

# Design Study of a Ring Stiffened Cylinder for use as a Manned Submersible

Shell Yield using the Simple Hoop Stress Formula - Marks, Lionel S.  
 "Mechanical Engineering Handbook, Fifth Edition, 1951, Page 421

This is the maximum theoretical depth.

SafetyFactor := 2

DesignGoal := 300·ft·SafetyFactor      DesignGoal = 600 ft

## Design Variables:

Outside Diameter

OD := 36.0·in

Shell Thickness

t := .25·in, .3125·in.. .5·in

Yield Strength

$\sigma := 38000 \frac{\text{lbf}}{\text{in}^2}$

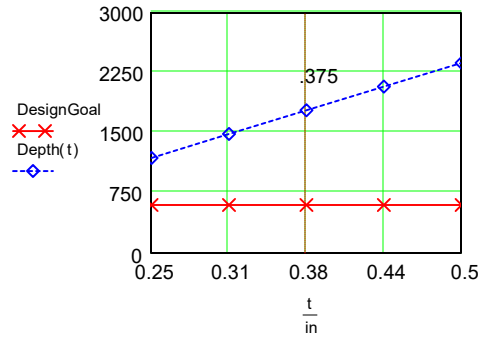
Cold Roll Steel

## Constants:

SeaWaterDensity :=  $64 \frac{\text{lbf}}{\text{ft}^3}$

## Equations:

$\text{Depth}(t) := \frac{2 \cdot t \cdot \sigma}{\text{OD} \cdot \text{SeaWaterDensity}}$

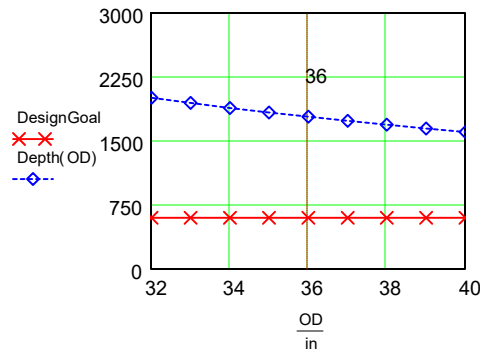


$\frac{t}{\text{in}} =$	$\frac{\text{Depth}(t)}{\text{ft}} =$
0.25	1188
0.3125	1484
0.375	1781
0.4375	2078
0.5	2375

OD := 32·in, 33·in.. 40·in

t := .375·in

$\text{Depth}(\text{OD}) := \frac{2 \cdot t \cdot \sigma}{\text{OD} \cdot \text{SeaWaterDensity}}$



$\frac{\text{OD}}{\text{in}} =$	$\frac{\text{Depth}(\text{OD})}{\text{ft}} =$
32	2004
33	1943
34	1886
35	1832
36	1781
37	1733
38	1688
39	1644
40	1603