ARCH 324 - Structures 2, Winter 2009

von Buelow, Peter

http://hdl.handle.net/2027.42/64938
DESIGNING A STEEL SECTION

**GIVEN:** \( f_b = 30 \text{ ksi} \)

\[
\begin{align*}
W &= 40 \text{k}\text{ip} \\
L &= 32.1 \text{ft}
\end{align*}
\]

For a simply supported uniformly loaded beam,

**Maximum Moment** \( M = \frac{WL}{8} \)

\[
\therefore M = \frac{40 \text{kips} \times 32.1 \text{ft}}{8} = 160 \text{kips-feet}
\]

**Now,**

\[
\frac{f_b}{30 \text{ ksi}} = \frac{M}{S}
\]

\[
\therefore S = \frac{M}{f_b} = \frac{160 \text{kips-feet}}{30 \text{ ksi}} = 64 \text{in}^2
\]

For \( S_x = 64 \text{in}^2 \), in table D-36, sections appropriate are:

'W 16 x 40'

'W 18 x 40'

'W 14 x 48' HEAVIER

'W 21 x 44' ALSO HEAVIER

But stiffer, \( S_x = 81.6 \text{in}^2 \)

***The most economical section is 'W 16 x 40'***.