



Application Note Title: Sonatest Veo Wedge definitions

Converting Information from inspection procedures

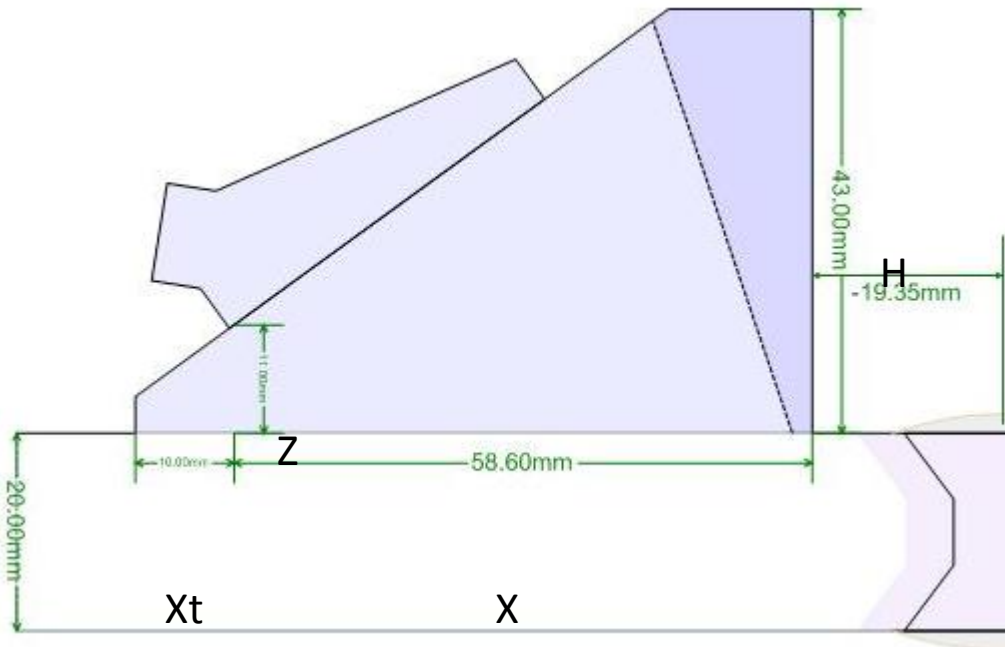
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Date: Feb, 2011.

Typical wedge information in PAUT inspection procedure.

A minimum level of information usually supplied in an inspection procedure is:

1. The specified wedge angle of the incident beam into steel (ϑ)
2. The height of the first element of the array from the bottom of the wedge (Z)
3. The distance from the first element of the array to the front of the wedge (X)
4. The length of the wedge
5. The overall height of the wedge (H), this is the Front Height.



The Distance X_t will also need to be known, this can be determined from the overall length of the Wedge minus X , or is sometimes specified as above.

Converting the information to veo parameters

Front Height

This is generally supplied in the inspection procedure, or can easily be measured.

Cut Angle

This is the physical angle cut into the wedge, and can be calculated based on the Shear Wave angle of the wedge specified in the procedure, and the wedge and material velocities using Snell's Law.

$$\text{Cut Angle} = \sin^{-1}\left(\sin \vartheta * \frac{V_w}{V_m}\right)$$

Where V_w and V_m are velocities in the wedge and material respectively, and ϑ is the incident angle in the material.

For Perspex and Steel, the equation simplifies to:

$$\text{Cut Angle} = \sin^{-1}(\sin \vartheta * 0.719)$$

Back Height

This can be calculated as follows:

$$\text{Back Height} = Z - Xt * \tan(\text{Cut Angle})$$

Length

This is the total length of the wedge, and can either be measured, entered directly, or is the sum of the distance from the first element to the back and front of the wedge.

$$\text{Length} = X + Xt$$

Probe Back Distance

This is the distance long the slope of the wedge from the back of the wedge to the first element on the array.

$$\text{Back Distance} = \frac{Xt}{\cos(\text{Cut Angle})} - \frac{\text{Element Size Dimension 1}}{2}$$

Width

This will not affect the focal laws for a 1D array, but should be made larger than the elevation of the array elements. Either measure this distance or set to larger than the *Probe Element Dimension 2*

Probe side distance

This parameter will not affect the focal laws for a 1D array, either measure this distance or set to value that positions the array elements in the centre of the wedge on the Scan Plan view.

$$\text{Side distance} = \frac{1}{2} * (\text{Width} - \text{Probe Dimension 2})$$