

Geomembrane bridging issues in lagoon based anaerobic digesters

Michael Flynn

FLI Group, Ireland (mflynn@fli-group.com)

ABSTRACT: The geosynthetic installation challenges created by such designs are many. The interface between a vertical wall, a steep embankment with either sharp or curved corners and a flat floor create both bridging and wrinkling problems which have to be solved. Concrete structures in and pipe penetrations through the embankment sides add to the complexity in terms of ensuring a high quality installation. A further added challenge is created when the installation is going on in winter as opposed to the summer months as the thermal coefficient of the selected geomembrane comes into play and can lead to welding challenges.

The key to delivering such projects successfully is in the detailed planning and scheduling of the various elements of the works and having a clear understanding of the sequential steps that must be adhered to in order to enable the geomembrane to find its own level so to speak, before it is firmly fixed in place. Managing temporary ballasting during geomembrane installation is a critical element of delivering such projects.

Bearing in mind that there may be several layers of geosynthetics involved in such applications, the temporary anchoring of such materials is complicated. With such smooth surfaces interfacing with the geomembrane during the entire installation period, there is a high risk of the geomembrane slipping as the permanent mechanical fixing at the top of the concrete wall is one of the last elements of the works to be completed in such installations, otherwise the bridging and wrinkling cannot be managed.

A detailed but not an exclusive list of considerations that a project manager and the installation supervisor on such a project have to consider and plan for and around each day include: weather including wind, access to the working face, sequencing of the installation of the geosynthetic layers, preparation and placing of the individual geomembrane and geosynthetic panels, temporary ballasting including water and permanent ballasting, risk of bridging of the geomembrane at the interface of the concrete wall and the embankment and between the embankment toe and the floor, concrete structures and pipe penetrations and fixing to both, geomembrane slippage risks, ensuring that there is sufficient surplus material at the wall level to manage both bridging and wrinkling while ensuring that there remains in place sufficient material to be anchored permanently on the outside of the concrete wall cap.