# European Drainage Systems

By-pass or slit drainage, as it is sometimes called, has been widely used in Europe to successfully drain athletic fields. Europeans have recognized that an athletic field has unique properties that require a different drainage system other than our accepted standard of applying an agricultural drainage technique to athletic turf.

The earliest published research dates back to 1939 with additional work that was published in the 50's. In the mid 60's, the first practical machinery was introduced that was capable of successfully installing by-pass drainage. The word by-pass is used since the water does not pass through the soil as in normal drainage systems. Narrow columns of sand are installed which allow the water to move through vertical columns of sand, bypassing the soil. These columns of sand, which are approximately 5/8" to 3/4" of an inch wide and at a controlled depth of up to nine inches, are crossed at right angles with small diameter tile. These tile lines are spaced as close as 40 inches apart, and the tile may be as small as 25 millimeters (3/4 inch) to the more generally accepted 35 millimeter (1.2 inches) in diameter. The sand used is critical. It must be absolutely uniform in partical size to allow rapid drainage of upto 60 inches per hour, yet at the same time, sufficiently small to create gravitational pull or wicking action. Generally a sand appriximately .25 millimeter meets the above criteria.

Columns of sand extend to the soil surface where a top dressing program is strongly recommended to assure a matrix for lateral movement of water to the slits. The narrow columns of sand are generally run in a goal line to goal line configuration on an athletic field, on a pre-engineered spacing that may range from five inches to 40 inches apart. (The design formula is not given here, due to it's complexity and amount of verbiage required to explain.) The formula does take into consideration the sand, the filtration that may be naturally occurring in the existing soil, slope of the field, run-off, and other factors. Following this, another formula states the amount of rainfall that can be removed from an athletic field in a given period of time. Often, the amount is six inches per day or greater. The narrow slits that we have described above are interconnected to 35 millimeter tile that are bedded in fine stone and topped with sand. These tiles cannot be installed in trenches wider that two inches in width. A width greater than this will dry out in the summer time and cause the grass growing in the sand to die back, leaving the athletic field with a poor appearance and an unlevel playing surface. In addition, trenches two inches or greater in width, are subject to disturbance by athletic shoes, even after grass has grown over. The system described above, works extremely well and is very cost effective. It does, however, require exacting work and specialized equipment to install. Systems installed in the late 60's appear to drain well currently. The system can be used in new cosntruction and as a refit to an existing field, often between scheduled games. Perhaps the greatest advantage is the system's ability to guarantee drainage on an athletic field at an economical price. The economics make a number of poor playing fields better all-season fields, at a cost most schools can afford.

*by David Heiss, Turf Services*

## JOB MART

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