e:Pave

News from Interpave

January 2011

Inside:

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
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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:

Permeable and conventional concrete block paving at Craigmillar, Edinburgh (page 11)

Cover – top left image:

Permeable paving at the World Exposition, Hanover, Germany (page 7)

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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Interpave News

The Interpave Summit

The 2010 Interpave Summit took place in Leicester at the beginning of November, focusing on trends and prospects for precast concrete paving in consumer, urban and engineering markets. It offered all those involved with the paved environment – including designers, contractors and manufacturers – the opportunity to debate and exchange ideas about a wide range of topics raised in fifteen presentations during the day.

Interpave is particularly grateful for contributions from the two Keynote speakers. Landscape architect Sheena Raeburn, a principal of Ian White Associates, explained the essential role played by precast concrete paving in developing a vocabulary of external materials throughout the exemplary, award winning Craigmillar regeneration scheme in Edinburgh (featured on page 11 of this issue).

But concrete block paving has been contributing to our urban streetscapes for decades, as Professor Ian Walsh reminded us in his presentation on long-term paving performance. His examples of busy roads through Kent's towns and villages, laid in block paving in the 1980s, were also covered in the last issue of e:Pave.

Other presentations covered issues ranging from research and standards to sustainability and health & safety. Consultant engineer John Emery argued that concrete block paving is not just a visual, design-orientated hard landscaping material but also an established, heavy duty civil engineering technology: this topic is explored in more detail on page 4. The primary message that delegates took away from this summit, in a mood of optimism, was the growing potential for precast concrete paving across different sectors and applications - irrespective of the current challenging economic climate.

Domestic paving guidance

Two separate pieces of legislation applying to new or replacement paving around the home could lead to action by local authorities and complications with selling homes. To help designers, contractors and homeowners - as well as planners, surveyors and lawyers – understand the new rules and how they operate, Interpave has published Paving for Rain. This essential guidance document is already specifically referred to in Government guidelines and is freely available to download from www.paving.org.uk. A new edition of Interpave's domestic Design Guide is also available to download.

Expanded web resource

The Interpave website www.paving.org.uk has for some time been regarded as the definitive source of information on all aspects of precast concrete paving and, indeed, the paved environment generally. Apart from its extensive design and construction information, the website offers documents on topical issues, such as SUDS, masterplanning, accessibility and sustainability – as well as case studies - aimed at a wide professional and commercial audience.

But, from the beginning of 2011, a completely new section has been added for homeowners, showcasing the huge variety of concrete paving products available, illustrated in a domestic context. Guidance is also available on the new rules that now apply to paving around the home.

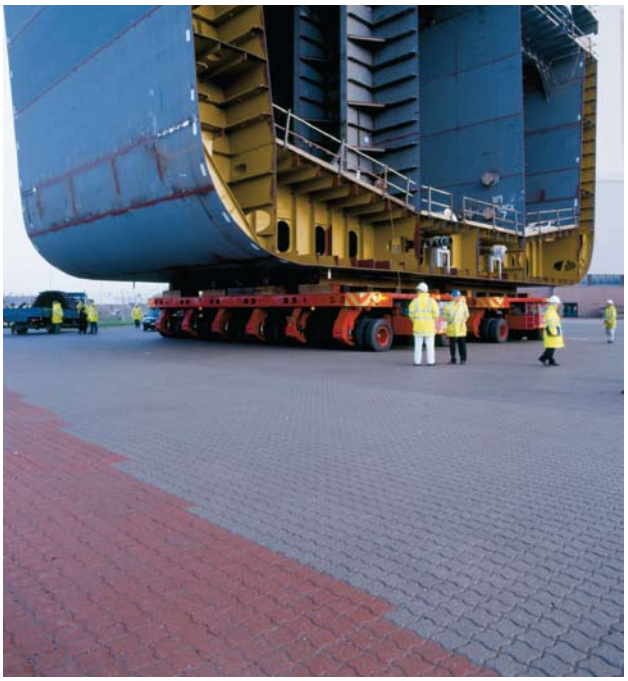
All website users will now be greeted by a new home page, guiding them either to Commercial or Domestic sections. To match the new style, the commercial sections of the site will also be upgraded during 2011 – in addition to the usual, ongoing expansion and information updating.

Unsung Hero

Concrete block paving is well-known as a popular choice with urban designers for residential developments and regeneration projects with its huge variety of styles and colours. But it also has an impressive history as a civil engineering solution for a wide range of heavier duty applications where long-term technical performance is paramount and aesthetics take second place.

John Emery's presentation at the recent Interpave Summit – put together jointly with John Howe and summarised here – provided a timely reminder of just some of the heavier duty applications where the technical performance of concrete block paving has proved invaluable. And a reminder that the technology is just as valid today for pavement engineers.

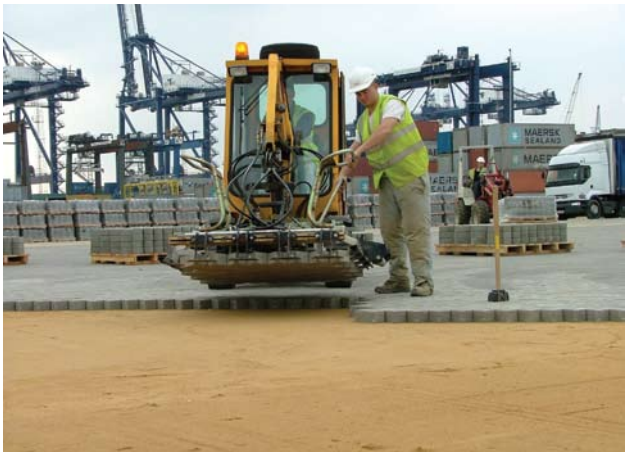
Following its initial use in Germany and the Netherlands, concrete block paving was first used in the UK during the 1960s. Research into its structural behaviour in the 1970s resulted in a wide range of applications in various countries. Its performance characteristics make it suitable for the heaviest duty applications, able to support substantial loads and resist shearing and braking forces.



Blocks are fully engineered products manufactured in the factory to give consistency and accuracy. The resulting interlocking characteristics of concrete block paving give it a distinct advantage over other forms of surface. Laid on a granular laying course and with an edge restraint, individual blocks interlock with each other to act together, distributing large point loads evenly. Concrete block paving can be used immediately after the laying procedures have been completed and requires only minimal maintenance over its long life.

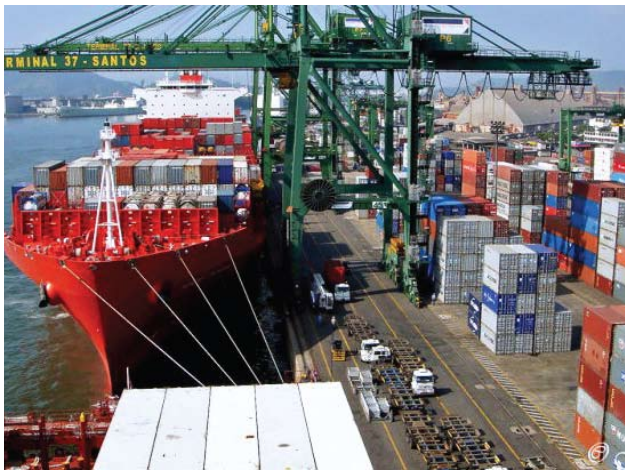
Engineers in the UK and Australia soon realised the potential for heavy-duty pavement applications surfaced with concrete block paving and appropriate design methodologies were developed. For example, heavy duty block pavements started to be used in ports such as Dover and then airports, commencing with Luton in 1982.

One important development was the introduction of mechanical or machine laying of concrete blocks, in place of hand laying, with substantial time savings and efficiencies, particularly on larger projects. Another inevitable step forward was the use of concrete block permeable paving for heavy duty applications – not just residential roads.



e:Pave

Industrial Paving



Concrete block permeable paving at the Port of Santos in Brazil

In the UK and internationally, we have seen concrete block heavy-duty pavements proven as a long-term solution for an extensive variety of commercial, industrial and other taxing applications including:

- Bus stations and transport interchanges
- Distribution centres and lorry parking areas
- Petrol station forecourts
- Embankments and other civil engineering elements
- Railway terminals
- Low speed trunk roads
- Industrial areas and storage areas
- Container terminals.

Access ramps at the Channel Tunnel Terminal

John Emery and John Howe are chartered engineers, each with some 25 years experience of pavement design and construction, and presentation of numerous papers on block paving technology internationally.

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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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Mainstream Paving

Dr Soenke Borgwardt of Bureau BWB Norderstedt has been involved with the development of concrete block paving technology in Germany and internationally for over 15 years. He has carried out extensive research and presented numerous papers on the subject – including Interpave conferences in 2000 and 2003. In this article, he focuses on the setting of federal standards, maturing of the technology and its widespread adoption as a mainstream form of construction.

For many years, concrete block permeable paving has been making an important contribution to the environmental improvements of urban development in Germany, as part of the sustainable management of drainage systems. It has helped to reduce flooding, overstressed drains, water pollution and lowered ground water level. There have also been remarkable cost reductions – both initial and whole-of-life - for the overall drainage of pavements on new building and road projects. In addition, stormwater runoff from sealed pavements is also being handled effectively by adjacent areas of permeable paving.

Federal Standards

Central to the successful structural and hydraulic design of concrete block permeable paving and its long-term use is accurate information about the infiltration performance of the pavement during its service life. Since the first use of permeable paving in Germany around the mid-1980s, a body of detailed information has been built up from practical experience and scientific research, leading to federal standards for design, construction and maintenance published by the German Department for Transport in 1996.

By 1998 around 20million m² of concrete block permeable paving was being installed in Germany every year – some 10 % of the whole national production of concrete block paving. Impressive projects like the World Exposition in Hanover in 2000 showed that permeable paving is as capable as conventional block paving in terms of structural performance and durability - but with the benefit of considerable impact on the run-off process of the entire catchment area.

"In Germany today, concrete block permeable paving is now state of the art."

Monitoring the long-term infiltration performance of permeable paving (summarised in the graph below).

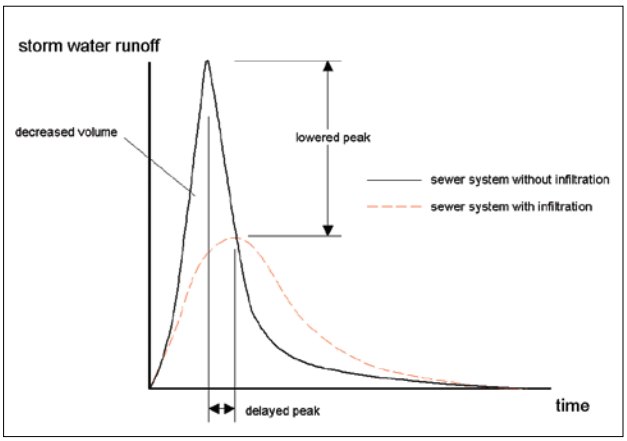
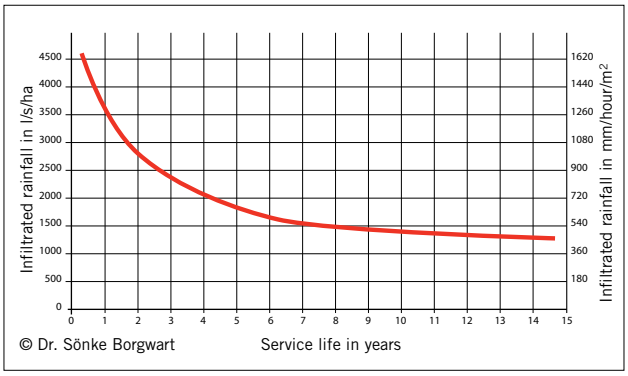


Illustration of the impact of permeable paving on reducing runoff in a storm



The infiltration rate of concrete block permeable paving will decrease due to the build-up of detritus in the jointing material, then stabilise with age. Even after allowing for this, the long-term infiltration capability of permeable pavements will normally substantially exceed UK hydrological requirements.

Extensive areas of concrete block permeable paving for bus parking areas at the World Exposition, Hanover, in 2000.

Growing Experience

Where the first federal standards were very cautious about applications for permeable paving, the second revised edition of *Merkblatt für wasserdurchlaessige Befestigungen von Verkehrsflaechen* (Guidelines for permeable pavements in road construction) to be published in 2011, combined with growing experience means that its use for heavily trafficked roads and other areas should now be commonplace. Correctly designed concrete block permeable paving is suitable for a wide variety of residential, commercial and even industrial, heavy load applications. We are also seeing a wider use of infiltrating permeable paving over less permeable subsoils, with adaptation of the pavement design.

Permeable paving used for heavily trafficked industrial areas in Germany

All in all, the use of concrete block permeable paving in Germany – and several other countries - is nowadays very common for a wide range of traffic applications. The technology is sophisticated, there is detailed information from long experience in use and established standards guarantee a controlled, consistent approach. In Germany today, we can say that concrete block permeable paving is now state of the art.

Editor's comment:

Although not as extensively as Germany, concrete block permeable paving has been in use successfully around the UK for some 20 years. This long experience is distilled in Interpave's **Design and Construction Information for Permeable Pavements** and **Understanding Permeable Paving** documents. It also gives highway authorities the confidence to adopt permeable paving – a requirement of the new Flood and Water Management Act - with trouble-free, long term service and minimal maintenance.

Permeable Paving in Practice

Paving Energy

A new office building in Bedfordshire, designed by architects tp Bennett, combines ground source heat pump (GSHP) technology with the concrete block permeable paving forming its 6,500m² car park.

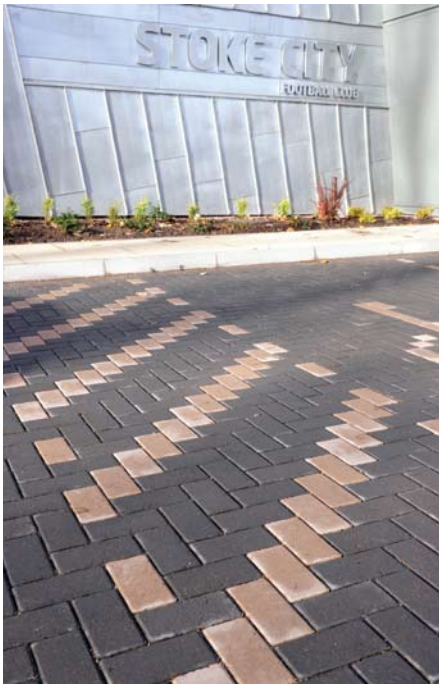
The architects wanted to maximise utilisation of the 285 car parking spaces on the site and researched the integration of permeable paving for SUDS with a geothermal heating/cooling system. The solution involves a tanked reservoir area below the car park, ensuring that the 8.4km of slinky pipes used in the GSHP process are constantly immersed in water. To achieve this, the pipes lie within 200mm of permanently saturated stone below the frost line, with any surface water overflow from the paving directed into the lake. This wet environment allows an efficient heat exchange.

The network serves five 130kW GSHPs which are able to guarantee an impressive energy supply meeting the demands of the entire 6,000m² building. Awarded an Excellent BREEAM rating and an EPC energy efficiency rating of B, the building is 30% more efficient than a typical new-build. It has a rating of just 35kg of CO_2 per m² per year, compared with a typical new-build figure of 50kg of CO_2 per m² per year. And by using concrete block permeable paving, no additional areas had to be excavated to accommodate the GSHP.

As the 2010 Flood and Water Management Act – which makes SUDS effectively mandatory on new construction work – takes effect, concrete block permeable paving is set to grow rapidly in popularity. Over the next few issues of e:Pave we shall be featuring project case studies with permeable paving from Interpave manufacturer members.

Flood Action

Some 2,000m² of concrete block permeable paving has been installed at the new Stoke City FC training ground car park, located in a flood-risk area on low-lying land.



Permeable paving formed a firm condition of the planning consent for the project. A tanked 'System C' permeable paving construction is ideal for flood-risk areas, as runoff water is treated and attenuated, then released back into the watercourse or sewerage system up to five hours after the peak of the storm.

Understanding Permeable Paving

Interpave's website www.paving.org.uk is the definitive source of information on permeable paving. The download **Understanding Permeable Paving** provides essential information for a wide audience on all aspects of SUDS, while the **Design and Construction Information** (DACI) download gives comprehensive, detailed guidance.

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Precast concrete products from Interpave manufacturer members are produced locally on modern, automated manufacturing plant working as an essential part of the local economy and community, while giving effective national coverage. And they also satisfy the broadest sustainability criteria including:

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Regeneration Revisited

Wauchope Square in Craigmillar, Edinburgh, is a major regeneration project with wider implications for urban design in the UK. In our July 2010 issue we looked at the masterplanning of the scheme. We revisit it now with a summary of a presentation at the Interpave Summit by Sheena Raeburn - principal with Stirling based landscape architects Ian White Associates.

Wauchope Square is a good example, I think, where applying a progressive design approach and a collective desire to raise the bar in quality - not only by the design team and client but, perhaps surprisingly, also by the roads and planning departments of the City of Edinburgh Council - can have a positive influence far beyond the reaches of the scheme itself. Craigmillar's proximity to the centre of Edinburgh and the outlook to Arthur's Seat to the North and Craigmillar Castle to the South, provide a magnificent setting. However, a Scottish Executive report defined it as the fourth most deprived area in Scotland. Dominated by poor quality inter-war social housing, the population has steadily declined, in part due to rising unemployment, and it has previously witnessed high levels of anti-social behaviour, crime and alcohol and drug abuse.

Safe and Enjoyable

The key aim is to make Craigmillar a safe and enjoyable place to live, work and visit. It has been subject to a major urban regeneration initiative, in which a Framework document set out a vision and planning principles for the area over a 15 year period: 2005-2020. In total, there will be 3,000 new homes – so doubling the population - a new town centre, new schools, commercial and community facilities and a greatly enhanced public realm. Wauchope Square was the first of the new neighbourhoods to be implemented and, when complete, will provide 400 new homes grouped around a new primary school campus for up to 700 children.

Successful place-making is at the heart of the vision for the regeneration. Design quality is seen as a way of encouraging investment into the area, in order that a sustainable community can be created. Home zones were seen as integral to providing a high quality residential setting to this area. The new development was integrated into the existing estates, so that it helped to encourage their general use by the community, in particular children, in a safe and secure environment of which every part was overlooked by housing.

Concrete block permeable paving is used extensively, in conjunction with conventional block paving. This was the first permeable paving to be adopted by a local authority in Scotland. Subsequently, other local authorities have followed suit.

Case Study – Craigmillar

Defining Character with Paving

Traffic speed reduction was essential for the homezones, so encouraging more people to occupy the spaces, whether on foot, on a bike or in play. This was achieved without resorting to typical 'negative' devices such as speed humps, road markings or intrusive signage, all of which irritate the driver and reduce the overall quality of the space with the invasion of street clutter. Instead we designed the site as a complete environment, treating the road as part of a consistent shared space between the various buildings.

The aim was to create a high quality, inclusive environment and public realm with superior paving, landscaping, gardens, squares and courtyards. Fully paved areas with varying textures and patterns helped to define the character of these spaces. So we didn't exclude cars but gently reminded drivers that they were occupying a space primarily designed for the benefit of play, social interaction and neighbourliness.

Critical Material Choices

Critical to the success of the scheme was the choice and design of the hard landscape materials. This was an iterative process and a continuous dialogue with both client and the planning and roads departments of the Council. Various alternative designs were prepared that could be assessed on aesthetic qualities, performance and durability, cost and, critically, the likelihood of adoption by the local authorities.

Parking areas are delineated by colour and pattern, rather than painted markings or studs. Everyone understands the extent of an individual parking space and uses them efficiently, without the haphazard free-for-all that can sometimes happen with shared surfaces.

Case Study – Craigmillar

Sample panels of precast concrete paving colours and patterns proved to be a really useful tool in persuading and eventually getting acceptance from the client and the Council to proceed. Eventually, a hard landscape pallet was approved incorporating a range of warm colour tones for different scale paving elements and conservation kerbs, with a special case for some natural York stone in the relatively civic setting of the new school square.

National Awards

Wauchope Square is featured as a case study in the new Designing Streets planning policy document for Scotland. It was chosen because: *"it illustrates how many of the functions of streets can be integrated in both innovative street design and collaborative processes that result in streets with a distinctive and positive character and excellent functionality."* Wauchope Square, has also been recognised nationally through a number of awards:

- Saltire Society 2010 Housing Award,
- Roses Design Awards (Place-making category) 2009,
- UK Street Design Awards – winner of best Home-zone category 2009,
- Master-planning winner, Homes for Scotland, Designing Places Award 2008,
- Scottish Sustainable Communities Initiative – Awarded recognition as 1 of 11 exemplar projects that are working towards 'Creating a Scottish Sustainable Community'.

On this scheme in particular, we recognised the importance of the role that materials played, in enabling us to create distinct spaces within an attractive environment. We certainly could not have begun to think about achieving this with traditional asphalt or blacktop. And there were budgetary constraints with using natural stone, and concerns about the appropriateness of these materials within non-civic, residential scheme. The variety and quality of precast concrete paving blocks and kerbs provided us with a rich palette to work with creatively.

Photos: Sheena Raeburn

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social surfaces

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