

Whether you do pervious concrete for fun or for profit, you should understand how to remain...

### **Legally Defendable, a Contractor's Perspective.**

Pervious construction offers some attractive business opportunity for the concrete contractor, mainly the aspect of building pavement with concrete that would otherwise be asphalt. It's also an opportunity to manage storm water as a valuable natural resource rather than a nuisance. The pervious contractor might be attracted to the innovative features of the environmental benefits or its beautiful, rustic texture. An attractive business opportunity could mean different things to each person. But, regardless of whether you are in pervious construction for fun or for profit, certain problems can ruin them both.

Like many professions, the products and the methods being used are those which have shown to be legally defendable. Early in the development of pervious mixtures and methods, it was promoted in markets that enjoyed favorable conditions for pervious construction. Pervious concrete pavement was built in a moist climate that rarely experienced freezing conditions. Contractors began building this pavement in dry and freezing climates to discover serious failures with the same mixtures and methods that had proven successful in other climates. They could claim that they using the best practices known to the industry and could easily defend their position. However, we now know that you cannot expect pervious concrete to perform in dry and freezing climates without certain properties in the mixture and adhere to certain practices of production and installation.

We now know more about the subtle nuances that are unique to pervious concrete. It is the great challenge to our industry to translate those into practices that address these inherent risks to the material and to the profitability of our bottom line.

How do you remain legally defendable with many of the critical variables outside your control? You must identify each potentially critical variable. You must satisfy a potential problem in one of three ways.

The producer and the installer share in identifying a mixture and method that is compatible and manageable throughout the construction process. Any item in the plans or specs that is not consistent with these practices should be negotiated to **revise** such items to enable them to produce their best pavement. Producer and installer must have practiced their mix and method, previously. This type of confidence cannot be had without at least some experience with their process, their material and with each other. This is also a good way to discover the level of confidence between producer and installer as they jointly pool their resources and risk.

The contract which contains items that are incompatible should be **amended** to provide waivers of responsibility for failures which relate to issues in question.

If the contract cannot be revised or amended with waivers, turn and **walk away**. Don't be so anxious to secure the contract that makes you unable to do your best work. A wise contractor once said, "You will never lose money on the job that you don't do".

An impossible contract is not as rare as one may think. The designers of concrete mixtures, storm water systems, pavement systems, structures and landscape will often design pervious projects without realizing the unusual properties of pervious concrete. They will often fall into the prevailing goof by presuming that pervious concrete is about the same as conventional concrete.

The contractor should clearly disclaim any performance feature of the pavement that is outside his control. The system design and its application to the site variables of configuration, climate and soils, as well as the owner's use and service of the pavement are outside the control of the installer. Thus, he should not be bound by written, verbal or implied responsibility for the pavement to perform in those functions. It is useful to compose a legal instrument to declare those things to be excluded from his responsibilities under the contract. Any inclusion of those things that are outside his control must be carefully considered and should be well funded in compensation.

Legal provision must be made to exclude acts of God, including undue sources of water and silt to keep the warrantee language limited to those things within the control of the construction team. This should also have provision to exclude problems caused by errors in engineering, geo-tech information or unstable soils.

Some of the producers and contractors have teamed up to offer a blanket warrantee, covering the production and the installation of this pavement and extending the warrantee up to five years. This warrantee offers nice coverage for the owners of this pavement. But, it also makes a powerful statement about their confidence in the pavement and their skills in building it. Pervious construction requires a higher level of confidence between the producer and contractor. They are legally conjoined because it's difficult to say when and where the transaction takes place. The load is delivered and the responsibilities for its care are transferred from producer to contractor while they share certain overlapping tasks. It is sometimes more effective and comfortable for the owner, if the producer and installer to share this warrantee agreement. History has shown that errors during construction are usually blamed on the other guy.

As a potential owner of this pavement considers various types of pavement and storm water solutions, they will see a noticeable absence of acceptance criteria that would verify the performance of the concrete producer. He is usually forced to accept the pavement if the concrete mixture reached the proper unit weight, holds together and drains. He has very little evidence, at that point, that the ownership experience will be a happy one that continues for decades. The decision to choose pervious concrete pavement becomes far easier if the builders of this pavement are in united and confident.

The producer shoulders the responsibility for many QC issues, such as aggregate variables and mix proportioning. But as that proportion comes to include batch water, tempering water, fog and humidity during moist curing, they both actively share this role of water management. The producer and installer both deal jointly with the issues of mixer access, belt placement and adverse environment. (precipitation, freezing, wind, dehydration, etc.)

The agreement between producer and installer should define authority for the installer to follow the producer's lead in mix proportioning, water management, scheduling and attention to curing issues and agree to follow these. The producer's role should extend through these shared responsibilities even to the education of the owner about maintenance and service of the pavement. The agreement should also define the recourse that would follow a warrantee claim by owner. I think these too should be shared. An example might be that the producer supplies the replacement concrete and hauls away the demolition. The installer could demolish and replace the pavement.

The warrantee should include that it drain well and be open enough to allow maintenance with a simple wash and vacuum process. This is made possible by building the pavement with sufficient void content to allow the extraction of contaminants. It is useful for the contractor to offer an extended maintenance service for surface cleaning as an option to the owner. Whether the owner accepts this offer or not, this is a good way to clearly align the expectations of the owners with the ongoing maintenance issues associated with owning this pavement. Any event of undue contamination or loading from silt should void that aspect of the warrantee. As well, the prolonged neglect of scheduled cleaning of the pavement should also void that aspect of the warrantee.

It is important to recognize that design of the pervious mixture is made to serve two very different functions. Measures taken to enhance the structural performance of pervious concrete will often conflict with hydrology features that are essential sustained permeability. The targeted designed void content of the pervious concrete mixture is a compromise between strength and permeability. This must also include a void structure that is serviceable through the life of the pavement. The practice of building voids in concrete, intentionally reducing density, and knowingly reducing strength are unnatural acts for both producer and installer. However, this is the essential component of transition for the concrete producer and the concrete contractor to become a pervious concrete pavement construction team.

Pervious pavement failures are usually related in some way to a malfunction in the hydration process. Pavement that shows undue raveling History has shown an alarming presence of unused cement particles in slabs that experience undue raveling. The problem seems to be a shortage of batch water and/or lost water during installation and its moist curing process.