Project	Project #	Date
Stone Strong Engineering Manual	15001.00	2/5/15

ENGINEERING

The Engineering section presents information necessary for design of Stone Strong retaining walls in a gravity configuration. This information includes design methodologies and example calculations for traditional allowable stress method as well as LRFD (Load and Resistance Factor Design) procedures. Information is also provided on computerized analysis methods.

The design methodologies presented conform substantially to AASHTO specifications (Standard Specification for Highway Bridges - 2002, or LRFD Bridge Specifications - 2011). The allowable stress methodology has undergone rigorous evaluation through the HITEC review process and was judged to be in conformance with the AASHTO standard.

This section includes the following documents:
Gravity Wall Height Tables
Typical
AASHTO
LRFD
Vertical Face
Gravity Wall Design Methodology
Example Calculation (no tail extension)
Example Calculation (w/ tail extension)
LRFD Design Methodology
LRFD Example Calc (no tail extension)
LRFD Example Calc (w/ tail extension)

Stone Strong recommends that site specific design be performed by a licensed Professional Engineer based on actual site conditions. Global stability should be evaluated separately by the designer considering the site specific soil and ground water conditions.

Calculation Spreadsheet

None of the commercially available software packages will accommodate analysis of "stepped module" configurations (modular units of different width). Stone Strong has developed a powerful spreadsheet application for Microsoft Excel that will analyze stepped modules in a gravity configuration. The spreadsheet follows the design methodologies listed above, and includes options for allowable stress analysis and LRFD analysis. The file is compatible with Excel versions 97-2003 and later. The spreadsheet is extremely versatile and provides many design and analysis options, including support for both SAE and metric units.

In order to solve complex slope and surcharge geometry including tiered walls, a trial wedge analysis method is utilized. This routine automatically iterates to evaluate the critical failure geometry and the associated load on the wall system. This feature is unique to available analysis software currently available.

Geogrid Reinforced Walls

There are commercially available software packages with well documented methodologies that can be used for design of geogrid reinforced walls (e.g. MSEW, Vespa, & SRWall). These programs require test data to define the interface shear properties of the precast modular units and the connection properties between the synthetic geogrid and the precast modular facing. Test data for these properties are included in the interaction reports.