Go Green with Pervious Concrete!

- Superior durability, strength and long life span = cost savings
- Reduces or eliminates the need for stormwater management and irrigation systems
- Helps property owners minimize sewer system usage and avoid municipal stormwater impact fees
- Makes more efficient use of the land
- Reduces operational costs

Pervious concrete lets the "river run through it," so to speak, so that rainwater returns to and replenishes groundwater, instead of creating puddles and stormwater runoff, an environmental liability.

In pervious concrete, carefully controlled amounts of water and cementitious materials are used to create a paste that forms a thick coating around aggregate particles. A pervious concrete mixture contains little or no sand, creating a substantial void content – between 15% to 25%. Using sufficient paste to coat and bind the aggregate particles together creates a system of highly permeable, interconnected voids that drains quickly. Pervious concrete allows 3 to 8 gallons of water per minute to pass through each square foot of the material.

USES

Applications for pervious concrete include:

Hardscape
Low-volume pavements
Residential roads, alleys, and driveways
Low-water crossings
Parking lots
Sidewalks and pathways
Patios
Tennis courts
Swimming pool decks
Pavement edge drains

Floors
Foundations/floors for greenhouses, fish hatcheries, aquatic amusement centers, and zoos

Walls
Load bearing and other walls
Sound barriers

Other
Sub-base for conventional concrete pavement
Slope stabilization
Artificial reefs
Well linings
Hydraulic structures
Tree grates in sidewalks
Groins and seawalls

SUSTAINABILITY

Pervious concrete has many environmental benefits. See associated sustainability solutions and technical briefs (right) for more detail.

Stormwater Management. By allowing water to soak through and infiltrate, pervious paving reduces stormwater flow and pollutant loads. Can contribute to LEED Credit 6.

Minimize Site Disturbance. By integrating paving and drainage, less site area may need to be used to manage stormwater, allowing a more compact site development footprint. May contribute to LEED Credit SS 5.

Local. Materials are usually extracted and manufactured locally. May contribute to LEED Credit M 5.

Recycled content. Fly ash, slag cement, or silica fume can substitute partially for cement, and recycled aggregates can replace newly mined gravel. Recycled content can contribute to LEED Credit M 4.

Cool. The voids reduce mass reducing the heat build up associated with heat islands. Lighter colored cements can increase reflectivity. Not specifically approved for achieving LEED Credit SS 7.

CONSIDERATIONS

The properties of pervious concrete vary with design and depend on the materials used and the compaction procedures. General guidelines for specifications are provided below.

Permeability. Typical flow rates for water through pervious concrete are 3 to 8 gallons per sq foot per minute, but can be double that amount if desired.

Compressive Strength. Pervious concretes can develop compressive strengths in the range of 500 to 4000 psi – suitable for a wide range of applications.

Flexural Strength. Flexural strength of pervious concrete ranges between 150 and 550 psi.

Shrinkage. Drying shrinkage of pervious concrete is faster but much less than that experienced with conventional concrete. Many pervious concretes are made without control joints and are allowed to crack randomly.

Freeze-Thaw Resistance. Freeze-thaw resistance depends on the saturation level of the voids in the concrete at the time of freezing. In the field, it appears that the rapid draining characteristics of pervious concrete prevent saturation from occurring. Where substantial moisture and freeze-thaw conditions are anticipated, pervious concrete should be placed on a 6 to 18-in.-thick layer of drainable rock base such as 1-in. crushed stone.

Abrasion Resistance. Because of the rougher surface texture and open structure of pervious concrete, abrasion and raveling of aggregate particles can be a problem, particularly where snowplows are used to clear pavements. Surface raveling in new pervious concrete can occur when rocks loosely bound to the surface pop out under traffic loads. This raveling is considerably reduced after the first few weeks.

CASE STUDIES:

State of Michigan -- Otsego Lake State Park

Team Elmer's provided pervious concrete for the State of Michigan's first test park project. Otsego Lake State Park had the

new product poured in five campsites and a bathhouse. In past years, campers would complain about "rivers" that resulted from heavy rains, making paths difficult to travel, and transporting water, soil, and possible pollutants to the nearby lake. Now those campers are delighted to note safe, flat, dry concrete surfaces – ideal for firepits and walking – and free of stormwater runoff.

Mary's Kitchen Port -- Traverse City

Gourmet food retailer Mary's Kitchen Port co-owners Mike Boudjalis and Kathy Baier recently installed Team Elmer's pervious concrete in their back parking lot. "It's so much fun to stand in the rain and watch it drain," Mike says, "especially since we had water come into our building 25 years ago!" He and Kathy recall when the store flooded because the parking lot storm drain was overloaded. They were filling five-gallon buckets from the parking lot and lugging them to the street to dump. Mike says he's seen a huge decrease in the amount of rainwater running into the storm drain now. Maintenance has thus far been easier than that for traditional asphalt. "The snow doesn't stick to it as much," he says. "There's almost no buildup. It's cleaner."