

Movable Silence, Digital Design-Build in the Academy

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Movable Silence

Movable silence is a sound attenuating, digitally fabricated movable space built by faculty and students in the [omitted], the digital fabrication laboratory at [omitted] College of Architecture and Design. Designing and building Movable Silence was a formidable challenge; it needed to accommodate 6 people, be sound-attenuating, movable within a warehouse space, and have two large sliding doors on the short sides. The project was fabricated off-site at the [omitted] so it needed to be designed in components, or chunks, that could be assembled for testing, disassembled for transport and reassembled on-site. Additionally, the project had to be done on a very tight budget and in 8 weeks.

Design

Due to off-site fabrication and partial assembly the team first determined the maximum size of each chunk. Due to the limited budget, the team opted for the largest box truck available for rental. A series of diagrams were produced to determine the best configurations. Ultimately, we opted to assemble the structure on-site with large, but lightweight, panels fabricated off-site. The team was not afforded a forklift or other lightweight lifting equipment; so all chunks were designed to be lifted by the team of six people.

Pairing the two primary design limits, mobility and sound attenuation, the team devised a stacked component system that consists of Baltic birch plywood for structure and a high-density felt commonly used in the automotive industry for noise dampening. The layered felt and plywood was bound together by staggered horizontal rods allowing for compression nuts for on-site "tuning." The plywood that was layered into the side panels was mostly created using the scrap from the cutting of the larger structural "chunks." Milled into each structural band is a "wrench pocket" to adjust tension from both the inside and outside of the room.

Fabrication

Fifteen days prior to completion, the team fabricated the first component. Each chunk had two rings of structure composed of 7 sheets of plywood. In total, 53 sheets were cut to create the structure, floor, siding panels, and entry. The arrangement of each chunk was carefully configured to maximize the material and to minimize waste. The structure was CNC'd, while a jig was designed for cutting and perforating the felt.

The team assembled the chunks in a makeshift space outside the [omitted] (later referred to as "tent city"). Each chunk was built on its side through stacking the felt and plywood in an order dictated by the numbering and lettering designation on each milled piece. As each chunk was completed it was tilted up into place and checked for tolerance and alignment.

In one week, the chunks were assembled and tested, the doors were milled and assembled with the arrival of the box truck at the [omitted]. The team disassembled the chunks into components for transport to Illinois for final on-site assembly.



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Faculty: James Stevens, AIA Student Team: Natalie Haddad, Ergys Hoxha, Eric Rito, Brent Dekryger, Joseph Doneiko, Barbra Grossi

