Part b) Grade No. 2

Grade No. 2 (P. 33 of the NDS SUPP)

DESIGN VALUES

F_b = 850 psi (vs. 975 for No. 1)
F_V = 150 psi (same)
E = 1,300,000 psi (vs. 1,500,000 for No. 1)

Let's look at Bending ...

Same as for No. 1 except that the F_b is different, and thus perhaps the C_M (because it depends on F_b) ... let's check!

Trying the 2 x 6 ...

$F_b' = F_b C_D C_M C_t C_L C_F C_{fu} C_i C_r$

C_M = ... looking at p. 30 ...

Size Factor is 1.3 ... so $F_b C_F$ = 850 x 1.3 = 1105 ... which IS less than 1150, so, $C_M = 1.00$;

C_t = 1.0 (not hot)
C_L = 1.0 (lateral stability provided by decking)
C_F =1.3 (above)
C_{fu} = ... not applicable ...

$C_i = 0.80$ ...

$C_r = 1.15$ ...

So,

$F_b' = 850$ psi (1.0 wet but $F_bC_F \leq 1150$) (1.3) (0.80) (1.15) = <u>1017 psi</u>

Since $f_b = 846$ psi $\leq F_b' = 1017$ psi ... GOOD!

The design check for Shear will be the same numbers ... GOOD!

Deflection ...

$E = 1{,}300{,}000$ psi (0.90) (0.95) = 1,111,500 psi (same Adjustment factors)

$\Delta = (5/384)\,(53/12$ lb/in.$)\,(8 \times 12$ in.$)^4/(1{,}111{,}500$ psi $\times$ 20.8 in.$^4) =$
<u>$\Delta = 0.21$ in.</u>

Limit is $L/240 = 0.40$ in. (from before)
Since $0.21 \leq 0.40$ ... GOOD!

<u>GOOD! ... 2 X 6 HEM-FIR NO. 2 @ 16 IN. O.C. ALSO DOES IT!!!</u>
<u>(Part b)</u>

NOTE: we have not checked the 2 x <u>FOUR</u>. My guess is that the section modulus and MOI will be so much less ... that it *won't even be close.*