1. Let's continue with ... snip ...

1) ... snip ...

2) **Bearing of wood on the bolt.** Yes, we can handle that.

   Use: 5/8 in. diameter bolt; Grade A307, for which ... Fy = 36 ksi (yield stress) and Fu = 58 ksi (ultimate stress). Assume that bearing does not occur along the section of the bolt with the threads (see handout).

   Applied bearing stress will be the force (660 lb) divided by the projected area of the bolt in the wood (5.5 in. x 5/8 in.) = 3.44 in.^2.

   Calculate the applied bearing stress ... f_p = 660 lb / (5.5 in. x 5/8 in.) = 660 lb / 3.44 in.^2 = 192 psi.

   The Allowable Stress ... we get from the handout ... 1.20 Fu ...

   Calculate the Allowable Stress ... 1.20 x Fu = 1.2 x 58,000 psi = 69,600 psi.

   Do the design check ... is the applied stress under design load = f_p = 192 psi <= 69,600 psi = Fp = the allowable stress? ... (Yes or No?) ... YES, YES!!!

   If 'Yes' then 'Good' ... if not yes, then 'not good' ... and we need to change something.

3) **Shearing of bolt** ...

... snip ...

4) **Bearing of Metal Side Plate on Bolt** ...

   Use 5 in. x 5 in. x 1/4 in. thick plates ... as sketched in class ...

   Center the bolt (holes) in the plates ...

   Bearing force, P, is 330 lb ...

   Bearing stress, fp = P / A ... where, again, A is the projected area of the plate on the bolt, =
plate thickness times bolt diameter ...

So, \( A = \frac{5}{8} \text{ in.} \times \frac{1}{4} \text{ in.} = .1563 \text{ in.}^2 \) ...

So, \( fp = \frac{330}{.1563} = 2112 \) psi

\( Fp \) is ... the same as from Step 2) above ... \( = 69,600 \) psi

Do the design check ... is the applied stress under design load \( = fp = 2112 \) psi \( \leq 69,600 \) psi \( = Fp \) the allowable stress? ... (Yes or No?) ... Yes, Yes.

If `Yes' then 'Good' ... if not yes, then `not good' ... and we need to change something. ... Good, Good.

5) **Bearing of Bolt ... on Metal Side Plate ...**

Let's use Grade A36 (\( F_y = 36 \text{ ksi}; F_u = 58 \text{ ksi} \)) for the plate ...

Bearing stress is \( fp = P / A \) where \( A \) is the projected area of the bolt onto the plate ...

Exactly the same as Step 4)

Again, assuming threads in shear plane, blah, blah, ...

And since the material properties for the bolt and the plate are the same, the design check also ends up being exactly the same (calculation) (as Step 4) ...

So ... (Yes or No) ... Yes, Yes, Good, Good ...

... snip!