



# Construction & Materials Tips

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## Short, Easy-to-Read Format for TxDOT Project Summary Reports

A project summary report (PSR) must be submitted with all research projects ending this fiscal year. Most will be four pages or less and include pictures and/or illustrations.

A PSR does exactly what its name implies – summarizes a research project. It is intended to be a clear, concise, readable statement of *what* the research accomplished, *why* the research is important, and *how* the research can best be put to use. The PSR is a vital link between TxDOT's ongoing research program (academic inquiry) and the implementation program (practical applications). It guides the user from one to the next.

The new PSR, in its shorter and easier-to-read format, serves several purposes - to:

- Facilitate implementation of research results
- Further continuing education and professional development
- Elicit interest among audience members in more detailed information about the research
- Satisfy requirements that TxDOT report research results to other transportation entities and DOTs

Each PSR will normally contain these elements:

1. A brief statement of the purpose and scope of the project and the need giving rise to the research
2. "What We Did"
3. "What We Found"
4. "The Researcher Recommends . . ."
5. "For More Details . . ."
6. "TxDOT Implementation Status" – prepared by CSTR
7. "Related Research" – optional.

If you have comments or suggestions regarding this new format, please contact John Bassett of the Construction Division/Research Section (CSTR), at 512.465-7922.

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## Waco District Constructs TxDOT's First Permeable Friction Course

The Waco District recently began construction on a project located on Loop 340 in north Waco that utilizes a permeable surface mixture known as Permeable Friction Course (PFC). It consists of two layers of hot mix; the underlying layer is SMA and the surface is the PFC mixture. PFC is the name used in Texas for Permeable European Mix (PEM), which is gaining widespread acceptance in the Southern United States. PFC, Stone Mastic Asphalt (SMA) and Stone Filled (Superpave) mixes are being promoted as materials which should significantly improve pavements in Texas. TxDOT's Flexible Pavements Design Task Force (FPDTF) recently developed specifications to utilize these three products.

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Permeable surface mixtures have been used in the United States for over 40 years. These mixtures are referred to by many names. The most common name is Open Graded Friction Course (OGFC); however, names such as “Plant Mix Seal”, “Popcorn Mix”, and “Asphalt Concrete Friction Course (ACFC)” are often used for products that are somewhat similar.

Georgia is considered by many paving experts as having the best pavements in the United States. As a matter of policy, permeable mixtures are required on all interstate highways in Georgia. After many years of using conventional Open Graded Friction Courses (OGFC), Georgia has adopted the use of Porous European Mixtures (PEM) after studying their use in Britain, Spain, and Italy. PEM is typically placed 1 ¼ inch thick and the mixture has several distinguishing characteristics. PEM in Georgia is made with 0.4 % fibers, PG76-22 binder and is designed to have a minimum of 20% air voids, which is achieved by using a gradation that is coarser than most conventional permeable surface mixtures.

Several states, such as Oregon, Arizona, and Florida, use a significant amount of permeable surface mixtures in addition to the European countries listed above. Due to the success of PEM in Georgia, Alabama and South Carolina have recently converted to using PEM as the predominate surface mixture on roadways with posted speed limits above 45 mph. The state of Arizona has been very successful in the use of ACFC, which differs somewhat from other friction courses. The primary difference is that recycled crumb rubber is used in ACFC instead of fibers. The Odessa District has also been very successful in using crumb rubber open graded friction courses.

Georgia reports that PEM is by far their most complemented mixture from the public. They have been placing the open graded friction courses with fiber and modified binders since 1991. Prior to the 1996 Olympics, Georgia began using the PEM version (coarser gradation with fibers and modified binders) as an open graded mixture. Safety and comfort are the primary advantages offered by PEM; however, there are several other secondary benefits that PEM offers. Some advantages of PEM are:

- Wet weather friction and visibility are enhanced
- Water spray is reduced 90-95% compared to conventional mixtures
- Interconnected voids drain water and reduce hydroplaning
- Noise levels are reduced (reported to be about ½ of conventional mixtures)
- Night time visibility of painted pavement markings is improved
- Texture is uniform - no segregation
- Surface is rut resistant
- More durable than conventional OGFC (higher binder film thickness, less oxidation and drain down)
- More resistant to plugging with debris than conventional OGFC

The PFC used in Waco is not the same as the Plant Mix Seals traditionally used in Texas (built under Item 342). There are three primary differences between the “new generation” of permeable surface mixtures, such as PFC, and the Plant Mix Seals used in Texas throughout the 1980’s. PFC mixtures employ the use of fibers, modified binders, and coarser gradations as compared to TxDOT’s Item 342 mixtures. These three differences make for a mixture that is significantly more durable than traditional Plant Mix Seals. In addition, PFC mixtures are designed to have a minimum of 20 % air voids. The expected life for PFC is between 10 and 14 years, as compared to Plant Mix Seals which typically last from 5 to 7 years.

For more information about the Waco project, contact Chris Starr via GroupWise or by phone at 254.867-2780. To receive a technical bulletin on “Georgia’s Use of Permeable Surface Mixtures” contact Dale A. Rand at 512.232-1903 or via GroupWise.

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