NATIONAL CONCRETE MASONRY ASSOCIATION

Sustainable Concrete Products for Structures & Hardscapes

Student Unit Design Competition

School Year: Fall 2009–Spring 2010

OBJECTIVE:

To understand the relationship between a specific material and a form made using that material. There are no preconceived "ideal" solutions to this project. Instead, the emphasis is placed on understanding the implications of your decisions and on making a series of related decisions about a form and its material. Explore alternatives and try to understand the tradeoffs of each decision.

Concrete masonry or hardscape units are an abundant but underutilized part of the designer's palette. This product is a durable material that can be used to carry weight, enclose space, and perform a variety of utilitarian functions in buildings and the built landscape. Because it is a manufactured material, its texture, color, shape and size are controllable features. A wide variety of concrete masonry or hardscape products are available and new ones can be proposed.

This project will be part of a student design competition in unit design. Your work will be evaluated by the faculty in this course as one of your exercises. In addition, you are also expected to submit your project for review by the competition jury during Blockfest (a Saturday morning event hosted by the State Masonry Association and the local producers). The winner of the unit design competition will go on to compete on a national level. The project grade for this course is not affected by the outcome of the competition jury.

TEAM SIZE: 4 people

Demographics: 1 graduate student and three undergraduate students if class participation allows or 4 undergraduate students.

UNIT DESIGN

A Concrete Masonry or Hardscape Unit: Design a new concrete masonry or hardscape unit. The unit you design is to be conceived as a mass produced unit with potential architectural or landscape applications. What are concrete masonry or hardscape units? What do they want to be? What could they be used for? Your design should capitalize on the advantages offered by concrete masonry or hardscape as a material, a fabrication process and a use, while accommodating for the associated weaknesses. The design of the unit should conform to the following practical considerations:

1. 'Box' size: The 'box' that concrete masonry or hardscape units are molded in measures 16"wide x 24"long x 8" high. It is important that the unit or units you design can be cast in this box.

2. Shape must be extruded when molded: After the units are cast, the mold lifts up vertically, leaving the units behind on the table. The units are only in the mold for a few

seconds. This means that the shape you are casting is basically extruded vertically. To be extruded, it must have a consistent cross section in the z (vertical) axis when being cast. Protrusions or holes in the x and y axes are very difficult to make.

3. Efficiency: The manufacturers have invested a lot of capital in this equipment, and want to make a few dollars off of each cycle of the molding machine. To do so, either the units must have a high profit margin, or they must make a lot of units in each cycle. Preferably both. Try to make it so that your units occupy at least 90% of the "box' each cycle.

4. Stable shapes: Concrete masonry or hardscape units are strong when cured, but are weak for the first few hours. To avoid the unit crumbling or cracking while it is being handled, make the minimum thickness of the unit at any point about 1". Avoid acute angle shapes of less than about 60 degrees, because the corners tend to not get filled in the mold and are vulnerable to getting broken later in transit.

Submission: To clearly illustrate the design intentions the following drawings are required prior to Blockfest for course grading and during Blockfest for competitive judging (scale 1" = 1'0"):

Overall view of an assembly using the masonry unit(s) you designed, as well as non-masonry components such as adjoining materials, masonry accessories, etc. This drawing should show how the masonry units would be used in a plausible architectural application. This should be a series of perspectives, axonometric or isometric drawings, using color to represent the appearance of the materials. Include notes to briefly explain your proposal and its intended application.

Prototype Model of the unit or units you design. This may be made of any material. It should be made to represent accurately the colors and textures of the units you propose. It is important to make a minimum of 4-6 so the interplay of units may be physically explored. The models should be full scale.

General note: all drawings must be mounted on 11" x 17" board. Use color to represent those of the materials. You must restrict identifying remarks in your submission to the back of the board; do not put your names or other identifying marks on the front of the boards or on the prototype models. All competition entries will be judged on Saturday during BlockFest.

ASSESSMENT CRITERIA - The drawings and the prototypes will be evaluated in terms of the following ranked criteria:

- use of modular coordination
- innovation
- technical performance (potential stability, weathering resistance)
- quality of craft and presentation (clear drawings, well constructed prototype, graphic appeal, etc.)

LOCAL COMPETION: Organized by the State Association & Local Producers.

Judges: Local Architect
Local Landscape Architect
Local Mason Contractor
Local Producer

Prizes: 1st $250 & Certificates
2nd $150 & Certificates
3rd $100 & Certificates
Honorable Mention Certificates

NATIONAL COMPETITION: 1st Place team members and professor from each participating university competition will be provided transportation and lodging to present at the:

NCMA Summer Meeting.
July 28 - August 1, 2010 in Chicago, IL

Westin, River North

Judges: Local Architect
Local Landscape Architect
Local Mason Contractor
Local Producer

Prizes: 1st $250/Student
2nd $150/Student

Itinerary (Tentative):

Thursday, July 29, 2010

	Early Morning Flight to Chicago
4:30 PM – 6:00 PM	Town Hall Meeting (Students introduced at end of meeting)
6:00 PM – 7:00 PM	NCMA Member Reception (Student displays set up)
7:00 PM –	Dinner with NCMA Members

Friday, July 30, 2010

7:00 AM – 5:30 PM	Committee Meetings
4:30 PM – 6:00 PM	Product Development & Creative Concepts
	Student Unit Design Presentations
	Award Presentation
7:00 PM -	Dinner on own

Saturday, July 31, 2010

8:00 AM – 10:00 AM	Committee Meetings
11:00 AM -	Students check out and sightseeing on their own
	Flight Home

If interested, please contact Dennis Graber at (703) 713-1900 or dgraber@ncma.org.