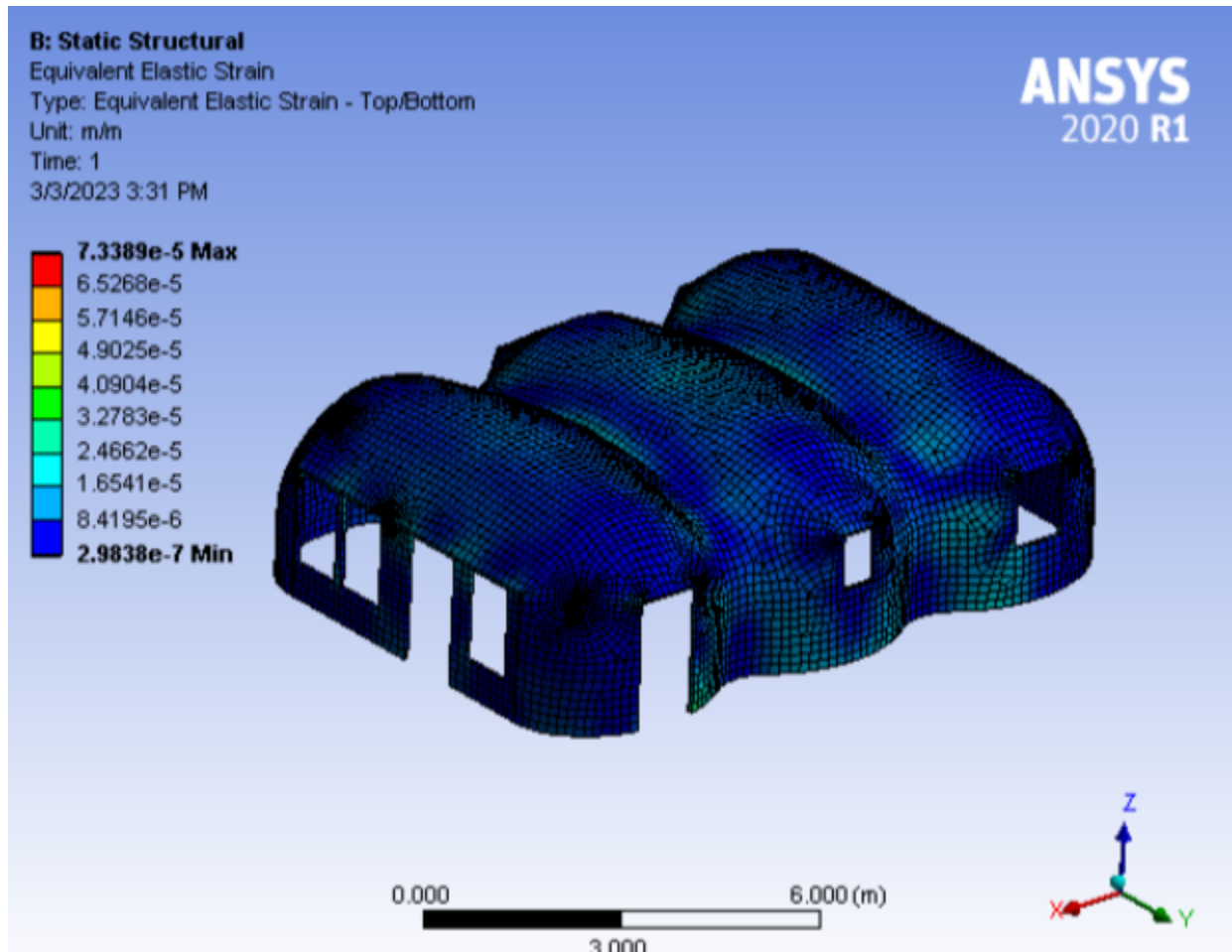


Introduction

The Triple Dome Home is a one-of-a-kind structure. Our goal was to build a home entirely outside the traditional status quo. It is clear that no home like this is readily available in the market today.



The home consists of three concrete dome structures. The walls are concrete and foam, wholly encased in a PVC-coated membrane. The home will then be covered in soil. Throughout this document, we will highlight how our home's design is not only unique but a potential housing solution moving forward. From the materials to the energy savings, the Triple Dome Home taps into energy efficiency and circular economy capabilities. As evidenced by the creation of this competition, we need to innovate how we build homes to more sustainably house our growing

populations. We believe the market is moving in the direction that a different home style would be accepted and celebrated.

Embodied Carbon

Dome homes have recently become an eco-friendly alternative to traditional housing. Due to their unique design, many assume that dome homes must have a lower embodied carbon than traditional homes. The reality is that they may have a similar embodied carbon footprint.

However, dome homes have the advantage of lasting longer over time, meaning their embodied carbon is spread out over a longer period. This is because dome homes are made from materials resistant to decay and degradation. In our case, we used concrete and fiberglass rebar to reinforce our walls. As a result, dome homes require less maintenance and are more durable than traditional homes, which typically need to be repaired or refurbished every few decades. Ultimately, dome homes' longer lifespan can help reduce their overall carbon footprint, making them a more sustainable housing option.

Life Cycle Assessment

Dome homes have a unique design that can help to reduce the environmental impact of housing. Our dome shape allows for better insulation, which can help to reduce energy consumption for heating and cooling. Figure 1 below shows our approach is unique to a

traditional wooden residential structure.

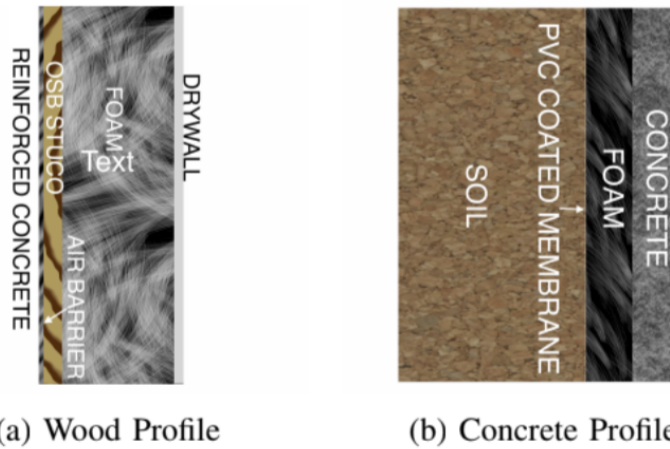


Fig. 1: Thermal material profiles for a typical wooden residential structure and that of a concrete dome structure are shown.

Our home's walls have an increased R-value, retaining heat and cool air for longer periods of time. We believe this type of structure will not only be energy efficient but long-lasting.

Additionally, our dome home could be made from even more sustainable and environmentally friendly materials, such as fly ash or polymer-subsidized concrete.

Innovation

The quality of analysis and determination of the environmental impact of dome homes is an important consideration for builders and homeowners. In Figure 3 below, the domes were tested for flux in temperature compared to a traditional home.

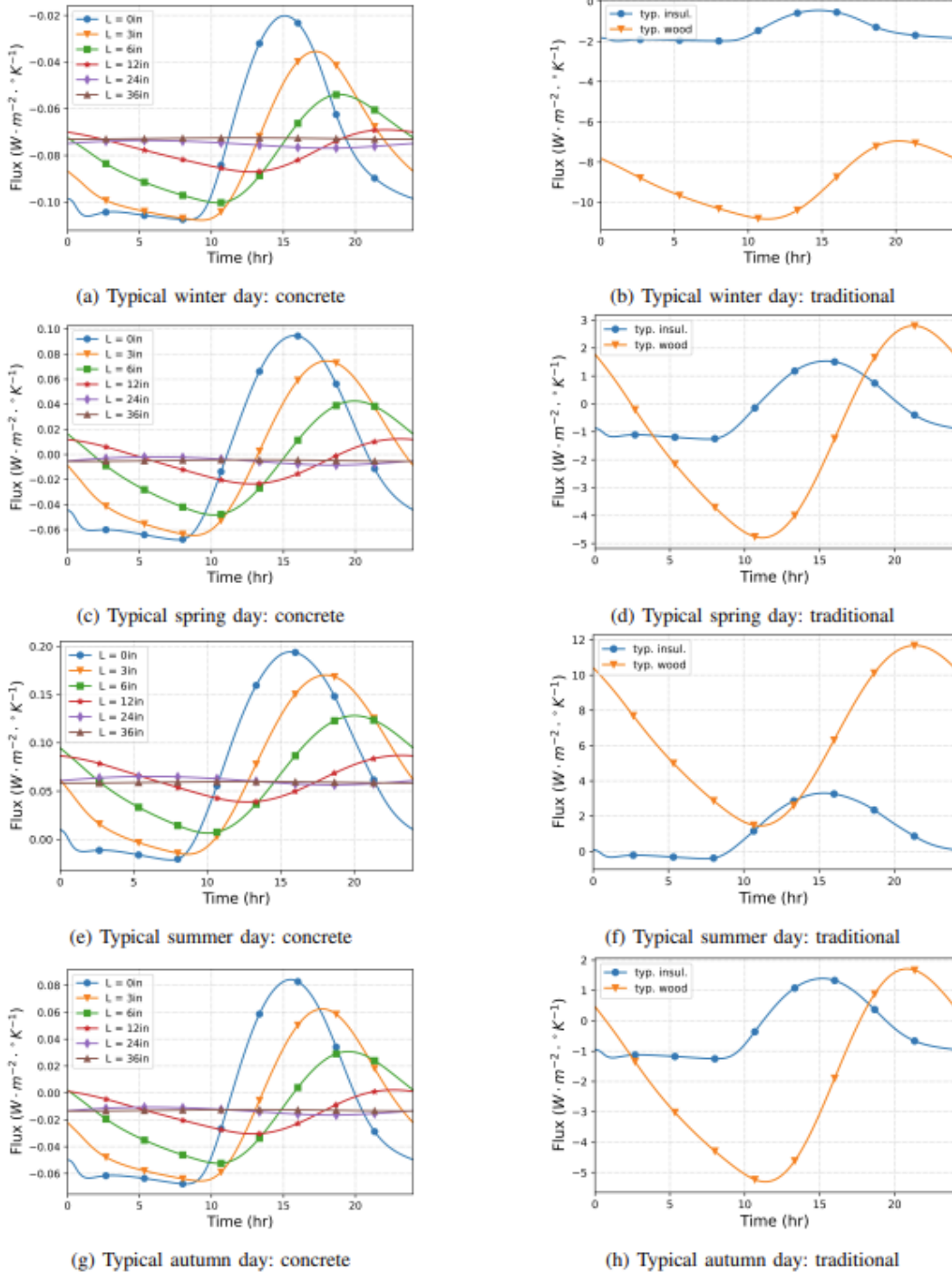


Fig. 3: Variation in total heat flux on the interior wall of a thermal configuration during typical day. Figures for the proposed concrete configurations are shown on the left, and those for the traditional insulating system on the right. Notice that scales for figures on the left differ drastically from those on the right.

Clearly shown, the flux within a traditional home is much larger than our concrete dome home across all seasons. This reduction in flux over time will greatly reduce the energy required to

heat and cool the home. Though, as mentioned above, the embodied carbon of the home may not be dramatically different from that of a traditional home; the operational carbon will be. With the additions of solar panels and greywater cycling (where states allow), the offset of operational carbon will be even greater. Ultimately, dome homes have the potential to meet the life cycle assessment criteria, making them a more environmentally friendly housing option.

Conclusion

There is more to be learned about the efficiency of our Triple Dome Home. We will continue empirically testing our home to receive more specific metrics on how it compares with traditional homes. With the information we have gathered thus far, we can confidently say we have built a more sustainable and less environmentally impactful home.