RCP Bending Moments: Reduced w/ Saturated Soils

For Dry Soil:

$$Md_{vert} := 0.222 \cdot p \cdot 1.43 \cdot r^2$$

$$Md_{horiz} := -0.250 \cdot K_a \cdot p \cdot r^2$$

$$Md_{Tot} := Md_{vert} + Md_{horiz}$$

$$\boxed{Md_{Tot} = 0.235 \, p \cdot r^2}$$

For Saturated Soil

$$Ratio_{vert} := \frac{\gamma_s}{\gamma_d} \qquad Ratio_{eff} := \frac{\gamma_b}{\gamma_d} \qquad Ratio_{wat} := \frac{\gamma_w}{\gamma_d}$$

$$Ratio_{vert} = 1.167 \qquad Ratio_{eff} = 0.48 \qquad Ratio_{wat} = 0.52$$

$$Ms_{vert} := 0.222 \cdot Ratio_{vert} \cdot p \cdot 1.43 \cdot r^2$$

$$Ms_{horiz} := -0.250 \cdot Ratio_{eff} \cdot K_a \cdot p \cdot r^2 - 0.250 \cdot Ratio_{wat} \cdot p \cdot r^2$$

$$Ms_{Tot} := Ms_{vert} + Ms_{horiz}$$

$$\boxed{Ms_{Tot} = 0.201 \, p \cdot r^2}$$