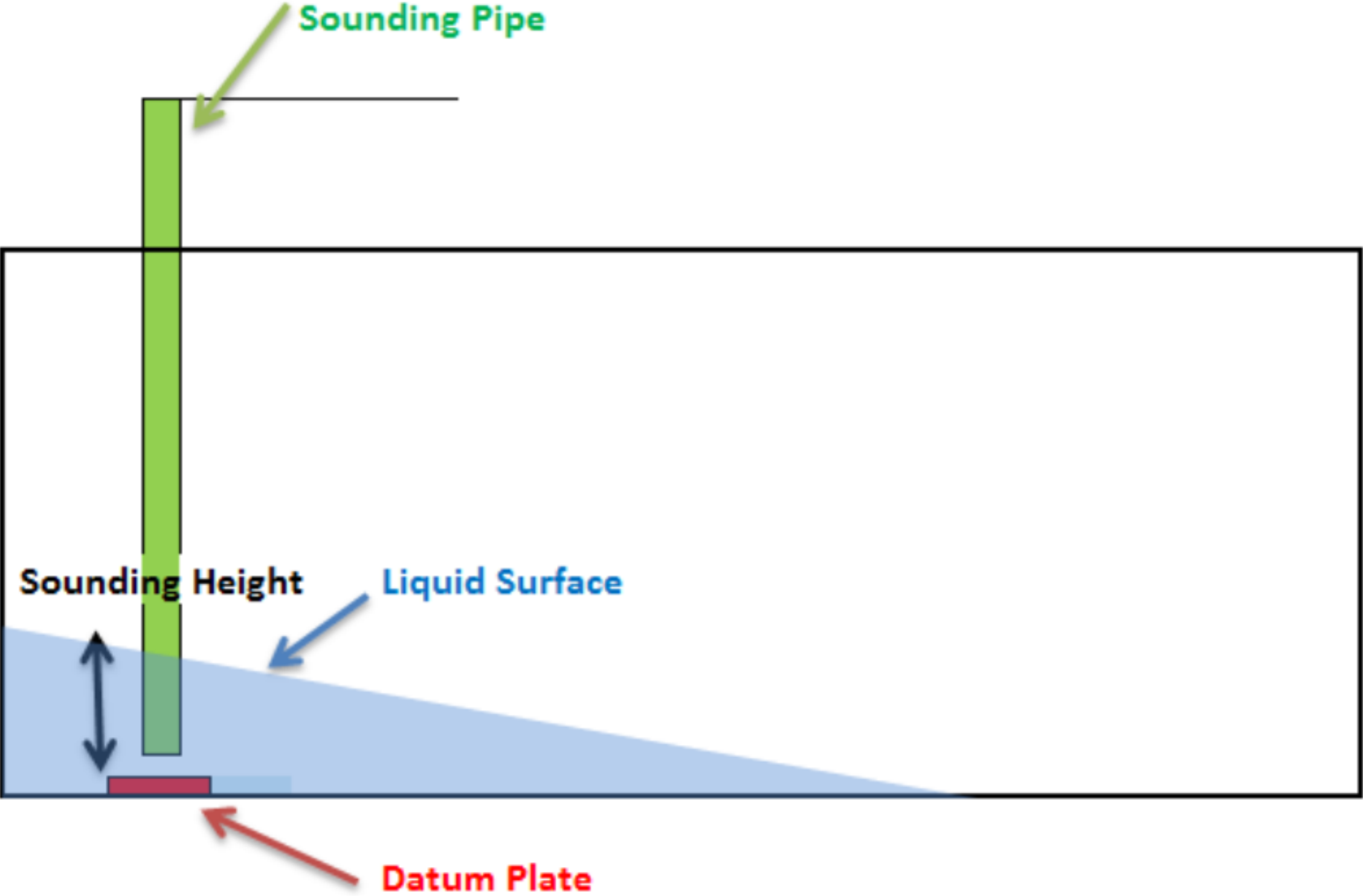


# Wedge Formula Calculation



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Where the above condition exists within a vessel tank (i.e. the liquid does not touch all four bulkheads) then calculation of the liquid wedge needs to be made to correctly attain the GOV, this can be done by geometric calculation of a wedge, however the I.S.O. standard method is also available.

This method depends upon the accuracy of the vessel's tank ullage calibration tables for the larger ullages / smaller soundings in the cargo tank. If the tank calibration tables are accurate for this region of the cargo tanks, then this method is most accurate.



## Step 1:

Calculate  $D_A$  (the Corrected liquid sounding at the aft bulkhead position)

$$D_A = D + \{f(Y - (H \times f))\}$$

where:

$D$  is the observed liquid sounding;

$f$  is the Trim factor ( $T_s / L_s$ );

$T_s$  is the vessel's trim;

$Y$  is the distance of the sounding point to the aft bulkhead;

$H$  is the reference height of the cargo tank;

$L_s$  is the vessel's Length Between Perpendiculars.



## Step 2:

Calculate  $C_t$  (the Tank constant);

$$C_t = a L_s / ( 2 \times T_s \times L_t )$$

Where:

$L_t$  is the Length of the Cargo Tank).

## Step 3:

Calculate the ' $k$ ' coefficient

$$k = D_A \times C_t$$

if  $k > 0.5$  wedge is **not** required to be carried out (Using  $D$ , apply trim correction and obtain GOV from strapping tables direct)

if  $k \leq 0.5$  wedge must be carried out (proceed to step **4**)



## Step 4:

Calculate  $D_X$  (the wedge sounding)

$$D_X = D_A / 2$$

## Step 5:

Cross reference strapping tables with  $D_X$ , without applying trim corrections to obtain the equivalent volume  $V_0$ .

## Step 7:

Calculate the liquid wedge volume ( $V_1$ ):

$$V_1 = V_0 \times 2 \times k$$



## Note:

In addition to above methods it should be noted that if the procedures as specified in the vessel's COW manual are being followed for the determination of the 'Dryness' of a cargo tank, namely, the sounding of the residues in four (4) differing locations within the cargo tank, then the foregoing method of calculations can be avoided.

Assuming the shape of the individual cargo tanks is fairly regular / constant in a fore and aft direction and, notwithstanding the fact that the vessel will be significantly trimmed by the stern, then the four measurements, as suggested in the COW Manual guidelines, as obtained by sounding can be used to calculate an average sounding so as to obtain a single sounding. The single average sounding can be used directly in order to obtain an equivalent volume from the vessel's tank ullage calibration tables

Such a method will provide a clearer indication as to the type and nature of the residues on the cargo tank floor as well as provide much clearer indications as to the profile of the residues within the cargo tanks.





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