

Establishing Informed Design Procedures for “Living Small”

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The “Tiny House Movement” consists of individuals who are re-defining the “American dream home” by designing compact homes that are typically between 50-500 square feet. These homes have a significantly lower cost and carbon footprint. According to the U.S. Census, the average cost of a standard American home in 2010 was \$272,000 while the average cost of a tiny home (if built by the owner) is only \$23,000. Individuals searching for alternatives to traditional low cost housing are choosing to take on this challenge themselves by building tiny homes. Information on designing and building tiny houses is becoming increasingly available, but this information is unstructured and presented in the form of blogs and construction diaries; therefore, the lack of a structured design method poses great difficulties for individuals throughout the design and fabrication processes. Unlike custom homebuilding where individuals typically adapt-build established designs or work with an architect to create an original design, many tiny homes are both designed and built by the eventual occupant. Individuals with little or no design and construction experience are unaware of challenges they will face in building a tiny house. Also, commercial tiny home builders have not created a structured design procedure to overcome these challenges for individuals designing and building their own homes. The purpose of this research is to create a design procedure with the use of iterative modeling, to be used as a resource to help others overcome known design constraints in the form of a replicable process, instead of individuals facing these problems on their own. Through extensive data collection in review of industry leading tiny home, boat, and RV designers, design criteria will be developed in a proof of concept project that incorporates functional living requirements within the form of a tiny house. By iterating the design and evaluating alternatives within a building information modeling environment, an optimal design will be achieved for successful future fabrication. Furthermore, design decisions will be documented for informing the individual design guide—the eventual output of this research. The research had three major phases which are now complete: 1) Data Collection and Design 2) Construction 3) Documenting Lessons Learned. The outcome is a guided step-by-step approach specifically for resolving design challenges for a BIM-to-fabrication-based construction work-flow process that will help individuals with minimal design experience efficiently design a functional and cost-effective tiny house for subsequent fabrication.

Key Words: Tiny House, Living Small, BIM, Residential Construction, Step-by-Step