2018 NCMA Foundation Unit Design Competition

Final Presentation by the team from

Ball State University

- Department of Architecture
- College of Architecture & Planning
- Muncie, Indiana

- 2018 Mid Year Conference
- Chicago, Illinois / 01 August 2018

Meet Our Team

- **Our team members and hometowns**
  - Anna Goodman, West Lafayette, IN
  - Nick Hennessey, Carmel, IN
  - Jordan Jones, Indianapolis, IN
  - Chase Woosley, Fort Wayne, IN

Photos of team presenting our *Clinic For Rural Puerto Rico* project to the external jury on 02 May 2018; the UNIT DESIGN COMPETITION was judged solely on boards and models in order to replicate the NCMA jurying process at the national level.

Ball State University 2018 Unit Design Competition

National Concrete Masonry Association FOUNDATION

Course Instructor

Tony Costello, FAIA

Tony's knowledge-base gained from his 26 trips to Haiti directing mission trips (2001-2006) and as an architect (2007- present) with his firm, C+A, greatly informed his teaching in this course.

- Instructor for the NCMAF-funded Student Design Competition 2010 – 2013; 2015-2017 that focused on projects in Haiti
  - 2010 - Solar heated kiln to cure CMU's
  - 2011 – Master Plan / OLPH Campus
  - 2012 – Prototype Community Design Center for Small Towns in Northern Haiti to also Serve as a Pre & Post Disaster Assistance Center (*)
  - 2016 – OLPH Orphanage / Vocational School (*)
  - 2017 - OLPH Orphanage / Prototype Visitors Center to also serve as a Pre & Post Disaster Assistance Center (*)
  - 2018 – Prototype Medical Clinic to Serve as a Pre & Post Disaster Medical Assistance Center for Rural Puerto Rico. (*)

*** Unit Design Competition sponsored by the NCMAF and funded by: Indiana Concrete Masonry Association (ICMA) / 2010-2012 and Midwest Masonry Council (MMC) 2016-2018. Ball State teams made the National Finals in 2012 (3rd Prize); 2016 (2nd Prize) and 2017 (2nd Prize).**

Ball State University 2018 Unit Design Competition

National Concrete Masonry Association FOUNDATION

Course Format

Our 3 credit, elective class undertook two design competition projects throughout the semester. The UNIT DESIGN COMPETITION was introduced first and focused on the application of a redesigned concrete masonry unit and how it might benefit the construction methods and climate in rural Haiti. Introduced in the fourth week, the STUDENT DESIGN COMPETITION focused on the need for medical care in rural Puerto Rico following the extensive loss of life and injury caused by Hurricane Maria in 2017. The block design was also applied to the clinic design, where in addition to being used as a functional building element, it was also used as a sculptural element in the plaza fountain design.

UNIT DESIGN COMPETITION

STUDENT DESIGN COMPETITION

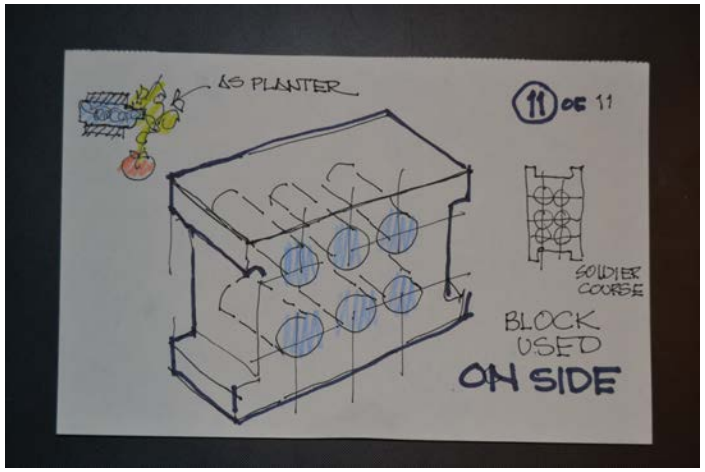
Ball State University 2018 Unit Design Competition

National Concrete Masonry Association FOUNDATION

Our Process

Tony introduced the Unit Design Competition Project by:

1. Graphically clarifying certain key requirements that would inform the design of the UNIT (left);
2. Providing a disposed water bottle to be incorporated in unit. (center); and,
3. Lectured about the abundance of plastic waste in Haiti and typical construction in Haiti. (right)



http://www.eco-business.com/news/dell-unlikely-protector-of-the-oceans/

Ball State University 2018 Unit Design Competition

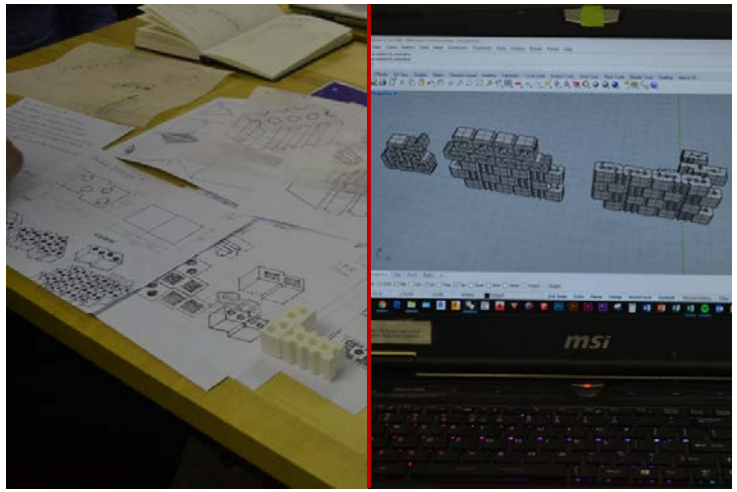
National Concrete Masonry Association FOUNDATION

Our Process

Students were exposed to many learning formats that attempted to replicate how a design team works in a professional office. Emphasis was placed on:

TEAM DESIGN /COLLABORATIVE INVESTIGATION

Analysis of alternative design concepts in a two hour period



CHARRETTES

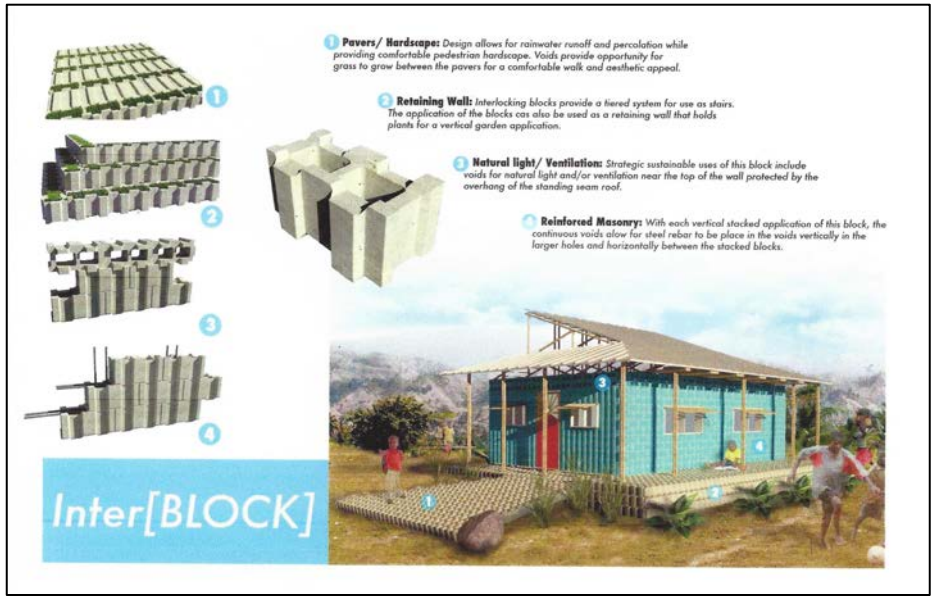
Design produced with both free-hand sketching and computer-generated studies.

PRELIMINARY MODELING

Construction of a 3D printed model to visualize the blocks and understanding of stacking and reinforcement.

Our Process

It was only until later in the semester after the teams had decided on their final design concept and taken it through design development did he show 2D graphic boards and models from prior class' projects to demonstrate the quality he expected of our class.



Ball State University 2018 Unit Design Competition

National Concrete Masonry Association FOUNDATION

Judging

The external jury judged both competitions and were selected so as to represent the architecture and landscape architecture practice professions as well as the concrete masonry industry.

Don Able, AIA ACHA, LEED BD+C, Architect and project manager w/ archDESIGN, Indianapolis, IN. Multiple decades of planning, design and project management in medical facilities. Spoke to class on February 21st. Ball State alumnus.

Malcolm Cairns, FASLA. Professor of Landscape Architecture at Ball State. Has served on several past NCMAF juries at Ball State and his design studio in the fall 2017 semester undertook a housing project for Puerto Rico.

Eston Hathaway, President, Indianapolis Mason Contractors Association. Multiple decades of experience in the masonry industry. Eston has also served on a number of previous juries. Serves on the Advisory Board for the CAP/ Construction Management Program.

Terri Truitt, Executive Director of the Midwest Masonry Council (MMC), Indianapolis, IN. Vast experience in the masonry industry and its educational program. She coordinates the MMC sponsorship of the Unit Design Competition with Tony and is the primary person to coordinate/manage the annual masonry program w/ CAP on the Ball State campus for ARCH, LA and CM students. Lastly, serves on the Advisory Board for the CAP/ Construction Management Program.

Dave Wheeler. Thirty plus years of managing CMU production at Wheeler Block (now L. Thorn Company) Shelbyville, IN. Toured this year's class on a tour of his plan in March.

Gary Vance, FAIA, FACHA, LEED AP, President of Vance Consulting, LLC. Nationally recognized architect in medical and health care facilities. Spoke to class on February 21st. Ball State alumnus.

Ball State University 2018 Unit Design Competition

Midwest Masonry Council — Educate Innovate

National Concrete Masonry Association Foundation

Judging

The final jury review of both competitions was held at Ball State University on 02 May 2018. The 3 teams orally presented their STUDENT DESIGN COMPETITION projects(below) before the jury and answered questions.

The STUDENT DESIGN COMPETITION was juried without the teams orally presenting and were strictly evaluated on the merits of the projects as presented on the boards and in models. This replicated the format of the initial national jury process that determines the three schools to be invited to this presentation.

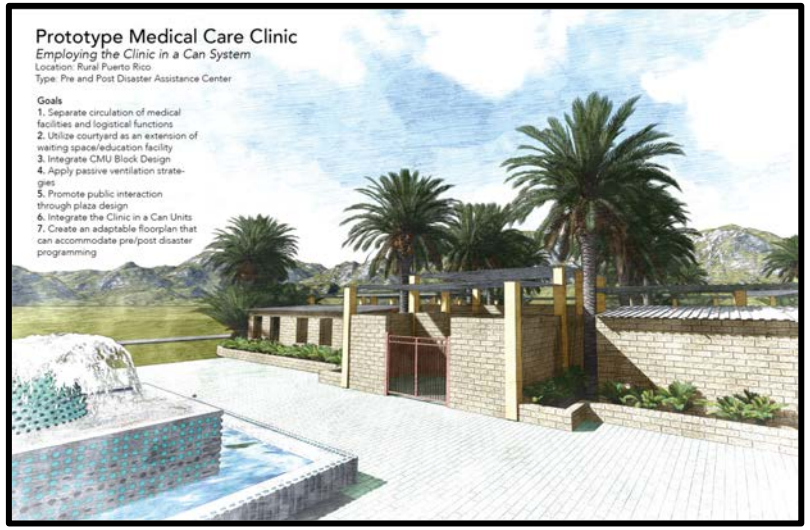
Ball State University 2018 Unit Design Competition

MIDWEST MASONRY COUNCIL EDUCATE INNOVATE

National Concrete Masonry Association FOUNDATION

Judging

- Because both competitions were undertaken simultaneously, we had a better understanding on how to utilize and implement the block across a variety of possible applications.
- The **Student Design Competition** was **CO-FIRST PRIZE** winning teams' projects include our team's project (left) and that of a team of our classmates that included Victoria Bell, Ashley Caceres, Jessica Franke and Sabrina Streicher (right).



Ball State University 2018 Unit Design Competition

Midwest Masonry Council

National Concrete Masonry Association FOUNDATION

[RE] BLOCK

Goals

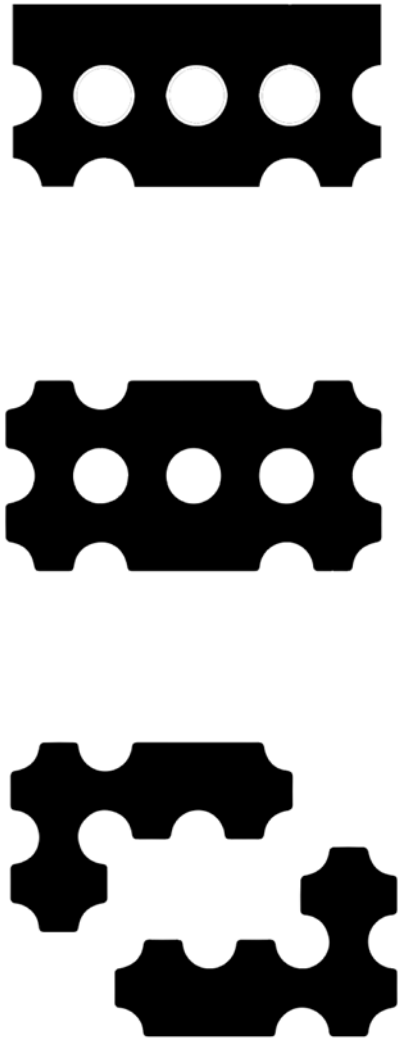
1. **RECYCLE** used plastic bottles by incorporating them into the block design

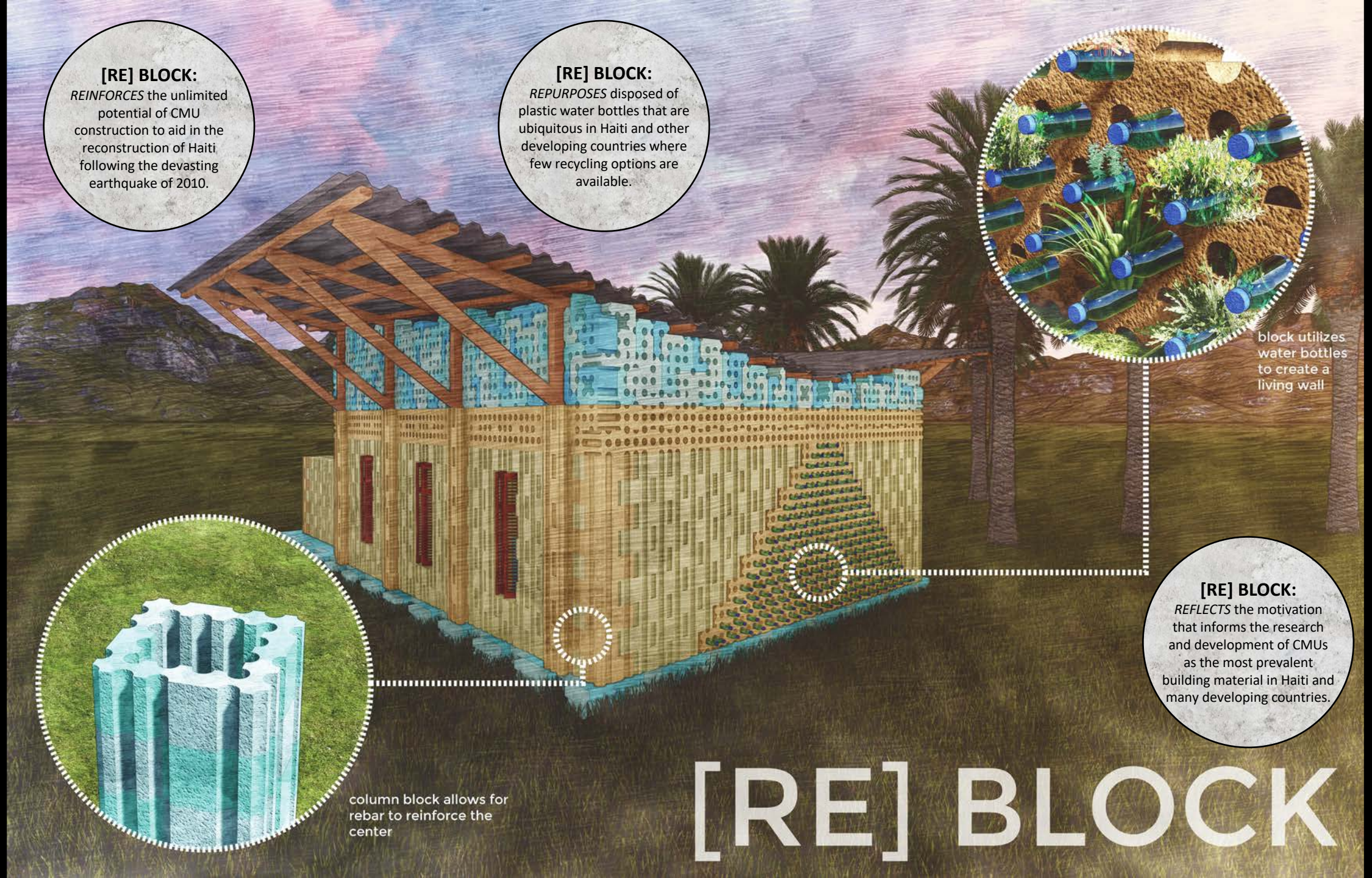
2. **RETHINK** a block mold to create different iterations

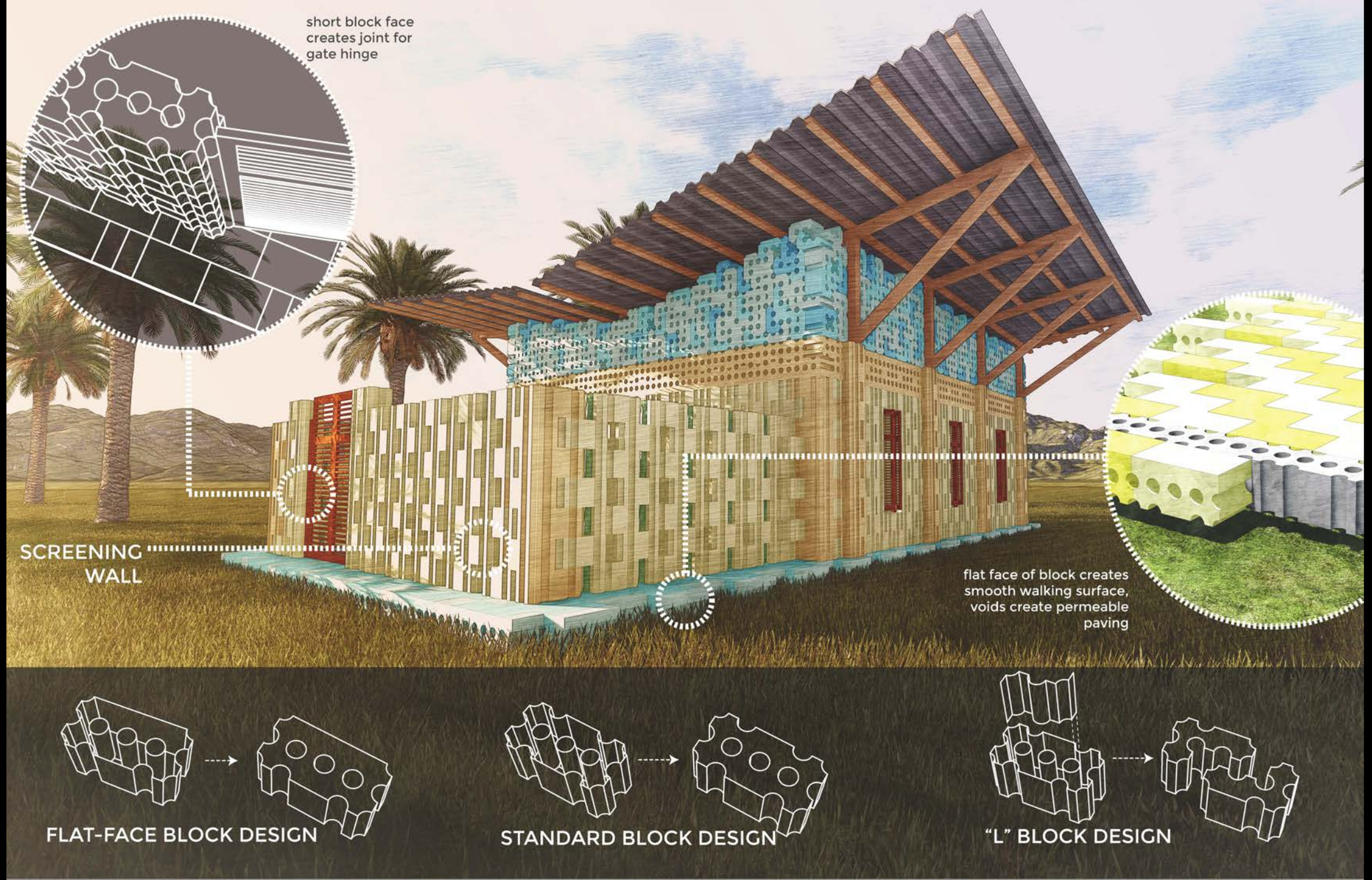
3. **REFRESH** CMU block composition to reflect cultural surroundings

4. **REPLACE** ground surface materials with block design to create a permeable landscape

5. **REINFORCE** structure by incorporating used plastic bottles




[RE] BLOCK:
REINFORCES the unlimited potential of CMU construction to aid in the reconstruction of Haiti following the devasting earthquake of 2010.
[RE] BLOCK:
REPURPOSES disposed of plastic water bottles that are ubiquitous in Haiti and other developing countries where few recycling options are available.
block utilizes water bottles to create a living wall
[RE] BLOCK:
REFLECTS the motivation that informs the research and development of CMUs as the most prevalent building material in Haiti and many developing countries.
column block allows for rebar to reinforce the center
[RE] BLOCK


short block face creates joint for gate hinge
SCREENING WALL
flat face of block creates smooth walking surface, voids create permeable paving
FLAT-FACE BLOCK DESIGN
STANDARD BLOCK DESIGN
"L" BLOCK DESIGN


water bottles through the core perform as structural bracing
VENT BLOCK
block voids allows for bottles to act as "glass" block

[RE] BLOCK

Interior Structure using the **[RE] BLOCK**

Fountain Design using the **[RE] BLOCK**

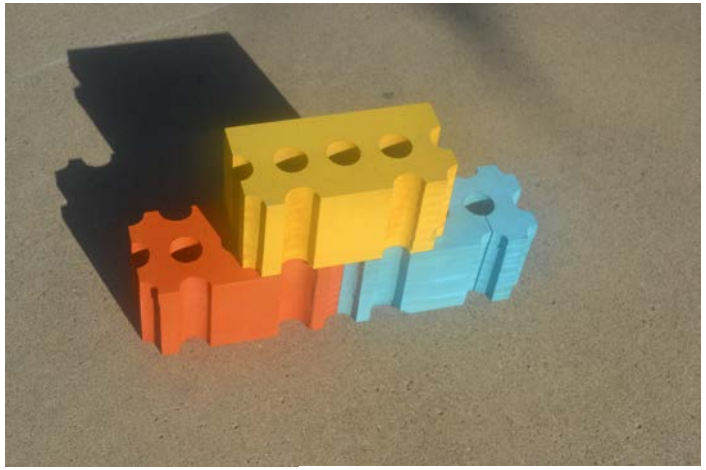
Ball State University 2018 Unit Design Competition

Midwest Masonry Council

National Concrete Masonry Association FOUNDATION

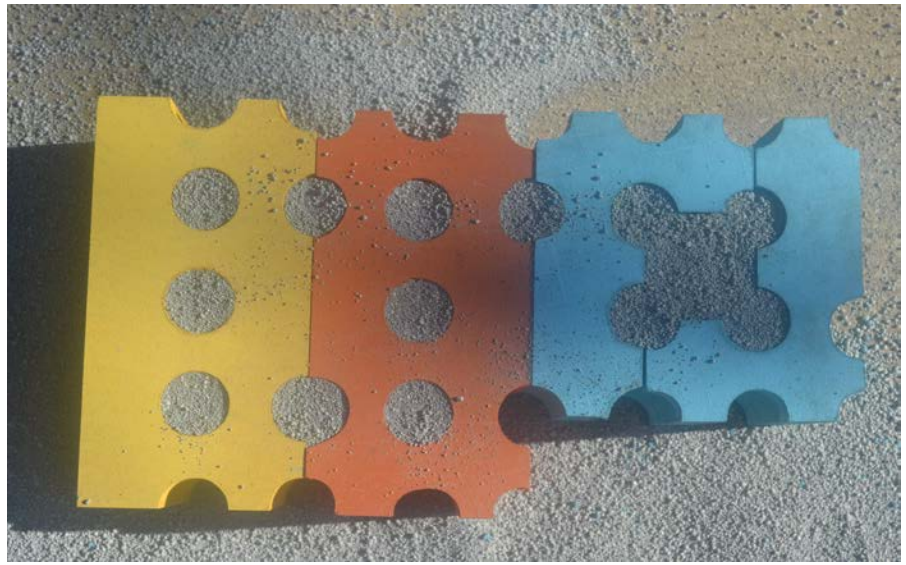
[RE] BLOCK

- The three 1/2 scale models (right / top & bottom) were done in three colors that are indicative of the love of color that is evident throughout the Caribbean island and especially in Haiti (below/left). Our team proposed that the **COLOR** would be integral to the concrete mixture with both the color of the aggregate and a liquid color additive to the cement being employed. An example of the color of stone in Haiti that could be crushed and graded for use to produce colored units with earthen tones is illustrated in the photo Tony recently took in Haiti (below/right) of an excavation for a major highway improvement project.



[RE] BLOCK

- **The three variations (right) of the unit that can be easily achieved through typical casting:**
  - 1.A. **Yellow** – fluted on one face and smooth on the other for a single-wythe application to create a smooth wall of a building, can be turned to be a flat walk surface, and used for possible window sills;
  - 1.B. **Orange** – fluted on both faces to be used for a free-standing wall; and,
  - 1.C. **Blue** – The blue block is cut into two L shapes. These "Ls" can be configured randomly (as seen at the top of the wall) to create visual interest, they can be configure into a square (as shown on the left) which can be used as a column or larger drainage receptacle.
- All three can be filled w/ grass (right/top) or compacted sand & gravel (right/bottom) to create a “hardscape.” Both provide a pervious infill that allows for ground water from the heavy rains common to Haiti to be drain on site to sub-surface below.



Thank You!

On behalf of our team, our classmates, Tony … our mentor, and the Department of Architecture at Ball State University, we would like to express our sincere appreciation to: the National Concrete Masonry Association; the NCMA Foundation; and the Midwest Masonry Council for funding this course and competitions. It provided a great learning experience for all of us as well as award monies that will assist us as we move on in our academic careers.

Ball State University 2018 Unit Design Competition

MIDWEST MASONRY COUNCIL EDUCATE INNOVATE

National Concrete Masonry Association FOUNDATION