



Potential Growth of Wood Products Use in Low-Rise Nonresidential Buildings

Today, concrete and steel are the predominant nonresidential building framing types. However, great potential exists for expanding the use of wood building products into nonresidential building. Currently, only 8% of total constructed nonresidential area is wood.

The use of solid-wood products in new and in additions to low-rise nonresidential buildings could increase more than two to four times current consumption levels if all buildings eligible to use wood actually used it. In 2003, estimated wood products consumption for new nonresidential construction was

- Lumber 1.1 billion board feet
- Structural panels 1.8 billion square feet, 3/8-inch basis
- Engineered wood 0.2 billion board feet equivalent
- Total 2.2 billion board feet equivalent

Since 1995, wood-framed construction has made modest gains when compared with concrete and steel construction. However, only about 20% of low-rise nonresidential buildings are currently wood framed.

We used two methods to estimate the potential for wood in nonresidential building construction. These methods are the Maximum Potential Wood Use Scenario and the International Building Code Scenario, which are explained in the following.

Maximum Potential Wood Use Scenario

The maximum potential wood use for buildings that are not principally wood was estimated by applying wood usage rates (amount of wood used per square foot of floor area) from buildings that were principally wood. This assumes that the replacement of nonwood by wood building materials would not exceed current wood usage rates for applications that are principally built from wood.

Under this scenario, all low-rise nonresidential buildings with concrete and/or steel upper story floors, exterior and interior walls, roofs, and exterior siding are built principally with wood at current wood usage rates.

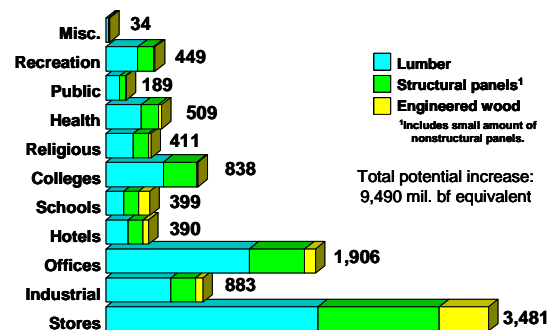


Figure 1.-Potential increase in wood products use, 2003.

As shown in Figure 1, the following lists the resulting incremental increases in wood products consumption:

- Lumber 5.7 billion board feet
- Structural panels¹ 2.9 billion board feet equivalent (5.8 billion square feet, 3/8-in. basis)
- Engineered wood 0.8 billion board feet equivalent
- Total 9.5 billion board feet equivalent

¹Includes small amount of nonstructural panels.

Excluded from these estimates are foundations and ground level floors, which are unlikely to ever convert from concrete to wood. The total increase would be equivalent to nearly 9.5 billion board feet of wood products.

Roofs hold the greatest potential for incremental increases, with the South having the greatest regional potential, and large buildings the greatest size class potential. Overall, the potential increase in wood products use varied considerably by wood product and building type. In general, stores, office buildings, and colleges had the highest potential for nearly all wood products (Fig. 1).

International Building Code Scenario

U.S. building codes place limits on the use of wood framing according to area, height, and intended usage (“occupancy”) of a building. Another way to estimate growth potential for wood is by using a code-limits approach. Potential increase in wood usage is estimated for only those buildings allowed by code to be wood-framed. This analysis used the International Building Code (IBC), because it is the dominant model code currently in place in the United States.

The IBC defines area and height limits for each building code occupancy and for various types of structural assemblies that are defined by the code in terms of fire protection. However, area and height limits can be substantially increased through the addition of automatic fire protection sprinklers, use of firewalls to subdivide large buildings, and provision for substantial frontage to the building to enable easy firefighting access. The most aggressive assumptions were made here regarding sprinklers, use of fire-rated assemblies, and building frontages in order to capture the maximum code-allowable gain for wood. The estimate includes buildings that would be permitted to use wood in all assemblies and buildings that could only use wood in some assemblies, such as roofs.

Recent widespread adoption of the IBC allows more buildings to be framed in wood because the area and height allowances are typically greater in the IBC than in the previous three U.S. model building codes. Almost 64% of the total constructed nonresidential value could have been framed in wood in 2003, compared with just 50% in 1995 using a similar method but under previous U.S. codes. As shown in Figure 2, the following lists the resulting incremental increases in wood products consumption:

- Lumber 3.2 billion board feet
- Structural panels 3.3 billion square feet
- Total¹ 4.9 billion board feet equivalent

¹Lumber and structural panels only; does not include nonstructural panels or engineered wood.

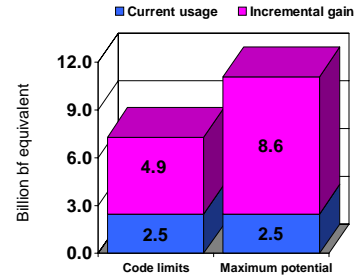


Figure 2.-Current and potential combined lumber and structural panel use, 2003.

In Summary

A large unfulfilled potential exists that can greatly increase wood products consumption in new and major additions to low-rise nonresidential buildings (Fig. 2). These gains can be substantial and range from nearly a threefold overall increase under the maximum potential wood use scenario to almost a twofold increase under the International Building Code scenario.

Wood must remain and become even more competitive in order to maintain and increase its share of the nonresidential building market. A series of technical and educational marketing efforts would encourage the construction community to choose wood over steel and concrete.

References

McKeever, David B.; Adair, Craig; O’Connor, Jennifer. 2006. *Wood products used in the construction of low-rise nonresidential buildings in the United States, 2003*. APA—The Engineered Wood Association, Tacoma, WA. 68 p.

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