14-26 From Prob. 14-25:

$$W_1^t = 3151 \text{ lbf}, \quad W_2^t = 3861 \text{ lbf},$$
$$W_3^t = 1061 \text{ lbf}, \quad W_4^t = 1182 \text{ lbf}$$
$$W^t = \frac{33\,000 K_o H}{V} = \frac{33\,000(1.25)(40)}{1649} = 1000 \text{ lbf}$$

Pinion bending: The factor of safety, based on load and stress, is

$$(S_F)_P = \frac{W_1^t}{1000} = \frac{3151}{1000} = 3.15 \qquad \textit{Ans.}$$

Gear bending based on load and stress

$$(S_F)_G = \frac{W_2^t}{1000} = \frac{3861}{1000} = 3.86 \qquad \textit{Ans.}$$

Pinion wear

based on load: $n_3 = \frac{W_3^t}{1000} = \frac{1061}{1000} = 1.06$

based on stress: $(S_H)_P = \sqrt{1.06} = 1.03$ *Ans.*

Gear wear

based on load: $n_4 = \frac{W_4^t}{1000} = \frac{1182}{1000} = 1.18$

based on stress: $(S_H)_G = \sqrt{1.18} = 1.09$ *Ans.*

Factors of safety are used to assess the relative threat of loss of function 3.15, 3.86, 1.06, 1.18 where the threat is from pinion wear. By comparison, the AGMA safety factors

$$(S_F)_P, (S_F)_G, (S_H)_P, (S_H)_G$$

are

$$3.15, 3.86, 1.03, 1.09 \quad \text{or} \quad 3.15, 3.86, 1.06^{1/2}, 1.18^{1/2}$$

and the threat is again from pinion wear. Depending on the magnitude of the numbers, using S_F and S_H as defined by AGMA, does not *necessarily* lead to the same conclusion concerning threat. Therefore be cautious.