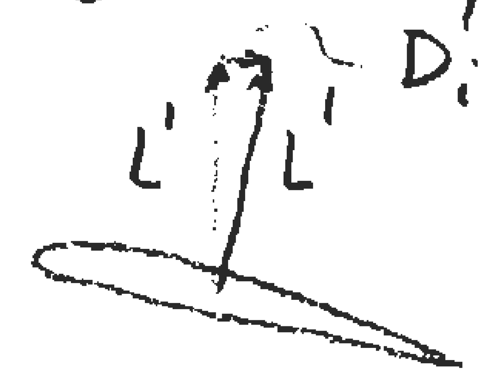

a) Assuming L' is uniform across the span,

$$D_i' = L'\alpha_i = L'\frac{w}{V_\infty}$$

Given: $w = \dfrac{L}{2\rho V_\infty b^2}$

$$D_i = D_i' b = L' b \frac{w}{V} = L\frac{w}{V} = \frac{L^2}{2\rho V_\infty^2 b^2} = \frac{L^2}{\frac{1}{2}\rho V^2}\frac{1}{4b^2}$$

$$\boxed{C_{D_i} \equiv \frac{D_i}{\frac{1}{2}\rho V_\infty^2 S} = \frac{L^2}{(\frac{1}{2}\rho V_\infty^2)^2 S^2}\cdot\frac{S}{4b^2} = \frac{C_L^2}{4AR}}$$

b) $C_L = 2\pi\,\alpha_{eff} = 2\pi(\alpha - \alpha_i)$ ignore $\alpha_{L=0}$, no effect on $\dfrac{dC_L}{d\alpha}$

but we have $C_{D_i} = \alpha_i C_L$, or $\alpha_i = \dfrac{C_{D_i}}{C_L} = \dfrac{C_L}{4AR}$

$$\Rightarrow C_L = 2\pi\left(\alpha - \frac{C_L}{4AR}\right)$$

$$C_L\left(1 + \frac{\pi}{2AR}\right) = 2\pi\alpha$$

$$\boxed{C_L(\alpha) = \frac{2\pi}{1+\frac{\pi}{2AR}}\,\alpha}$$

$$\boxed{\frac{dC_L}{d\alpha} = \frac{2\pi}{1+\frac{\pi}{2AR}}}$$

small than 2-D value of 2π by factor of $\dfrac{1}{1+\frac{\pi}{2AR}}$