Fermilab

Particle Physics Division
Mechanical Department Engineering Note

Number: MD-ENG- 115 Date:21 Feb 2007

Project Internal Reference:

Project: Sciboone

Title: Safety Check for the temporary plate restraint at the lab F south loading dock

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Key Words:

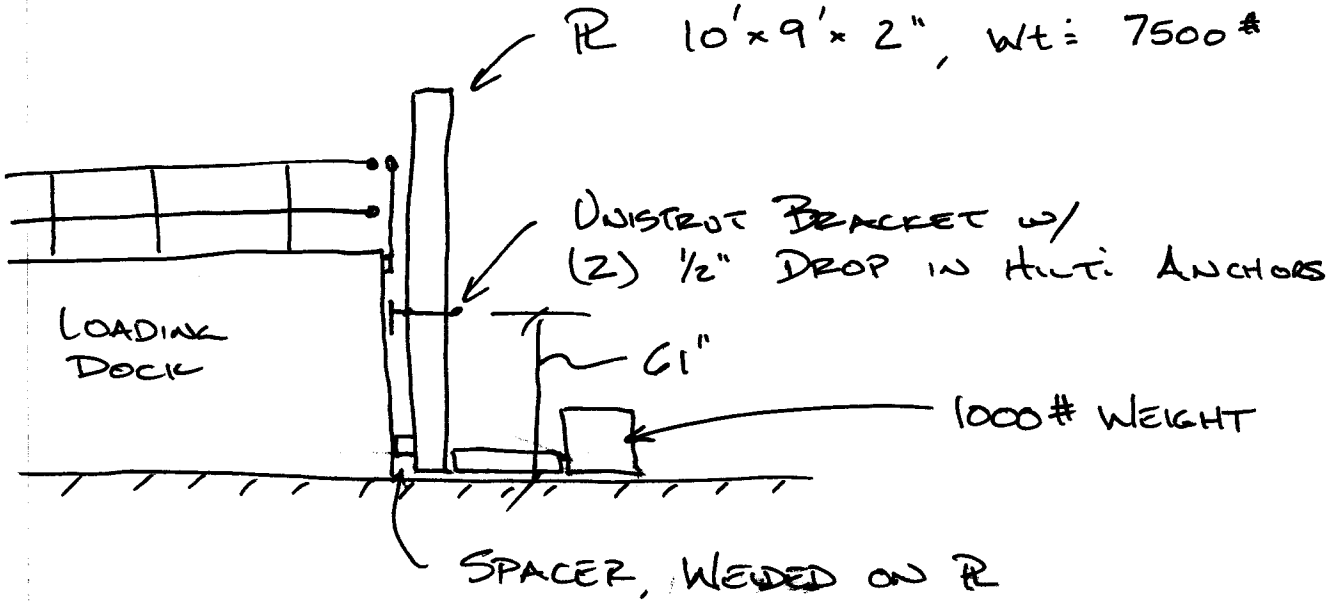
Abstract Summary:

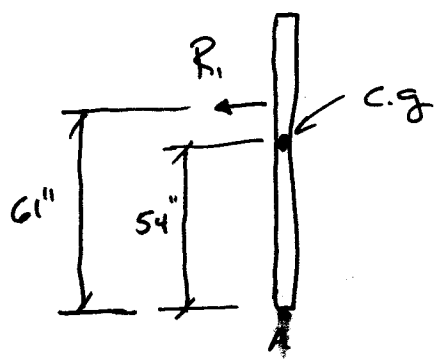
Applicable Codes:

This is a brief check to verify that the temporary placement and support restraint of a plate located at the lab F south loading dock is adequate.

SCIBOONE PL ON LAB F 2-21-07 D. PUSHKAS

LOADING DOCK





ASSUME 10% HORIZONTAL SIESMIC INDUCED LOAD @ c.g.

$F_H = 0.1 \times 7500\# = 750\#$

$$\Sigma M_A = 0 = 54''(750\#) - 61''(R_1)$$

$$R_1 = \frac{54}{61} \times 750 = 664\#$$

R_1 IS PROVIDED BY 2 UNISTRUT P254 BRACKETS.

EACH BRACKET IS ATTACHED w/ 2 1/2" 304 S/S BOLTS.

2-21-07 D. Poshian

Axial Load on Bolts

$F_y = 30{,}000$ psi

$A = \frac{\pi}{4} * (1/2)^2 = .1963 \text{ in}^2$

Assume $\sigma_{Allow} = 0.4 F_y = 12{,}000$ psi

$\therefore$ Tension per bolt $= 2356$ #

4 Bolts gives a 9424 # capacity

9424 # >> 664 # $\therefore$ OK

Drop-in-Anchors

Allowable working tension load of 1/2" Drop-in anchors is ~~1240~~ 1840 # in 4000 psi concrete

4 anchors give a 4960 # capacity

~~4960~~ 7360 # >> 664 # $\therefore$ OK