



ICCBP 11th INTERNATIONAL CONFERENCE ON CONCRETE BLOCK PAVEMENT

JOINT STABILISER FOR CONCRETE BLOCK PERMEABLE PAVING

The continued growing awareness of climate change, and all of its associated factors has encouraged designers to seek and adopt innovative solutions to combat its effects.

Over the last decades we have seen an increase in the frequency and intensity of summer storms and winter flooding, placing additional burdens on already full to capacity storm water drains.

For a number of years, designers have readily adopted permeable block pavements as a tool within a pallet of solutions to assist with storm water management.

The premise behind these solutions, is that a large capacity void is created within the joint between the block pavers. In the UK, the performance of modular block paving has traditionally been assisted by frictional interlock created through and consolidated sand filled joint. With permeable modular block paving, the requirement for frictional interlock is balanced by the need to encourage water through the joint to the sub layers beneath. Typically a course 4-6mm angular jointing material is usually placed within the joint, which creates this balance allowing water to pass freely, but also adding structural integrity through frictional interlock across the depth of the pavers.

The advent of this form of construction is a reversal of traditional highway engineering methodologies, allowing water into the construction rather than shedding as quickly as possible. The filled joint typically allows around 18,000 litres per second per hectare of water to flow unimpeded to the sub layers below, leaving a surface which is free of water, acts as part of the designers SUDs responsibility and reduces the overall risk of surface flooding.

The uptake of the concept is significant, and over the last decade we have seen many local Authorities adopting this form of construction as a halfway house, to have a fully surfaced hard landscaped area, and a free flowing drained surface simultaneously.

The industry guidelines for maintenance of these systems, is typically to follow similar maintenance regimes as one would for standard block pavements. Industry research has shown that, whilst the joint will silt to a degree, the permeability of the joint will remain such that the area will be able to cope with any expected rainfall activity. As a caveat, the industry suggests that should the permeability of the pavement become less than expected, this will be noticeable from a visual inspection in the form of ponding on the surface. In these instances the joint should be gently agitated with a stiff bristled broom, and any loose material brushed back into the joint, or additional joint filling material introduced where necessary.

However, with the permeable pavement market beginning to reach maturity, and existing pavements reaching service life's in excess of 3, 5 and 10 years, pavement owners are looking at maintenance strategies to ensure that their asset continues to perform in the manner designed, for the remainder of its intended lifespan. Pavement owners have reported that it has been necessary to undertake more stringent maintenance regimes than anticipated, which has resulted in vigorous periodic jet washing and brushing to unclog the blocked voids (also serving to remove weed growth) within the jointing material. This has resulted in the need to refill and replenish the jointing media, this can prove to be a labour intensive and therefore expensive operation. It has been shown that regular jet washing can unclog around 80% of the voids.



Jointing aggregate readily dislodged from maintenance regimes to unclog voids

As a manufacturer of market leading joint stabilising materials, Resiblock were increasingly being approached by operators of larger paved areas to find a solution to the number of permeable pavements which require their joints to be replenished upon regular maintenance. Some of the owners and facility management operators, are of the opinion that if they were able to keep the jointing mechanism in place, and maintain its integrity, then this would reduce their operating costs significantly.

Resiblock's Research and Development Department identified that there were a number of apparent occurrences which caused materials to be removed from the joint.

1. Maintenance regimes:
 - (i) Jet washing
 - (ii) Brushing
2. Storm activity and,
3. Traffic draught from the passage of vehicles.

Jointing aggregate deposited on paver surface following channelised vehicular trafficking



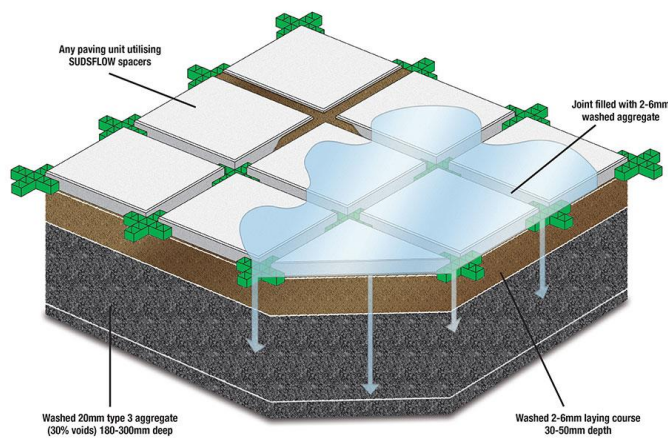
Image courtesy of PavingExpert.com

The challenge to find a solution represented a complete change of mind-set. Traditionally, Resiblock stabilised their joints with a view to creating an impervious joint which did not allow any moisture to penetrate into the sublayers. This obviously had significant benefits to the performance of trafficked traditional block pavements, but it meant that the polymer chemistry had to be considered to allow for the free flow of moisture through the joint. In addition the product had to have enough elasticity to perform in a more flexible pavement, maintain, and be unaffected by climatic conditions such as snow and frost or by manmade substances i.e. chemical spillage, hydrocarbons or de-icing salts etc.

The pore structure of permeable jointing materials is such that the contact surface area is reduced because the angularity and size of the material. Resiblock identified that any developed material should have an increased bonding ability over a reduced surface area, and should be viscous enough so as to cure prior to falling all the way through the joint on application.

The resulting material, Resiblock Envirofix, has all of these qualities. It is able to bond the more porous aggregate within the joint, perform in a highly flexible manner, cure rapidly, in the right conditions. The material coats the jointing aggregate and creates a bond at the interface between adjacent particles, however it leaves the centre of the void free to allow the unimpeded passage of water through the joint and maintain the integrity of the permeable pavement.

Full scale trials were undertaken at Sizewell B Nuclear Power Station in Suffolk, UK, over some 3,000m², using a flag pavement, SuDS Flow joint spacers, permeable pavement joint filling materials. The challenge of the site came as a flag pavement with a wide joint. The designers wanted to maintain the permeability of the area but were required to protect the pedestrians items such as stiletto heels becoming stuck in the joints. Resiblock's Envirofix was used in the application to create a permeable but solid jointing mechanism and reduce the amount of maintenance from the cleaning regime and migrating aggregate.



Subsequent trials resulted in a specification at RAF Spadeadam in Cumbria, UK over some 14,000m², which would be trafficked by military helicopters, specifically Chinooks. The Local Authority have specifically insisted on an active storm water management policy for new building works at the base to manage the flow of rainwater into the neighbouring landscape and water courses. The client was concerned about FOD (Foreign Object Damage) with their squadron of Chinooks and visiting aircraft. Resiblock's Envirofix provided a superb solution.

**RAF Spadeadam,
Chinook**



Summary

Permeable pavements have been providing an ideal solution for pavement owners, facilities management operatives and Local Authorities commitment to the sustainable drainage schemes and reducing the impact of environmental climate change.

Permeable pavements, in general require little maintenance, however, there are instances where refurbishment or operational conditions require assistance to maintain the integrity of the joint via water jetting and brushing.

Conclusion

Resiblock has developed Envirofix as a solution to these occurrences, enabling the jointing materials to remain stable and within the joints without a loss of permeability. Once installed Resiblock Envirofix will prevent the migration of jointing material from:

- 1) Natural forces
- 2) Maintenance regimes, water jetting and brushing
- 3) Traffic draught from the passage of vehicles.

The continuous replacement of jointing aggregate can prove both labour intensive and costly, this process can be quickly and simply negated by the simplistic application of Resiblock Envirofix.



***Joints stabilised with Resiblock
Envirofix no loss of jointing
aggregate***

Resiblocks' expertise and knowledge is widely recognised as the most definitive in its field of providing products to seal, stabilise and protect modular paving for domestic and commercial markets. As Europe's leading specialists we have provided sealing and stabilising solutions for tens of millions of square metres of paving in the United Kingdom and worldwide, from transshipment ports, aircraft aprons to theme parks.



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