

Managing wrinkles, bridging, and ballasting during geomembrane installation

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ABSTRACT: This presentation will review Australian examples of geomembrane installations for containing liquids with wrinkles and bridging.

It has been documented that wrinkles can reduce the life of geomembranes and are to be avoided. In Australia the generally recognized maximum level of strain in Polyethylene geomembranes is between 4% and 8%. These limits are regularly applied to the assessment of localised strain caused by sub-grade irregularities and from drainage layers interacting with the geomembrane. Relating these limits to wrinkles and bridging is less developed in specifications and field construction and inspection processes.

Local climatic conditions cause high swings in geomembrane temperature over any 24 hour period and between climatic seasons increasing the difficulty in managing installed geomembrane strain levels. Accordingly there are a number of challenges in designing and constructing storages to achieve an acceptable level of bridging and wrinkling. Further, the operating temperature of the storage, and when the storage is filled after construction are also relevant considerations. A number of storages are compared with un-reinforced and reinforced geomembrane materials.

Bridging effects have been less widely reported than the occurrence and effects of wrinkles. Features and construction issues which increase the risk of bridging are assessed. Field observations are reported showing that the effect of bridging is not limited to the potential reduction in geomembrane life arising from strain in the material and particularly around weld features and anchoring points. The barrier system can also be compromised by excessive bridging before the geomembrane layer has failed.

Analysis of failures leads to practical suggestions to improve specifications and construction processes.