

## ME 2120 Free Body Diagram Worksheet 2

Useful Equations

$$\sum F = 0 \quad \sum F_x = 0 \quad \sum F_y = 0 \quad \sum F_z = 0$$
$$\sum M = 0$$













Simplified explanation of typical retaining walls			
<p><b>Gravity wall</b></p> <p>Earth pressure vector Gravity vector (of wall) Reactive force vector</p>	<p><b>Piling wall</b></p> <p>Earth pressure vector Gravity vector (of wall) Reactive force vector</p>	<p><b>Cantilever wall</b></p> <p>Earth pressure vector Gravity vector (of wall) Reactive force vector</p>	<p><b>Anchored wall</b></p> <p>Earth pressure vector Gravity vector (of wall) Reactive force vector</p>
<p>Standard wall type that holds the earth mainly through its own weight. Can pivot and topple relatively easily, as the internal leverage of the earth pressure is very high.</p>	<p>Using long piles, this wall is fixed by soil on both sides of its lower length. If the piles themselves can resist the bending forces, this wall can take high loads.</p>	<p>The cantilever wall (which may also extend in the other direction) uses the same earth pressure trying to topple it to stabilize itself with a second lever arm.</p>	<p>This wall keeps itself from toppling by having cables driven into the soil or rock, fixed by expanding anchors (can be combined with other types of walls).</p>



