

Pervious concrete is full of void spaces between the aggregate. Another dimension of voids within the paste comes from space between particles and is occupied by water when the mixture is fresh. These void spaces will wick full of storm water during the service life of pervious concrete pavement.

Paste density is attracting attention as we consider the perils of freezing climates and deicing salts. Our first step in shaping the pervious mortar comes from water. Proper moisture content in the pervious mixture will form the coating and the paste bridge to a uniform shape, having slick surfaces that drain well. The dense and uniform shape in this type of mortar will allow storm water to drain through the pavement, rather than absorbing into the paste and aggregate.

Many types of high performance concrete mixtures rely on particle packing to achieve strength and density. Our work with pervious mixtures seeks similar properties by packing the particles within the paste. There is great variation in the size of particles in pozzolans and other additives. Selecting the optimum proportion for the various particle sizes is a matter of filling as many voids as possible. These particles may be integral to the mixture or may be applied after paste begins hardening and water begins to vacate the paste.

Micro silica is readily available and affordable for use in pervious concrete. Our experience of recent months with micro silica has shown it to be manageable in water requirements and a great enhancement in paste density.

Nano silica is a particle so small that it's tough to handle by itself. It will pass through rubber gloves like marbles through a tennis net. Nano silica has limited availability and is more pricey. However, our theories of particle packing should prove this item to be useful for durable pervious concrete pavement.

Certain other properties come with the use spherical particles, like lubricity. As with fly ash, these tiny beads tend to lubricate the paste, which aids the movement of aggregate during consolidation. This is great enhancement of mix uniformity, ease of discharge and placement. But, it is easy to over compact mixtures of high lubricity if excessive compaction forces are applied. Use of screeds and compaction equipment must observe strict limits to avoid collapse of

the void structure within the pervious concrete mixture containing these products.