STUDY

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

MULTI-RESIDENTIAL STRUCTURES

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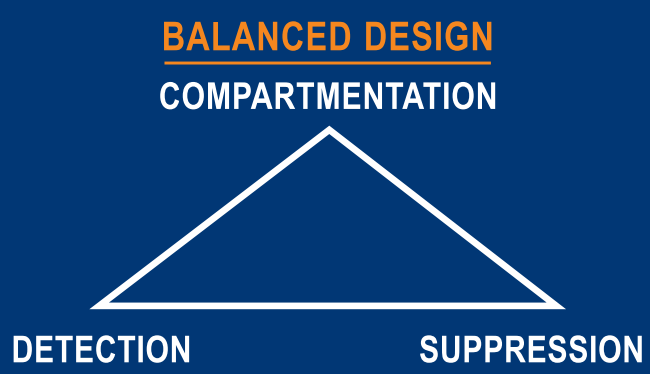
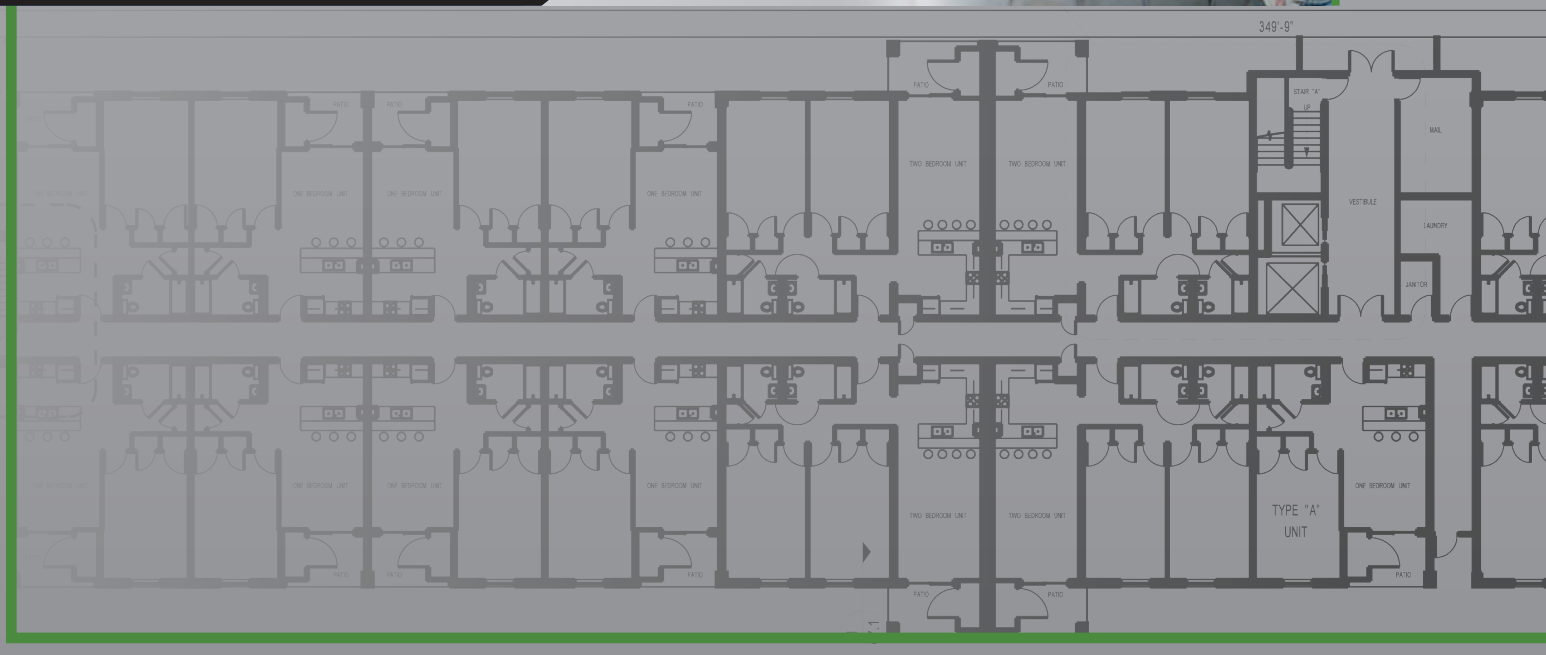




Addendum: Lehigh Valley, Pennsylvania
- October 2017 with June 2022 Insurance Update

OCTOBER 2017
Base Study

Introduction

The Lehigh Valley Area of Pennsylvania is a metropolitan area that includes the cities of Allentown, Bethlehem, and Easton in addition to numerous other smaller municipalities in Eastern Pennsylvania. For the Lehigh Valley Area, Pennsylvania cost comparison it was decided to use Federal Prevailing 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 June 2022 insurance rates.

Study Results and Discussion

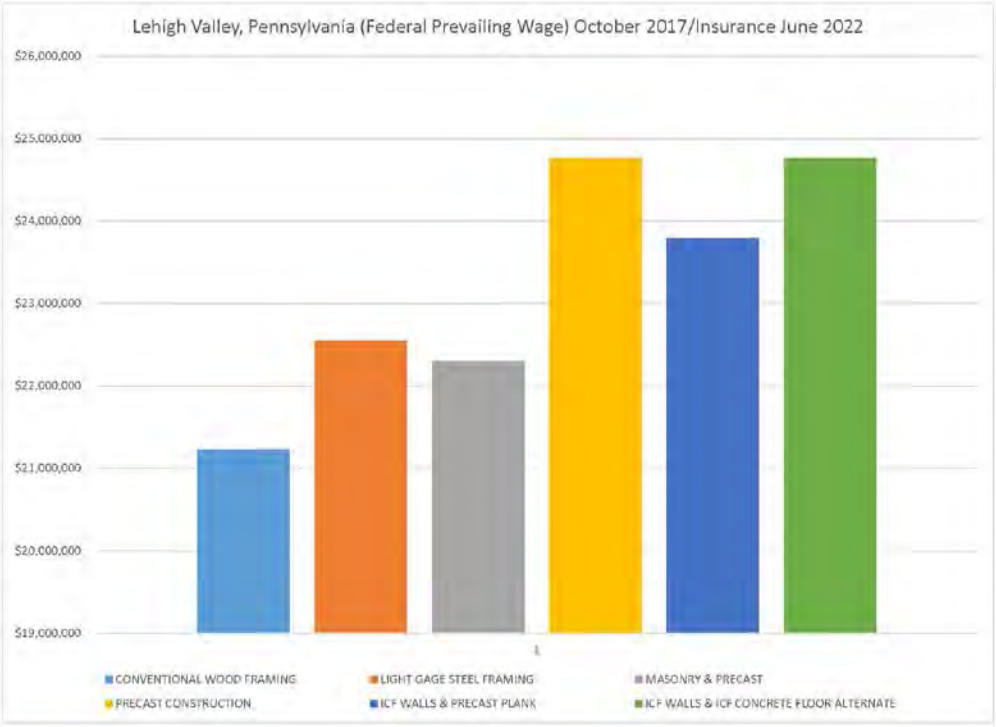
The results of the construction cost study for each geographic location are presented in the following tables. The relative cost presented is a percentage of the conventional wood frame system.

Lehigh Valley Area, Pennsylvania

Lehigh Valley, Pennsylvania - October 2017/June 2022 Insurance
Federal Prevailing Wages

Building System	Insurance Cost	Construction Cost	Cost/Sq Ft	Relative Cost
CONVENTIONAL WOOD FRAMING	$ 158,294	$ 21,230,047	$ 219.77	100
LIGHT GAGE STEEL FRAMING	$ 92,564	$ 22,544,257	$ 233.38	106
MASONRY & PRECAST	$ 69,246	$ 22,298,458	$ 230.83	105
PRECAST CONSTRUCTION	$ 76,920	$ 24,769,916	$ 256.42	117
ICF WALLS & PRECAST PLANK	$ 97,711	$ 23,797,815	$ 246.35	112
ICF WALLS & ICF CONCRETE FLOOR ALTERNATE	$ 101,691	$ 24,767,243	$ 256.39	117

The least expensive system is the conventional wood framing system. The relative cost of the most expensive framing system, the precast concrete wall system with precast concrete floor system is 17 percent higher. The load bearing masonry wall system with precast concrete plank floor system compares very favorably with both the conventional wood frame system with an increased cost of 5 percent over the conventional wood frame system. This is 1 percent lower than the light gage steel framing system, with respect to the conventional wood frame 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.

Lehigh Valley, Pennsylvania - October 2017/June 2022 Insurance Federal Prevailing Wages **Building System**	**Builders Risk Insurance Cost**	**Construction Cost**	**Property Insurance Annual Cost**	**Total 10 Year Cost**	**Relative Cost**
CONVENTIONAL WOOD FRAMING	$ 158,294	$ 21,230,047	$ 76,428.17	$ 21,994,328.69	100
LIGHT GAGE STEEL FRAMING	$ 92,564	$ 22,544,257	$ 27,053.11	$ 22,814,788.08	104
MASONRY & PRECAST	$ 69,246	$ 22,298,458	$ 17,838.77	$ 22,476,845.66	102
PRECAST CONSTRUCTION	$ 76,920	$ 24,769,916	$ 19,815.93	$ 24,968,075.33	114
ICF WALLS & PRECAST PLANK	$ 97,711	$ 23,797,815	$ 28,557.38	$ 24,083,388.78	109
ICF WALLS & ICF CONCRETE FLOOR ALTERNATE	$ 101,691	$ 24,767,243	$ 29,720.69	$ 25,064,449.92	114

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

The light wood frame system is the least expensive system initially, with a five percent premium to use the load bearing masonry wall system with precast concrete plank floor system. The cost difference between the light wood frame system and load bearing masonry wall system with precast concrete plank floor system is reduced to two percent when the on-going insurance premiums are considered over ten years. 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. Even the other 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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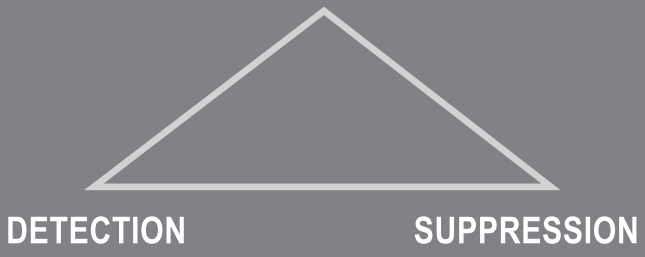

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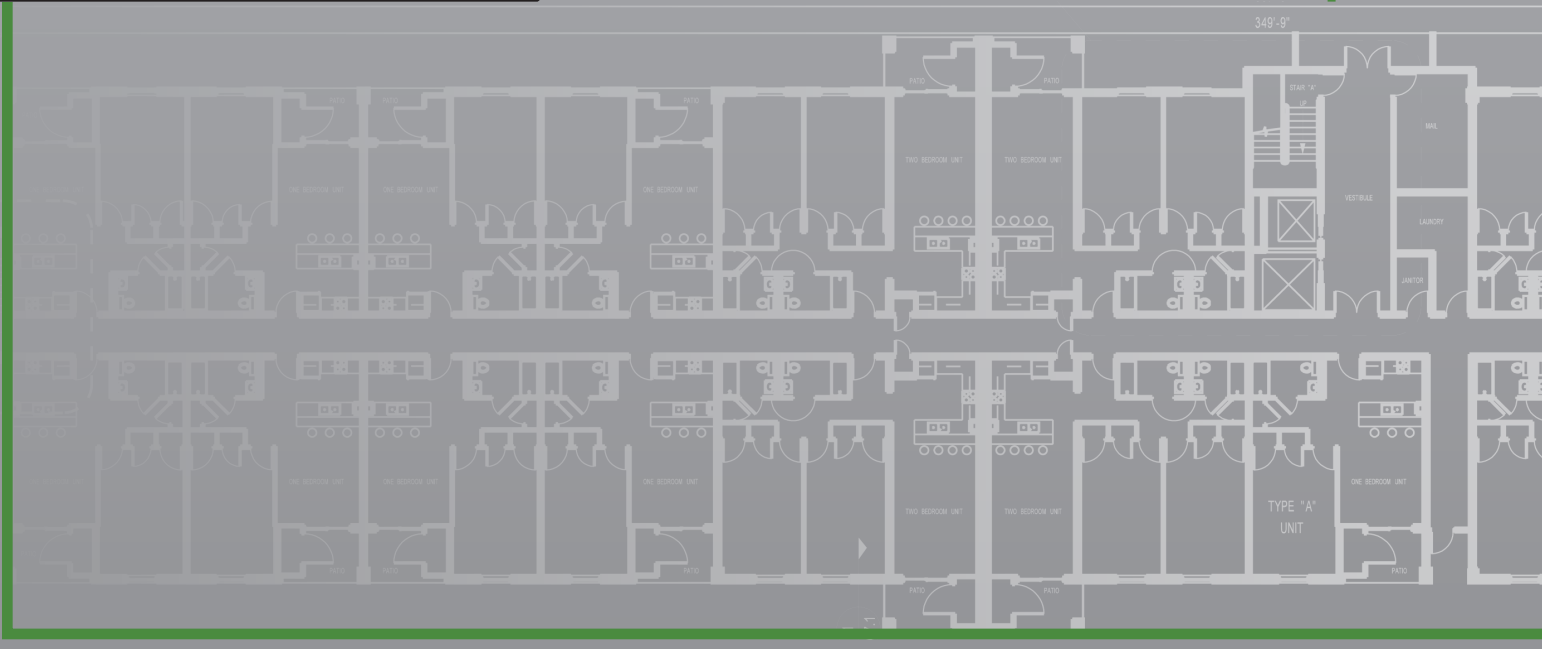

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