Ex5) Strength of Bolts

Compare the tensile load capacity of a $5/16-18$ UNC thread (SAE grade 8) and a $5/16-24$ UNF thread (SAE grade 7). Which one is stronger?

5/16 - 18 UNC $\Rightarrow$ $A_t = 0.0524\ in^2$

5/16 - 24 UNF $\Rightarrow$ $A_t' = 0.0581\ in^2$

Proof strengths: SAE grade 8; $S_p = 120$ kpsi

SAE grade 7; $S_p' = 105$ kpsi

Allowable load:

$F_{UNC} = A_t S_p = 0.0524 \times 120 \times 10^3 = 6288$ lb

$F_{UNF} = A_t' S_p' = 0.0581 \times 105 \times 10^3 = 6101$ lb

$\Rightarrow$ F_{UNC} (grade 8) > F_{UNF} (grade 7)

Note: When all conditions are the same, UNF thread has a higher capacity than UNC thread.