

MASS WALL BENEFITS

Our new home is designed to provide exemplary performance for energy sustainability and comfort. THA Architecture and PAE (consulting engineers) developed an hourly simulation of the building's operation to optimize the design architecturally and mechanically. The simulation accounted for schedules of use, materials, geometry, and the local climate. With this tool, the architecture of the building was designed to harness the natural energy of Bend's unique climate. Passive design and how the building's mass walls integrate into the overall design concept were driving forces in how our building looks and functions:

Glazing Type & Orientation: A majority of the building's glazing is placed on the south façade. The deep overhang on the south blocks out this sunlight in summer and allows deep penetration in winter when sun angles are low. Additionally, the type of glazing was selected to optimize the amount of visible light and solar energy brought into the building while minimizing heat loss.

Thermal Mass: A basic principal of passive building design is to provide sufficient thermal mass to absorb both the external loads (sunlight & heat gain/loss through the building's skin), and internal loads (heat from people, lights, & equipment) such that temperature swings within a space are naturally minimized. In a building, such as ours, with passive systems and an active mechanical system, the passive systems act as the first mechanism to control temperature and minimize the size of mechanical system needed in the building. Both the massive floor and mass walls contribute to the spaces' thermal mass and minimize the temperature fluctuations in the space.

IN THE SANCTUARY, the southern mass wall provides specific benefits:

1. It allows for a smaller mechanical system
2. Reduces heating energy
3. Reduces cooling energy
4. Improves thermal comfort by separating occupants from the windows
5. Provides an elegant way to integrate the access ramp
6. Reduces glare from the southern windows while allowing the winter heat gain
7. Reduces visual noise at the southern windows