

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.



“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).

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.

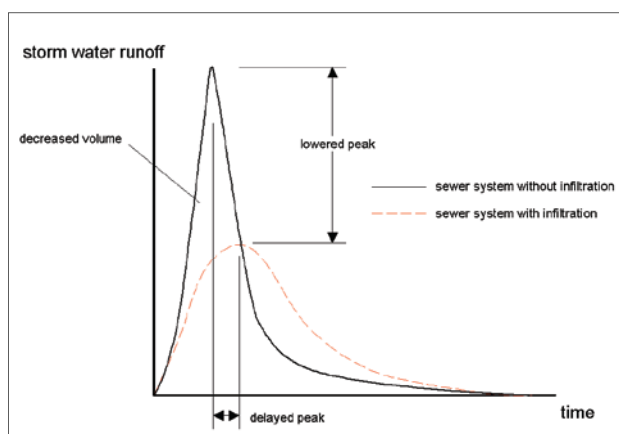
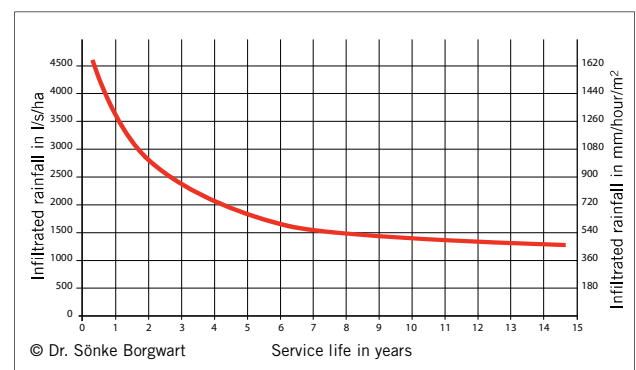


Illustration of the impact of permeable paving on reducing runoff in a storm



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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 *Merkmale für wasserdurchlässige Befestigungen von Verkehrsflächen* (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.