TIMBER FRAMING AS ONE OF THE BEST REVIVING STYLES IN MODERN CONSTRUCTIONS

DANIIL GRANKIN, student VALENTINA PRYANITSKA, Senior Teacher, English Language Adviser
O. M. Beketov National University of Urban Economy in Kharkiv

There has always been a growing interest to natural building materials as they can be perfectly used in all types of construction. Timber framing is a distinctive style of building construction in which heavy timbers frame the structure instead of more slender dimensional lumber (for example, 2 x 6-in.). Timber framing was a building practice used throughout the world until toughly 1900 when the demand for cheap, fast housing brought dimensional lumber to the construction forefront. In the 1970s, craftsman revived the timber framing tradition in the United States and have ushered the design style into the modern era.

Meticulously crafted and beautiful, timber frame homes are also versatile, energy-efficient and sturdy. But what exactly makes timber framing so unique? We cover everything you need to know about how modern design meets traditional craftsmanship in today's timber frame homes.

Timber framing and "post-and-beam" construction are traditional methods of building with heavy timbers, creating structures using squared-off and carefully fitted and joined timbers with joints secured by large wooden pegs. It is commonplace in wooden buildings through the 19th century. If the structural frame of load-bearing timber is left exposed on the exterior of the building it may be referred to as half-timbered, and in many cases the infill between timbers will be used for decorative effect. Timber framing is strong, old and so well-established that they used to just call it building. It forms the basis of a building that will last for hundreds of years.

One of the big advantages of timber-frame construction is that it is so strong it doesn't need load-bearing walls cutting through the middle of the house, so you can design the layout in any configuration you want, including a totally open great room/dining room/kitchen/entry. On the other hand, in open designs, the frame connects the volumes and brings them down to a more human scale due to the warmth of the wood and the joinery. The skeleton of timbers also can be covered any way you want, so your timber home can look like any other style of house and can fit in anywhere.

What's the Difference Between Post-And-Beam and Timber Frame Homes?

You'll often hear a timber home's structure referred to as either post-and-beam or timber framing. The difference has to do chiefly with the method used to fasten the frame's complex joinery system together. A post-and-beam home employs metal fasteners, which are either hidden behind the timbers or face the

interior. Timber framing uses only wooden pegs to secure the frame's joinery. Whether you choose post-and-beam or timber frame will determine the look and feel of your home's interior.

Benefits of Timber Framing

Beyond the aesthetics of exposed timber and open floor plans, timber structures enjoy a durability unmatched by conventionally-built homes. Timber framing also provides more structural integrity in the unfortunate event of fire damage, as the large timber supports are more resistant to burning completely through than the thinner cuts of wood that make up conventional building structures. Finally, a timber home affords the owner opportunity to make a bold design statement, as timbers come in a number of sizes, shapes and colors. A timber home can take on a casual or rustic mountain style, an ornate Victorian style, the Timber Framing Terminology , timber framing has a language of its own.

Below is a brief list of commonly-used timber frame terms to help you better understand the process.

- **Timbers** are the wooden beams that comprise the home's structural frame.
- **Posts** are the main upright timbers that comprise the timber frame.
- **Crossbeams** connect the post beams, providing stability.
- **Joints** are where two timbers or frame pieces come together. Joints can range from simple to highly decorative and include lap joints, mortise-and-tenon joints, dovetailed and pegged joints, among many others.
- **A truss** is a rigid triangle of timbers. Trusses provide column-free floor space and are typically incorporated on the top floor.
- **Hybrid** is a type of building that combines the methods of timber framing and conventional stud-frame building or, in our industry, log construction. Combining building styles can sometimes save you money and will definitely add visual interest to a home.
- **SIPs** (structural insulated panels) sheath the timber-frame structure. Made of two layers of durable, flat wood and filled with a highly dense insulating foam in between, SIPs have more or less revolutionized the timber frame building process.

SIPs: What You Need To Know

SIPs (structural insulated panels) are the most popular way to enclose a timber home. Although individual products from manufacturers vary, today's SIPs all have a solid core of insulation sandwiched between two layers of oriented strand board (OSB). Other materials used in SIPs include plywood, wafer board, sheet metal and gypsum board. The white core often is polystyrene, extruded polystyrene, Styrofoam or polyurethane — the same durable yet lightweight foams used in bicycle and motorcycle helmets and egg cartons.

Benefits of Using SIPs to Insulate a Timber Home:

- They're flexible.

SIPs can arrive at the home site in bundles of large generic panels that builders cut to fit the home's specific floor plan. Or panels can be cut exactly to the home's design at the factory by the manufacturer and then numbered for easy installation, which results in less wasted materials and resources.

- They're energy efficient.

SIPs cut heating and cooling costs by as much as 60 percent over products used for conventional "stick" construction. Even where wall thickness is the same, SIPs outperform stick framing on whole-wall energy performance by 40 to 60 percent.

- They're soundproof.

SIPs block sound like few other materials — a big perk, especially in bedrooms, dens, home offices and media rooms. For more information, visit sips.org.

Timber Frame Home Truss Styles

The kind of structural support your design requires, as well as personal preference, will determine your home's truss system. A triangle is the simplest form of truss, but its use is limited to small buildings. Adding a king post in the center allows for a wider span. Queen-post trusses, in contrast, look like a rectangle within a triangle. The dramatic hammerbeam truss is used to span large interior spaces and enables ceilings to soar.

Hammerbeam Truss

- Achieves the cathedral quality
- Creates vaulted spaces
- Can be enhanced with embellishments

King Post with Struts

- The most cost-effective
- Offers a strong, sturdy appearance
- Creates a cozy, intimate feeling

Queen Post (modified)

- Can span distances of 30 feet or more
- Offers an open area in the center of the truss
- Visually lowers the ceiling height for a more intimate feel

Scissor Truss

- Perfect for those seeking something unique
- Can create a narrow, cottage-like aesthetic
- Ideal for steep roof pitches

Taking into account everything written above, we can conclude that timber framing should be widely used in modern constructions. More and more people are becoming interested in this style all over the world. It is undoubtedly perfect style for those who want to have both sturdy and environmentally-friendly buildings.

References:

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ADAPTIVE MODEL OF ENERGY EFFICIENCY PROGRAMS MANAGEMENT AT INDUSTRIAL ENTERPRISES

ILLIA KHUDIAKOV, PhD student
MARIA SUKHONOS, Professor, Doctor of Science in Engineering, Scientific Adviser
VLADYSLAV PLIUHIN, Professor, Doctor of Science in Engineering, Scientific Adviser
OLENA ILIENKO, Associate Professor (Philology), English Language Adviser
O. M. Beketov National University of Urban Economy, Kharkiv, Ukraine

Nowadays relevance of introduction of optimizational measures at the production site increases for industrial enterprises in Ukraine. This is caused by the high energy resources cost and overall unsatisfactory state of production capacities and technological processes. Not only buildings and constructions are subject to optimization and energy renovation, but also their equipment and process chains.

Such condition of enterprises causes negative effect on the economy of Ukraine, as well as on the competitiveness of Ukrainian products on foreign markets. The main consequence of the influence of a high level of energy consumption lies in a higher cost price of domestic products on foreign markets in comparison with, for example, European products. This is caused by a more significant energy component within the cost price.

One of the ways of optimization of energy consumption for industrial enterprises is represented by implementation of energy efficiency programs. An advantage of a program is a complex approach, that is expressed by the opportunity parallel or coherent implementation of projects in:

- energy renovation of buildings and structures;
- replacement of production lines and other equipment;
- implementation of new technological chains;
- implementation of complete or partial use of renewable sources of energy in energy supply for production and other needs;
- conduction of information campaigns for employees.

Definition of the most efficient decisions within implementation of energy efficiency programs is a labor intensive and durable process with a high proximity of making wrong decisions. Optimization of this process is possible with application of the adaptive model.