

# Layers in Golf Green Construction

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## Goals:

- *Examine particle migration from the rootzone layer into underlying gravels of increasing size in situations where no intermediate layer is present.*
- *Assess the effects of different intermediate and drainage layers on moisture retention in the rootzone layer*
- *Review particle size criteria for the selection of intermediate layer and drainage layer materials.*

## Cooperator:

*Daniel Binns*

Two separate laboratory experiments have been established to examine particle migration into the underlying gravel and moisture distribution in the rootzone layer for a variety of golf green profiles.

In the first experiment, a two-layered profile is considered with the rootzone layer directly overlying the drainage layer. Two rootzones have been used, one based on an 85/15 mix with medium-coarse sand and sphagnum peat, the other being a 70/30 mix of medium-coarse sand and the same peat. Ten gravels are included, five based on rounded material and five based on angular material. The increase in size from a range where particle migration into the gravel should not occur to a size where there is a severe risk of downwards movement from the rootzone into the gravel. A total of 3000 mm of simulated rainfall is currently being applied at the rate of 100 mm per week. At the end of this period, the gravel layer will be impregnated with an araldite resin containing fluorescent dye. When the resin has hardened, the impregnated material will be sectioned so that particle migration can be examined.

Vertical changes in moisture distribution in the rootzone layer also will be measured.

In the second part of the study columns simulating a three-layered USGA golf green profile have been established. The rootzone is based on an 80:20 sand:peat mix and the gravel is a predominantly 6-9 mm material conforming to USGA requirements. The intermediate layer is, however, varied to allow for increasing proportions of medium sand (0.25-0.5 mm) and coarse sand (0.5-1.0

mm) being added to the 1-4 mm grit that forms the intermediate layer. Moisture profiles will be assessed after saturation and 48 hours gravitational drainage to establish

at what point the inclusion of finer material in the intermediate layer begins to affect the suspended water table in the rootzone layer.

**Table 13. Bridging factors for the combination of two rootzones and five gravel sizes.**

D <sub>15</sub> of gravel (mm)	Medium rootzone	Medium-coarse rootzone
	D <sub>85</sub> = 0.45 mm	D <sub>85</sub> = 0.60 mm
----- Bridging Factor -----		
2.2	4.9	3.7
2.8	6.2	4.7
3.5	7.8	5.8
4.4	9.8	7.3
5.6	12.4	9.3

Note: The 1993 revision of the USGA Recommendations for a Method of Putting Green requires a value of  $\leq 5$ .