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"The International Building Code & Its Impact on Wood-Frame Design & Construction" by Sam Francis & Dennis Pitts

There have been several extraordinary leaps in building code development throughout history, beginning with the issuance of the first known code, the Laws of Hammurabi (a Mesopotamian ruler from 2285-2242 B.C.).[1, 2] The second was the establishment of the first set of rudimentary codes as law (circa.1900); and the third was the first publicly developed model building codes (1924). A fourth seminal event must now be added to this list: the development of the International Building Code (IBC). For those who have not heard, the IBC has been developed by the International Codes Council (ICC) to serve as a single model building code for the entire United States.

In the fall of 1999, development of the first edition of the code, which will be known as the 2000 International Building Code, was concluded. Now that the process is complete many people, including some in the wood truss industry, wonder what it will mean to them. This article is intended to answer the question, How will the IBC impact this industry?

HEIGHT & AREA

For the wood products industry, and wood trusses in particular, changes to code-regulated allowable heights and areas will probably have the greatest impact. During the IBC development process, the Occupancy Chapters Drafting Committee made the decision to create tables of allowable building height and area which would contain all the heights and all the areas currently allowed by each of the existing model codes. While the overall benefit is significant, the specific impact is complicated by changes to definitions of various occupancy or use groups, and changes to definitions of types of construction. However, it can be generally said that the IBC contains the largest allowable area for every use group and construction type combination currently permitted by the three existing model codes.

In addition to the new tabular areas, there is an entirely new method for computing permitted increases to those areas. The formulae for calculating increases are derived from a system developed by the now-defunct CABO Board for the Coordination of the Model Codes (BCMC) in the early 1980s and will be new to every code user because none of the existing codes use this complex system. The new formulae produce slightly smaller area increases compared to BOCA's National Building Code (NBC) or SBCCI's Standard Building Code (SBC) and larger increases as compared to ICBO's Uniform Building Code (UBC). That is because the UBC allowed a sprinkler system to increase height or area but not both. The IBC, just as is permitted by the NBC and SBC, will allow both area and height to be increased in a sprinklered building. However, in all cases, the net result is an allowable area for wood buildings which is larger than or equal to the area allowed by current model code methods. Under the IBC, sprinklered buildings may contain one additional story and be increased in height twenty feet.

As noted above, providing sprinklering in a building will allow increases to both height and area. However, if not used for an increase in area, sprinklers may alternately reduce the fire resistive requirements by one hour for all construction elements except exterior.

The IBC has a large permitted height and area for most types of construction and all use groups when compared to the model codes. The most efficient means of spanning these larger building dimensions will be to utilize engineered wood products. For many applications, trusses will become the only efficient wood product and will benefit from the heights and areas permitted in the IBC.

One further note about the height and area limits on buildings: there has been a small but disturbing trend in some areas to further modify the building code by placing some type of restriction on engineered wood products, including trusses. Since no code is effective until it is adopted locally, the ICC does not inherently override these problems. The American Forest & Paper Association (AF&PA) has been working with WTCA and others to prevent the adoption of locally adopted restrictions.

WOOD DESIGN STANDARDS

The IBC will reference all three design publications from the AF&PA: The National Design Specification® for Wood Construction (NDS®) for allowable stress design (ASD), ASCE/AF&PA 16 Load and Resistance Factor Design© (LRFD), and The Wood Frame Construction Manual for High Wind for conventional construction. The NDS is the long-standing design specification cited in the model codes and has been relied upon by designers for years. LRFD is a relatively new method for designers utilizing wood. It has some economies not available to ASD design, especially in beam and column designs. Use of the LRFD approach has been shown, in some cases, to result in significant efficiencies.

Additionally, the IBC contains a more thorough, up-to-date series of wood industry standards references than has been found in the NBC, SBC or UBC.

OTHER CONSIDERATIONS

The IBC, along with its companion document the International Residential Code (IRC) which regulates the construction of one- and two-family dwellings and townhouses, will provide a number of other benefits to the wood products industry in general. These are:

- Recognition of ASCE 7-98 design provision, establishing a precedent for future revisions of wood industry technical documents.
- More detailed requirements concerning the information to be included on truss design drawings. At this point the IBC requires that truss design documents be prepared by a registered design professional. Under the IRC, however, professional design is required only when mandated by the jurisdiction.
- Conventional construction provisions for wood frame structures in all but the most active seismic areas.

- Recognition of the perforated shearwall concept.
- An increase in the allowable use of wood in noncombustible buildings compared to that which was permitted in some of the codes.
- Reasonable fire-resistive requirements for building assemblies that will continue to permit the use of wood in those assemblies.

CONCLUSION

It is clear that the IBC will be a challenge as well as an opportunity for designers, builders and building officials. In the regions where an existing code did not contain the provisions carried into the IBC, it will all be new. At the same time, the IBC will provide designers with a new, more powerful set of tools with which to work. A nationwide acceptance of the IBC will provide a distinct advantage to the various elements of the wood industry. By using a single set of codes, architects, engineers, designers and contractors will be better able to expand and market their services to broader geographical areas, rather than being limited to small regions. Manufacturers of building products will also be better able to put their efforts into research and development rather than into designing products to meet differing sets of regional standards. This, in turn, should enable manufacturers to improve their competitiveness in worldwide markets. Further, a single code will permit the industry to standardize its marketing and informational efforts rather than be forced to gear their efforts to each of three different code regions.

But note that the IBC, just like any other model code, has no effect until it is adopted by a jurisdiction. Many states and local jurisdictions are approaching this cautiously. However, New York, which has labored under its own home-grown building code since 1984, has begun the adoption process. Wisconsin has just completed its own state code review and has revised its code to contain IBC provisions. Rhode Island, Connecticut and Virginia are preparing for the adoption process.Cities like Chicago are reviewing their own codes for possible IBC adoption. So the honeymoon adjustment period may be short. This is an idea whose time has apparently come. It promises new potential for designers and builders alike.

[1]Oldest Code of Laws in the World, Translated by S. H. W. Johns, M.A.; T & T Clark, 38 George Street, Edinburgh. 1903.
[2]The laws also provided fixed fees for design and construction, among other things.

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SBC HOME PAGE

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