

[PLYWOOD] PARTNERS ON DWELLING INITIATIVE

FIRM NAME
SERA Architects

DESIGN TEAM
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POD DIMENSIONS
8W x 12L x 10H (IN EASY-TO-MOVE 3 FOOT SECTIONS)

NOTABLE FEATURES

- CNC cut plywood-centric design minimizes weight compared to standard construction
- Interchangeable modules maximize program flexibility and allow for future expansion
- Three foot sections that are compact, lightweight, and forklift friendly
- Alternating volumes allow for clerestory glazing
- A covered front porch encourages community interaction
- A trellis provides a surface to grow your favorite climbing flowers or vegetables.

USE OF PLYWOOD

The PlyPAD maximizes the potential of both plywood and CNC technologies. Referencing the open-source WikiHouse project, it utilizes interlocking joinery that allows the modules to be built almost entirely of plywood cut on a CNC router. The furniture employs the precision offered by the CNC technology as extensions of the supporting ribs that are simultaneously structural and sculptural.

CONSTRUCTION PROCESS

The PlyPAD is designed to be built by users with little to no construction experience: CNC routed notches and bolt holes ensure that all elements are precisely located, and reduce the need for extra hands. The modules are constructed separately and assembled on-site for ease of transport. Each module consists of a floor system, structural ribs, sheathing and furniture. The double layered ribs (with staggered seams) are glued together, fit with fastening angles and set into a simple waffle-frame base. Exterior sheathing and ceiling are then screwed to the angles and insulated. The interior walls and roof are attached, along with vapor barrier, weather barrier, and standing-seam metal panel cladding. On site, the modules bolt together to compress applied gaskets and the exterior is finished with snap-on cap flashing.

PROJECT DESCRIPTION

Our concept for the PlyPAD is to create a series of interchangeable modules that can be prefabricated to fit a resident's desired layout. They are then manufactured and shipped in easy-to-move sections that will be connected on site. The benefits of utilizing a module include: reduced weight and size for shipping and delivery, adaptability to varying site conditions, ease of future expansion, and added rigidity due to the duplication of structure at connecting ribs.

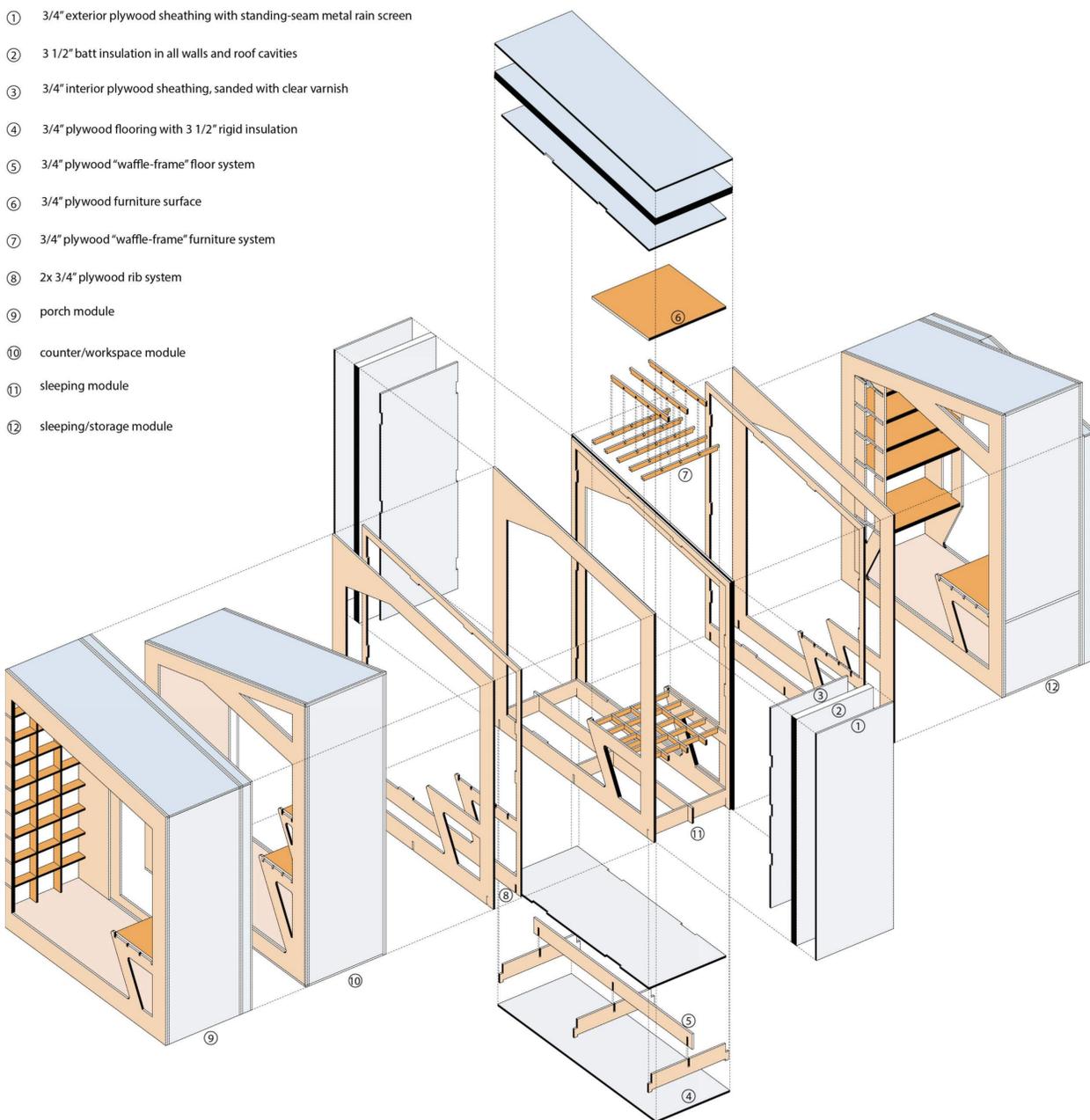
In the short term, as designed, we hope the PlyPAD can serve as a reproducible POD that can be used to address both the need to create dwelling spaces for Portland's houseless residents and more broadly to serve as a model for disaster relief housing around the country and world. As a long term goal we would develop a system to allow users to select the individual quadrants of each module, including furniture and roof lines, to provide a personalized design that could be cut with nothing but an inexpensive, chain-driven, CNC router. With downloadable software a user could assemble their desired design through preprogrammed templates and cut all the components with automatically generated cut and assembly sheets.

While very different in scale and application from his work, the project draws inspiration from John Yeon's use of affordable plywood panel modules. His panel modules are often framed with a distinct projecting rib that, when installed side-by-side, form a distinguished repeating double rib. The corresponding doubled rib on the interior of the PlyPAD inherently provides structure, rigidity, a point of attachment, and forms the three-dimensional framework for the built-in furniture in the design. The trellis and the supporting grid in the furniture are also a nod to the structural grid implemented by Yeon throughout his illustrious career.



POD CONCEPT + ASSEMBLY

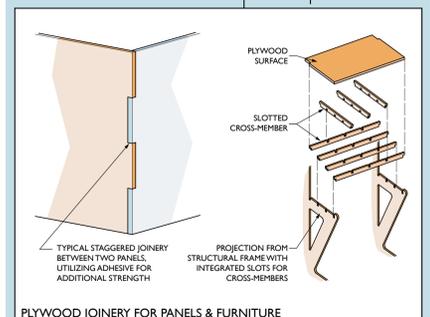
- 1 3/4" exterior plywood sheathing with standing-seam metal rain screen
- 2 3 1/2" batt insulation in all walls and roof cavities
- 3 3/4" interior plywood sheathing, sanded with clear varnish
- 4 3/4" plywood flooring with 3 1/2" rigid insulation
- 5 3/4" plywood "waffle-frame" floor system
- 6 3/4" plywood furniture surface
- 7 3/4" plywood "waffle-frame" furniture system
- 8 2x 3/4" plywood rib system
- 9 porch module
- 10 counter/workspace module
- 11 sleeping module
- 12 sleeping/storage module



1) ASSEMBLE EACH UNIT

Every POD gets built out of four smaller units. Each unit gets assembled utilizing a simple rib & panel system that includes all supports necessary for the structure and furniture.

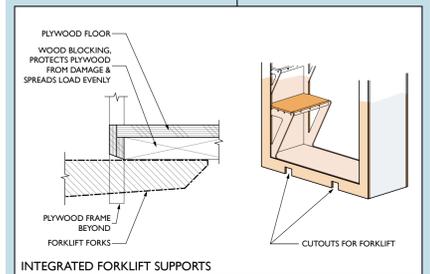
The furniture itself uses a similar rib & panel system that helps keep the units light and efficient.



2) TRANSPORT UNITS TO SITE

The four units that make up each pod are forklifted onto a truck and taken to the site. Because the Pod separates into 4 pieces, each piece is light and transports easily via forklift.

Special cutouts and blocking are provided in the base to facilitate easy moving.



3) BOLT & SNAP UNITS TOGETHER

After units are delivered on site the four units are bolted together into one pod. Bolting compresses a gasket that runs around the perimeter to provide an air seal for the unit.

To finish the rain screen system off, a metal snap cap joins the metal panels of the units.

