ELASTIZELL EF (Engineered Fill)

RESEARCH REPORT

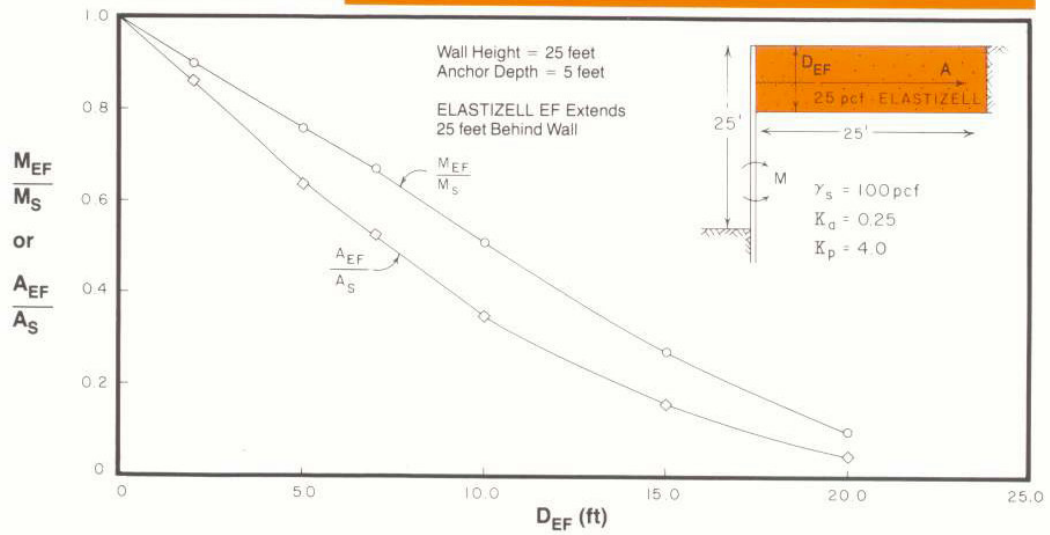
Retaining Wall Design Parameters

The Computed Effect of Various Design Parameters

- Overturning Moment
- Bending Moment
- Sliding Force
- Anchor Pull

From ELASTIZELL EF as a Soil/Backfill Replacement Having Different Configurations Behind Retaining Walls.

Computed Reduction in Wall Bending Moment and Anchor Pull from Replacement of Backfill with ELASTIZELL EF



Elastizell Corporation of America

ASSUMPTIONS

1. All of these analyses utilized the theory for active earth pressures (Coulomb's Earth Pressure Theory) as outlined in Lambe & Whitman, *Soil Mechanics*, John Wiley & Sons. From the theory, a coefficient of active earth pressure, K_a, is computed. This coefficient relates the horizontal forces generated by the soil to the depth and unit weight of the soil: $K_a = f(\delta,\phi)$

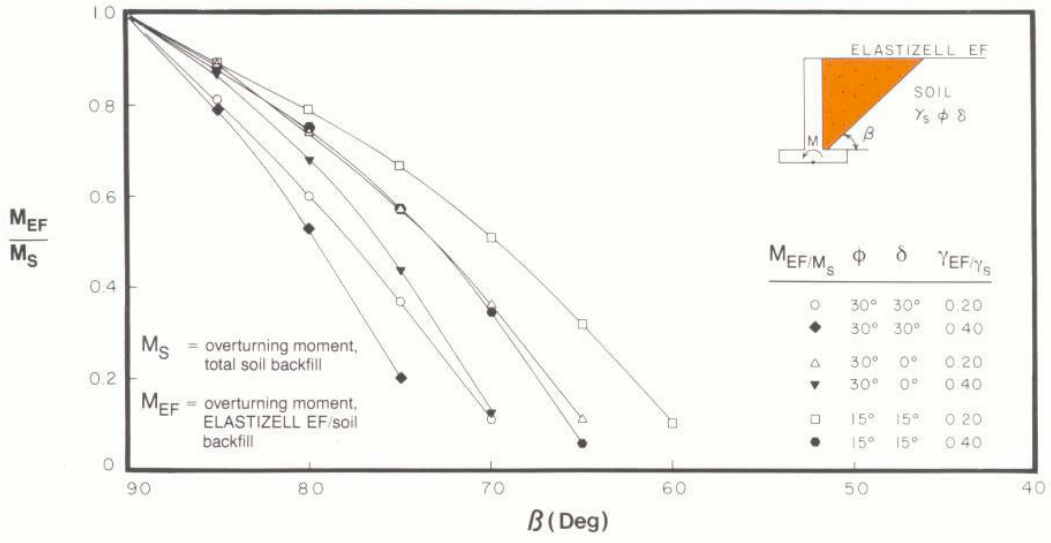
2. All analyses assumed that the active earth condition has developed, i.e., the wall is permitted to move slightly.

3. All analyses assumed a cohesionless backfill. If the backfill is cohesive, adjustments to the active earth pressures can be made based on past experience with the particular soil in a specific location. For some of the analyses, the results are independent of the actual value of active earth pressure since dimensionless ratios are used.

4. Another assumption is that the **ELASTIZELL EF** contributes pressure on the wall through the soil below. In the partial wedge studies, the **ELASTIZELL EF** is assumed to transfer earth pressure from the soil behind it onto the wall.

5. The partial wedge studies assume the **ELASTIZELL EF** reduces wall forces by two mechanisms:
   a) Since it replaces soil that is heavier, it reduces load.
   b) Its own weight resists overturning forces from the soil since it acts as a solid mass. The straight backfill case also resists sliding at its base.

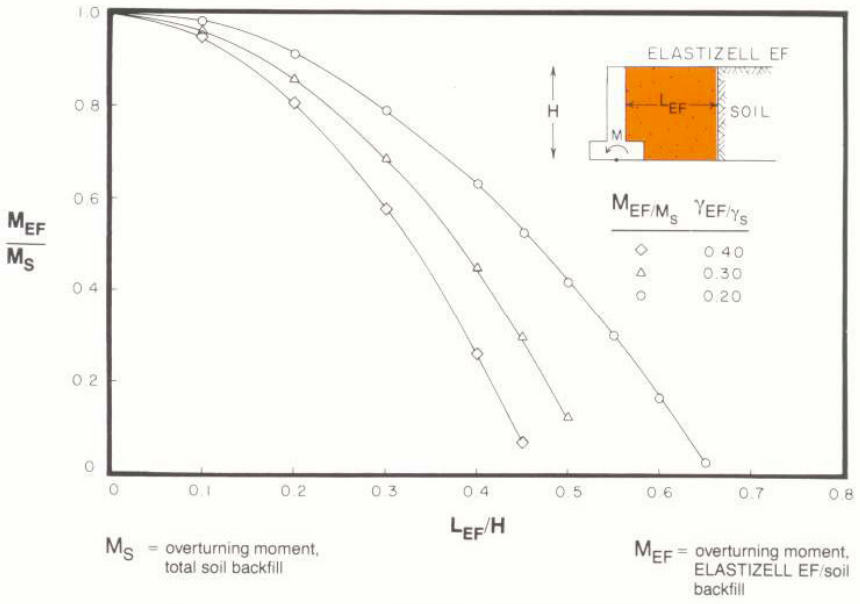
Computed Reduction in Overturning Moment at the Base of a Retaining Wall from Replacement of Backfill with ELASTIZELL EF in a Wedge Configuration



REMARKS

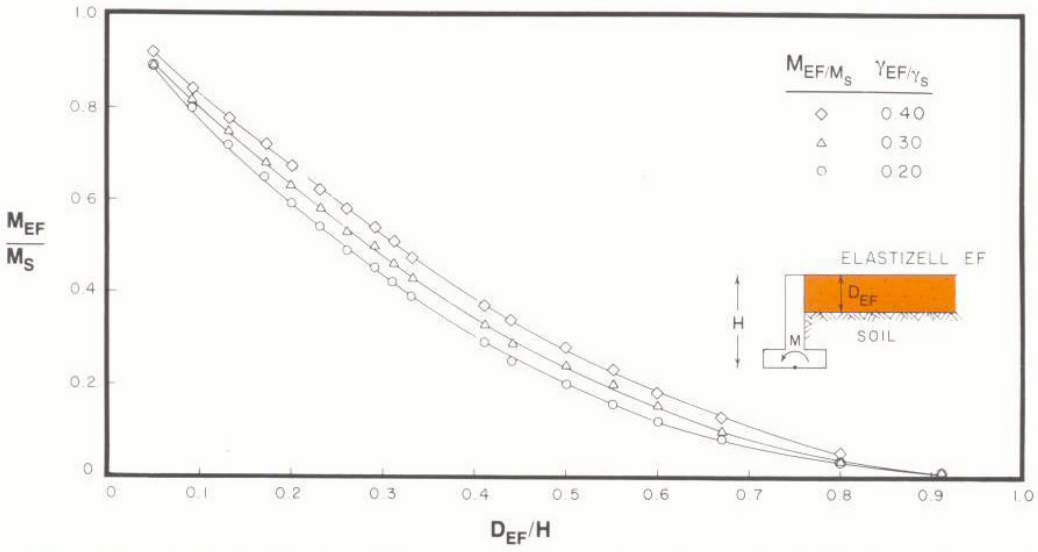
Many retaining walls fail due to poor drainage of their backfills. Typically, the walls can retain the loads that they are designed for, but water forces can double the design loads and cause failure of the retaining wall. However, these water forces will not build up if adequate drainage is provided. The combination of **ELASTIZELL EF** as a total or partial replacement of standard, heavy backfill materials and the proper drainage system offer the designer the alternate of lighter retaining walls and footings with a backfill material—**ELASTIZELL EF**—which will not capture water and build up these increased forces.

Computed Reduction in Overturning Moment at the Base of a Retaining Wall from Replacement of Backfill with ELASTIZELL EF in the Block Configuration

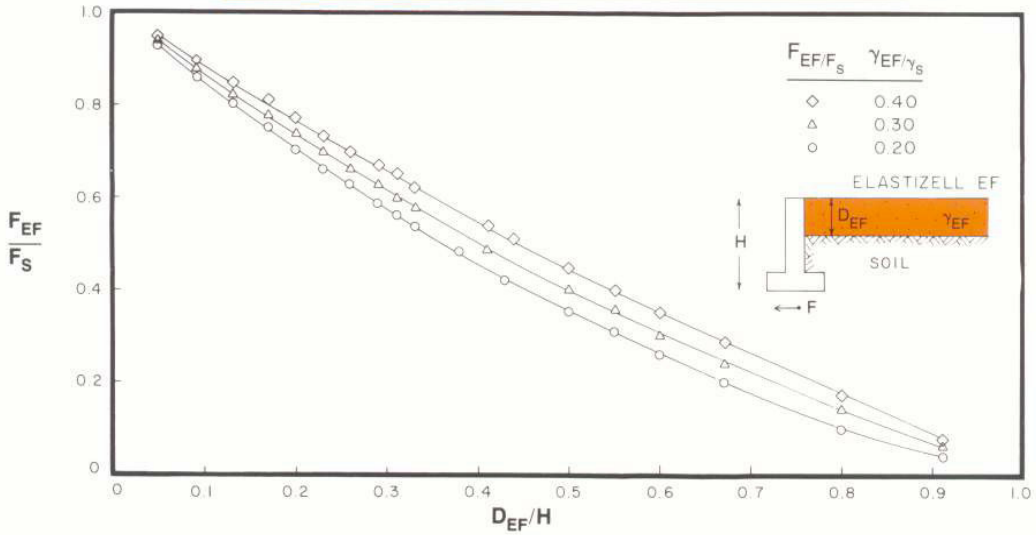


M_S = overturning moment, total soil backfill

M_{EF} = overturning moment, ELASTIZELL EF/soil backfill



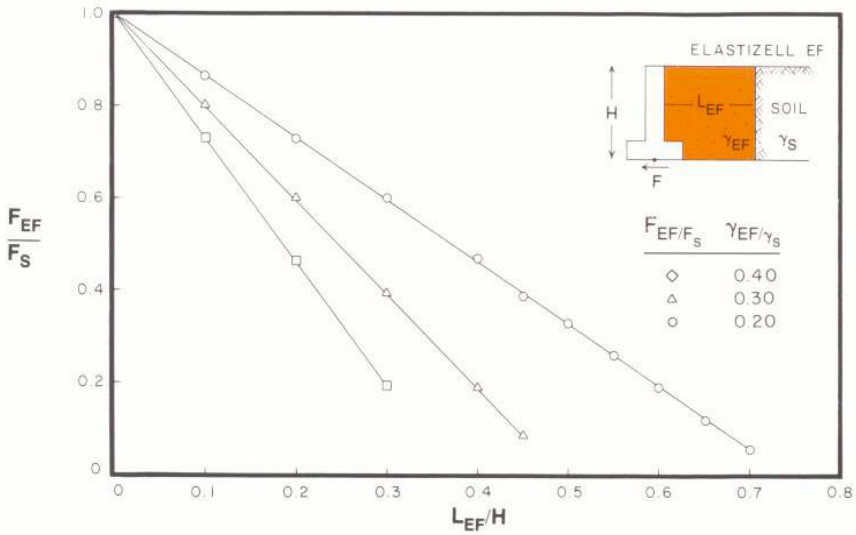
Computed Reduction in Sliding Forces at the Base of a Retaining Wall from Replacement of Backfill with ELASTIZELL EF.



F_{EF} = sliding force, ELASTIZELL EF/soil backfill

F_S = sliding force, total soil backfill

Note: Sliding resistance may be substantially increased by keying the footing into the ground.



Elastizell Corporation of America

P.O. Box 1462 - Ann Arbor, Michigan 48106
AC 734/761-6900 Fax 734/426-6078
www.Elastizell.com

CALL FOR DESIGN ASSISTANCE AND ADDITIONAL INFORMATION!