating SUDS Law

As reported in the last issue of e:Pave, new legislation is proposed to make sustainable drainage systems (SUDS) mandatory on all new developments, with major potential for expanding the use of concrete block permeable paving.

The Draft Flood and Water Management Bill will apply to new surface water drainage from buildings and roads in England and Wales. The Bill is intended to replace current arrangements for approval, construction and maintenance of conventional piped drainage with similar procedures applying to SUDS techniques. A new set of National Standards is planned by 2011, developed in conjunction with trade associations and other stakeholders, to deal with the various SUDS techniques.

Threat of Delays

The Bill does, however, cover a much wider range of issues affecting flooding and water than just SUDS, many of which have raised concerns. The Commons environment, food and rural affairs committee recently warned the government that rushing the draft Bill would render it ineffective. It recommends delaying until after the general election to allow time for draft plans to be rethought – and putting the 2011 implementation date at risk.

So, how does this situation affect concrete block permeable paving? Without doubt, it is the most versatile SUDS technique - but it does differ from others, such as swales and other soft landscaping features. In particular, detailed guidance for design, construction and maintenance is already in place for concrete block permeable paving from Interpave, based on decades of experience both here and abroad, which should form the basis for National Standards.

Meeting Current Requirements

There is therefore no reason why concrete block permeable paving should not be used more extensively now, in place of impermeable surfaces, gulleys and pipes, to meet existing planning policies and satisfy a range of sustainability criteria. It is worth remembering that current planning policies across the UK strongly prioritise SUDS and place responsibilities on local planning authorities to further their use. Building Regulations also already favour source control measures such as permeable paving. And the Code for Sustainable Homes and BREEAM assessment methods for other building types include various requirements which permeable paving satisfies.

As part of the consultation process for the Draft Bill, Interpave submitted a detailed response highlighting two particularly important considerations. Firstly, as permeable paving us fundamentally unlike other SUDS techniques, National Standards related to the design, detailing, construction, maintenance and adoption of concrete block permeable paving should be developed in conjunction with Interpave and based on the existing Interpave Guide.

Removing Barriers to Adoption

Secondly, although most SUDS techniques fall outside the immediate highway area, permeable paving simply provides a sustainable alternative to conventional paving with its piped drainage, but on the same footprint. So, at adoption it will itself become the highway, along with impermeable areas draining onto it. The limited maintenance regimes that apply to concrete block permeable paving, such as sweeping, are similar to those for conventional highways. It should, therefore, be treated similarly to conventional highways and associated drainage with Highways Act 1980, Section 38 adoption agreements with highway authorities.

In any event, it is essential to remove any barriers to Section 38 adoption of concrete block permeable paving as a highway – as distinct from a drainage system in the Draft Bill. To achieve this aim, it is recommended that the new National Standards also be applied to Highways Act Section 38 adoption.

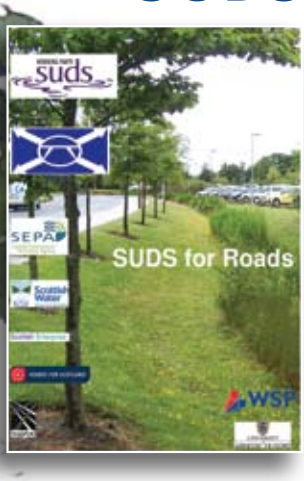
Just as with conventionally paved areas, by applying correct details, design, specifications and guidance – all available from Interpave – developers, designers and adoption authorities can have confidence in the long-term performance and life span of concrete block permeable paving as an essential, mainstream technology.

More information on all aspects of concrete block permeable paving and precast concrete paving generally is available from the Interpave information resource: **www.paving.org.uk**.

Making In-Roads into SUDS

In the first of two articles, Neil McLean, SUDS Co-ordinator for the Scottish Environment Protection Agency, discusses draft guidance to help make SUDS mainstream in Scotland. He will be reviewing the final version of the guidance in a subsequent issue of e:Pave.

SUDS for Roads in Scotland



Sustainable Drainage Systems are now becoming a legal requirement in many areas of the country, with either flood mitigation or water quality as the driver. In Scotland, new developments draining to the water environment must provide SUDS within the drainage network that will fulfil the requirement that *"all reasonable steps must be taken to ensure that the discharge shall not result in pollution"*. Roads engineers with a *'duty to drain'* often find it difficult to apply the prospect of allowing water within the vicinity of the road foundation.

After it was realised that roads engineers were generally somewhat reserved when considering the use of SUDS and adopting SUDS under a road construction consent, the Sustainable Urban Drainage Scottish Working Party (SUDSWP) established a group to deliver the production of guidance that would be dedicated towards the use of SUDS serving roads.

The consultants WSP were, in turn, commissioned to produce the guidance under the watchful eyes of the steering group formed from SUDSWP and SCOTS (The Society of Chief Officers for Transportation in Scotland), the umbrella body representing all local authorities in Scotland. In addition, the University of Abertay provided useful academic support using their SUDS centre of excellence in Dundee.

Guidance for Roads Engineers

Common types of SUDS applied to road networks and paved surfaces are described in the guidance document. The guidance is meant to give the road engineer an understanding of what measures are available and which are appropriate for the particular situation that may be being dealt with, thus providing a suite of options to consider. Systems included are:

- Permeable paving systems
- Filter drains
- Filter strips
- Swales
- Bioretention Cells/Areas
- Basins
- Ponds
- Wetlands

So, let's focus on just one particular aspect of sustainable drainage - source control. Here, surface water runoff is managed at, or adjacent to the surface that rainfall lands on. Source control is the best means by which to attenuate peak flows and manage pollutants scavenged from hard surfaces. This can easily be delivered by using the pavement itself with permeable paving systems; typically block paving designed to allow infiltration of runoff into the sub-base, before either infiltration into the ground (where suitable) or piping to the next stage of the drainage network, which may be attenuation or further treatment prior to final discharge.

Acceptance of Permeable Paving

Clearly block permeable paving systems would be inappropriate for high speed road networks but their use in areas of lower volume, slow speed situations is quite suitable. This has been accepted in some areas of the UK, most notably Bristol, Edinburgh and Oxfordshire. Many other areas have found it easier to avoid adoption and prefer more conventional solutions. But in Scotland with legislation commonly known as the 'CAR Regs', or *Controlled Activities Regulations*, requiring SUDS for most developments, roads engineers now find that conventional drainage is not enough.

So, although permeable paving is good at delivering SUDS there is still sometimes resistance to its acceptance in a road system. The new guidance hopes to allay at least some of these fears.

Extensive Consultation

With the guidance and discussion from the steering group, a draft version of *SUDS for Roads* has now been produced and was launched on the 1st September at the Scottish Government office in Edinburgh. On the day, 28 of the 32 Scottish local authorities attended with a full house. This launch was, however, intended to start the 6 weeks consultation period that would allow roads engineers – not just from local authorities, but consultants, developers, and other transport agencies – to provide feedback and comments on the document.

At the time of writing, these comments and representations are being considered and it is hoped that the final document will be published and made freely available on the internet shortly. Watch this space!

Early phases of the impressive redevelopment of the Wauchope Square area of Craigmillar in Edinburgh includes 5,000m² of concrete block permeable paving (with some 20,000m² to follow) – the first to be adopted in Scotland.

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raining champion

precast concrete sustainable paving

Precast concrete permeable paving is a unique SUDS technique used, with no additional land-take, to minimise, slow down and clean up rainwater runoff – an essential part of the fight against flooding. And products from Interpave manufacturer members also satisfy the broadest sustainability criteria including:

- Low environmental impact endorsed by the BRE Green Guide, generally with A or A+ ratings
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Snapshot Case Studies

The American Way

E:Pave takes a look at a few of the winning projects from the last Hardscape North America Awards, which demonstrate the bold visual approach taken in the USA with hard landscaping. They also highlight the exciting design potential, in terms of colour, texture, pattern and scale, offered by precast concrete paving – in stark contrast with the formless monotony of asphalt.

This review follows an earlier visit to American projects in Pave-It, May 2006 which can be downloaded from www.paving.org.uk. Thanks to David Smith of the Interlocking Concrete Pavement Institute (ICPI), Interpave's sister organisation in America, for supplying the images.

Central Area Regeneration, Anchorage, Alaska

A major regeneration project to encourage pedestrians with a continuous kerb-free surface, while maintaining vehicular traffic. Colour and texture are used to suggest routes and delineate footways, with a subtle transitional pattern approaching the darker trafficked area. This is the first concrete block paved street in Alaska – and one of the first heated roadways in Anchorage.

Particle Measuring Systems Building, Boulder, Colorado

A unique company logo greets all those entering this company parking area, presenting an impressive message to company employees and to visiting customers.

For construction, a template was made for cutting paving blocks with curved sides and these units were sandblasted and sealed to increase visual contrast.

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Case Study

Aquatic Sports Park, Naples, Florida

This enormous project includes concrete block paving around an Olympic-sized lap pool, a children's play pool, water slide, fountain, Jacuzzi and sunbathing areas. The use of two predominant colours and regularly repeated geometric patterns is particularly strong in the Florida sunlight.

Colony Park, Ridgeland, Mississippi

Not Mexico – but an up-market retail and entertainment complex in Mississippi with some 22,000m² of concrete block paving. Richness and diversity are maintained across these large areas by using mixes of colour and tumbled block paving to relieve regular patterns.

e:Pave

Case Study

Not Back to Black

Concrete block paving at a refurbished historic railway station provides a stark visual contrast with the sea of black tarmac that previously surrounded it.

Minehead Station is in a key location right next to the beach at the end of the historic West Somerset Railway. The Station was first opened in 1874 and the current platforms are probably the longest on any preserved railway, accommodating a sixteen-coach train with locomotive. The recent re-paving within and around the station forms part of a major regeneration project in the town, including modern workspaces for business, retail units, car parking and a viewing area for the new railway turntable. The whole project makes extensive use of precast concrete paving, including substantial areas of permeable paving.

With precast concrete paving and kerbs, distinct, modular units and designed variations in colour, texture and shape break up areas giving visual interest and a human scale not possible with monotonous, formless materials such as asphalt. In recent years, Interpave manufacturers have transformed this concept, moving away from the simple, regular patterns and colours of the 1970s and 1980s. They continue to expand an extensive palette of styles, shapes, colours and textures to meet current demands in urban design, matching – and often exceeding – the visual qualities of materials such as stone. At Minehead Station, the 3:1 ratio rectangular blocks have a granite surface, delivering this high-quality finish with substantially reduced carbon footprint and call on extracted resources.

The benefits of precast concrete paving are more than just visual. With a higher diffuse solar reflectance – or albedo – than asphalt, it reduces the urban heat island effect generally and therefore the energy needed for cooling buildings. Precast concrete paving also differs substantially from asphalt in terms of luminance, or the amount of light reflected off the paving. For asphalt, luminance is only about 7% whereas block paving achieves between 15% and 30%. This often-overlooked area has implications for street lighting design and reducing energy requirements, as well as safety in terms of contrasting pedestrians against paving at night.

Before

After

Before

After

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social surfaces

precast concrete sustainable paving

Precast concrete paving and kerbs from Interpave manufacturer members give the reassurance of predictable and consistent performance characteristics for safe surfaces, accessibility for all and long-term durability. And they also satisfy the broadest sustainability criteria including:

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e:Pave Case Study

Wembley Forum

Paving to a podium courtyard at the heart of a new, high-density development succeeds in reconciling technical challenges with a deceptively simple visual design.

The new 'Forum House' development, designed by PRP Architects, is close to Wembley Stadium and provides 24,000m² of residential space for 286 high quality apartments. Around half of the apartments are mixed tenure affordable housing and some are intended as live/work spaces. Also included is 300m² of retail and 1,000m² of community space, with a basement car park for 132 cars and 286 secure bicycle storage spaces.

Operational Constraints

The development forms a block wrapped around the central courtyard above the car park. This courtyard forms the central focus of the development, overlooked by most of the apartments, but also had to accommodate a number of technical demands, as PRP Architects' Landscape Architect Simon Abbott explains: "One of the main constraints was access and on-site turning for the largest fire brigade vehicles and concrete block paving was ideal for this as well as the other equipment needed to maintain building facades. We also had to accommodate access points for all the apartments to a centralised refuse disposal system and a large, Sedum-roofed cycle shelter within the courtyard. Porous resin-bound gravel was also used, contrasting with the block paving.

"Working around these requirements, we have integrated softer landscaped areas, largely within a raised oval 'island' positioned to maximize sunlight. The island is 'eaten into' by water, providing both movement and sound, and has seating and shaded areas with a range of planting for interest throughout the year. Whilst we initially looked at other materials for the vehicle access paving, we avoid importing products wherever possible and are comfortable with the choice and consistency of precast concrete from UK manufacturers."

The high quality granite finish concrete block paving is laid in a simple pattern across the courtyard and structured with black cross-bands. Cutting through the paving are black granite diagonals to give connectivity with the outside.

Photo: Howard Bartrop

Kerb Specification Slip-Ups

Use of alternative materials to concrete for standard road kerbs and other edge details is causing concern with poor slip-resistance posing very real potential dangers to pedestrians.

In the urban street environment, consistency of surface slip or skid resistance characteristics is critical – with serious implications for pedestrian safety and accessibility. This is particularly so with standard kerbs – both where a change of levels occurs and also within shared surfaces where flush-set kerbs are used for demarcation.

Correct Testing

The European Standard BS EN 1340, *Concrete Kerb Units – Requirements and Test Methods* includes a specific test to determine slip resistance, suitable for kerb units in any material. In some cases, this test has been mis-applied and it is essential for it to always be carried out correctly to provide a realistic assessment of how safe kerbs will be in use. This is important not just to avoid personal injury claims resulting from slips but also to satisfy guidelines such as *Manual for Streets* and the accessibility Code of Practice BS8300 – both of which require consistent, non-slip surfaces.

Specifiers cannot afford to take risks and should demand consistent, predictable, trouble-free performance from all kerbs and accessories over the longer term. Compliance with all aspects of test procedures, as stipulated in current Standards and designed to replicate performance in use over time, is therefore essential. They should not just accept manufacturers' reassurances but check for themselves that tests have been correctly carried out.

Consistent Characteristics

Availability of the complete range of British Standard profiles and accessories – as well as new designs such as level-access kerbs for buses – in a single material with consistent characteristics is essential for successful and safe urban street design. This can only be achieved with precast concrete. Today, precast concrete kerbs are mechanically handled and laid on site to optimise efficiency and ensure consistent quality, and an extensive array of equipment is readily available to achieve this.

Interpave's *Kerb Appeal* document is available as a PDF download, together with design, construction and handling guidance for kerbs, at: **www.paving.org.uk**.

e:Pave International Conference Report

Argentina Calling

*The **9th International Conference on Concrete Block Paving** was held in Buenos Aires in late October, organised by the local trade body Asociacion Argentina del Bloque de Hormigon (AABH), in conjunction with the Small Element Pavement Technologists (SEPT) group which instigated the long-term programme of international conferences. Interpave's representative on SEPT, John Howe, reviews the Conference and a sample of papers presented.*

With over 200 attendees from 27 countries, this Conference provided an important gathering of experience and expertise from around the world. A substantial amount of information was made available and debated over an intensive 4-day event, with 56 papers presented by 107 authors. Despite the diversity of papers, several clear areas of interest were revealed.

Heavy Duty

Firstly, ports and container terminals came under the spotlight with John Knapton's overview of the fourth edition of Interpave's *Heavy Duty Pavements – The Structural Design of Heavy Duty Pavements for Ports and Other Industries* (available for download) which he wrote, based on experience of current equipment and operating practices. My own and Alastair MacLeod's paper reviewed pavements on container terminals in various countries and concluded that concrete block pavements do work in the most taxing situations and highlighted important design and construction considerations. For municipal roads, the USA's David Smith and Canada's David Hein outlined a life cycle cost analysis, demonstrating the benefits of concrete block paving over other road constructions – in line with a similar life cycle exercise carried out by Interpave.

Precast concrete paving is particularly popular in Argentina – this project is in the centre of Buenos Aires.

International Permeable Paving

Concrete block permeable paving (CBPP) proved to be a major theme of the Conference. A particularly inspirational paper was well-presented by two 17 year old students, mentored by John Knapton, examining the effectiveness of a permeable pavement at their school in Northern Ireland. This paper highlighted in a practical way the capabilities of CBPP to remove pollutants from water runoff. Another paper by John Knapton featured a full-scale trial of CBPP for heavily trafficked roads, endorsing the Interpave design method used. Another confirmation of the practicalities of CBPP was given by Brian Shackel from Australia, demonstrating that acceptable permeability is actually maintained over time with little requirement for maintenance, as proposed in Interpave's guidance on CBPP. Further information on the practical capabilities of CBPP was given by Anne Beeldens from Belgium and the UK's Stephen Coupe introduced an innovative ground source heat pump system for use with CBPP (discussed in a previous e:Pave). Finally, John Knapton presented the benefits of CBPP and concrete block paving generally in terms of embodied carbon.

SEPT would like to congratulate and thank the organiser Timoteo Gordillo – a civil engineer and President of AABH – and his team for making this event such a success. Precast concrete paving technology has come a long way since the very first International Conference in Newcastle in 1980. These events do, however, continue to move the technology forward and expand its potential applications. My colleagues and I at SEPT are looking forward to the next Conference to be held in Shanghai during 2012. We hope to see you there!

More information from the 9th Conference website: **www.iccbp2009.com.ar/** or from SEPT: **www.sept.org**

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