

Reconsidering Modularity in Gypsum Wallboard

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Abstract

This research reconsiders contemporary interior finishing practices, e.g. the installation of gypsum wallboard and the application of joint compound, as a singular modular commodity. Through discussions with industry contacts and physical prototyping methods, the proposed project investigates how gypsum wallboard can be redesigned as a modular panel system that considers methods of installation and disassembly. The resulting panels consider industry impact including sustainable construction practices, the reduction of debris and material waste, and shortages in skilled labor as well as aesthetic and functional qualities of the interior.



Methods

This research was completed in two phases:

Phase I: Preliminary Research

The intent of the preliminary research phase was to gather information on the current gypsum wallboard industry including all stages of the material supply chain with a focus on on-site installation and construction practices. Information gathering occurred via:

- *Observational Site Visits**
- *Academic and Industry Sources*
- *On-site testing of installation practices*

Phase II: Design and Production

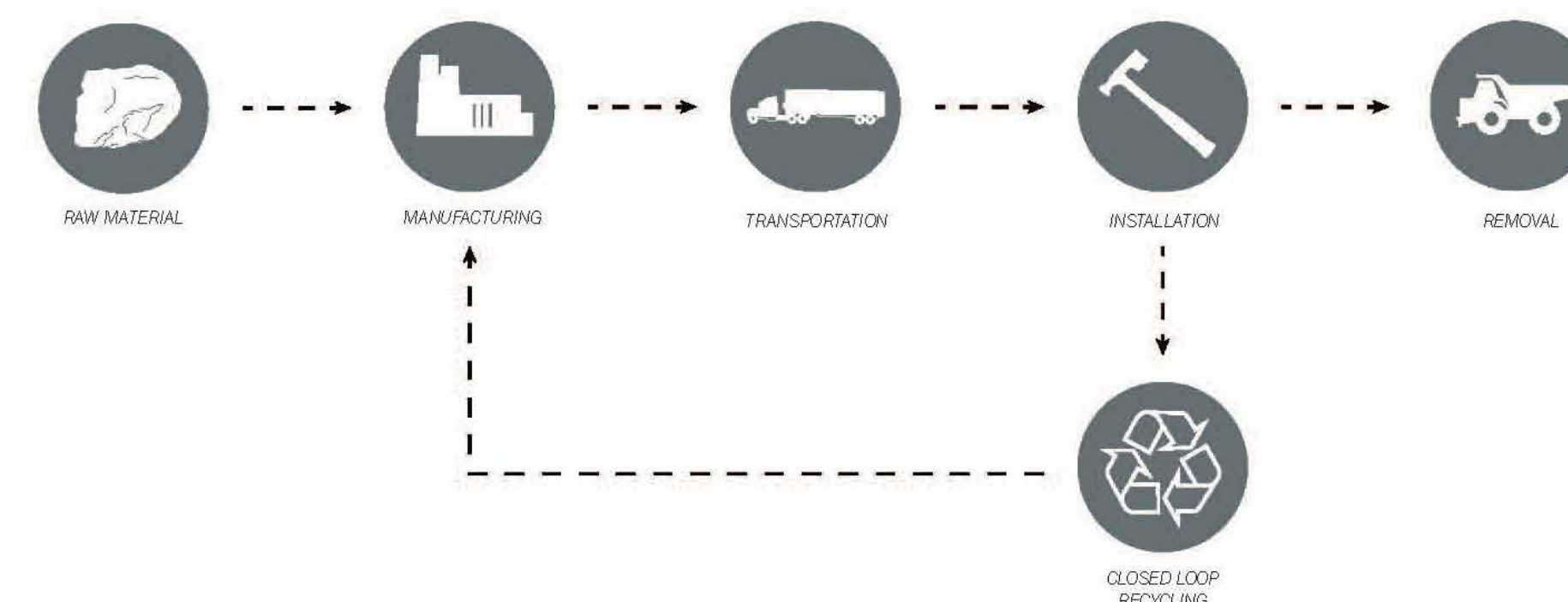
Preliminary Research served as design criteria for the reconsideration of gypsum wallboard panels. The design and production process for the reconsidered panels was as follows:

- *Design development based on Preliminary Research*
- *Panel production*
- *Feedback from Industry*

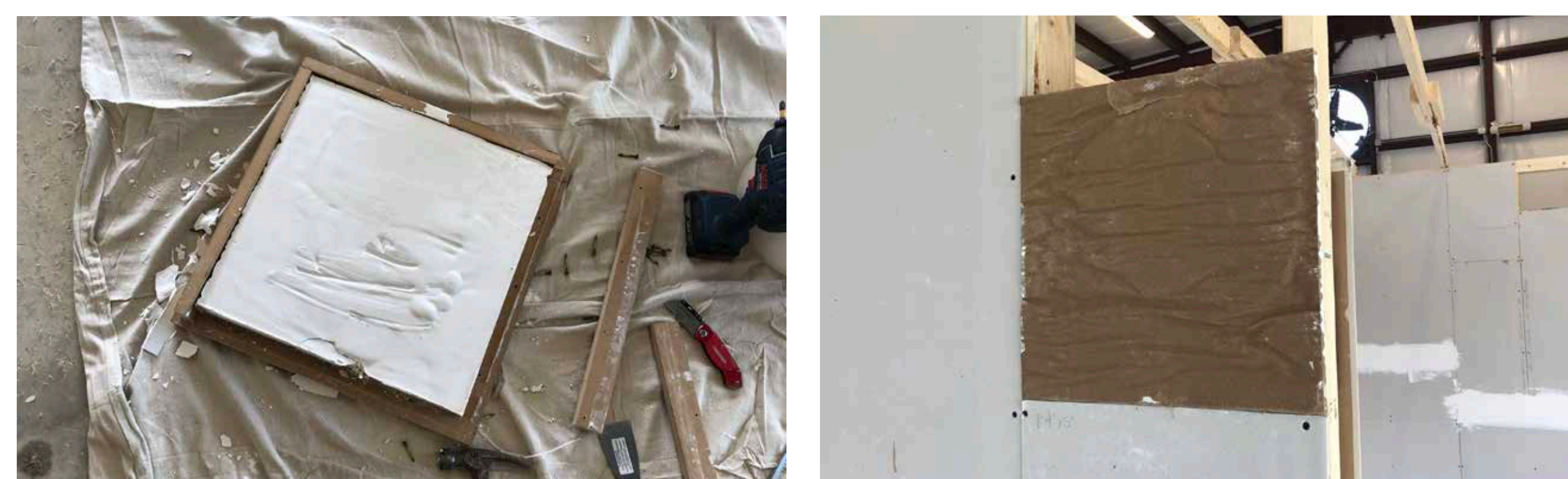
*Due to pandemic-drive travel restrictions, a greater emphasis was placed on source gathering and testing in lieu of site visits.

Process

Through academic and industry resources, interviews with industry players, and a site visit to gypsum wallboard installation at Goodwin Hall, we developed an understanding of the successes and shortcomings of the gypsum wallboard material supply chain system.



This informed design-build explorations, beginning with the testing of installing various gypsum wallboard modules sizes. Each module size was derived by the division of a standard 4'x8' sheet of gypsum wallboard and considered orientation, pattern, ease of installation, and attachment. Panels were then cast using analog methods that align with manufacturing processes. The casting process allowed for further exploration of surface and edge conditions of the panels.



Results

Preliminary research established a deeper understanding of the gypsum wallboard industry and material supply chain. Information gathering at each supply chain stage helped to inform decisions in physical testing, prototyping, and design.

Key factors stemming from research and testing to be considered in design include:

- *Smaller boards are easier to handle and install but cannot be strongly secured due to lack of attached surface area.*
- *Larger boards are preferred by professionals to reduce the number of seams which decreases finishing time and increases finish quality.*
- *Contractors are not incentivized to create material efficiencies causing more board cutoffs and waste.*
- *Board cutoffs can be recycled if source separated on-site.*

Next Steps

This work will develop through travel to additional site visits and developing relationships with finishing subcontractors such as Anning Johnson and Raymond Group. Panel production will also continue and focus on exploring edge condition, attachment, and surface qualities.

Credits

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