12 ICG
12th International Conference on Geosynthetics
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Geosynthetic Reinforced Structures including Seismic Aspects

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Dr. Bathurst is Professor Emeritus of Civil Engineering at the Royal Military College of Canada where he has taught since 1980 and holds a cross-appointment at Queen's University. He is a past-President of the Engineering Institute of Canada, Canadian Geotechnical Society, International Geosynthetics Society (IGS) and the North American Geosynthetics Society. Dr. Bathurst has authored or co-authored more than 200 journal papers and 250 other contributions. Dr. Bathurst is Editor-in-Chief of the IGS peer-reviewed technical journal Geosynthetics International and Associate Editor of the International Journal of Geomechanics, and the IGS journal Geotextiles and Geomembranes. He is Fellow of the Canadian Academy of Engineering, the Engineering Institute of Canada and the Canadian Society for Civil Engineering. Dr. Bathurst was elected Fellow of the Royal Society of Canada in 2017, which is the highest academic honour in Canada. The "Bathurst Lecture" was recently announced by the IGS in recognition of his lifetime contributions to the development of geosynthetic soil reinforcement technologies and the mission of the IGS. The lecture is delivered every four years beginning with the 12th International Geosynthetics Conference in Rome in 2023.

http://www.geoeng.ca/members/Bathurst/Index.html#fndtn-publications

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Course Outline

Called mechanically stabilized earth (MSE) walls in North America

1. Overview of geosynthetic reinforced soil walls: The history of GRS walls is briefly reviewed including important new construction methods and materials. The basic components of these systems are explained. The relatively higher sustainability of these systems over conventional earth retaining wall systems is highlighted.

2. Design and analysis of GRS walls: External, global and internal design limit states are presented. The characterization of the mechanical properties of geosynthetic reinforcement materials is discussed and how these properties are determined from physical testing and used in internal stability design and analysis is demonstrated. The new stiffness method recently adopted in the US and Canada is explained. The essential features of emerging probabilistic methods of analysis are introduced.

3. Seismic design: GRS walls have most often performed well during earthquake. Examples of their performance under seismic loading are given. The reasons for their good performance are explained and the design methods used to quantify the additional seismic-induced external and internal loading are discussed.

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Reinforced soil walls constructed with inextensible (steel) and relatively extensible (polymeric) reinforcement materials are a mature and proven technology

[aka: mechanically stabilized earth (MSE) walls]

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Agar-Quf Ziggurat (Iraq) - 1000 BC

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Courtesy J.P. Giroud

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First concrete panel steel reinforced soil wall (Lyon, France 1971)

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SeaTac Airport runway extension (Seattle Washington USA) - steel strip MSE wall (46 m high) (completed in 2006)

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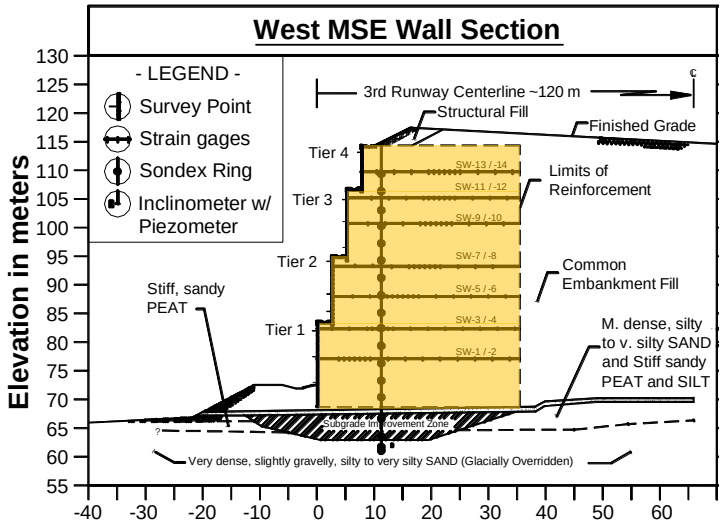

Stuedlein, A.W., Bailey, M., Lindquist, D., Sankey, J. and Neely, W.J., 2010.
Design and performance of a 46-m-high MSE wall. *Journal of Geotechnical and Geoenvironmental Engineering*, *136*(6), pp.786-796.

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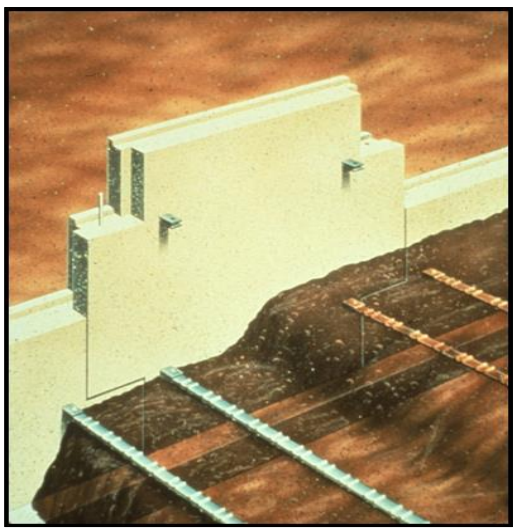

Steel strip

Steel grid

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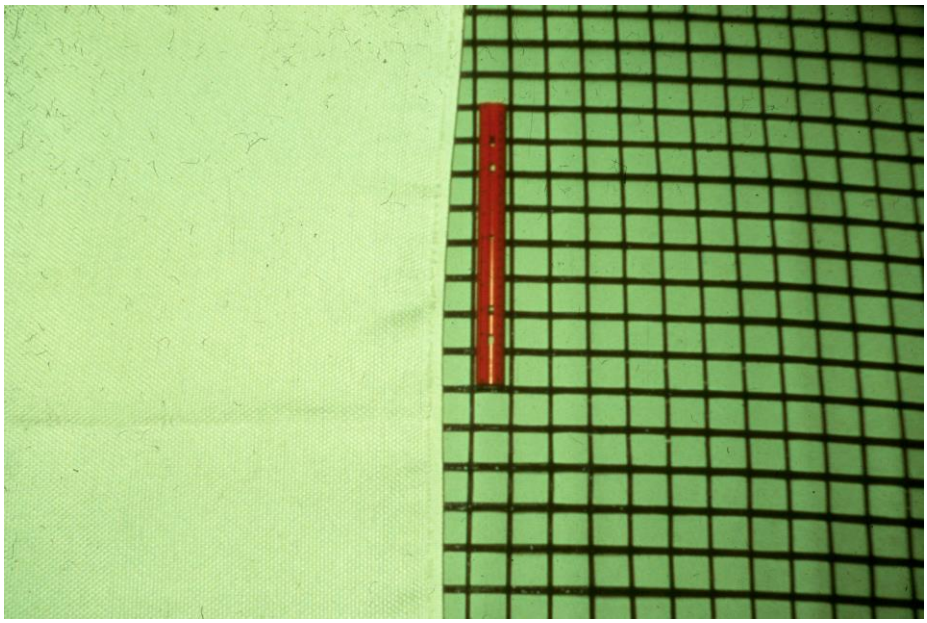

Woven polyester geotextile Woven polyester geogrid

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The first geosynthetic reinforced soil wall was constructed in France in 1970 near Poitiers (polyester strap)

The second geosynthetic reinforced soil wall was also constructed in France in 1971 at Rouen (first geotextile wrapped-face wall)

The third geosynthetic reinforced soil wall in the world and first in North America was built by the US Forest Service in Siskyou National Forest, Oregon in 1974 (wrapped-face wall)

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