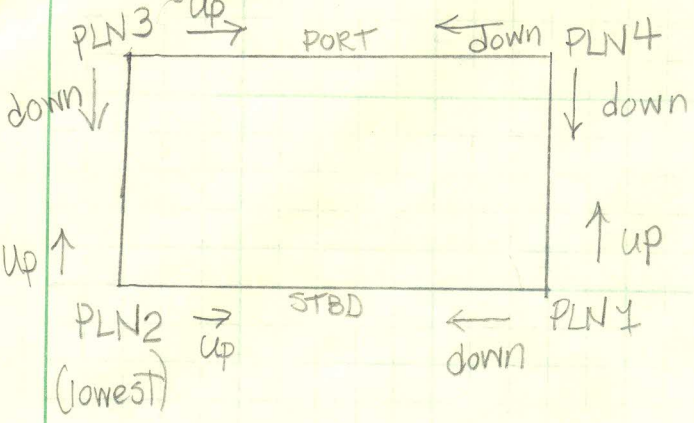
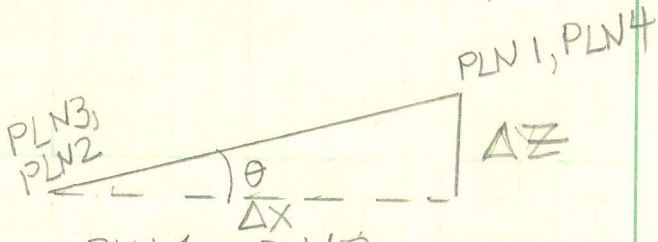
Angles roll direction



(port-stbd)
Y
Z direction UP-DOWN
x (forward-aft)

Pitch Direction Plate edges



PLN4 → PLN3

$$\tan^{-1}\left(\frac{\Delta Z}{\Delta X}\right) = \theta$$

$\Delta X = [(-26.901) - (-27.566)]$

$= 0.66501$

$\Delta Z = [(-2.771) - (-2.769)]$

$= -0.00165$

PLN1 → PLN2

$$\tan^{-1}\left(\frac{\Delta Z}{\Delta X}\right) = \theta$$

$\Delta X = [(-26.900) - (-27.565)]$

$= 0.655$

$\Delta Z = [(-2.767) - (-2.765)]$

$= -0.00165$

$$\theta \sim \tan^{-1}\left(\frac{-0.00165}{0.665}\right) \approx -0.142°$$

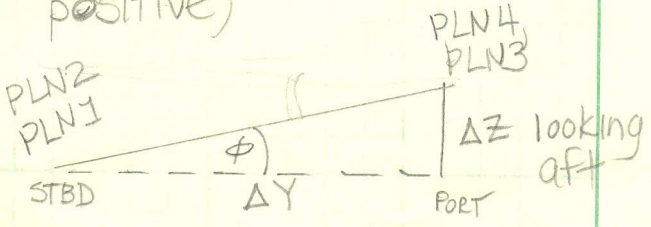
↑ here the negative sign indicates that the Z value is upward (survey had down as positive)

When using all the decimal places allotted in survey it actually comes to $\phi = 0.412°$

In this case the ± sign in the θ = + indicates ± goes more negative (up) as we move negative (PORT)

Roll Direction - Plate edges

$$\phi = \tan^{-1}\left(\frac{\Delta Z}{\Delta Y}\right)$$



PLN4 → PLN1

$\Delta Y = [(0.173 - 0.743)] \approx -0.570$

$\Delta Z = [(-2.771) - (-2.767)] = -0.004$

$\phi = 0.402°$

PLN3 → PLN2

$\Delta Y = [(0.172) - (0.742)] \approx -0.570$

$\Delta Z = [(-2.769) - (-2.765)] \approx -0.004$