NACA-TN-3431 Page 9 mentions that the stability criteria for a plate in wrinkling mode is based on Thimoshenko's analysis for a column on an elastic foundation

Timoshenko, Theory of Elasticity, art 2.10, Buckling of a Bar on an Elastic Foundation

Timoshenko's column buckling load (equation 2-37 on page 2-36):

$$P = \frac{\pi^2 \cdot EI_s}{L^2} \cdot \left(m^2 + \frac{\beta \cdot L^4}{m^2 \cdot \pi^2 \cdot EI_s} \right)$$

substitute

$EI_s = D_s$ plate flexural rigidity

$L = \lambda$ wavelength

$m = 1$ most critical mode

$\beta = \psi$ support spring stiffness per unit length

$$P = \frac{\pi^2 \cdot D_s}{\lambda^2} \cdot \left(1 + \frac{\psi \cdot \lambda^4}{\pi^2 \cdot D_s} \right)$$

Allowed skin wrinkling stress per NACA-TN-3431 figure 9

$$\sigma = \frac{k_m \cdot \pi^2 \cdot E}{12 \cdot (1 - \nu^2)} \cdot \left(\frac{t_s}{b_s} \right)^2 \quad \text{with} \quad D_s = \frac{E \cdot t_s^3}{12 \cdot (1 - \nu^2)} \quad \text{gives} \quad \sigma = \frac{D_s \cdot k_m \cdot \pi^2}{t_s \cdot b_s^2}$$

hence, the allowed skin wrinkling load: $P = \sigma \cdot A_s = \sigma \cdot (b_s \cdot t_s)$ $\quad P = \frac{D_s \cdot k_m \cdot \pi^2}{b_s}$

Substituting the skin wrinkling load

$$\frac{D_s \cdot k_m \cdot \pi^2}{b_s} = \frac{\pi^2 \cdot D_s}{\lambda^2} \cdot \left(1 + \frac{\psi \cdot \lambda^4}{\pi^2 \cdot D_s} \right) \quad \text{gives} \quad k_m = \frac{1}{\left(\frac{\lambda^2}{b_s} \right)} + \frac{\psi \cdot b_s^3}{\pi^2 \cdot D_s} \cdot \left(\frac{\lambda}{b_s} \right)^2$$

The found solution differs from NACA-TN-3431 equation 5:

$$k_m = \frac{1}{\left(\frac{\lambda}{b_s} \right)^2} + \frac{\psi \cdot b_s^3}{\pi^2 \cdot D_s} \cdot \left(\frac{\lambda}{b_s} \right)^2$$