

## Experiences with Online Homework in a Design Class

Richard Bennett

## Online Homework Systems

- Commonly used in freshman classes
  - Mastering physics, web assign, custom systems
- University of Tennessee Engineering Fundamentals system
  - Used in large freshman engineering classes
  - Proven to be very effective
- How would this work in a design class?
  - Used in Sp 11 Masonry Design class (27 students)

**Deadlines:**  
100% credit: Tue Feb 22, 2011 12:40 [View Discussion](#)  
p70% credit: Thu Feb 24, 2011 23:59 [about this question](#)  
p40% credit: Tue Mar 1, 2011 23:59

[General Instructions](#) [State](#)

Clicking here takes students directly to our discussion board, and filters for only posts on this problem.

Partial credit for late homework

Students can type equations/notes here. Instructor can view notes when providing help.

Built-in calculator

Can embed links to resources, such as NCMA Tek Notes

Parameters are randomly generated so each student has the same problem, but different numbers.

Students can upload sketches or pictures. Can also pix-text work.

Small penalty (2%) for each wrong answer to encourage students to think about answer.

Try history can be reviewed to see errors (e.g. sign error).

Part	Description	Answer	Chk	History
A.	Determine the required spacing of #4 reinforcement for a 12 ft high wall. Ignore effective flange width requirements for this part. (in)	A: 56 C: 56.0000	✓	# tries: 2 Clear tries and answer
B.	Determine the required spacing of the #4 reinforcement for a 16 ft high wall. (in)	32	0 pts. 0% 0 hints 2% try penalty	Clear tries and answer

Online homework system developed by Prof. Will Schleiter, University of Tennessee

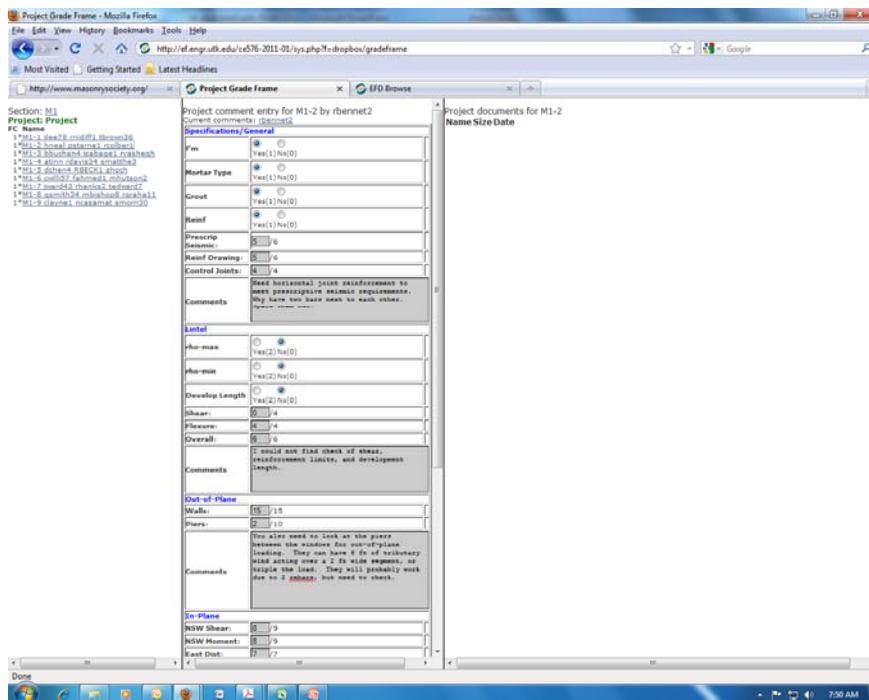
## Discussion Board

HWH ward43	Thu 4/7 15:26	hw17: Part G: The problem asks me to calculate the design moment when the wall weight is included, but does not tell me anything about the steel. Is there steel in each grouted cell, as there is in Part C, or just the one bar furthest away from the compression face, as there is in Part E?
H walldog	Thu 4/7 15:34	I am guessing that old calcdog included all the steel in the calculations, like in part C.
<a href="#">Add a response...</a> <a href="#">Mark as answered</a>		
HWH RBECK1	Wed 4/6 1:31	hw17-1: On Part B wouldn't $(\phi)V_n = (\phi)V_n + (\phi)V_n$ ? $V_n = 0$ because we do not consider shear reinforcement. $V_n m = [4.0 - 1.75(\mu V_u / V_u)] A_n \sqrt{f_c}$ and the $0.25 P_u$ term is zero because no axial load. I get a $(\phi)V_n = 77.33$ kips which is not right.
H rbennet2	Thu 4/7 15:34	Problem corrected.
<a href="#">Add a response...</a> <a href="#">Mark as answered</a>		
HWH clayne1	Thu 3/31 19:18	hw16-1: Can you look at my notes for part A?
H rbennet2	Thu 3/31 21:18	Multiply applied axial force by length of wall, not by height. Shear strength is a function of $M/V_d$ .
<a href="#">Add a response...</a> <a href="#">Mark as answered</a>		
HWH Anon	Sun 3/27 15:09	hw15-1: , part I---In calculating the deflection of the wall, $I_g$ is considered to be the gross cross-section (7.625' x 12" for a one-foot section of wall)--correct? Also, when calculating the service moment, can we use the equation on slide #29 (considering 2nd order effects), but instead substitute unfactored loads in for $P$ and $w$ ? To me, this would be the service moment considering 2nd order effects, but am I missing something? Thanks--
H rbennet2	Sun 3/27 19:39	Although the code says $I_g$ , it should be $I_n$ , which is the moment of inertia of the net area. Yes you can use the equations of slide #29 substituting service loads.
<a href="#">Add a response...</a> <a href="#">Mark as answered</a>		
HWH ncasamat	Sat 3/26 13:09	hw15-1: part G, Find " $\phi M_n$ " I considered the strain distribution based on masonry yielding and a compressive strength, $C-T$ , equal to the factored axial load at mid height. $C-T = \phi P_n = P_u$ at midheight, the only unknown is the ".8c" or "a" Once the location of the neutral axis is determined $\phi M_n$ can be calculated by summing the moments about $A_s$ . Is this the correct approach?
H rbennet2	Sat 3/26 19:49	Almost. $C-T = P_n = P_u / \phi$ . There are equations for that in the notes.
<a href="#">Add a response...</a> <a href="#">Mark as answered</a>		

Link takes instructor directly to students homework

## Evaluation of Online Homework System

- Students get immediate feedback; work problem until completed
- Discussion board enables entire class to see questions and answers
- Took just slightly longer to code online homework problems as to grade a set of 27 homeworks
- Only complaint from students was the tolerance on the problems (1%)
  - This can be changed in the system, and will be for next time



## Evaluation of Online Homework System

- Online homework supplemented with a design project at end of semester
- Students had to upload several Excel files with graphs which were manually graded.
- Online grading rubric eased the grading

## Conclusions

- Online homework system eliminated many of the administrative hassles of homework
- Instructor could focus on providing help instead of routine grading
- Positive experience for instructor and class