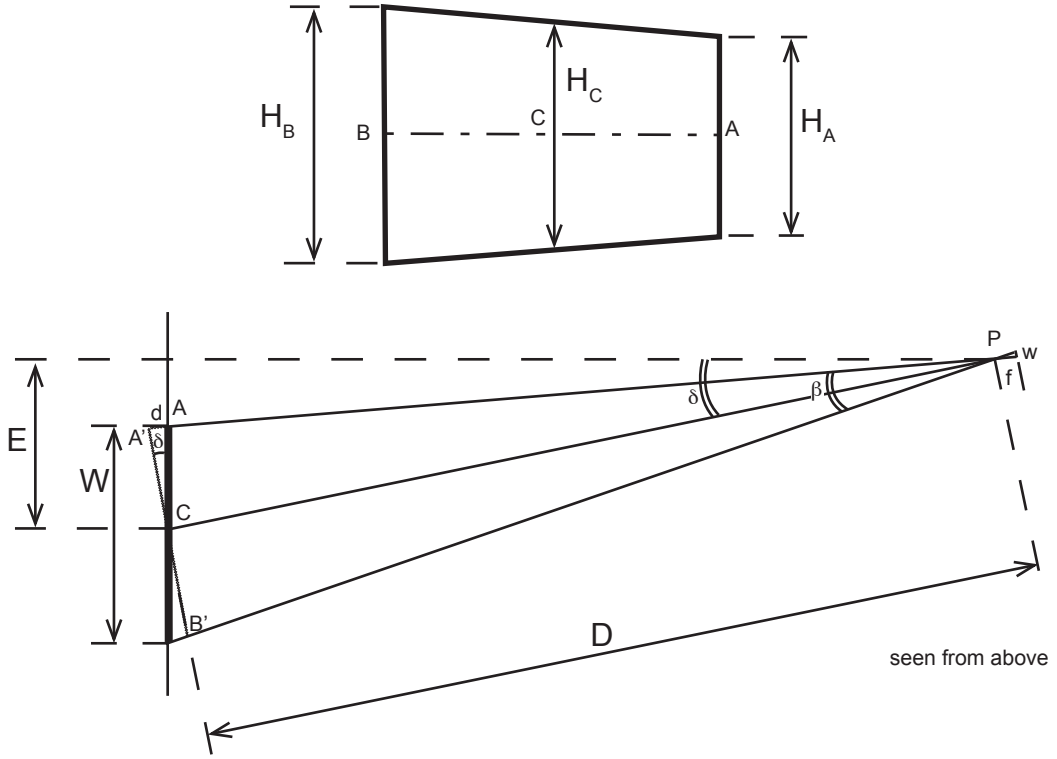
HORIZONTAL DISTORSION



$$\text{HOR } \Delta = \frac{H_B - H_A}{H_C} = \frac{W.\sin\delta}{D} = \frac{W.E}{D^2}$$

HOR $\Delta \leq 3\%$ no problem ; $3\% <$ HOR $\Delta \leq 5\%$ careful ; avoid HOR $\Delta > 5\%$

$$H_A = \frac{h.PA}{f} = \frac{h.(PA' - d)}{f}$$

$$H_B = \frac{h.PB}{f} = \frac{h.(PB' + d)}{f}$$

$$H_C = \frac{h.D}{f}$$

$$\Rightarrow H_B - H_A = \frac{h}{f}.(PB'+d-PA'+d) = \frac{h}{f}.2d$$

$$\Rightarrow \text{HOR } \Delta = \frac{H_B - H_A}{H_C} = \frac{h}{f}.2d.\frac{f}{h.D} = \frac{2d}{D}$$

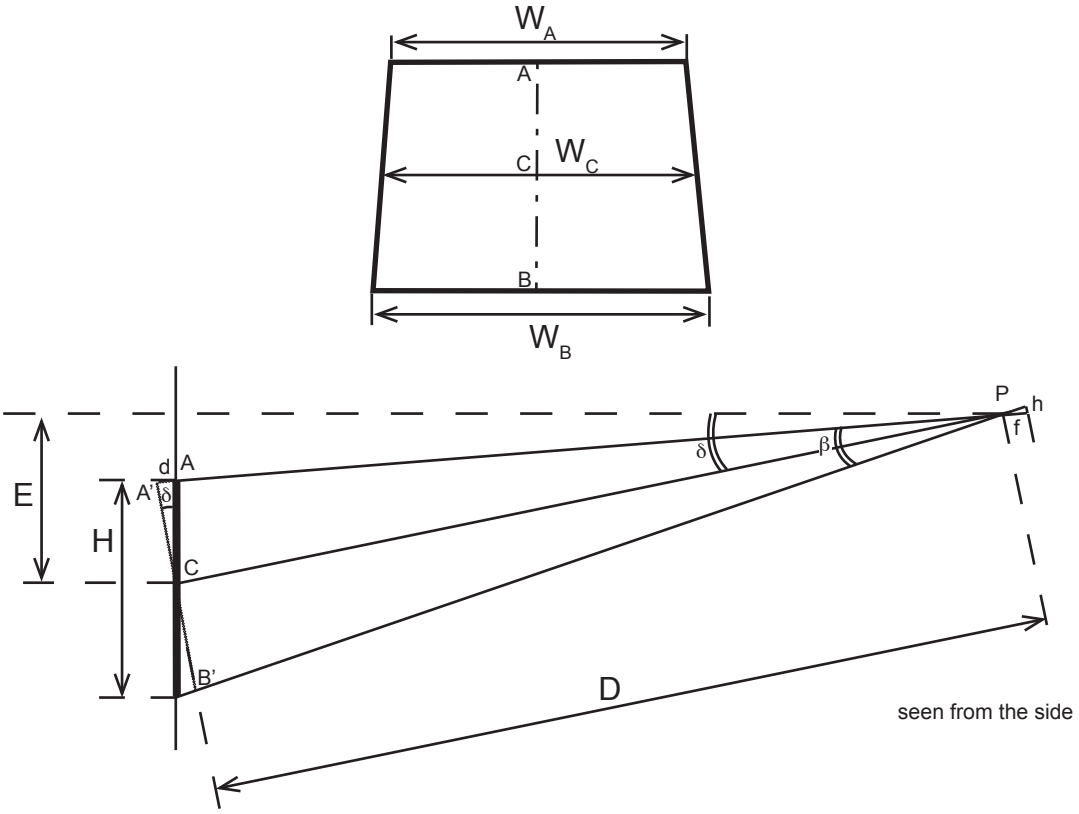
$$\sin\delta = \frac{2.d}{W} \Rightarrow \text{HOR } \Delta = \frac{W.\sin\delta}{D}$$ (Advanced projection manual)

$$\sin\delta = \frac{E}{D} \Rightarrow \text{HOR } \Delta = \frac{W.E}{D^2}$$

when δ is small, $\delta \approx \sin\delta$ $\Rightarrow$ $\text{HOR } \Delta = \frac{W.\delta}{D} = \frac{w.\delta}{f}$ (J. Vivié)

$$\text{tg}(\beta/2) = \frac{W}{2.D} \Rightarrow \text{HOR } \Delta = 2.\delta.\text{tg}(\beta/2)$$ (CST, France)

VERTICAL DISTORSION



$$\text{VER } \Delta = \frac{W_B - W_A}{W_C} = \frac{H.\sin\delta}{D} = \frac{H.E}{D^2}$$

VER $\Delta \leq 3\%$ no problem ; $3\% <$ VER $\Delta \leq 5\%$ careful ; avoid VER $\Delta > 5\%$

$$W_A = \frac{w.PA}{f} = \frac{w.(PA' - d)}{f}$$

$$W_B = \frac{w.PB}{f} = \frac{w.(PB' + d)}{f}$$

$$W_C = \frac{h.D}{f}$$

$$\Rightarrow W_B - W_A = \frac{w}{f}.(PB'+d-PA'+d) = \frac{w}{f}.2d$$

$$\Rightarrow \text{VER } \Delta = \frac{W_B - W_A}{W_C} = \frac{w}{f}.2d.\frac{f}{w.D} = \frac{2d}{D}$$

$$\sin\delta = \frac{2.d}{H} \Rightarrow \text{VER } \Delta = \frac{H.\sin\delta}{D}$$ (Advanced projection manual)

$$\sin\delta = \frac{E}{D} \Rightarrow \text{VER } \Delta = \frac{H.E}{D^2}$$

when δ is small, $\delta \approx \sin\delta \Rightarrow \text{VER } \Delta = \frac{H.\delta}{D} = \frac{h.\delta}{f}$ (J. Vivié)

$$\text{tg}(\beta/2) = \frac{H}{2.D} \Rightarrow \text{VER } \Delta = 2.\delta.\text{tg}(\beta/2)$$ (CST, France)