



To: Mark Lamer, P.E., CENE 476 Grading Instructor

Cc: Bridget Bero, Ph.D., P.E. and Wilbert Odem, Ph.D., P.E., CENE 476 Instructors

From: North Star Engineering: ASCE 2015-16 Concrete Canoe Team
Evan Kaichi, Chelsie Kekaula, Brent Lipar, Colton McConnell, and Emily Melkesian

Date: September 30, 2015

Re: Technical Advising Meeting #1

Attendance: Brent Lipar, Evan Kaichi, Chelsie Kekaula, Colton McConnell, Emily Melkesian

Prepared by: Brent Lipar

Updates

Updates	Notes
Capstone	Project understanding: Almost there
Canoe Transportation - Paddling	Coordinate with Mark, he will check next week Need key for storage container
Mentees	Email has been sent out
Sponsor List	Has been made and on google drive
Canoe Rig	Cody will make a list of materials for and send it to Mark Lamer
TA Meeting	Get TA form signed

Topics

Topic	Description
Structural Analysis	<ul style="list-style-type: none"> • Changes for calculations • Start with original design • Figure out where people are for buoyancy • U-shape design: <ul style="list-style-type: none"> ○ Simple-good for iterations ○ Taper at the top to shave off weight • Sapp tool: a lot more useful than Risa but a lot more difficult to use • How to get center of buoyancy <ul style="list-style-type: none"> ○ Average of multiple cross sections ○ Depth vs buoyant force graph to show depth for various load cases.



Concrete	<ul style="list-style-type: none"> • Ceratech • Used multiple poraver, aggregates • How would you improve the mixture <ul style="list-style-type: none"> ○ Multiple mixes ○ Put on the finishing mix on the outside for sanding <ul style="list-style-type: none"> ▪ Fine aggregate and heavier mix, less voids • When to put everything on? <ul style="list-style-type: none"> ○ At same time, could cause delamination otherwise • What type of aggregates to research? <ul style="list-style-type: none"> ○ Go through winning teams and see if they have any unique lightweight aggregates • Admixtures: <ul style="list-style-type: none"> ○ Does it affect the strength? Should we use more? <ul style="list-style-type: none"> ▪ Admixture affects the strength greatly ▪ Investigate a retarding admixture, slows down curing time
Reinforcement	<ul style="list-style-type: none"> • Smaller mesh, harder for concrete to bond • Post-tensioning is applying the load at the very end of the canoe <ul style="list-style-type: none"> ○ Forces that coincide with the center of the canoe • Pre-stressing is “at the end”, but bonds along the canoe
Construction	<ul style="list-style-type: none"> • Anything to research for construction? <ul style="list-style-type: none"> ○ Make a concrete cube and rolled it down to ○ Look up other team’s process: placing concrete ○ Look up mold possibilities ○ Post-tensioning? Pre-tensioning? • Shotcrete? <ul style="list-style-type: none"> ○ Problems with the sprayer, test ○ Maybe add more Poraver possibly
Farm Clean-Up	<ul style="list-style-type: none"> • What day works best for everyone? Friday, Saturday or Sunday?
Mentees	<ul style="list-style-type: none"> • Plan? Work with mentee applications we received or go to more classes? • Preferably three juniors, but two should be alright (Gina and Taylor)
Chelsie	<ul style="list-style-type: none"> • Made sponsor letter, made a list of all the sponsors from last year • Started a google sheet for sponsors, emailed Ceratech
Colton Catch up	<ul style="list-style-type: none"> • Hour long in time sheet, weekly meeting google sheet • Cleaned out about half of the Farm
Meeting times	<ul style="list-style-type: none"> • Meet on Tuesdays and Fridays or Wednesdays and Fridays if with Tommy.
ABET Interviews	<ul style="list-style-type: none"> • Chelsie and Emily will be interviewed on Friday by ABET.



Action Items

Task	Team Member	Due Date
Project Understanding	Chelsie and Emily	
Farm Clean-Up Day - Sunday @ 10:00 am ~12	Everyone	10/3/15
Read over 2016 Rules and Regulations	Everyone	10/2/15
Think of Sponsors	Everyone	10/2/15



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From: North Star Engineering: ASCE 2015-16 Concrete Canoe Team
Evan Kaichi, Chelsie Kekaula, Brent Lipar, Colton McConnell, and Emily Melkesian

Date: October 19, 2015

Re: Technical Advising Meeting #2

Attendance: Brent Lipar, Evan Kaichi, Chelsie Kekaula, Colton McConnell, Emily Melkesian
Prepared by: Colton McConnell

Updates

Update	Description
Mentees	Introduce more mentees to project
Canoe Trailer	Got the trailer and it works
Scope	Draft revisions?
Budget	Pretty much complete, approximate total budget cost is \$9,843.55
Paddling Practice	Started on Sunday October 25th

Topics

Topic	Description
Materials List	Approved by Mark. Hopefully Gary gets it for us.
Scope of Work	Give parts to Chelsie by Wednesday night (Due Friday 10/30)
Schedule	Need to begin Gantt chart (Due Friday 10/30)
Budget	Anything need added?
Questions for Tommy	Next Meeting Time? Wed, Fri, next <u>Tues</u> ?



Action Items

Task	Team Member	Due Date
Scope	All	10/30/15
Schedule with Gantt Chart	All	10/30/15
Testing	Evan (All)	ASAP
Meet with Tuchsherer for training	All	mid November
Name and Theme	All	10/30/15
Talk to IT about Prolines	Brent	
Talk to Cody about transport rig	Colton	



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From: North Star Engineering: ASCE 2015-16 Concrete Canoe Team
Evan Kaichi, Chelsie Kekaula, Brent Lipar, Colton McConnell, and Emily Melkesian

Date: November 11, 2015

Re: Technical Advising Meeting #3

Attendance: Brent Lipar, Evan Kaichi, Chelsie Kekaula, Colton McConnell, Emily Melkesian
Prepared by: Emily Melkesian

Updates

Update	Description
Concrete	<ul style="list-style-type: none"> Mixed and prepared 3 cylinders yesterday Have mixed and tested portland cylinders Look at winning team's design reports for concrete strengths

Topics

Topic	Description
Schedule	<ul style="list-style-type: none"> Shrinkage is a 28 day test Flexural and Tensile can be tested after 7 days Add post-tension to the schedule Need to accelerate structural analysis timeline Finishing may take longer than estimated
Structural Analysis	<ul style="list-style-type: none"> Spreadsheets and calculations May want to look at post-tensioning book Use 2 scales for post-tensioning to measure losses
Concrete	<ul style="list-style-type: none"> Mixed last year's mix Mixed 3 alternatives Added a superplasticizer for one mix and it dried up the concrete, fly ash reacts differently with admixtures Trying a liquid plasticizer versus a powder, would probably work better Tried using a black pigment, turned gray in the concrete mix, adjust amount added As more pigment is added, it can decrease the overall strength and influence weight



	<ul style="list-style-type: none"> • Used different sized of poraver and glass bubbles, made mix heavier, will have to play around with strength vs. weight • Soak poraver to get consistent results • Surface coating of finishing mix with extra pigment • Try a weaker glass bubble and different size poraver to made a weaker middle layer mix • Use similar water to cement ratios if different mixes are used in canoe to prevent delamination • Test glitter and if you have to grind and buff to see it in the concrete
Reinforcement	<ul style="list-style-type: none"> • Don't test the same as last year, can just test new samples • Any size for testing will work, may be limited to length, can go wider for larger mesh, need to calculate area , need capacity per inch • Check if it's the same in both directions, if square just test in one direction, if not, test in both • May use 2 layers of reinforcement if we use a weaker mix in the middle • Maybe do 2 layers at the bottom and transitioning to one up the side, can minimize cracking
Construction	<ul style="list-style-type: none"> • Concrete etching may work differently with our concrete mixtures, will have to test it • Shrink-wrap- use a thicker one would help smooth out imperfections, may create larger creases and bumps • Incubator, as air-tight as possible to keep in as much humidity • Get a professional hot wire, easier to carve bulkheads • Custom tools- curved trowel for easier finishing • Guides for thickness of concrete, female cross-sections • Concrete form oil (release agent) test ahead of time for use of a wax versus an oil/liquid
Cost of services	<ul style="list-style-type: none"> • Add paddling practice and meeting times • Follow Gantt chart for times and cost

Action Items

Task	Team Member	Due Date
Paddling Practice	Everyone	11/15/15
Continue working on budget and staffing	Everyone	



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From: North Star Engineering: ASCE 2015-16 Concrete Canoe Team
Evan Kaichi, Chelsie Kekaula, Brent Lipar, Colton McConnell, and Emily Melkesian

Date: December 1, 2015

Re: Technical Advising Meeting #4

Attendance: Evan Kaichi, Chelsie Kekaula, Brent Lipar, Colton McConnell, Emily Melkesian

Prepared by: Chelsie Kekaula

Topics

Topic	Notes
Structural Analysis	2D/3D Analysis <ul style="list-style-type: none"> Start from scratch, try to make Excel calculations user friendly so that next year, the team can easily refer to sheets Set up a meeting with Tommy for further verification and to help with calculations; can also email at any time Bulkhead design <ul style="list-style-type: none"> Size bulkheads based on the weight of the concrete Last year, bulkheads were only used as a precaution as the weight of the concrete was lighter than the weight of water
Concrete	Pigmentation: try powder because the liquid pigments are making the weight of the concrete too heavy
Reinforcement	Post tensioning design <ul style="list-style-type: none"> Figure out required materials before winter break Compared to last year, tensioning could be improved - last year's team tensioned one at a time Make sure that the object pulling against should be strong enough Calculate losses Research other options and methods that other schools used Design plates on each side and how we distribute the load along the concrete
Construction Management	Incubator <ul style="list-style-type: none"> The incubator will be constructed over winter break Tempered hardboard, 24' long, panels (\$500) Measure strongback, 8' increment Mold renovation <ul style="list-style-type: none"> Shrink wrap and can use joint compound before the shrink wrap Coffin Pigment based sealant - look more into



Action Items

Action Items	Notes	Due Date
Structural	Continue structural calculations, set up an individual meeting with Tommy to get help	12/10/2015
Concrete	Look into powders for concrete pigment	12/10/2015
Reinforcement	Work on post tensioning design	12/10/2015
Construction Management	Continue working on incubator design, mold renovation and coffin renovation design	12/10/2015