

## THE "PREMATURE HYDRATION" OF GCLs

It is often asked whether "premature hydration" affects GCLs to the extent where it should be "removed and replaced". The term "premature" is used because excessive hydration is only a concern when the GCL is uncovered. Once a modest confining cover (12 inches of soil) is applied over the GCL, the bentonite cannot exert enough swelling force to delaminate the product, nor can it absorb enough water to become overly plastic. A few years ago, specifiers began to include provisions requiring the removal and replacement of all GCL that was hydrated before being covered. However, this "remove and replace" practice is not always necessary.

Bentomat® is a needlepunched GCL in that it is held together with needlepunched fibers. The needlepunched construction of Bentomat provides a mechanical bond that cannot be overcome by the swelling bentonite. In other words, Bentomat can withstand unconfined hydration without losing its integrity. This is why Bentomat can be successfully deployed even in standing water for short periods without adverse impacts. However, this does not mean that CETCO recommends such installation practices. CETCO's guidance is that these instances should be evaluated on a case-by-case basis. For example, the duration that the material was exposed, the degree of its hydration, the location of Bentomat within the liner system, and the bearing loads it will be subjected to during construction are all factored into a recommendation.

When assessing whether to remove and replace any prematurely hydrated Bentomat, an examination of the hydrated areas should be conducted in order to verify that:

1. The geotextiles have not been separated, torn, or otherwise damaged.
2. There is no evidence that the needlepunching between the geotextiles has been compromised.
3. The Bentomat does not leave deep indentations when it is walked upon.
4. The overlapped and bentonite-enhanced seams are intact.

If these conditions are met, then the Bentomat probably may remain in place. Although it may contain more water than it would have under soil or geosynthetic cover, this water will be drained from the Bentomat when consolidation occurs as normal loads are applied. The end result will be a water content in the formerly unconfined areas that is equivalent to that in the confined areas. Even if the Bentomat is hydrated to the extent that bentonite is displaced under foot, it may be possible to allow the material to air-dry such that bentonite is no longer displaced by point load. This is why it is not necessary to specify an absolute numerical moisture content criterion to decide whether to remove and replace the Bentomat. Again, removal and replacement would not be necessary, provided there is no visible evidence of damage.

Premature hydration is an extremely common occurrence, and Bentomat was designed to sustain it without requiring removal and replacement. In CETCO's experience, such cases are a rare exception and occur only as a result of prolonged hydration followed by direct vehicular contact. For this reason, CETCO estimates that over 99% of prematurely hydrated Bentomat does not require removal.