

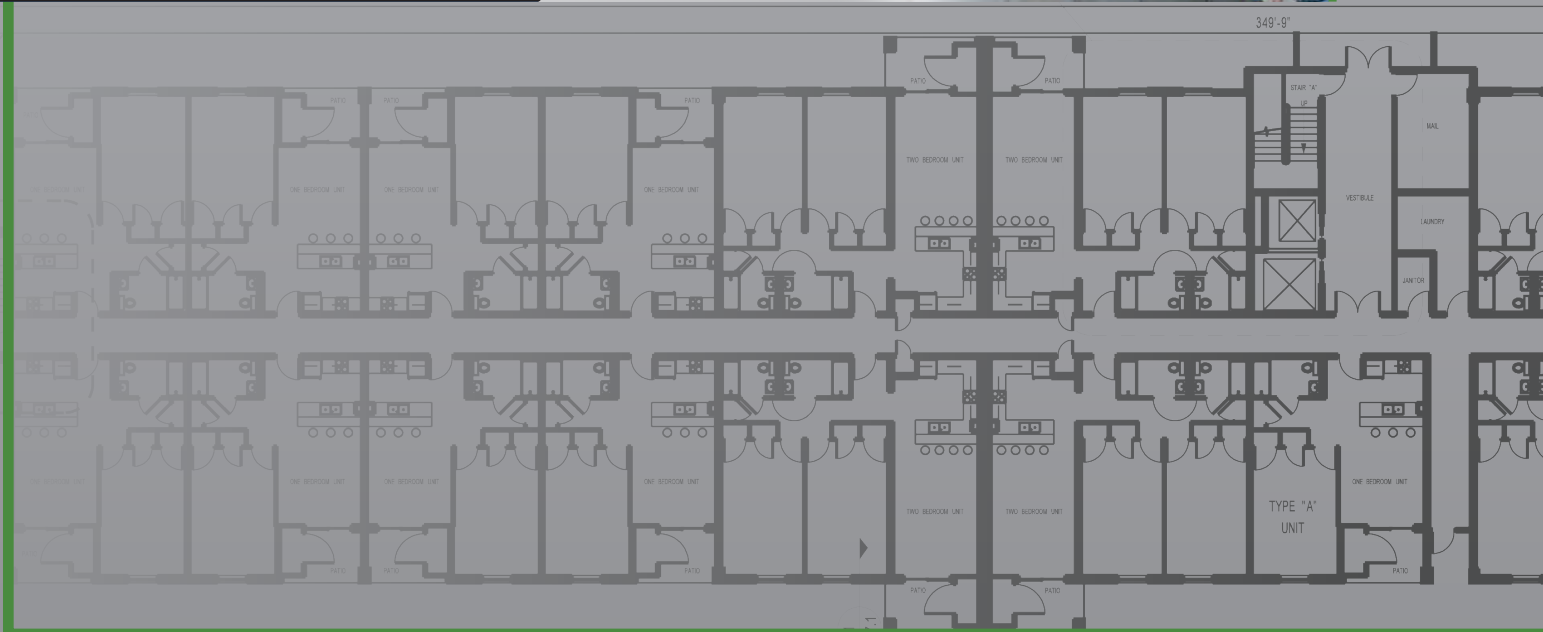
# STUDY

## Impact of Construction Type on Cost of Construction and Building Insurance Cost

### MULTI-RESIDENTIAL STRUCTURES

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BALANCED DESIGN  
COMPARTMENTATION



## Introduction

For the Honolulu, Hawaii November 2022 cost comparison it was decided to use union wages based on the local construction climate. The reader is referred to the *Study, Initial Cost of Construction, Multi-Residential Structures, October 2017* original report for a complete discussion on study design and methodology. It has been determined that the insurance industry recognizes that there is a relative risk differential between wood construction materials and the other materials used in this study. The differential risk is included in this study and reflected in the builder risk insurance costs. The builders risk insurance costs have been applied based on recognized building construction type, and September 2022 insurance rates.

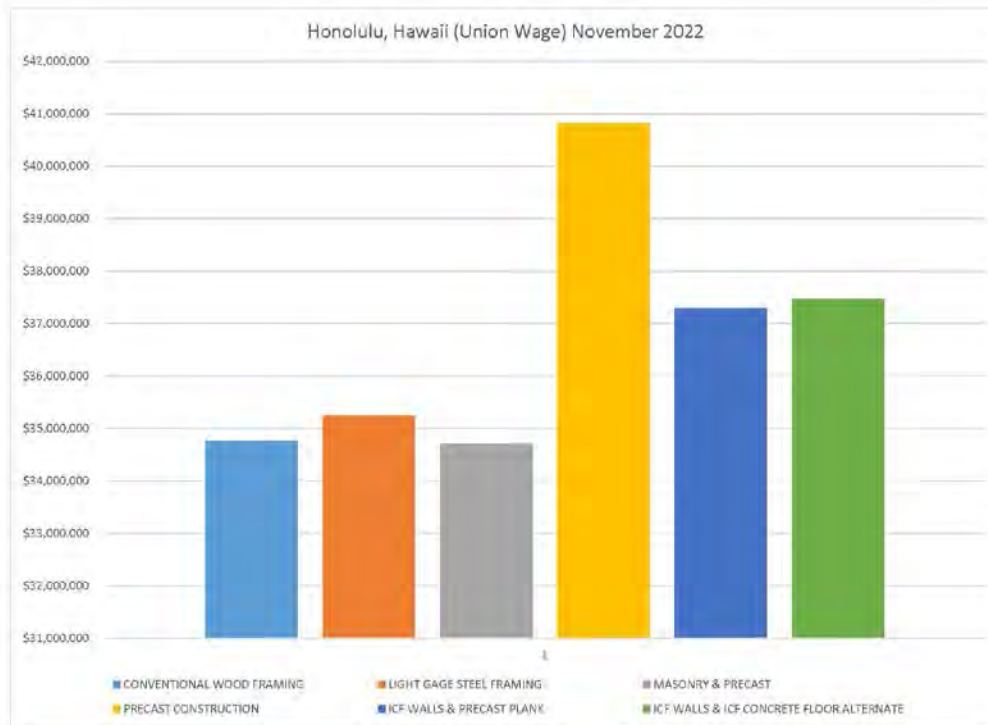
## Study Results and Discussion

The results of the construction cost study for each geographic location are presented in the following tables. The relative cost presented is a percentage of the conventional wood frame system.

### Honolulu, Hawaii

| Honolulu, Hawaii - November 2022         |                |                   |            |               |  |
|--|----------------|-------------------|------------|---------------|--|
| Union Wages                              |                |                   |            |               |  |
| Building System                          | Insurance Cost | Construction Cost | Cost/Sq Ft | Relative Cost |  |
| CONVENTIONAL WOOD FRAMING                | \$ 259,233     | \$ 34,767,765     | \$ 359.91  | 100           |  |
| LIGHT GAGE STEEL FRAMING                 | \$ 144,725     | \$ 35,248,249     | \$ 364.89  | 101           |  |
| MASONRY & PRECAST                        | \$ 107,787     | \$ 34,709,480     | \$ 359.31  | 100           |  |
| PRECAST CONSTRUCTION                     | \$ 126,761     | \$ 40,819,535     | \$ 422.56  | 117           |  |
| ICF WALLS & PRECAST PLANK                | \$ 153,115     | \$ 37,291,557     | \$ 386.04  | 107           |  |
| ICF WALLS & ICF CONCRETE FLOOR ALTERNATE | \$ 153,854     | \$ 37,471,603     | \$ 387.90  | 108           |  |

The least expensive system is the load bearing masonry wall system with precast concrete plank floor system. The relative cost of the most expensive framing system, the precast concrete wall and precast floor system is 17.6 percent higher. The conventional light weight wood framing system is an increased cost of 0.2 percent over the load bearing masonry wall system with precast concrete plank floor system. This is also 1.6 percent lower than the light gage steel framing system, with respect to the load bearing masonry wall system with precast concrete plank floor system.



In addition to the initial cost of construction, lifecycle cost is effected by the building construction type. While this is very difficult to quantify for maintenance costs, overall and material performance level over time, it is being acknowledged by the insurance industry. Keeping in mind that the property insurance cost is greatly affected by many external factors, and is highly dependent on the building occupancy type, there is a recognized difference in the property insurance based on the construction materials and thus recognized construction type. The following table presents the builder's risk insurance cost, the initial cost of construction, the building insurance cost, and the cost of insuring the building for ten (10) years. The costs are compared using the conventional wood framed system as the baseline in the "relative cost" evaluation.

| Honolulu, Hawaii - November 2022         |                              |                   |                                |                    |               |  |
|--|------------------------------|-------------------|--------------------------------|--------------------|---------------|--|
| Union Wages                              |                              |                   |                                |                    |               |  |
| Building System                          | Builders Risk Insurance Cost | Construction Cost | Property Insurance Annual Cost | Total 10 Year Cost | Relative Cost |  |
| CONVENTIONAL WOOD FRAMING                | \$ 259,233                   | \$ 34,767,765     | \$ 125,163.95                  | \$ 36,019,404.54   | 100           |  |
| LIGHT GAGE STEEL FRAMING                 | \$ 144,725                   | \$ 35,248,249     | \$ 42,297.90                   | \$ 35,671,227.99   | 99            |  |
| MASONRY & PRECAST                        | \$ 107,787                   | \$ 34,709,480     | \$ 27,767.58                   | \$ 34,987,155.84   | 97            |  |
| PRECAST CONSTRUCTION                     | \$ 126,761                   | \$ 40,819,535     | \$ 32,655.63                   | \$ 41,146,091.28   | 114           |  |
| ICF WALLS & PRECAST PLANK                | \$ 153,115                   | \$ 37,291,557     | \$ 44,749.87                   | \$ 37,739,055.68   | 105           |  |
| ICF WALLS & ICF CONCRETE FLOOR ALTERNATE | \$ 153,854                   | \$ 37,471,603     | \$ 44,965.92                   | \$ 37,921,262.24   | 105           |  |

Note: Total 10 year cost includes construction cost and 10 years of property insurance premiums

The load bearing masonry wall system with precast concrete plank floor system is the least expensive system initially, and looks even more favorable when the on-going insurance premiums are considered. This reinforces the benefits of the resilient, non-combustible, fire-resistive construction methods.

## **Study Conclusions and Recommendations**

Based on the construction cost estimates prepared by Mr. Maholtz, the cost associated with using a compartmentalized construction method utilizing a concrete based construction material was very favorable with light weight conventional wood frame construction cost and light gage steel framing construction cost. All of the concrete based construction systems were within a 17 percent increase over the light weight conventional wood frame construction system. In many cases this amount can be partially offset by the contingency budget typically recommended for the owner to carry for unanticipated expenditures during the project.

The minimal increase in construction cost can also help pay for itself over the life of the structure. Materials like concrete masonry, precast concrete, and cast-in-place concrete have many other advantages beyond their inherent fire performance including resistance to mold growth, resistance to damage from vandalism, and minimal damage caused by water and fire in the event of a fire in the building. In many cases, with this type of construction the damage outside of the fire compartment is minimal. This provides for reduced cleanup costs and quicker reoccupation of the structure.

The recognition of the advantages of non-combustible, and fire-resistive cement based construction is reinforced by the insurance industry through a large reduction in builders risk insurance rates, and a large reduction in the on-going building insurance rates paid by the building owners.

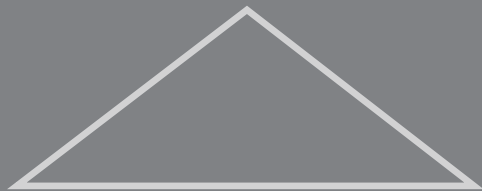
Based on the results of this study, we recommend that a similar study be undertaken to evaluate use of similar construction techniques and their associated construction cost impact on other typical building types like, schools, retail establishments, and commercial office buildings.

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COMPARTMENTATION



DETECTION

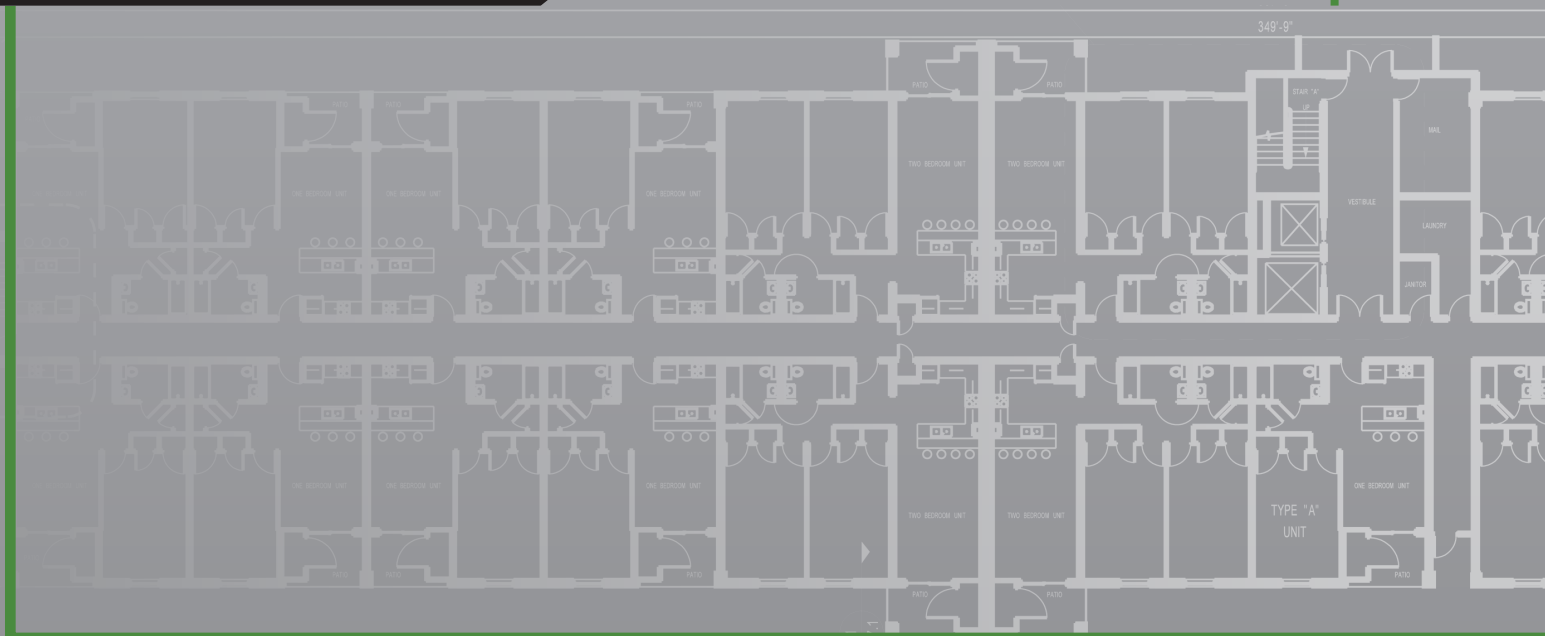
SUPPRESSION



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