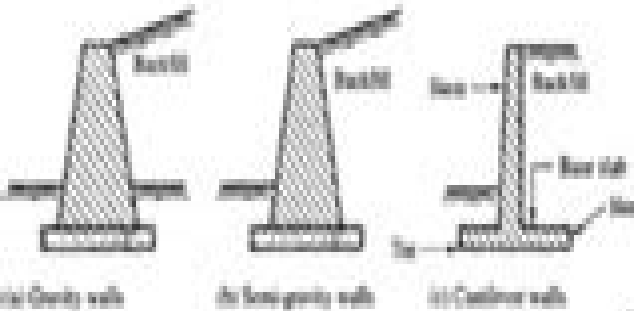


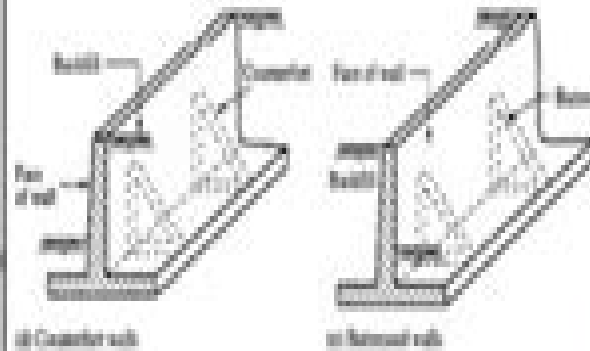
## Conventional Retaining Walls

- Gravity Retaining Structures
  - Stability depends on the self weight of the wall
  - Not economical for design
- Semi-gravity Retaining Structures
  - Minimum amount of reinforcement may be used in the wall to reduce the size of wall
- Counterfort Retaining Walls
  - Reinforced concrete is used in wall design with thin stem and slab base
  - Relatively economical for design

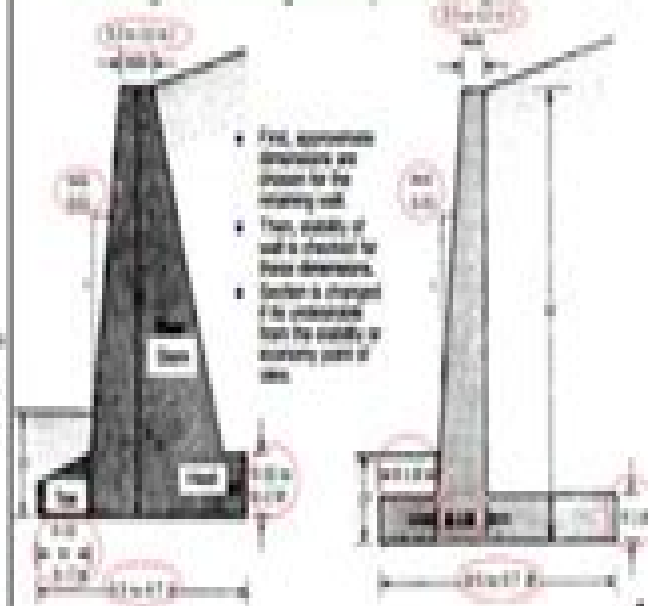


## Conventional Retaining Walls

- Counterfort/Butressed Retaining walls
  - Similar to Cantilever retaining walls, but thin slab stems may be used at some interval to tie the base slab and stem in order to reduce the shear force and bending moment for more economical design



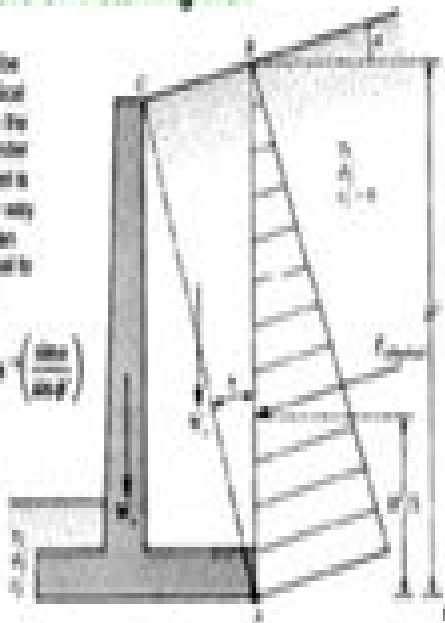
## Retaining Wall Design: Proportioning



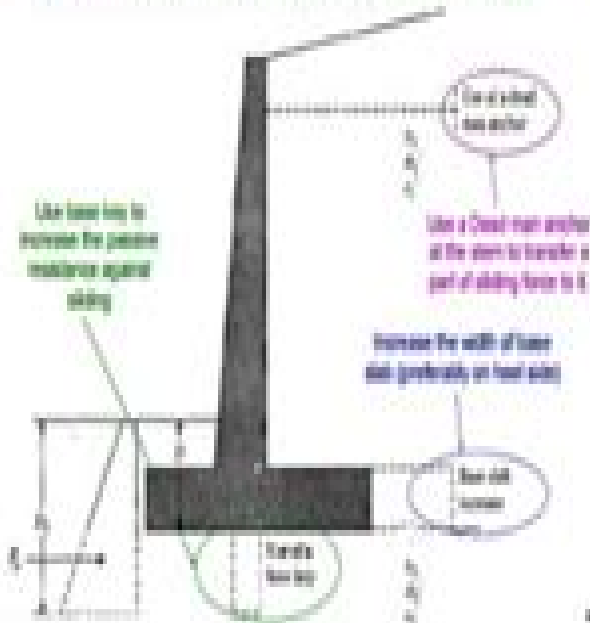
## Earth Pressure on Retaining Wall

Earth pressure may be calculated at the vertical section going through the heel of wall. This is under the constraint that heel is proportioned in such a way that line AC makes an angle less than or equal to  $\phi$  with vertical.

$$\sigma = \frac{1}{2} \gamma H + \frac{1}{2} \gamma H^2 \tan^2 \left( \frac{45^\circ - \phi}{2} \right)$$

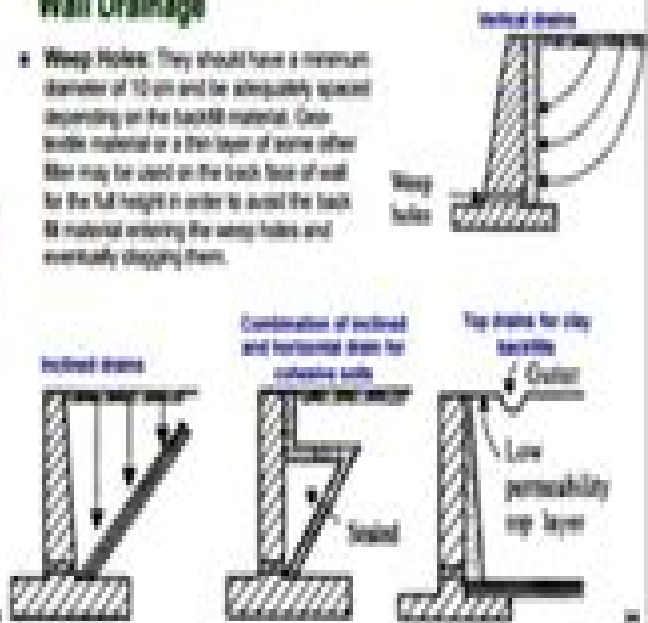


## Alternatives for Improving FOS against Sliding



## Wall Drainage

- Weep Holes: They should have a minimum diameter of 10 mm and be adequately spaced depending on the backfill material. Coarse grained material or a thin layer of some other filter may be used on the back face of wall for the full height in order to avoid the backfill material entering the weep holes and eventually clogging them.



# Retaining Walls A Building Guide And Design Gallery

**Matthew Teller, Rough Guides**

A decorative red circular graphic element, resembling a stylized sun or a lens flare, is positioned to the right of the author's name. It has a soft, glowing red center that fades into a lighter red and then into the white background of the slide.

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*Retaining Walls* Tina Skinner, National Concrete Masonry Association, 2003 The National Concrete Masonry Association presents the essential guide to constructing segmental retaining walls with detailed easy to follow diagrams and charts for do it yourself homeowners and landscape contractors alike From the fundamentals to the latest research and modern techniques in segmental retaining wall construction this colorful and inspiring gallery of design suggestions accompanies the expertly written step by step guide and offers a plethora of landscaping ideas ilable and will inspire great new designs for all landscape styles     *Landscape Design for Architectural Style: United States original styles* Scott Bradstreet, 2009 This thorough guide the second of two volumes displays and discusses American original architecture including Pueblo Spanish Revival Ranch Cabin Craftsman Prairie Cape Cod and the Mediterranean influence Over 320 beautiful color photos and 96 line drawings illustrate possibilities and display the implemented landscapes For each architectural style descriptions of colors materials and unique features are given Site elements include the paving walls fences trellises shade covers water features fire features seating and garden art This book is a must wherever landscape design is discussed imagined and implemented     Forthcoming Books Rose Arny, 2003-04     *Black & Decker The Complete Guide to Masonry & Stonework* Editors of Creative Publishing international, Editors of Creative Publishing, 2010-04 Poured concrete brick block natural stone stucco     Los Angeles Annual Builders Guide , 1923     **Library Journal** , 2003 Includes beginning Sept 15 1954 and on the 15th of each month Sept May a special section School library journal ISSN 0000 0035 called Junior libraries 1954 May 1961 Also issued separately     Real Estate Record and Builders' Guide , 1904     The Structural Engineer , 2001     Structural Design James R. Underwood, Michele Chiuini, 2011-11-07 Written for the practicing architect Structural Design addresses the process on both a conceptual and a mathematical level Most importantly it helps architects work with structural consultants and understand all the necessary considerations when designing structural systems Using a minimum of simple math this book shows you how to make correct design calculations for structures made from steel wood concrete and masonry What s more this edition has been completely updated to reflect the latest design methods and codes including LRFD for steel design The book was also re designed for easy navigation Essential principles as well as structural solutions are visually reinforced with hundreds of drawings photographs and other illustrations making this book truly architect friendly     **The Building News and Engineering Journal** , 1884     **ASCE Manuals and Reports on Engineering Practice** , 1998     **The Adirondack Architecture Guide, Southern-Central Region** Janet A. Null, 2017-06-01 Explores the architectural treasures of the Southern Central region of New York s Adirondack Park and places them in the context of Adirondack history and culture The Adirondack Architecture Guide Southern Central Region provides a professional and insightful survey of the built environment of a unique area within New York s Adirondack Park This book is the first field guide to the architecture of the Park revealing the ordinary and the extraordinary the remarkable buildings by prominent designers as well as the hidden

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Miriam F. Stimpson, 1985      **Engineering Record, Building Record and Sanitary Engineer** Henry Coddington  
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