

Wood & Other Materials Used to Construct Nonresidential Buildings

CANADA

2012



A Cooperative Study Sponsored by Industry and Government

About the cover:

Victoria Air Terminal

Victoria, British Columbia, Canada

Architect: Moore Paterson Architects, Victoria, BC

Contractor: Durwest Construction Management

Engineer: Hirschfield Williams Timmins Ltd.

Completed:2005

Wood and Other Materials Used to Construct Nonresidential Buildings in CANADA 2012

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ABSTRACT

Low-rise nonresidential building construction is an important market in Canada for lumber, engineered wood products, structural wood panels, and nonstructural wood panels. This report examines wood products consumption in 2012 for construction of selected low-rise nonresidential buildings types that have six or fewer stories. Buildings with more than six stories are typically severely restricted by building code from being wood framed.

In 2012, the construction value of the selected low-rise nonresidential buildings exceeded \$25.3 billion. This includes the value of new construction, of major additions to existing buildings, and for alterations, renovations, and remodeling to existing buildings. This level of construction required 215 million board feet (bf) of lumber, and 59 million board feet equivalents (bfe) of engineered wood (11 million linear feet (lf) of wood I-joists, 15 million bf of glulam timber, more than 1 million cubic feet (ft³) of structural composite lumber, nearly 16 million square feet, 3/8-in. basis (ft²), of engineered rim boards, and lesser amounts of cross-laminated timber). Also consumed was 238 million ft² of structural panels and 2 million ft² of nonstructural panels. When converted to board feet equivalents, total wood products consumption was estimated to be 393 million bfe. If concrete and steel-framed buildings that met building code requirements for wood framing had been built with wood, an overall 2.7-fold increase in total wood use would have resulted.

New construction and major additions added a total of 124 million ft² of new floor area in 2012. This floor area required 133 of the 215 million bf of lumber, 35 million of the 59 million bfe of the engineered wood, and 153 million of the 240 million bfe of wood panels. Alterations, renovations, and remodeling accounted for the remaining amounts.

Volume estimates include allowances for onsite waste and loss. Not included are amounts of wood used for facilitation (temporary uses such as concrete forms, shoring, etc.), millwork, and other interior finishing, and outdoor structures. Farm construction, engineering construction (such as bridges, dams, and highways), and other miscellaneous nonresidential buildings were not included in this study.

Keywords: Nonresidential construction, wood products consumption, value of new construction, lumber, structural panels, nonstructural panels, engineered wood products, wood I-joists, glulam timber, structural composite lumber, engineered rim boards, cross-laminated timber.

EXECUTIVE SUMMARY

Nonresidential construction in general, and the construction of low-rise nonresidential buildings (buildings with six or fewer stories above ground level) in particular, is an important market for lumber, engineered wood products, and structural and nonstructural wood panels, as well as a promising market for newly emerging wood products and construction techniques such as cross-laminated timber construction.

Annual consumption of wood products is dependent on many factors, including the number, types, and geographical locations of new buildings started, building size and height, architectural characteristics, and principal framing type. The extent of alterations, renovations, and remodeling to existing buildings also affects wood products consumption. This study evaluated for the first time nationwide the use of wood building products to construct new and major additions to low-rise nonresidential buildings in Canada and the use of wood products in alterations, renovations, and remodeling projects. The potential for increasing the use of wood building products was also evaluated. Buildings that were not constructed with wood, but met all International Building Code requirements for wood, were converted to wood based on typical wood construction practices. Potential estimates are applicable only to new and additions construction.

Results of this study are reported by construction type (New & Additions vs. Alterations, Renovations, & Remodeling), building type (Industrial, Commercial, Institutional), province or province group (Atlantic Provinces, Quebec, Ontario, British Columbia, Prairie Provinces), construction application type (Framing, Siding, Soffit, Fascia, Exterior Trim, Sheathing & Underlayment),

finishing application type (Finished Flooring, Interior Wall & Ceiling Coverings, Interior Trim & Mouldings, Cabinetry Built Onsite, Built In Furniture, Windows & Doors, Wood Shutters), and wood product. Wood potentials are reported for floors, walls, roofs, and exterior cladding in the new and major additions construction type.

Capital Construction Expenditures

In 2012, all construction in Canada was valued at nearly \$261 billion (Canadian \$) (Figure ES-1) (Statistics Canada 2014a–c). Residential construction and nonresidential engineering construction were nearly equally divided at 39% and 42%, respectively. Nonresidential buildings made up the remaining 19%, or about \$49.6 billion. Total capital expenditures for construction, measured in constant 2007 dollars (Statistics Canada 2014d), were relatively stable during the 2007–2013 period (Figure ES-2). Nonresidential buildings maintained market share over the period, averaging \$41 billion, or about 19% of total construction over the 7-year period.

Figure ES-1 Capital construction expenditures in Canada, by type, 2012.

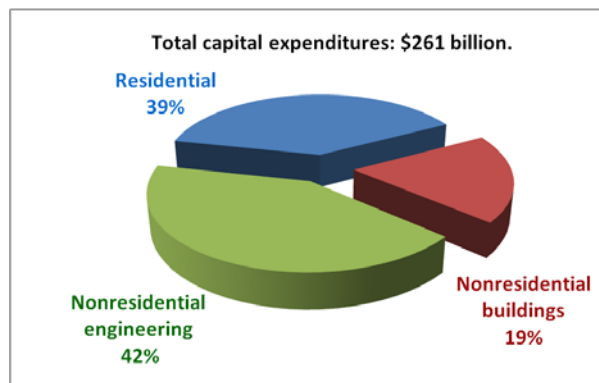
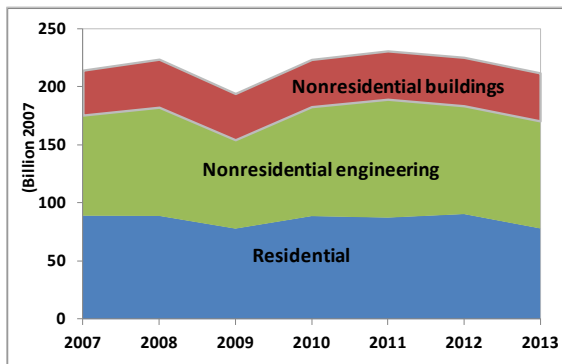


Figure ES-2 Capital construction expenditures in Canada, by type, 2007-2013.



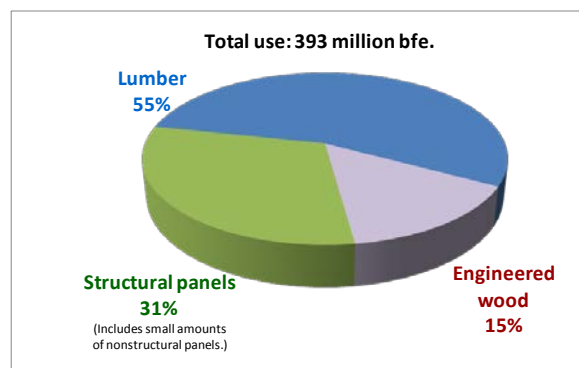
Low-Rise Construction Value and Floor Area

Construction value is a component of capital construction expenditure. Construction value includes only actual costs incurred during the construction process and includes profit and overhead for the construction firm. For this reason, construction value and capital construction expenditures are not strictly comparable. The construction of all low-rise nonresidential buildings included in this study was valued at \$25.3 billion (Table ES-1, page 10). More than half (57%) of all construction value was for commercial buildings (\$14.3 billion), followed by institutional/government and industrial. Construction value is divided between new and major additions construction and alterations, renovations, and remodeling of existing structures. New and major additions construction results in the creation of new floor area; alterations, renovations, and remodeling creates no new floor area. On average, the creation of new floor area accounted for 71% of all construction value, about \$18.1 billion. In each building type, addition of new floor area accounted for nearly two-thirds or more of total construction value.

Wood Products Consumption

In 2012, construction of new and major additions to low-rise nonresidential buildings and alterations, renovations, and remodeling of existing buildings required 215 million board feet (bf) of lumber, 59 million board feet equivalents (bfe) of engineered wood products, 238 million square feet, 3/8-in. basis (ft²), of structural panels, and 2 million ft² of nonstructural panels (Table ES-1, page 10; Figure ES-3). Engineered wood includes 11 million linear feet (lf) of wood I-joists, 15 million bf of glulam timber, 1 million cubic feet (ft³) of structural composite lumber (SCL), nearly 1 million ft² of rim boards, and small amounts of cross-laminated timber. When converted to board feet equivalents, a combined 393 million bfe of wood was consumed for low-rise nonresidential construction in 2012. Included in this figure are framing, columns, siding, soffit, fascia, exterior trim, sheathing, underlayment, and allowances for onsite waste and loss. Less than 2% of the 393 million bfe was for exterior cladding (siding, soffit, fascia, exterior trim). Not included are amounts of wood used principally for interior finishing, outdoor structures, and for facilitation (temporary uses such as concrete forms, shoring, etc.).

Figure ES-3 Wood products used for low-rise nonresidential construction in Canada, 2012.



Quebec was the top overall wood-using province in 2012 at 123 million bfe (Table ES-2, page 10). It used more lumber, engineered wood, and nonstructural panels than any other province. Ontario was second highest at 118 million bfe and was the top structural panel user at 77 million ft², 5 million ft² greater than Quebec. The Prairie Provinces were third highest at 101 million bfe. British Columbia and the Atlantic Provinces were distant fourth and fifth places at 42 and 10 million bfe, respectively.

Wood products consumption is dependent not only on overall extent of construction, but also on types of buildings being constructed. Commercial buildings were by the far the largest wood-using building type, accounting for 233 million bfe of the 393 million bfe of total consumption (59%) (Table ES-2, page 10). Industrial buildings were consistently the building type with the lowest total wood consumption.

Potential Wood Products Consumption

Great potential exists for increasing the amounts of wood products used for low-rise nonresidential building construction. Potential is the incremental (additional) amounts of wood that could be used if all major building applications (framing, columns, siding, soffit, fascia, exterior trim, sheathing, and underlayment) in concrete or steel-framed buildings were built entirely with wood and if all major building applications in wood-framed buildings that were not wood were converted to wood. However, not all buildings and applications can be built from wood. To qualify, specific characteristics of the building must meet building code standards for allowable wood construction. The International Building Code was used in this

study to filter out those buildings that could not be converted to wood. Potential applies only to new construction and major additions. Alterations and renovations are typically too varied and not so dependent on building codes as new construction to reliably estimate incremental potential. Wall-framing type is a key determinant of wood potential.

In 2012, an estimated 9% of all nonresidential low-rise buildings were categorized as wood framed, based on principal exterior wall-framing material (Figure ES-4). These buildings accounted for 11 million ft² of floor area. If all buildings that qualified for wood construction were in fact built with wood, an additional 69 million ft² of floor area would have been constructed with wood. This additional floor area would have resulted in the use of an additional 1,056 million bfe of wood products (Table ES-3, page 11). This potential consisted of 649 million bf of lumber, 157 million bfe of engineered wood, 490 million ft² of structural panels, and 10 million ft² of nonstructural panels. The combined additional volumes represent a 2.7-fold increase in wood use. If all incremental potential had been achieved, total consumption would have increased from 393 million bfe to 1,449 million bfe (Figure ES-5, page 9).

Figure ES-4 New and major addition floor area in Canada, by framing type and wood potential, 2012.

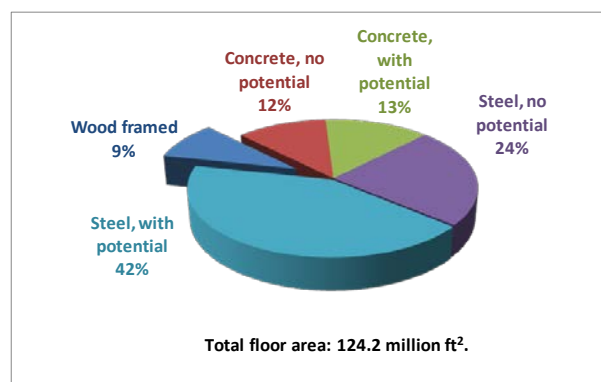
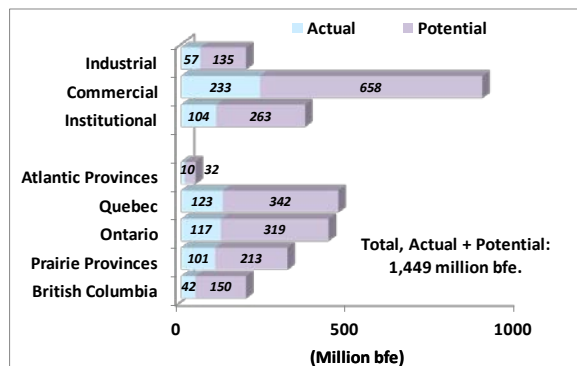


Figure ES-5 Actual plus potential wood use for new and additions to nonresidential buildings in Canada, by building type and province, 2012.



Provincial potential wood use closely follows provincial actual wood use. Quebec led all provinces in commercial buildings in potential wood use of each wood product except structural panels (Table ES-3, page 11). Nearly one-third of all potential wood use (342 million bfe) was in Quebec province. Ontario was second with 319 million bfe of potential, followed by the Prairie Provinces at 213 million bfe and British Columbia and the Atlantic Provinces at 150 and 32 million bfe, respectively.

Commercial buildings, which had more wood potential than all other building types combined, had the potential to increase wood use by nearly 658 million bfe, 62% of all wood potential (Table ES-3, page 11). More lumber and structural panels were potentially usable for commercial buildings, whereas more engineered wood and nonstructural panels were usable for institutional buildings.

Summary and Conclusions

Nonresidential building construction is an important market for wood products, but one that should not be taken for granted. Nonwood building products are continually challenging wood in many nonresidential building applica-

tions. At the same time, new wood products and innovative building practices are potential means to increase the use of wood. The acceptance by code officials and consumers of cross-laminated timber building systems, for example, could substantially increase wood use in the future.

In 2012, commercial buildings far exceeded all other building types in total wood products use, accounting for 59% of total consumption. Lumber and engineered wood for commercial buildings comprised more than one-half of total lumber consumption, whereas commercial buildings accounted for two-thirds of total structural panel consumption. Negligible amounts of nonstructural panels were found. Industrial buildings used the least amounts of wood products; institutional buildings, intermediate amounts.

Quebec and Ontario used more wood products than all other provinces combined. Prairie provinces were third, followed by British Columbia and the Atlantic Provinces

A large unfulfilled potential exists to greatly increase wood products consumption in nonresidential construction. Although the strategies needed to fill this potential were not a part of this study, the data here may provide clues and approaches for the wood products industry as it plans for the future. One such approach would be the development of new wood-based products that are competitive in performance and value to concrete and steel, thereby creating an advantage for wood. Wood products must become even more competitive in order to maintain and increase their share of the low-rise nonresidential building market.

Table ES-1.-Construction value, and lumber, engineered wood, and wood panels used in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type, and geographical area	Construction Value		Lumber, Engineered Wood, and Wood Panels														
	Total <i>Mil. \$</i>	Percent new & additions %	Lumber & Engineered Wood								Wood Panels						
			Lumber ¹ <i>Th. bf</i>	Engineered wood					TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total		TOTAL <i>Th. bfe</i>	
				I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th.cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>		Total ⁵ <i>Th. bfe</i>	Softwood Plywood <i>Th. ft²</i>	OSB <i>Th.ft²</i>		Total <i>Th. ft²</i>	Th. ft²		Th. bfe ⁷
BUILDING TYPE																	
Industrial	4.0	81%	35,396	2,429	1,239	170	117	7	8,978	44,375	24,532	0	24,532	0	24,532	12,266	56,641
Commercial	14.3	72%	120,338	6,437	7,380	676	326	22	31,573	151,911	154,055	8,504	162,559	0	162,559	81,280	233,191
Institutional	7.0	64%	58,782	2,187	6,349	450	143	13	18,210	76,991	46,379	4,898	51,277	1,829	53,106	26,553	103,544
All Buildings	25.3	71%	214,516	11,053	14,968	1,296	586	41	58,761	273,277	224,966	13,403	238,368	1,829	240,197	120,099	393,376
PROVINCE																	
East Canada	14.1	75%	136,380	6,481	10,933	843	350	24	37,938	174,318	141,615	9,644	151,260	1,638	152,898	76,449	250,767
Atlantic Provinces	0.6	56%	5,884	226	1,012	55	18	0	2,354	8,238	3,870	223	4,094	294	4,387	2,194	10,432
Quebec	4.6	79%	67,933	3,085	6,218	410	200	24	19,426	87,360	67,539	3,034	70,573	806	71,379	35,690	123,049
Ontario	8.9	75%	62,563	3,170	3,703	378	132	0	16,157	78,720	70,206	6,387	76,593	538	77,131	38,565	117,286
West Canada	11.2	66%	78,136	4,572	4,036	453	236	17	20,823	98,959	83,350	3,758	87,109	191	87,300	43,650	142,609
Prairie Provinces	5.8	64%	55,533	3,319	2,901	324	138	0	14,790	70,323	57,486	2,895	60,381	101	60,482	30,241	100,564
British Columbia	5.4	68%	22,603	1,254	1,134	129	98	17	6,034	28,636	25,865	863	26,728	90	26,818	13,409	42,045
Canada	25.3	71%	214,516	11,053	14,968	1,296	586	41	58,761	273,277	224,966	13,403	238,368	1,829	240,197	120,099	393,376

¹Includes framing lumber, boards, wood trusses, and shakes, shingles and siding.

²Structural Composite Lumber (SCL) includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent of engineered wood (1 lf I-joist = 2 BF equivalents; 1 ft³ SCL and CLT = 16 BF equivalents, 1 ft², 3/8" basis = 0.5 BF equivalent).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 BF equivalents.

Table ES-2.-Lumber, engineered wood, and wood panels used in low-rise nonresidential building construction, by building type and geography, ranked high to low, Canada 2012

Rank	Lumber ¹		Engineered Wood ²		Structural Panels ³		Non-Structural Panels ⁴		All Wood Products ⁵	
	Building Type	Th. bf	Building Type	Th. bfe	Building Type	Th. ft ²	Building Type	Th. ft ²	Building Type	Th. bfe
1	Commercial	120,338	Commercial	31,573	Commercial	162,559	Institutional	1,829	Commercial	233,191
2	Institutional	58,782	Institutional	18,210	Institutional	51,277	Commercial	0	Institutional	103,544
3	Industrial	35,396	Industrial	8,978	Industrial	24,532	Industrial	0	Industrial	56,641
	All Buildings	214,516	All Buildings	58,761	All Buildings	238,368	All Buildings	1,829	All Buildings	393,376
Rank	Region	Th. bf	Region	Th. bfe	Region	Th. ft ²	Region	Th. ft ²	Region	Th. bfe
1	East Canada	136,380	East Canada	37,938	East Canada	151,260	East Canada	1,638	East Canada	250,767
2	West Canada	78,136	West Canada	20,823	West Canada	87,109	West Canada	191	West Canada	142,609
	All Regions	214,516	All Regions	58,761	All Regions	238,368	All Regions	1,829	All Regions	393,376
Rank	Province	Th. bf	Province	Th. bfe	Province	Th. ft ²	Province	Th. ft ²	Province	Th. bfe
1	Quebec	67,933	Quebec	19,426	Ontario	76,593	Quebec	806	Quebec	123,049
2	Ontario	62,563	Ontario	16,157	Quebec	70,573	Ontario	538	Ontario	117,286
3	Prairie Provinces	55,533	Prairie Provinces	14,790	Prairie Provinces	60,381	Atlantic Provinces	294	Prairie Provinces	100,564
4	British Columbia	22,603	British Columbia	6,034	British Columbia	26,728	Prairie Provinces	101	British Columbia	42,045
5	Atlantic Provinces	5,884	Atlantic Provinces	2,354	Atlantic Provinces	4,094	British Columbia	90	Atlantic Provinces	10,432
	All Provinces	214,516	All Provinces	58,761	All Provinces	238,368	All Provinces	1,829	All Provinces	393,376

¹Includes framing lumber, boards, wood trusses, and shakes, shingles and siding.

²Includes I-joists, glulam, structural composite lumber, engineered rim boards, and cross laminated timber.

³Includes softwood plywood and OSB.

⁴Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁵Includes lumber, and board foot equivalent of engineered wood and wood panels. See Table ES-1 for conversion factors.

Table ES-3.-Net potential change¹ in lumber, engineered wood, and wood panel volume in low-rise nonresidential building construction, by building type and geography, ranked high to low, Canada 2012

Rank	Lumber ²		Engineered Wood ³		Structural Panels ⁴		Non-Structural Panels ⁵		All Wood Products ⁶	
	<i>Building Type</i>	<i>Th. bf</i>	<i>Building Type</i>	<i>Th. bfe</i>	<i>Building Type</i>	<i>Th. ft²</i>	<i>Building Type</i>	<i>Th. ft²</i>	<i>Building Type</i>	<i>Th. bfe</i>
1	Commercial	404,183	Institutional	85,095	Commercial	388,453	Institutional	10,078	Commercial	657,515
2	Institutional	138,834	Commercial	59,105	Institutional	68,013	Industrial	0	Institutional	262,974
3	Industrial	105,808	Industrial	12,836	Industrial	33,062	Commercial	0	Industrial	135,175
	All Buildings	648,825	All Buildings	157,036	All Buildings	489,528	All Buildings	10,078	All Buildings	1,055,664
Rank	<i>Region</i>	<i>Th. bf</i>	<i>Region</i>	<i>Th. bfe</i>	<i>Region</i>	<i>Th. ft²</i>	<i>Region</i>	<i>Th. ft²</i>	<i>Region</i>	<i>Th. bfe</i>
1	East Canada	412,755	East Canada	109,387	East Canada	331,775	East Canada	8,655	East Canada	692,357
2	West Canada	236,070	West Canada	47,649	West Canada	157,752	West Canada	1,424	West Canada	363,307
	All Regions	648,825	All Regions	157,036	All Regions	489,528	All Regions	10,078	All Regions	1,055,664
Rank	<i>Province</i>	<i>Th. bf</i>	<i>Province</i>	<i>Th. bfe</i>	<i>Province</i>	<i>Th. ft²</i>	<i>Province</i>	<i>Th. ft²</i>	<i>Province</i>	<i>Th. bfe</i>
1	Quebec	210,253	Quebec	52,689	Ontario	170,321	Quebec	3,865	Quebec	341,864
2	Ontario	187,356	Ontario	44,518	Quebec	153,978	Ontario	3,049	Ontario	318,559
3	Prairie Provinces	140,926	Prairie Provinces	25,960	Prairie Provinces	92,426	Atlantic Provinces	1,740	Prairie Provinces	213,438
4	British Columbia	95,144	British Columbia	21,689	British Columbia	65,327	British Columbia	745	British Columbia	149,868
5	Atlantic Provinces	15,147	Atlantic Provinces	12,180	Atlantic Provinces	7,476	Prairie Provinces	678	Atlantic Provinces	31,934
	All Provinces	648,825	All Provinces	157,036	All Provinces	489,528	All Provinces	10,078	All Provinces	1,055,664

¹New construction and major additions only.

²Includes framing lumber, boards, wood trusses, and shakes, shingles and siding.

³Includes I-joists, glulam, structural composite lumber, engineered rim boards, and cross-laminated timber.

⁴Includes softwood plywood and OSB.

⁵Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁶Includes lumber, and board foot equivalent of engineered wood and wood panels. See Table ES-1 for conversion factors.

ACKNOWLEDGMENT

This study marks the last multi-client project managed by Craig Adair, recently retired APA Market Research Director. In the 24 years of Craig's career at APA, he managed and coordinated 15 different major market research studies valued at more than \$1.7 million. Like this one, each was funded by several different organizations—all with different needs and expectations. The fact that Craig was asked again and again to coordinate these studies on behalf of disparate industry organizations and government agencies speaks not only to his extraordinary juggling skills, but also to his ability to deliver a valuable product time and again.

All of us who have used these studies over the years to develop business plans, marketing strategies, and product analyses owe Mr. Craig Adair a large debt of gratitude.

Dennis Hardman, APA President, retired

Wood and Other Materials Used to Construct Nonresidential Buildings in CANADA 2012

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INTRODUCTION

The construction of low-rise nonresidential buildings (buildings with six or fewer stories above ground level) is an important market for lumber, engineered wood products, and structural and nonstructural wood panels, and a promising market for newly developed wood products such as cross-laminated timber. Annual consumption of wood products is dependent on many factors, including number, types, and geographical locations of new buildings, building size and height, architectural characteristics, and principal framing type. The extent of alterations, renovations, and remodeling to existing buildings also affects wood products consumption. In the past, low-rise nonresidential buildings were defined to be buildings with four or fewer stories.

Over time, new and improved wood products coupled with new design and building techniques have enhanced the value of wood use in new nonresidential buildings. A re-evaluation of the International Building Code suggests that a sizeable number of buildings with five or six stories could readily be constructed of wood with minor design changes. This study is the first comprehensive study to evaluate the use of wood products to construct low-rise nonresiden-

tial buildings of six or fewer stories in Canada and to estimate the potential market for wood were it to replace concrete and steel-framed buildings based on building code requirements.

This study is the companion to a similar study conducted for the United States in 2011. The basic methodology for the two studies is the same and can be found in Adair et al. (2013). A major difference between the two studies is that the Canadian study uses the Statistics Canada construction classification system (see Appendix B—Definitions for details). Nonresidential construction is classified as being either buildings or engineering projects. Engineering projects (dams, bridges, power plants, etc.) were not included in this study. Buildings projects were further classified as being industrial buildings, commercial buildings, or institutional & government buildings. These three building categories, modified to include only building types of interest, are used throughout this report. To maintain consistency with the U.S. study, data for Canada based on building types used in the U.S. study are available in electronic format.

Two types of data were assembled for this study: 1) data directly related to constructing the building (uses included are framing, columns, siding, soffits, fascia, exterior trim, and sheathing

& underlayment) and 2) data for other, primarily finishing, uses (uses included are finish flooring, interior wall and ceiling finish, interior trim and mouldings, cabinetry, built-in furniture, windows & doors, and shutters). This report deals primarily with the evaluation of how nonresidential buildings were constructed. For completeness, finishing uses are covered briefly at the end of this report, with detailed data provided in Appendix A—Tables.

DATA AND METHODOLOGY

This study is based on information on nonresidential buildings contained in the Reed Construction Data Inc. (RCD) Nonresidential Projects database. The RCD database is designed to track building types, sizes, costs, geographic locations, and other general building specifications and is considered by analysts and others interested in nonresidential building construction to be the principal source of information for Canada. Overall, RCD estimates that their database accounted for approximately 47% of all nonresidential buildings constructed in Canada in 2012. The tabulation to the right shows multipliers used to adjust raw RCD floor area and construction values to national levels based on the original 10 building types, which were subsequently reduced to 3 building types.

In some instances, the level of detail required by the study was not available from the RCD database. In those instances, data were estimated from ancillary sources, including official government publications, related research reports, and the much larger RCD U.S. database.

BUILDING TYPE	MULTIPLIER
Stores	3.3
Industrial	4.4
Offices	2.9
Hotels	2.7
Academic	1.1
Religious	2.5
Health	1.3
Public	1.1
Recreation	1.4
Misc.	2.2

The U.S. database was used primarily to provide information on materials use per square foot of finished floor area because use per square foot of finished floor area data specific to Canada were not available. Occasionally, if provincial data other than materials use per square foot of finished floor area were not available or usable, national estimates were reported.

Construction Value and Floor Area

Of the nearly 6,000 projects added to the RCD database for 2012, the majority were either new nonresidential buildings, additions to existing nonresidential building, or renovation specifications to existing buildings. The project team developed programming to query the RCD Projects database for the year 2012 to obtain incidence rates of materials types and specifications for each building assembly for each of the 10 building types (which were subsequently combined into 3 building types), and grouped geographically into five Canadian province groupings: Atlantic Provinces, Quebec, Ontario, Prairie Provinces, and British Columbia. Projects were restricted to those with six or fewer stories. Because the database does not contain the full universe of building projects, aggregated data for some provinces and building types were missing, not realistic, or not consistent. The Atlantic Provinces and Quebec were particularly suspect. Quebec, which has roughly 23% of Canada's population, accounted for just 7% of the nonresidential construction activity in 2012. Further analysis of the data revealed that there was no recorded construction of hotels/motels in Quebec and the province accounted for just 6% of new store construction. Researchers and others familiar with Canadian nonresidential data, including the Canadian Chief Economist at Reed Construction Data,

Inc., stated that the reliability of data for Quebec on a year-to-year basis could be suspect.

A conference call with RCD in fact confirmed issues with some of the data and indicated that they reflect issues in the RCD Projects database itself. It was decided to use a “normalized” year approach to compensate for these data. The normalized year estimates were essentially six-year averages (2007–2012) excluding years with bad or missing data. In provinces where data were not suspect, normalized year estimates were very close to actual estimates. In provinces where data were suspect, normalized year estimates provided a means to compensate for the erroneous data. For example, new floor area in Quebec prior to normalization was 14% of that for Ontario, but after normalization Quebec was 57% that of Ontario. In comparison, Quebec’s population is 60% that of Ontario.

Overall, both researchers and sponsors felt that construction value and floor area data provided by RCD from the RCD Projects Database, and adjusted using the normalized year approach, adequately described new nonresidential construction in Canada in 2012 and were the best available data for this study.

Wood Products Use

Each year, the engineering staff at RS Means obtains detailed specifications from a statistically representative sample of more than 10,000 new nonresidential building projects across Canada and the United States where new area is added, categorizing materials by CSI MasterFormat™.

The representativeness of the sample ensures that the averages are reflective of all new

nonresidential projects for the geographic areas and time period. Only building projects six stories or fewer were included in the database.

Where existing specifications are considered inadequate for a representative sample (due to minimum sample size for uncommon building types or small geographic areas), the engineering staff of RS Means used existing expertise and cost models to validate select projects to increase the sample size.

Creation of Detailed Project Database and Preliminary Tabulations

RS Means has developed and maintains a data modeling process using project details and specification text queries, manual quantity takeoffs (QTOs), and a SAS software platform that accurately converts these inputs into detailed materials usage data. Funding levels for this study prohibited the manual creation of QTOs. As a reasonable alternative, QTOs developed for the United States in the 2011 study were used. It was felt that, although differences between the U.S. and Canada exist, they were small on a “per square foot of floor area” basis across buildings of similar types and geography. The following shows the allocation of U.S. Census divisions to Canadian provinces:

<u>CANADA PROVINCES</u>	<u>U.S. CENSUS DIVISION</u>
Atlantic Provinces	New England
Quebec	ENC & Mid Atlantic (minus NYC MSA)
Ontario	WN Central & EN Central
Prairie Provinces	Pacific & Mountain
British Columbia	Pacific

To obtain usage volumes for each nonresidential project, the project team applied the take-offs and materials volume modeling to each set of project specifications for the desired materials categories available in CSI MasterFormat™. Added to these were the QTOs for renovation

projects where no new floor area has been added. The project team reviewed the tabular output from the preliminary tabulations and developed conversion factors for each output item. Waste factors were applied where considered relevant by the project team and client. The tabulations at this interim stage are “coefficients,” which represent an amount of material used per square foot of building space added.

Conversions to suitable metrics for industry usage and comparability to Home Innovation Research Labs Annual Builder and Consumer Practices Survey reports were then made. First, using the RCD specifications data, material usage rates were calculated for each market segment. Second, these usage rates were tested by an analysis of variance (ANOVA) to determine if there are statistically significant differences in usage rates among the segments. Third, different material usage rates were applied per floor square foot per segment to projects bid in 2012 to create a statistically weighted market size for each level of segmentation.

Use of QTO and Models and Specification Research

Reed Market Intelligence maintains 80 RSMeans cost models, which are used by the construction marketplace, including Government, to estimate building envelope construction costs. These models are maintained by a staff of engineers, architects, and estimators who have worked in the construction market and expand on a 70-year history as the Gold Standard in cost data and modeling. These models are validated through ongoing industry contact and documentation of bids collected and maintained by Reed from throughout the country.

For this project, these models were used to determine quantity metrics for defined building assemblies and material items across the 2012 bid year market for defined building category segments for the 10 building types that were six stories and under. In addition to the above active models, Reed selected a statistical sample of 160 projects distributed over the building types and geographic markets defined by the study. Estimators then performed QTOs of materials designed into these projects, from which quantity per square feet of floor space ratios were determined. This information was used to enhance RSMeans standard models to identify and verify current material usage practices across the defined building types and regions.

Finally, a database of 755 new construction and 1,575 renovation construction specifications was compiled from qualifying building projects bid in 2012. These documents were electronically searched to calculate materials usage rates.

All three sets of data input were used to determine quantity and usage of materials in commercial construction projects in 2012. The definitive usage rates are statistically tested to determine supported variances using ANOVA testing of rates by geographic regions and building categories to adjust for design practices in those segments. These input rates are then applied to the universe of projects covered by Reed in those segments to extrapolate quantities of materials usage in the specific segments requested. The inputs provided were either calculated quantities or rates per square feet of floor space usage.

Development of Estimates for Nonresidential Renovations

Because wood usage in renovation represents a substantial share of total nonresidential wood usage, the project team provided estimates of wood usage for renovation as well. Again, due to cost considerations, project plans and specifications for renovations from the United States were used. These were adjusted by the project team's cost engineering expertise to develop models for calculating wood usage based on dollars of project cost—a method that has proven to provide estimates that are highly correlated with materials volume.

OBJECTIVES

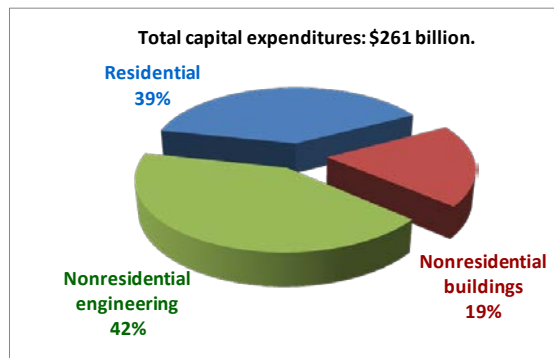
The objectives of this study were three-fold. The first objective was to characterize the overall nonresidential Canadian construction market in 2012 in general, and the low-rise nonresidential buildings market for selected building types in particular. The second objective was to develop estimates of wood products used in the construction of low-rise nonresidential buildings by geographical area, building type, building characteristic, and material type. Estimates are stratified by nonresidential building space added for new buildings and for major additions to existing buildings, and for alterations, renovations, and remodeling of existing buildings where no new space is added. The final objective was to quantify incremental potential wood use for each building type, geographical area, and wood product. Incremental wood potential is defined to be the additional amounts of wood that could be used if all major building applications were built entirely with wood. Incremental wood potential is applicable only to new and major addition construction to buildings where new floor area

is added that met the International Building Code standards for allowable wood construction.

CAPITAL CONSTRUCTION EXPENDITURES

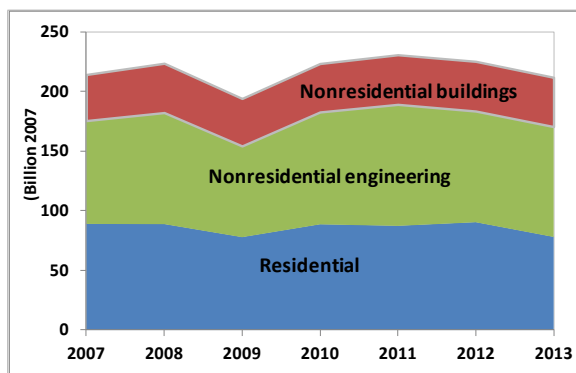
Capital construction expenditures measure annual levels of construction in a variety of construction activities and include the actual cost (value) of the construction (including profit and overhead), architect fees, other consultant fees, permits, and other costs associated with the construction project. The cost of land is not included in capital construction expenditures (Statistics Canada 2014c). Three major categories of capital construction expenditures are reported annually: 1) new residential structures, which include new single family, multi-family, and mobile home construction, 2) new nonresidential buildings, which include industrial, commercial, and institutional & government buildings, and 3) new nonresidential engineering construction such as bridges, highways, dams, etc. Also included in each category are alterations and renovations to existing structures. Not included are routine maintenance and repair expenditures. These three categories measure the overall level of construction in a given year and over time. In 2012, capital expenditures for all construction activity in Canada were estimated to be nearly \$261 billion (Figure 1, page 18) (Statistics Canada 2014a–c). Residential construction and nonresidential engineering construction were nearly equally divided at 39% and 42%, respectively. Nonresidential buildings made up the remaining 19%, or about \$49.6 billion.

Figure 1.-Capital construction expenditures in Canada, by type, 2012.



Total capital expenditures for construction, when measured in constant 2007 Canadian dollars (Statistics Canada 2014d), remained fairly robust during the 2007–2013 period (Figure 2). Total construction ranged from a low of just under \$200 billion in 2009 to a period high of \$230 billion in 2011. Nonresidential buildings have maintained a fairly constant market share, averaging \$41 billion, or about 19% of total construction, over the 7 year period.

Figure 2.-Capital construction expenditures in Canada, by type, 2007-2013.



CONSTRUCTION VALUE AND FLOOR AREA

Construction value and floor area are two measures of nonresidential construction activity. This study focuses on a subset of building types within each nonresidential buildings capital expenditures construction category. Included are buildings of six or fewer stories grouped as shown in Figure 3.

Figure 3.-Low-rise nonresidential building types.

LOW-RISE NONRESIDENTIAL BUILDING TYPES	
Industrial Buildings	
•Plants for manufacturing, processing & assembling goods	•Aircraft hangars
•Maintenance garages, equipment storage, workshops	•Other industrial construction
Commercial buildings	
•Laboratories, research and development	•Shopping centers, plazas, malls, stores
•Warehouses and freight terminals	•Theatres, performing arts and cultural centers
•Service stations including self-serve and car washes	•Indoor recreational buildings
•Automotive dealerships	•Other commercial construction
•Office buildings	•Student residences
•Hotels, motels, convention centers	•Post offices
•Restaurants, fast food outlets, bars	•Passenger terminals
Institutional & Government Buildings	
•Schools, colleges, universities, other educational	•Historical sites
•Churches and other religious buildings	•Penitentiaries, detention centers and courthouses
•Hospitals, health centers, clinics, other health care	•Museums, science centers, archives
•Nursing homes, homes for the aged	•Fire stations, halls
•Day care centers	•Other institutional and governmental construction
•Libraries	•Other building construction

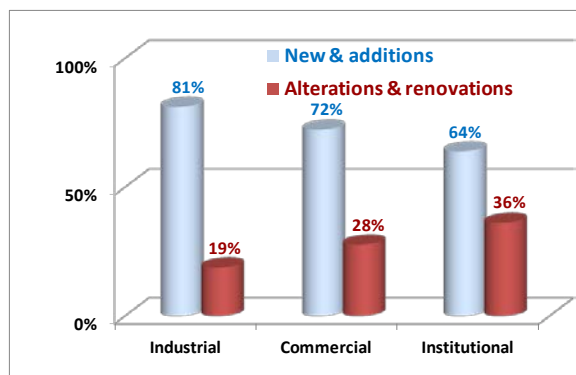
Throughout this report, Institutional & Government buildings are referred to as Institutional buildings.

Construction value is one component of overall capital construction expenditure. Construction value includes actual costs incurred during the construction process and includes profit and overhead for the construction firm. As such, construction value and capital construction expenditures are not strictly comparable. The

construction of all low-rise nonresidential buildings in 2012 was valued at \$25.3 billion (Table 1, page 38). More than half (57%) of all construction value was for commercial buildings (\$14.3 billion), followed by institutional and industrial. For this study, construction value can be divided into two principal construction types: 1) new and major additions and 2) alterations, renovations, and remodeling to existing structures. New and major additions construction

results in the creation of new floor area. Alterations, renovations, and remodeling creates no new floor area. On average, the creation of new floor area accounted for 71% of all construction value, about \$18.1 billion (Tables 1 and 2, pages 38 and 39). In each building type, the addition of new floor area accounted for nearly two-thirds or more of total construction value (Figure 4)

Figure 4.-Percentage of construction value in Canada, by building and construction types, 2012.



This level of construction value resulted in the addition of 124.1 million ft² of new floor area in nonresidential buildings in 2012, with an average value of \$145 per square foot of floor area (Tables 1 and 2, pages 38 and 39). Floor area estimates were also based on the normalized year approach. New commercial buildings added more actual floor area than all other building types combined, and at a lower cost per square foot than other building type. Institutional buildings had the highest value per square foot at \$192, compared to commercial buildings, which had the lowest at \$128.

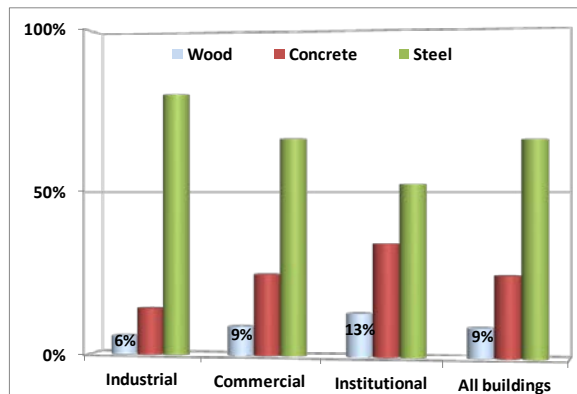
PRINCIPAL FRAMING TYPE

Principal framing type is determined by the types of structural materials used to construct 50% or more of the exterior wall area in a new building or major addition. Alterations and renovations have, by definition, no framing type because no new floor area is added. Three framing types were identified in this study: 1) wood, 2) concrete, and 3) steel. Wood construction includes lumber or other wood product framing, regardless of sheathing type; concrete construction includes concrete, masonry, stone, brick, and block; steel construction includes primarily steel framing or support members. Exterior wall cladding does not affect nor determine framing type. Although some buildings are built entirely using the same structural material as the exterior walls, many combine two or more types of structural materials within or among specific applications in the building. For example, many concrete-framed schools have wood-framed roofs, or roofs with both wood and steel framing members. Combining construction methods and materials results in structural wood products being present in many buildings regardless of framing type.

In 2012, wood-framed construction accounted for about 9% of all buildings, concrete framing 25%, and steel framing 66% (Table 2, page 39; Figure 5). Steel framing was the dominant framing type in all building types. Slightly more than 80% of all industrial buildings were steel framed, compared to just 53% of all institutional buildings. Commercial buildings were intermittent at 66%. Framing type is an important determinant of wood use. Wood-framed buildings will, on average, use more wood than non-wood-framed buildings, and the extent of

non-wood framing defines the potential for wood to gain market share.

Figure 5.-Percentage of principal framing type in Canada, by building type, 2012.



WOOD PRODUCTS USE FOR CONSTRUCTION APPLICATIONS

In 2012, nearly 394 million bfe of wood products were used to construct low-rise nonresidential buildings in Canada (Table 1, page 38). Board feet equivalents are defined as the amount of solid sawn lumber that would be required to replace a given unit of engineered wood or panel product, and as such provide a means to compare total solid wood consumption between various uses. Figure 6 shows units of measure for wood products included in this study and their respective board feet equivalents. Appendix B defines wood products and other terms used in this report.

Figure 6.-Units of measure.

UNITS OF MEASURE

Wood product	Unit of measure	Abbreviation	BFE ¹
Lumber ²	Board feet	bf	1.0
Engineered wood			
I-joist	Linear feet	lf	2.0
Glulam	Board feet	bf	1.0
SCL ³	Cubic feet	ft ³	16.0
OSB rim boards	Square feet, 3/8-inch basis	ft ²	0.5
Cross laminated timber	Cubic feet	ft ³	16.0
Structural panels ⁴	Square feet, 3/8-inch basis	ft ²	0.5
Nonstructural panels ⁵	Square feet, 3/8-inch basis	ft ²	0.5

¹Board Feet Equivalent (bfe) is the amount of solid sawn lumber required to replace an engineered wood or panel product.

²Includes softwood and hardwood dimension lumber, boards, beams, timbers, and millwork.

³Includes laminated veneer lumber (LVL), parallel strand lumber (PSL), laminated strand lumber (LSL), and oriented strand lumber (OSL).

⁴Includes (softwood) plywood and OSB.

⁵Includes (hardwood) plywood, particleboard, medium-density fiberboard, and hardboard.

The 393 million bfe of wood consumed in 2012 was for framing, siding, soffit, fascia and exterior trim, and sheathing and underlayment. Lumber and engineered wood accounted for 273 million bfe, structural and nonstructural panels 120 million bfe (240 million ft², 3/8-inch basis) (Table 3, page 40). Lumber accounted for 79% of all lumber and engineered wood used, and structural panels accounted for more than of 99% of all panel products found. It should be noted that within structural panels, softwood plywood was by far the most commonly specified structural wood panel, capturing a disproportionately large market share. However, based on field observations, the actual rate of OSB usage is higher than indicated because substitution of OSB for plywood often occurs during construction, after building plans have been submitted to and approved by local planning offices. The actual substitution rate of OSB for plywood is unknown.

New construction, including major additions to existing structures, used nearly 244 million of the 394 million bfe of wood products used in 2012 (Table 4, page 42). This is about 62% of total consumption. The remaining 149 million bfe of lumber, engineered wood, and structural and nonstructural panels was used for alterations, renovations, and remodeling of existing buildings (Table 5, page 44).

The use of wood products in nonresidential construction varies substantially by building type and province. Commercial buildings used more than half (152 million bfe) of the 273 million bfe of lumber and engineered wood used in 2012 (Table 3, page 40; Figure 7). Institutional buildings were second, industrial buildings third. Provincially, Quebec used the highest amount of lumber and engineered

wood at 87 million bfe, followed by Ontario and the Prairie provinces. The Atlantic provinces used less lumber and engineered wood than any other province. Figure 8 shows the provincial groupings used in this report.

Figure 7.-Lumber and engineered wood used in Canada, by building type and province, 2012.

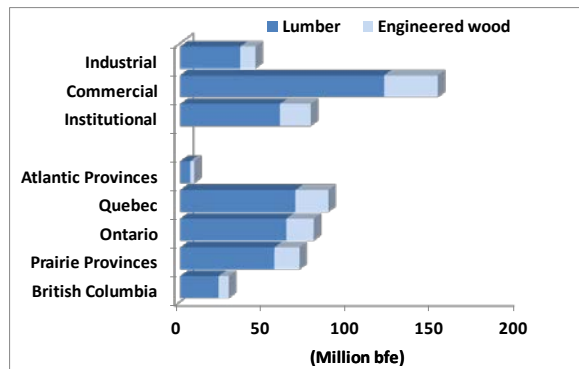


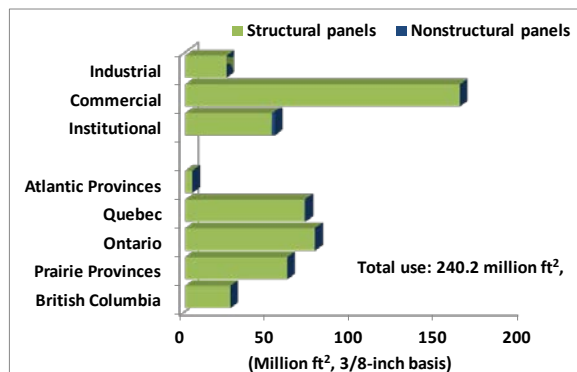
Figure 8.-Provincial groupings.



PROVINCIAL GROUPINGS	
Atlantic Provinces	
•New Brunswick	•Nova Scotia
•Newfoundland, Labrador	•Prince Edward Island
Quebec	
•Quebec	
Ontario	
•Ontario	
Prairie Provinces	
•Alberta	•Nunavut
•Manitoba	•Saskatchewan
•Northwest Territories	•Yukon
British Columbia	
•British Columbia	

Structural and nonstructural panel products were primarily used in nonresidential construction for sheathing, underlayment, and siding. Small amounts were also used for soffit, fascia, and exterior trim. More than 99% of the 240 million ft² of wood panels used in 2012 were structural panels (Table 3, page 40, Figure 9). Less than 2 million ft² of nonstructural panels were used. As with lumber and engineered wood, panel use was highest in commercial buildings, at about two-thirds of total consumption. Ontario was the highest consumer of panels at 77 million ft², followed closely by Quebec at 71 million ft².

Figure 9.-Structural and nonstructural panels used in Canada, by building type and province, 2012.



Lumber and Engineered Wood Used in Floors, Walls and Roofs

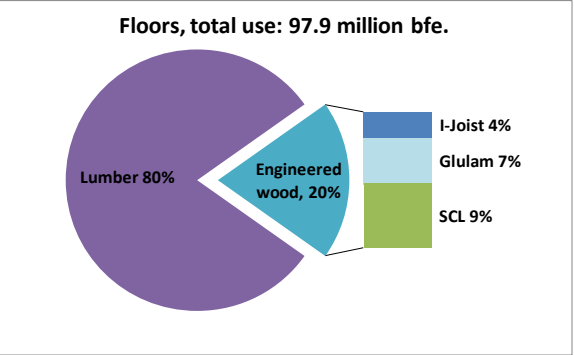
Construction of floors, walls, and roofs in low-rise nonresidential buildings required a total of 269 million bfe of lumber and engineered wood in 2012 (Table 6, page 46). This level of consumption accounted for 98% of the total use of these products. Commercial buildings, which accounted for 57% of total construction value, accounted for 55% of floor, wall, and roof lumber and engineered wood consumption. In general, consumption patterns closely follow

construction value patterns. Overall, walls and roofs used more wood framing material than floors. Their combined consumption accounted for three-fourths of total consumption, due largely to the popularity of concrete slab-on-grade floors in nonresidential buildings (Tables 7, 8, and 9, pages 48-53). Lumber is by far the most popular choice of wood framing material for floors, walls, and roofs. Overall, 78% or more of framing materials were wood. Institutional buildings were the only exception, with lumber accounting for just 49% of floor framing material.

Floors

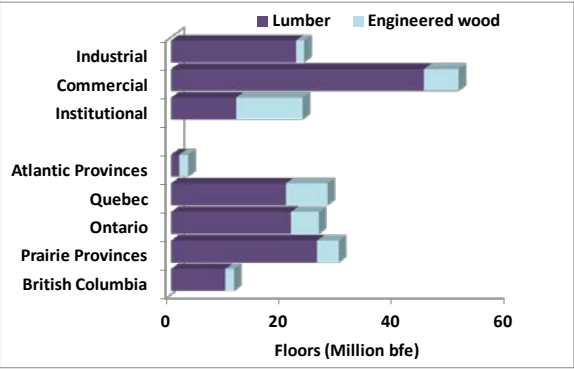
Nearly 79 of the 98 million bfe of lumber and engineered wood used in floor framing was lumber (dimension, boards, beams, and millwork), 80% of consumption (Table 7, page 48; Figure 10, page 24). Engineered wood comprised the remaining 20% of total floor framing material. The largest engineered wood category was structural composite lumber (SCL) at about 9%, which primarily consists of laminated veneer lumber (LVL), parallel strand lumber (PSL), and laminated strand lumber (LSL). Following SCL is glulam beams at 7%. SCL and glulam beams are typically used for midspan floor joist support for lumber and wood I-joist floors. They are also used as the primary load-bearing member when joist or beam spacing exceeds 32 inches. Wood I-joists were 4% of total wood framing in floors. Small amounts (less than one-fourth of 1%) of OSB rim boards and cross-laminated timbers were also used.

Figure 10.-Lumber and engineered wood used for floor framing in Canada, 2012.



Commercial buildings used just over half of all lumber and engineered wood for floor framing in 2012 (Figure 11). The remainder was nearly equally divided between industrial and institutional buildings. The Prairie provinces used nearly 30 million bfe of floor framing lumber and engineered wood, more than any other province. Quebec and Ontario were close at 28 and 28 million bfe, respectively.

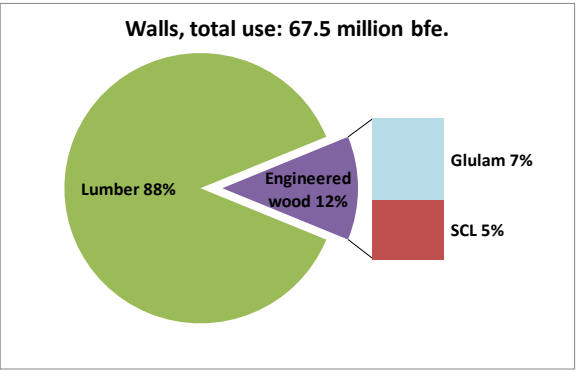
Figure 11.-Lumber and engineered wood used for floor framing in Canada, by building type and province, 2012.



Walls

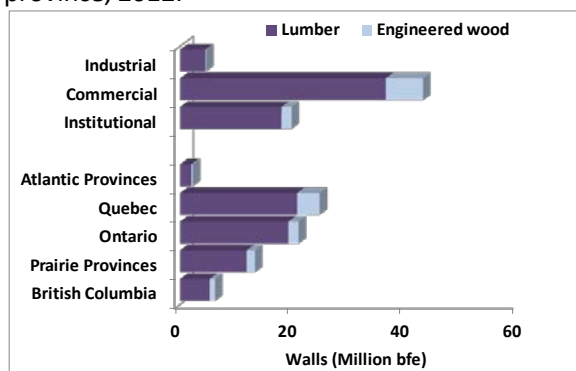
In 2012, an estimated 67 million bfe of lumber and engineered wood were used to construct walls in low-rise nonresidential buildings (Table 8, page 50). Exterior wall framing accounted for nearly half the total lumber and engineered wood use at 31 million bfe. Interior wall framing and window and door headers accounted for 31% and 22% of consumption, respectively. Support columns were negligible at just 1% of total use. Lumber was the dominant framing material, representing 87% of total use (Figure 12). The primary lumber products used were 2 x 4, 2 x 6, and 2 x 8 dimension lumber for studs and dimension lumber for window and door headers. The remaining 13% lumber and engineered wood used in walls was glulam and SCL, used primarily for load-bearing header materials that span wall openings. Negligible amounts of CLT were used.

Figure 12.-Lumber and engineered wood used for wall framing in Canada, 2012.



The highest volume of lumber and engineered wood used in walls was in commercial buildings, which used 43 million bfe, nearly two-thirds of total use (Table 8, page 50; Figure 13). Institutional buildings were second highest at 20 million bfe, followed by industrial buildings at less than 5 million bfe. Geographically, Quebec used the largest total volume of lumber and engineered wood for walls at nearly 25 million bfe, followed closely by Ontario at 21 million bfe. Lumber was by far the most common type of wall material in each province or province group. Glulam was the dominant engineered wood products in every province.

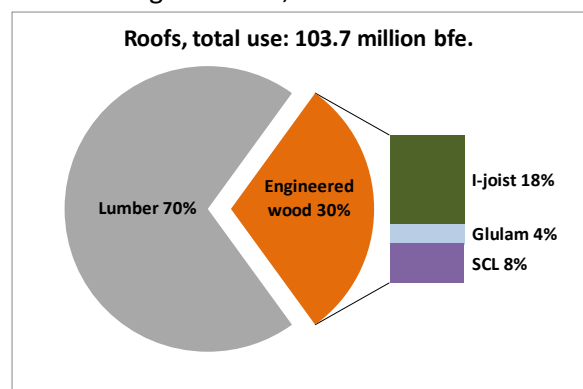
Figure 13.-Lumber and engineered wood used for wall framing in Canada, by building type and province, 2012.



Roofs

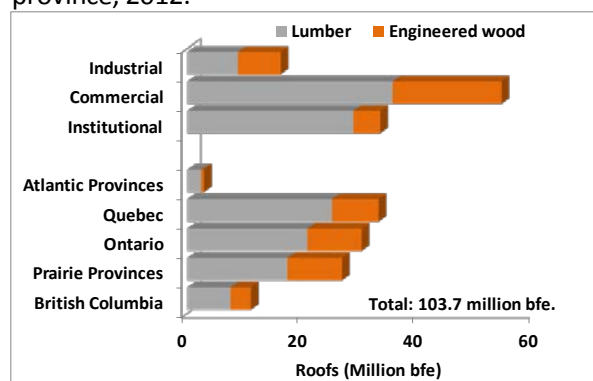
In 2012, nearly 104 million bfe of lumber and engineered wood were used to build roofs in low-rise nonresidential buildings (Table 9, page 52). Lumber was the principal framing material at nearly 73 million bf, or about 70% of the total wood roof framing market (Figure 14). Lumber in nonresidential roofs is used as conventional rafters, plated trusses (pitched or parallel chord), and beam and purlin configurations. I-joists were the second most used framing material at 9 million bfe, followed by glulam at nearly 4 million bfe. Small amounts of SCL, rim boards, and CLT were used, totaling less than 1 million bfe. I-joists are typically used as roof rafters in horizontal applications and less commonly in pitched roofs or as members in an engineered truss system. Both SCL and glulam are frequently used as midspan support beams for roof joists or in a beam and purlin configuration.

Figure 14.-Lumber and engineered wood used for roof framing in Canada, 2012.



The construction of commercial building roofs used more framing lumber and engineered wood than any other building type. In 2012, commercial buildings used 35 million bf of lumber and 19 million bfe of engineered wood, more than half of all lumber and engineered wood combined (Figure 15). Institutional buildings were second at 33 million bfe, industrial buildings last at 16 million bfe. Geographically, Quebec and Ontario were the two largest markets for wood framing in Canada in 2012. Each used in excess of 30 million bfe of lumber and engineered wood. Combined, these two provinces used nearly 61% of all lumber and engineered wood used for roof framing.

Figure 15.-Lumber and engineered wood used for roof framing in Canada, by building type and province, 2012.



Structural Wood Panels Used In Floors, Walls and Roofs

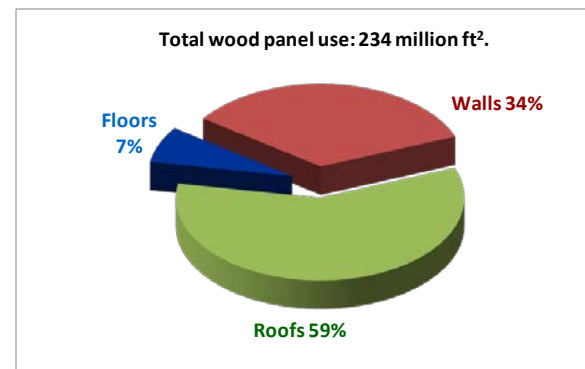
Structural wood panels are typically used in low-rise nonresidential buildings for exterior wall sheathing, roof sheathing, structural subflooring, and flooring underlayment. In addition, small amounts of nonstructural wood panels are used as floor underlayment. Structural panel consumption is, to a large extent, dependent on the amount of new building space added. In 2012, the 124 million ft² of new space added, coupled with limited usage in existing space, required 233 million ft² (3/8-inch basis) of structural panels for floors, walls, and roofs, plus a small amount (less than 2 million ft²) of nonstructural panel underlayment (Table 6, page 46).

In 2012, softwood plywood was by far the most commonly specified structural wood panel for wall, floor, and roof sheathing. In excess of 94% of all structural panels specified were softwood plywood, with the remainder being OSB. As previously stated, actual OSB rates may be higher than the 2012 study indicates because substitution of OSB for softwood plywood often occurs during construction—after building plans have been submitted and approved to local planning offices. However, the substitution rate of OSB for softwood plywood is unknown. Additionally, nonstructural wood panels (particleboard, MDF, and hardwood plywood) are sometimes used as a flooring underlayment material.

The majority of all wood panels used in 2012 were used to construct the roof structure—59% of total use (Tables 7, 8 and 9, pages 48-53; Figure 16). Wood structural panels are popular as a sheathing material on both wood and steel roof framing due to its strength and ease of use.

Usage in floors is low due to the popularity of concrete slab-on-grade floors and concrete's sound-deadening performance on elevated floors.

Figure 16.-Wood panel use for sheathing and underlayment in Canada, 2012.

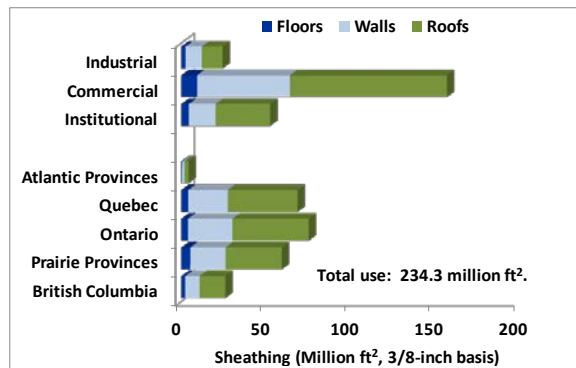


Floors

Nearly 17 million ft² of wood panels were used in floor assemblies. Structural panels accounted for nearly 15 million ft², nonstructural panels the remaining 2 million ft² (Table 7, page 48).

Commercial buildings used more than 9 million ft² of wood panel sheathing and underlayment for floors in 2012, more than half of total usage for floors (Figure 17). No nonstructural panels were used in commercial buildings. Institutional buildings were second at nearly 5 million ft², of which more than one-third were nonstructural panels. Industrial buildings used the remaining 3 million ft². Geographically, the Prairie provinces used more wood panels for floors than any other province. The 5 million ft² was nearly 30% greater than Quebec and Ontario, the second and third highest users.

Figure 17.-Wood panel use for sheathing and underlayment in Canada, by building type and province, 2012.



Walls

Wood sheathing panels for exterior walls are typically softwood plywood or OSB. In 2012, just over 80 million ft² of structural panels were used to sheath low-rise nonresidential buildings (Table 8, page 50). Low density fiberboard (insulation board), which was used for exterior wall sheathing in the past, has been replaced by other sheathing products. Not included in “Walls” is softwood plywood exterior siding panels, which are reported in the “Exterior Cladding” section below. Walls are the second highest use for structural panels, accounting for about one-third of the total sheathing and underlayment used in low-rise nonresidential buildings (Figure 16, page 27).

Commercial buildings used nearly 55 million ft² of wood panel sheathing for walls in 2012, more than two-thirds of total usage for walls (Figure 17). Institutional buildings were second highest at nearly 16 million ft², and industrial buildings third at just under 10 million ft². Ontario and Quebec were the two provinces with the highest use of structural panels for wall sheathing at 26 and 23 million ft², respectively. The Prairie provinces were a close third at 21 million ft².

Roofs

In 2012, more than 137 million ft² of structural panels were used as roof sheathing in low-rise nonresidential buildings (Table 9, page 52).

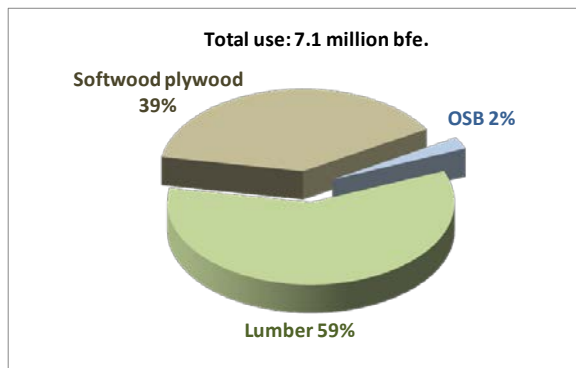
Roofs used more structural panels than all other uses combined, accounting for 59% of total structural panel use (Figure 16, page 27)

As was true for other sheathing applications, commercial buildings used more structural panels for roofs than all other building types combined. The 93 million ft² used for commercial buildings was two-thirds of total use (Figure 17). Institutional buildings were second highest, followed by industrial buildings. The geographical distribution of structural panel use for roof sheathing was similar to that for walls. Ontario was the highest user, followed closely by Quebec and the Prairie provinces. British Columbia and the Atlantic provinces were fourth and fifth in total use, respectively.

Wood Used in Exterior Cladding

Wood exterior cladding includes wood siding, soffit, fascia, and exterior trim materials. Lumber, softwood plywood, and OSB are the three types of wood products currently being used for exterior cladding. Nonstructural panel cladding products, once popular, are no longer in use. In 2012, a total of 7 million bfe of lumber and structural panel cladding products were used in low-rise nonresidential buildings (Table 10, page 54). Of this total amount, 59%—based on board feet equivalents, not surface area covered—was lumber, 39% softwood plywood, and 2% OSB (Figure 18). Exterior siding is the largest of the cladding applications. About 72% of lumber used for cladding was for siding, while 100% of structural panels was used for siding.

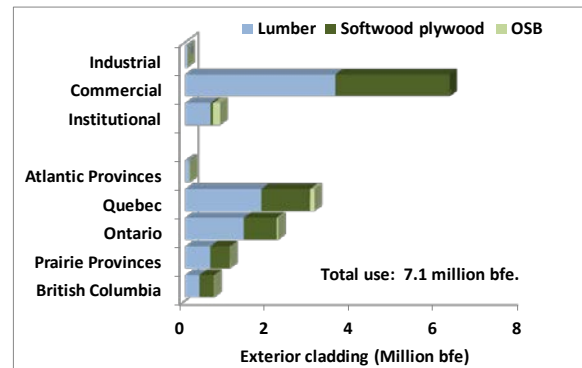
Figure 18.-Lumber and structural panels used for exterior cladding in Canada, 2012.



Exterior wood cladding is typically chosen for its unique aesthetic qualities. For this reason, commercial buildings were by far the largest user of wood exterior cladding, accounting for more than 88% of all wood cladding used (Figure 19). Institutional buildings were second at 12% of total consumption, and industrial buildings used less than 1% of all wood cladding products. Quebec and Ontario were the highest

wood cladding using provinces. Combined, they used nearly 75% of all wood cladding in 2012.

Figure 19.-Lumber and structural panels used for exterior cladding in Canada, by building type and province, 2012.

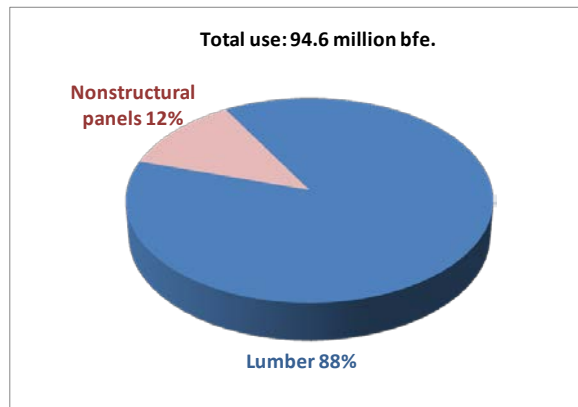


WOOD USED FOR BUILDING FINISHING APPLICATIONS

In addition to the construction of the nonresidential building itself, a variety of opportunities exist to use wood in finishing types of applications. Finishing applications that are more amenable to wood were examined in the course of this study, and include finished flooring, interior wall and ceiling coverings, interior trim and mouldings, cabinetry built onsite, built-in furniture, windows and doors, and wood shutters. Many of these uses, such as finished wood floors and walls and wood doors, windows, mouldings, and trim are traditional and are still popular in some nonresidential buildings. Lumber and nonstructural panels were the two categories of wood products that are used in finishing applications. This study found that approximately 95 million bfe of lumber and nonstructural wood panels were used in finishing applications to low-rise buildings in 2012 (Table 11, page 56). This consisted of about 89 million bf of lumber

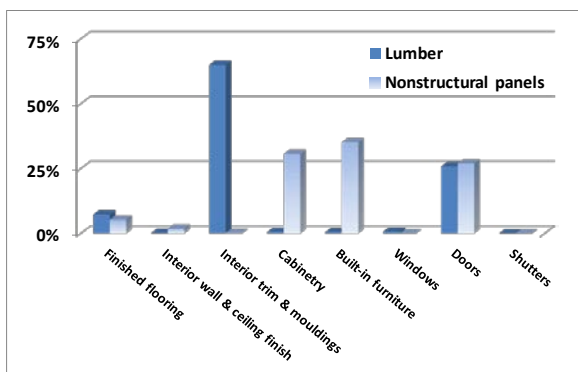
and 12 million bfe (24 million ft², 3/8-inch basis) of nonstructural panels being used (Figure 20). This volume of wood was nearly one-fourth of that used to construct the building itself.

Figure 20.-Lumber and nonstructural panels used for finishing applications in Canada, 2012.



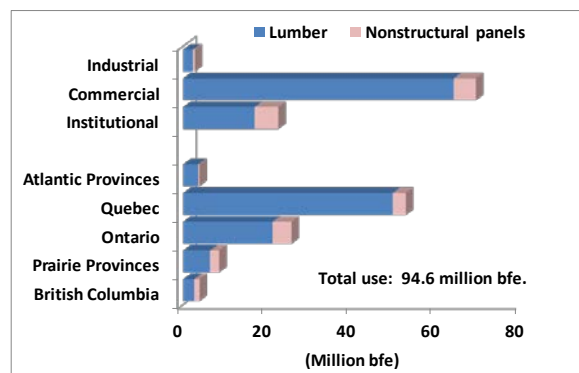
Interior trim and mouldings accounted for 65% of all lumber used for building finishing applications in 2012 (Figure 21). This was about 2.5 times greater than doors, the second highest use, which used 26% of all lumber. Built-in furniture and cabinetry used 35% and 31%, respectively, of all nonstructural panels. Doors were third and had about the same percentage use as did lumber.

Figure 21.-Lumber and nonstructural panels used for finishing applications in Canada, by type of application, 2012.



Commercial buildings used 73% (69 million bfe) of all wood used for building finishing applications (Figure 22). Institutional buildings used 24%, and industrial buildings used just 3% of all wood product building finishing applications. Quebec used more wood for finishing applications than any other province, accounting for more than one-half of all wood used. Ontario was second at 27%. All other provinces used less than 10% each.

Figure 22.-Lumber and nonstructural panels used for finishing applications in Canada, by building type and province, 2012.



Tables 12, 13, and 14 (pages 58-63) provide additional detail on wood products use for building finishing applications.

WOOD PRODUCTS POTENTIAL

Great potential exists for increasing the amounts of wood products used for low-rise nonresidential building construction. Potential is defined as incremental amounts of wood that could be used if all major building applications (framing, columns, siding, soffit, fascia, exterior trim, sheathing and underlayment) in concrete or steel-framed buildings were built entirely with wood and if all major building applications in wood-framed buildings that were not wood were converted to wood. However, not all buildings and applications can be built from wood. To qualify for wood construction, specific characteristics of the building must meet International Building Code (IBC) standards for allowable wood construction. Although the IBC does not necessarily dictate construction materials, provisions in the code require materials in certain applications (such as structural elements) or in specific building types to meet certain criteria (such as noncombustibility).

The codes also set conditions of use for certain materials that negatively impact building design, ease of construction, and cost. As such, wood is not selected for use as a structural material in every project nor application where permitted by code. The gap between usage rate of wood materials and their use in code-permitted projects where wood could be a cost-competitive substitute for concrete and steel is not necessarily due to building code restrictions.

Potential applies only to new construction and major additions. Alterations and renovations are typically too varied and not so dependent on building codes as new construction to reliably estimate incremental potential. Wall-framing type is a key determinant of wood potential.

A “Wood Potential Filter¹” was developed to determine which specific buildings, based on their type, physical characteristics, and intended occupancy, would be candidates for wood-framed construction. This filter was applied to approximately 2,250 buildings used in this study to determine those that could have used wood as the primary structural material instead of concrete or steel.

¹ The Wood Potential Filter was developed by the U.S. Forest Service and FPIInnovations in 2003 to determine whether a project, based on type, size, and occupancy of building, could have been constructed using wood and still meet International Building Code (IBC) criteria.

Methodology for Calculating Wood Potential

Figure 23 illustrates the calculation used to determine how much more wood could be used in exterior walls in concrete and steel buildings if they were converted to wood-frame construction. The example is for the volume of dimension lumber that could have been used in walls in stores in British Columbia in 2012.

Figure 23. Example of wood products potential calculations.

Wood Potential Calculation		
Dimension Lumber for Wall Framing in STORES in British Columbia		
SF of Floor Area where Wood was the Primary Structural Wall Material	<i>a</i>	1,081,551
SF of Floor Area with the Potential for Wood as the Primary Structural Wall Material	<i>b</i>	5,737,572
% of Wall Area that was not Wood but Wood was the Primary Structural Wall Material	<i>c</i>	28.30%
Wood Wall Potential Multiplier	$d = ((b) / (a)) * (1 - (c))$	3.82
Actual Board Feet of Dimension Lumber Used in Wall Framing	<i>e</i>	954,578
Net Change in Board Feet Dimension Lumber Used in Wall Framing	$f = d * e$	3,629,008

First, the square footage of floor area where wood was the primary structural wall material was calculated (*a*). Throughout the study, the primary structural wall material is defined as the structural material (wood, concrete, or steel) that is used to construct 50% or more of the exterior walls. Then, the Wood Potential Filter was used to determine the area of non-wood-framed buildings that could have been wood framed under current International Building Code constraints (*b*). We then looked at the walls where wood was the primary structural wall material and determined the percentage that was **not** wood (*c*). This calculation

was based on the statistical sample of projects selected for QTOs. Unfortunately, the sample was not sufficient to develop statistically reliable differences by geographic area within each building type. Therefore, (*c*) was developed at the national-level for each building type.

A multiplier was then used to determine potential volume. The wood potential multiplier for walls (*d*) is $((b)/(a)) \times (1 - (c))$. In the example below, we see that the potential for wood walls is 3.8 times greater than what was actually used.

Actual board feet of dimension lumber used in wall framing (*e*) was calculated by combining data from building plan QTOs and database queries of architectural specifications. Data were expanded to synchronize with national estimates of all nonresidential construction values in 2012.

The net change in wood usage (*f*) was calculated by applying the wood wall potential multiplier (*d*) to the actual board feet of dimension lumber used in wall framing (*e*).

Similar calculations were made for other wood products in walls and for wood potential in floors, roofs, and exterior siding. The wood floor and roof potential multipliers were calculated the same as for walls. Of note, the percentage of nonwood floor and roof areas in projects where wood was the primary structural material (*c*) was found to be zero across all building types. The multiplier (*d*) therefore becomes (*b*)/(*a*).

The specific data required for developing the wood potential multipliers for siding, exterior trim, soffits, and fascia were not available in the project specifications database. Therefore, the wood wall potential multiplier was used for siding & exterior trim, and the wood roof potential multiplier was used for soffits & fascia.

Incremental Floor Area Potential

The analysis was first conducted on buildings to determine square feet of floor area in new low-rise nonresidential buildings whose primary structural wall material could be converted from steel and concrete into wood. Of the 124 million ft² of building area added in 2012, about 11 million ft² was in buildings with wood as the primary structural wall material (Table 15, page 64). Applying the wood potential model showed that an additional 69 million ft² could have been

built with wood. Just over three-fourths of this area was from steel-framed buildings and one-fourth from concrete-framed buildings.

Incremental Wood Products Potential

Based on this analysis, wood products have the potential to capture an additional 1,056 million bfe of wood products for the construction of floors, walls, roofs, and siding (Table 16, page 65). Lumber and engineered wood accounted for 61% and 15%, respectively, and wood panels 24% of total wood potential (Figure 24). The greatest opportunity for wood substitution is in floors. The 573 million bfe of additional wood use for floors accounted for just over half (54%) of total potential use (Figure 25).

Figure 24.-Wood products potential use in Canada, by type of product, 2012.

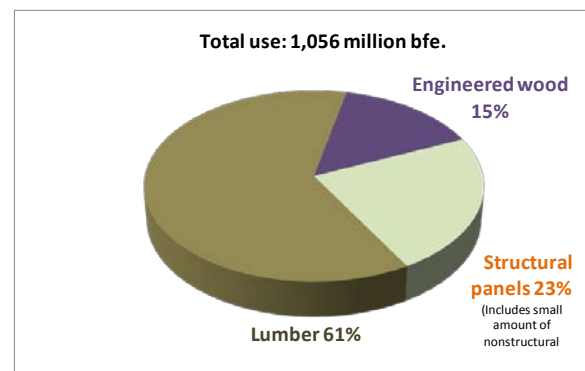
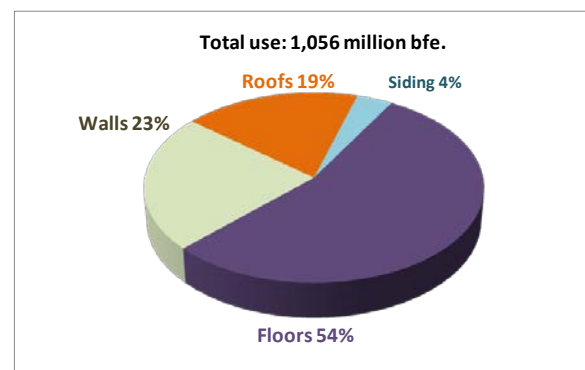
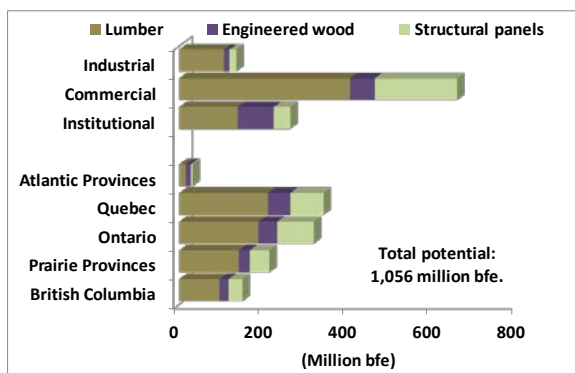


Figure 25 - Wood products potential use in Canada, by building application, 2012.



Commercial buildings in Canada in 2012 accounted for nearly two-thirds (62%) of total wood products potential, or 658 million bfe (Table 17, page 66; Figure 26). Institutional buildings were a distant second at 25% (263 million bfe). Industrial buildings had just a 13% share of total wood products potential. Quebec and Ontario were the provinces with the highest level of wood potential. Their combined potential was 660 million bfe, nearly two-thirds of total wood potential. Each of the remaining provinces accounted for 20% or less of total wood potential, with 3% being in the Atlantic provinces.

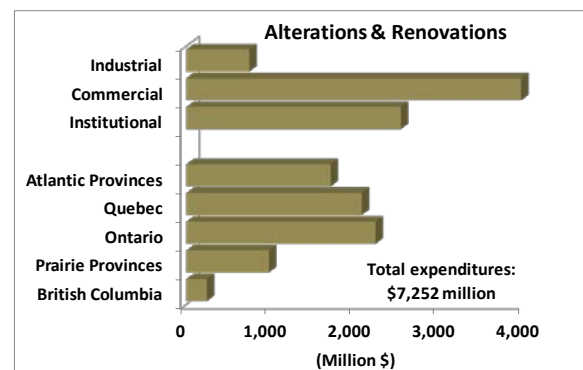
Figure 26.-Wood products potential in Canada, by building type and province, 2012.



LOW-RISE BUILDING ALTERATIONS, RENOVATIONS AND REMODELING

In 2012, alterations, renovations, and remodeling of low-rise nonresidential buildings in Canada was valued at \$7.3 billion (Figure 27). This was nearly 30% of total low-rise construction value. Of note, alterations, renovations, and remodeling do not add new building space, and hence fewer structural materials are used. The greatest expenditure was for commercial buildings, accounting for about 55% of total expenditures. Industrial buildings were lowest at 10%. Because by definition no new building space is added by alterations and renovations, they are not included in wood products potential. There are, however, smaller opportunities for structural materials for activities such as reconfiguring interior space with new walls and for interior and exterior finish materials.

Figure 27. - Expenditures for alterations, renovations & remodeling in Canada, by building type and province, 2012.



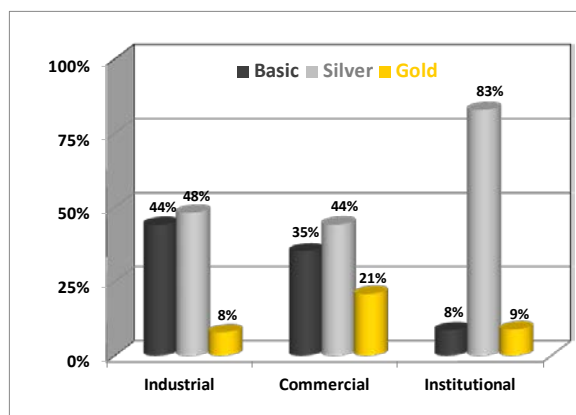
SPACE ADDED FOR WHICH LEED CERTIFICATION HAD BEEN REQUESTED

Project specifications used for this study indicate whether LEED certifications were requested for each building. No information was available whether actual LEED certifications were granted. In 2012, 2.1 million ft² of new low-rise nonresidential buildings floor area had LEED certification requested (Table 18, page 67). This represents just 2% of the total 124.2 million ft² of new low-rise building space added in 2012.

More than 4% of all institutional buildings requested LEED certification, four times more than commercial buildings and nearly six times as much as industrial. In general, buildings that are publicly funded have a higher likelihood of requesting LEED certification than non-publicly funded buildings, such as industrial.

Applications for Silver certification were higher among all building types than other levels of certification (Figure 28). There were no requests for platinum certification.

Figure 28.- Low-rise nonresidential buildings which applied for LEED Certification in Canada, by building and certification types, 2012.



SUMMARY AND CONCLUSIONS

The construction of nonresidential buildings in Canada is an important market for lumber, engineered wood, and wood panels. New low-rise buildings use the greatest volume of wood products, whereas lesser but still substantial volumes are used for changes to existing buildings. This study documented, for the first time, the amounts of principal wood building products used in the construction and finishing of selected low-rise buildings. Data are reported for construction that adds new floor area (new and additions) and construction that does not add new floor area (alterations, renovations, and remodeling). Over the 6-year period 2007 through 2012, overall nonresidential building construction (all building types, all stories) values remained fairly robust, varying by no more than 4% per year. Expectations are for continued strength in construction of low-rise buildings that were included in this study.

Based on data developed by Reed Construction Data and tabulated by Home Improvement Research Labs (2014), about 215 million bf of lumber and 59 million bfe of engineered wood were used in low-rise buildings in 2012. In addition, 240 million ft² (3/8-inch basis) of structural and nonstructural wood panels were used. Converting all wood usage to board feet equivalency, in excess of 393 million bfe of wood products were used to construct low-rise buildings in 2012. The vast majority of wood volume is structural materials, primarily softwood. Quebec and Ontario were the leading provinces in wood consumption at 31% and 30% of total consumption, respectively. Commercial buildings were the top building category at 59% of total consumption.

Substantial potential exists to achieve greater penetration of wood products into the low-rise nonresidential building sector than its present rate. This study shows that wood was used as the primary structural material in just 14% of projects where it would have been allowed by current International Building Code specifications. If all incremental wood potential had been realized, an additional 1.1 billion bfe of wood products could have been used.

In addition to the 393 million bfe of wood products used to construct new and to renovate existing low-rise buildings in 2012, substantial amounts of wood were used in finishing applications to newly constructed buildings. Finishing applications include finished flooring,

interior wall and ceiling coverings, interior trim and mouldings, cabinetry built onsite, built-in furniture, windows and doors, and wood shutters. These applications added an additional 95 million bfe of wood products.

The choice of materials for low-rise nonresidential buildings varies widely by building type and geographic area. Likewise, opportunities for increasing wood usage in low-rise building construction varies widely due to the same factors. The overall greatest growth potential for framing and sheathing products is in walls. Institutional buildings have the greatest wood growth potential, and the provinces of Quebec and Ontario have the greatest wood growth potential.

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Statistics Canada. 2014c. *Table 029-0040 - Capital expenditures on construction, by type of asset, annual (dollars)*, CANSIM (database).

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Statistics Canada. 2014d. Table 380-0102 - Gross domestic product indexes, annual (2007=100 unless otherwise noted), CANSIM (database).

<http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=3800102&pattern=3800102&searchTypeByValue=1&p2=35> (Accessed March 14, 2014).

APPENDIX A – TABLES

Table 1.-Construction value, floor area added, and wood products consumption in low-rise nonresidential buildings in Canada, 2012

Construction value, floor area added, and wood products consumption ¹	New buildings & additions	Alterations, renovations & remodeling	Total, all low-rise nonresidential construction	
CONSTRUCTION VALUE	(Mil. \$)	(Mil. \$)	(Mil. \$)	(%)
Industrial	3,217	747	3,964	16%
Commercial	10,346	3,963	14,309	57%
Institutional & government	4,488	2,541	7,029	28%
Total	18,051	7,252	25,302	100%
Percent	71%	29%	100%	--
FLOOR AREA	(Thou. ft ²)	(Thou. ft ²)	(Thou. ft ²)	(%)
Industrial	19,892	na ³	19,892	16%
Commercial	80,860	na	80,860	65%
Institutional & government	23,411	na	23,411	19%
Total	124,163	na	124,163	100%
WOOD PRODUCTS CONSUMPTION ¹	(Thou.)	(Thou.)	(Thou.)	
Lumber (bf)	133,413	81,103	214,516	55%
Engineered Wood (bfe)	34,818	23,944	58,761	15%
Glulam (bf)	9,909	5,059	14,968	--
CLT (cf)	41	0	41	--
Rim Board (ft ²)	543	43	586	--
I-Joist (lf)	5,664	5,390	11,053	--
SCL ² (cf)	791	505	1,296	--
Total, Lumber & Engineered Wood (bfe)	168,231	105,046	273,277	--
Structural Panels (ft ²)	151,922	86,447	238,368	30%
Softwood Plywood (ft ²)	142,865	82,101	224,966	--
OSB (ft ²)	9,057	4,345	13,403	--
Nonstructural Panels (ft ²)	1,255	574	1,829	0%
Total, All Panels (ft ²)	153,177	87,020	240,197	--
Total (bfe)	244,819	148,556	393,376	100%
Percent	62%	38%	100%	--

¹Includes wood products for building construction only - Faming, siding, soffit, fascia, exterior trim, sheathing & underlayment.

²Includes LVL, PSL and LSL.

³Not applicable.

Table 1.-Construction value, floor area added, and wood products consumption in low-rise nonresidential buildings in Canada, 2012

Table 2.-Construction value and primary structural material of new low-rise nonresidential buildings by building type, Canada 2012

Building type	Construction Value		New Buildings & Additions							
	Total <i>Mil. \$</i>	New & Additions <i>Mil. \$</i>	Floor Area						TOTAL <i>Th. ft²</i>	Value <i>\$ per ft²</i>
			Wood		Concrete		Steel			
			<i>Th. ft²</i>	%	<i>Th. ft²</i>	%	<i>Th. ft²</i>	%		
Industrial	3,217	3,217	1,126	6%	2,831	14%	15,936	80%	19,892	161.7
Commercial	10,350	10,346	7,138	9%	20,083	25%	53,639	66%	80,860	128.0
Institutional	4,490	4,488	3,075	13%	8,033	34%	12,302	53%	23,411	191.7
All Buildings	18,058	18,051	11,339	9%	30,947	25%	81,877	66%	124,163	145.4

Table 2.-Construction value and primary structural material of new low-rise nonresidential buildings by building type, Canada 2012.

Table 3.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-Structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
INDUSTRIAL														
East Canada	18,391	1,338	677	94	62	3	4,923	23,315	12,521	0	12,521	0	12,521	29,575
Atlantic Provinces	522	4	2	1	0	0	20	542	88	0	88	0	88	586
Quebec	7,103	527	322	39	35	3	2,060	9,163	4,880	0	4,880	0	4,880	11,603
Ontario	10,766	807	353	54	27	0	2,844	13,610	7,553	0	7,553	0	7,553	17,386
West Canada	17,005	1,092	562	76	55	4	4,055	21,060	12,011	0	12,011	0	12,011	27,065
Prairie Provinces	12,717	841	434	58	32	0	3,059	15,776	9,151	0	9,151	0	9,151	20,352
British Columbia	4,288	251	129	18	23	4	996	5,284	2,860	0	2,860	0	2,860	6,714
Canada	35,396	2,429	1,239	170	117	7	8,978	44,375	24,532	0	24,532	0	24,532	56,641
COMMERCIAL														
East Canada	72,058	3,365	5,215	378	173	12	18,275	90,333	96,178	6,211	102,388	0	102,388	141,527
Atlantic Provinces	636	17	134	3	1	0	218	853	697	2	699	0	699	1,203
Quebec	27,555	1,318	3,286	132	92	12	8,279	35,834	39,822	716	40,538	0	40,538	56,103
Ontario	43,867	2,029	1,794	243	79	0	9,779	53,646	55,658	5,493	61,151	0	61,151	84,222
West Canada	48,280	3,072	2,165	298	153	9	13,298	61,578	57,878	2,293	60,171	0	60,171	91,664
Prairie Provinces	34,662	2,229	1,702	205	89	0	9,479	44,141	38,969	1,607	40,576	0	40,576	64,428
British Columbia	13,618	843	463	93	64	9	3,819	17,437	18,909	686	19,595	0	19,595	27,235
Canada	120,338	6,437	7,380	676	326	22	31,573	151,911	154,055	8,504	162,559	0	162,559	233,191
INSTITUTIONAL														
East Canada	45,931	1,779	5,041	371	115	9	14,739	60,670	32,917	3,434	36,350	1,638	37,988	79,664
Atlantic Provinces	4,726	205	875	51	17	0	2,117	6,842	3,085	221	3,306	294	3,600	8,642
Quebec	33,275	1,240	2,610	239	72	9	9,088	42,363	22,837	2,318	25,155	806	25,961	55,344
Ontario	7,930	334	1,556	81	26	0	3,535	11,464	6,995	894	7,889	538	8,427	15,678
West Canada	12,851	408	1,308	79	28	4	3,471	16,321	13,462	1,465	14,927	191	15,118	23,880
Prairie Provinces	8,155	249	766	61	17	0	2,252	10,406	9,366	1,288	10,654	101	10,755	15,784
British Columbia	4,696	159	543	18	11	4	1,219	5,915	4,096	177	4,273	90	4,363	8,096
Canada	58,782	2,187	6,349	450	143	13	18,210	76,991	46,379	4,898	51,277	1,829	53,106	103,544

Table 3.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 3.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels														
	Lumber & Engineered Wood								Wood Panels						
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-Structural	Total ⁷	TOTAL	
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood		Total				
									Plywood	OSB					Panels ⁶
<i>Th. bf</i>	<i>Th. lf</i>	<i>Th. bf</i>	<i>Th. cf</i>	<i>Th. ft²</i>	<i>Th. cf</i>	<i>Th. bfe</i>	<i>Th. bfe</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. bfe</i>		
ALL BUILDINGS															
East Canada	136,380	6,481	10,933	843	350	24	37,938	174,318	141,615	9,644	151,260	1,638	152,898	250,767	
Atlantic Provinces	5,884	226	1,012	55	18	0	2,354	8,238	3,870	223	4,094	294	4,387	10,432	
Quebec	67,933	3,085	6,218	410	200	24	19,426	87,360	67,539	3,034	70,573	806	71,379	123,049	
Ontario	62,563	3,170	3,703	378	132	0	16,157	78,720	70,206	6,387	76,593	538	77,131	117,286	
West Canada	78,136	4,572	4,036	453	236	17	20,823	98,959	83,350	3,758	87,109	191	87,300	142,609	
Prairie Provinces	55,533	3,319	2,901	324	138	0	14,790	70,323	57,486	2,895	60,381	101	60,482	100,564	
British Columbia	22,603	1,254	1,134	129	98	17	6,034	28,636	25,865	863	26,728	90	26,818	42,045	
Canada	214,516	11,053	14,968	1,296	586	41	58,761	273,277	224,966	13,403	238,368	1,829	240,197	393,376	

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

Table 4.-Summary of all lumber, engineered wood, and wood panels used in new & major additions to low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-Structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
INDUSTRIAL														
East Canada	9,272	525	281	39	59	3	2,023	11,296	5,141	0	5,141	0	5,141	13,866
Atlantic Provinces	435	2	1	0	0	0	11	446	60	0	60	0	60	476
Quebec	4,399	298	182	22	34	3	1,191	5,590	2,798	0	2,798	0	2,798	6,989
Ontario	4,438	225	98	16	25	0	822	5,260	2,283	0	2,283	0	2,283	6,401
West Canada	9,143	451	232	33	53	4	1,755	10,897	5,225	0	5,225	0	5,225	13,510
Prairie Provinces	5,736	259	134	19	30	0	975	6,712	3,028	0	3,028	0	3,028	8,225
British Columbia	3,407	192	98	14	23	4	779	4,186	2,197	0	2,197	0	2,197	5,285
Canada	18,415	976	513	72	113	7	3,778	22,193	10,366	0	10,366	0	10,366	27,376
COMMERCIAL														
East Canada	41,816	1,428	3,534	208	162	12	9,999	51,815	62,283	4,158	66,440	0	66,440	85,035
Atlantic Provinces	455	8	105	2	1	0	145	600	503	1	504	0	504	852
Quebec	18,529	776	2,439	85	88	12	5,599	24,128	28,559	485	29,044	0	29,044	38,650
Ontario	22,832	644	990	121	73	0	4,255	27,087	33,221	3,671	36,892	0	36,892	45,533
West Canada	26,309	1,540	1,210	178	146	9	7,362	33,671	34,037	1,314	35,351	0	35,351	51,346
Prairie Provinces	15,793	852	858	102	84	0	4,229	20,022	19,783	920	20,703	0	20,703	30,373
British Columbia	10,516	689	352	77	63	9	3,134	13,649	14,254	394	14,648	0	14,648	20,973
Canada	68,125	2,968	4,744	386	308	22	17,361	85,486	96,320	5,472	101,792	0	101,792	136,382
INSTITUTIONAL														
East Canada	36,162	1,380	3,618	268	97	9	10,854	47,016	25,276	2,412	27,687	1,097	28,785	61,408
Atlantic Provinces	3,637	154	618	36	14	0	1,506	5,143	2,363	155	2,517	197	2,714	6,499
Quebec	26,825	990	1,891	176	62	9	6,859	33,684	17,850	1,630	19,479	540	20,019	43,694
Ontario	5,700	236	1,110	56	21	0	2,489	8,189	5,063	628	5,691	361	6,052	11,215
West Canada	10,712	340	1,034	64	25	4	2,825	13,536	10,903	1,173	12,077	158	12,235	19,653
Prairie Provinces	6,732	205	607	50	15	0	1,818	8,550	7,557	1,031	8,588	83	8,672	12,886
British Columbia	3,980	135	427	15	10	4	1,007	4,986	3,346	142	3,488	75	3,563	6,768
Canada	46,873	1,720	4,653	332	122	13	13,679	60,552	36,179	3,585	39,764	1,255	41,019	81,062

Table 4.-Summary of all lumber, engineered wood, and wood panels used in new & major additions to low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 4.-Summary of all lumber, engineered wood, and wood panels used in new & major additions to low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-Structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
ALL BUILDINGS	87,250	3,332	7,433	515	318	24	22,876	110,126	92,699	6,570	99,269	1,097	100,366	160,310
East Canada	4,527	163	724	38	14	0	1,661	6,188	2,926	156	3,082	197	3,278	7,827
Atlantic Provinces	49,753	2,063	4,511	284	184	24	13,650	63,402	49,206	2,115	51,321	540	51,861	89,333
Quebec	32,971	1,106	2,198	193	120	0	7,565	40,536	40,567	4,299	44,866	361	45,227	63,149
Ontario	46,163	2,332	2,476	276	225	17	11,942	58,104	50,165	2,488	52,653	158	52,811	84,510
West Canada	28,261	1,316	1,599	170	129	0	7,022	35,283	30,368	1,951	32,319	83	32,403	51,484
Prairie Provinces	17,902	1,015	878	105	96	17	4,920	22,821	19,797	536	20,333	75	20,408	33,025
British Columbia	133,413	5,664	9,909	791	543	41	34,818	168,231	142,865	9,057	151,922	1,255	153,177	244,819
Canada														

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

Table 5.-Summary of all lumber, engineered wood, and wood panels used in alterations, renovations & remodeling to low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-Structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
INDUSTRIAL														
East Canada	9,119	813	396	55	3	0	2,900	12,019	7,380	0	7,380	0	7,380	15,709
Atlantic Provinces	87	2	1	0	0	0	9	97	28	0	28	0	28	110
Quebec	2,704	229	140	17	1	0	868	3,572	2,082	0	2,082	0	2,082	4,613
Ontario	6,328	582	255	38	1	0	2,022	8,350	5,270	0	5,270	0	5,270	10,985
West Canada	7,862	641	330	43	2	0	2,300	10,162	6,786	0	6,786	0	6,786	13,555
Prairie Provinces	6,981	581	300	39	2	0	2,084	9,065	6,124	0	6,124	0	6,124	12,126
British Columbia	881	60	31	4	0	0	217	1,098	662	0	662	0	662	1,429
Canada	16,981	1,454	726	98	5	0	5,200	22,182	14,166	0	14,166	0	14,166	29,265
COMMERCIAL														
East Canada	30,241	1,937	1,681	170	11	0	8,277	38,518	33,895	2,053	35,948	0	35,948	56,492
Atlantic Provinces	181	10	29	1	0	0	73	253	194	1	195	0	195	351
Quebec	9,026	542	847	47	4	0	2,680	11,706	11,264	230	11,494	0	11,494	17,453
Ontario	21,035	1,385	804	122	6	0	5,524	26,559	22,437	1,822	24,259	0	24,259	38,688
West Canada	21,972	1,532	955	120	7	0	5,936	27,907	23,841	979	24,820	0	24,820	40,317
Prairie Provinces	18,869	1,378	844	103	6	0	5,250	24,119	19,186	687	19,873	0	19,873	34,055
British Columbia	3,103	155	110	17	1	0	685	3,788	4,655	292	4,948	0	4,948	6,262
Canada	52,213	3,469	2,636	289	18	0	14,212	66,425	57,736	3,032	60,768	0	60,768	96,809
INSTITUTIONAL														
East Canada	9,769	399	1,423	103	19	0	3,885	13,654	7,641	1,022	8,663	541	9,203	18,256
Atlantic Provinces	1,089	51	257	16	3	0	611	1,700	722	67	789	97	887	2,143
Quebec	6,451	250	719	63	11	0	2,229	8,679	4,987	689	5,676	267	5,942	11,650
Ontario	2,229	98	446	25	5	0	1,046	3,275	1,932	266	2,198	177	2,375	4,463
West Canada	2,139	68	274	15	2	0	646	2,785	2,558	292	2,850	33	2,883	4,227
Prairie Provinces	1,423	43	159	12	2	0	434	1,856	1,808	257	2,065	18	2,083	2,898
British Columbia	717	25	115	3	1	0	212	929	750	35	785	15	800	1,329
Canada	11,908	467	1,696	118	21	0	4,531	16,439	10,200	1,313	11,513	574	12,087	22,483

Table 5.-Summary of all lumber, engineered wood, and wood panels used in alterations, renovations & remodeling to low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 5.-Summary of all lumber, engineered wood, and wood panels used in alterations, renovations & remodeling to low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-Structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
ALL BUILDINGS	49,130	3,149	3,500	328	32	0	15,062	64,191	48,916	3,075	51,991	541	52,531	90,457
East Canada	1,357	64	288	17	3	0	693	2,050	944	67	1,012	97	1,109	2,604
Atlantic Provinces	18,181	1,022	1,707	126	16	0	5,777	23,957	18,333	919	19,252	267	19,518	33,717
Quebec	29,592	2,064	1,505	185	13	0	8,592	38,184	29,639	2,088	31,727	177	31,904	54,136
Ontario	31,973	2,241	1,559	177	11	0	8,882	40,855	33,185	1,271	34,456	33	34,489	58,099
West Canada	27,272	2,002	1,303	154	9	0	7,768	35,040	27,118	944	28,061	18	28,079	49,080
Prairie Provinces	4,701	239	256	24	2	0	1,114	5,815	6,068	327	6,395	15	6,410	9,020
British Columbia	81,103	5,390	5,059	505	43	0	23,944	105,046	82,101	4,345	86,447	574	87,020	148,556
Canada														

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

Table 6.-Lumber, engineered wood, and wood panels used in floor, wall and roof framing, and sheathing and underlayment in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
INDUSTRIAL														
East Canada	18,356	1,338	677	94	62	3	4,923	23,280	12,521	0	12,521	0	12,521	29,540
Atlantic Provinces	522	4	2	1	0	0	20	542	88	0	88	0	88	586
Quebec	7,091	527	322	39	35	3	2,060	9,151	4,880	0	4,880	0	4,880	11,591
Ontario	10,743	807	353	54	27	0	2,844	13,587	7,553	0	7,553	0	7,553	17,363
West Canada	16,987	1,092	562	76	55	4	4,055	21,042	12,011	0	12,011	0	12,011	27,047
Prairie Provinces	12,703	841	434	58	32	0	3,059	15,762	9,151	0	9,151	0	9,151	20,338
British Columbia	4,284	251	129	18	23	4	996	5,280	2,860	0	2,860	0	2,860	6,710
Canada	35,343	2,429	1,239	170	117	7	8,978	44,322	24,532	0	24,532	0	24,532	56,588
COMMERCIAL														
East Canada	69,281	3,365	5,215	378	173	12	18,275	87,556	92,390	6,211	98,601	0	98,601	136,857
Atlantic Provinces	597	17	134	3	1	0	218	814	689	2	691	0	691	1,160
Quebec	26,056	1,318	3,286	132	92	12	8,279	34,334	37,578	716	38,294	0	38,294	53,481
Ontario	42,629	2,029	1,794	243	79	0	9,779	52,407	54,122	5,493	59,615	0	59,615	82,215
West Canada	47,503	3,072	2,165	298	153	9	13,298	60,801	56,258	2,293	58,552	0	58,552	90,077
Prairie Provinces	34,174	2,229	1,702	205	89	0	9,479	43,653	38,045	1,607	39,652	0	39,652	63,479
British Columbia	13,329	843	463	93	64	9	3,819	17,148	18,213	686	18,899	0	18,899	26,598
Canada	116,784	6,437	7,380	676	326	22	31,573	148,357	148,648	8,504	157,153	0	157,153	226,934
INSTITUTIONAL														
East Canada	45,461	1,779	5,041	371	115	9	14,739	60,200	32,819	3,123	35,942	1,638	37,580	78,990
Atlantic Provinces	4,669	205	875	51	17	0	2,117	6,786	3,081	195	3,276	294	3,570	8,571
Quebec	32,986	1,240	2,610	239	72	9	9,088	42,074	22,772	2,101	24,873	806	25,680	54,914
Ontario	7,806	334	1,556	81	26	0	3,535	11,341	6,966	827	7,792	538	8,330	15,506
West Canada	12,719	408	1,308	79	28	4	3,471	16,189	13,444	1,440	14,884	191	15,075	23,727
Prairie Provinces	8,065	249	766	61	17	0	2,252	10,317	9,356	1,276	10,633	101	10,734	15,684
British Columbia	4,654	159	543	18	11	4	1,219	5,873	4,088	163	4,251	90	4,341	8,043
Canada	58,180	2,187	6,349	450	143	13	18,210	76,390	46,263	4,563	50,826	1,829	52,655	102,717

Table 6.-Lumber, engineered wood, and wood panels used in floor, wall and roof framing, and sheathing and underlayment in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 6.-Lumber, engineered wood, and wood panels used in floor, wall and roof framing, and sheathing and underlayment in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe	
ALL BUILDINGS														
East Canada	133,098	6,481	10,933	843	350	24	37,938	171,036	137,730	9,334	147,064	1,638	148,702	245,387
Atlantic Provinces	5,788	226	1,012	55	18	0	2,354	8,142	3,858	197	4,056	294	4,350	10,317
Quebec	66,133	3,085	6,218	410	200	24	19,426	85,559	65,231	2,817	68,047	806	68,854	119,986
Ontario	61,178	3,170	3,703	378	132	0	16,157	77,335	68,641	6,320	74,960	538	75,498	115,084
West Canada	77,209	4,572	4,036	453	236	17	20,823	98,032	81,714	3,733	85,447	191	85,638	140,851
Prairie Provinces	54,942	3,319	2,901	324	138	0	14,790	69,732	56,553	2,883	59,436	101	59,538	99,501
British Columbia	22,267	1,254	1,134	129	98	17	6,034	28,301	25,161	850	26,010	90	26,100	41,351
Canada	210,307	11,053	14,968	1,296	586	41	58,761	269,069	219,444	13,067	232,510	1,829	234,339	386,238

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 7.-Lumber, engineered wood, and wood panels used in floor framing, and floor sheathing and underlayment in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
INDUSTRIAL														
East Canada	11,170	80	341	17	5	2	802	11,971	1,138	0	1,138	0	1,138	12,540
Atlantic Provinces	479	1	1	0	0	0	3	482	5	0	5	0	5	484
Quebec	4,288	31	190	9	3	2	432	4,720	447	0	447	0	447	4,944
Ontario	6,403	48	151	7	2	0	366	6,769	686	0	686	0	686	7,113
West Canada	10,995	85	254	12	3	0	626	11,621	1,421	0	1,421	0	1,421	12,331
Prairie Provinces	8,071	65	197	10	3	0	484	8,554	1,091	0	1,091	0	1,091	9,100
British Columbia	2,924	20	57	3	1	0	142	3,066	330	0	330	0	330	3,231
Canada	22,165	165	596	29	8	2	1,427	23,592	2,559	0	2,559	0	2,559	24,871
COMMERCIAL														
East Canada	23,025	298	797	117	30	1	3,292	26,317	3,867	0	3,867	0	3,867	28,250
Atlantic Provinces	250	5	3	1	0	0	27	277	41	0	41	0	41	298
Quebec	8,956	114	442	37	14	1	1,284	10,240	1,421	0	1,421	0	1,421	10,950
Ontario	13,819	180	352	79	15	0	1,980	15,800	2,405	0	2,405	0	2,405	17,002
West Canada	21,841	430	593	86	18	0	2,835	24,675	5,544	0	5,544	0	5,544	27,448
Prairie Provinces	16,000	270	460	58	13	0	1,932	17,932	3,710	0	3,710	0	3,710	19,787
British Columbia	5,840	159	133	28	6	0	903	6,743	1,834	0	1,834	0	1,834	7,660
Canada	44,866	728	1,390	202	48	1	6,126	50,992	9,411	0	9,411	0	9,411	55,698
INSTITUTIONAL														
East Canada	8,896	755	3,644	284	62	5	9,815	18,711	2,051	39	2,090	1,638	3,728	20,575
Atlantic Provinces	703	96	650	44	10	0	1,548	2,251	190	5	195	294	489	2,495
Quebec	7,148	445	1,917	172	36	5	5,660	12,809	1,462	21	1,483	806	2,289	13,954
Ontario	1,045	214	1,076	68	16	0	2,606	3,652	399	13	412	538	950	4,127
West Canada	2,639	170	759	53	12	0	1,955	4,594	605	13	618	191	809	4,999
Prairie Provinces	1,805	133	471	44	9	0	1,450	3,255	475	11	485	101	587	3,549
British Columbia	833	37	288	9	3	0	505	1,339	130	3	132	90	222	1,450
Canada	11,535	924	4,402	338	74	5	11,770	23,306	2,656	52	2,708	1,829	4,537	25,574

Table 7.-Lumber, engineered wood, and wood panels used in floor framing, and floor sheathing and underlayment in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 7.-Lumber, engineered wood, and wood panels used in floor framing, and floor sheathing and under-layment in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe	
ALL BUILDINGS														
East Canada	43,091	1,133	4,782	418	97	8	13,908	56,999	7,055	39	7,094	1,638	8,732	61,366
Atlantic Provinces	1,432	101	654	45	11	0	1,578	3,010	235	5	240	294	534	3,277
Quebec	20,392	590	2,549	218	52	8	7,377	27,769	3,329	21	3,351	806	4,157	29,847
Ontario	21,268	442	1,578	155	34	0	4,953	26,220	3,491	13	3,504	538	4,041	28,241
West Canada	35,475	685	1,606	151	34	0	5,416	40,890	7,570	13	7,583	191	7,774	44,778
Prairie Provinces	25,876	468	1,128	112	24	0	3,866	29,742	5,275	11	5,286	101	5,388	32,436
British Columbia	9,598	216	478	40	10	0	1,550	11,148	2,295	3	2,297	90	2,387	12,342
Canada	78,566	1,817	6,387	569	131	8	19,324	97,890	14,625	52	14,678	1,829	16,507	106,143
Total use for:														
Floor joists	5,987	1,817	na	0	na	na	3,635	9,622	na	na	na	na	na	na
Rim boards	3,460	na	na	40	131	na	703	4,163	na	na	na	na	na	na
Beams	69,118	na	6,387	529	na	8	14,986	84,105	na	na	na	na	na	na
Total	78,566	1,817	6,387	569	131	8	19,324	97,890	na	na	na	na	na	na

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 8.-Lumber, engineered wood, and wood panels used in wall framing, and wall sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
INDUSTRIAL														
East Canada	2,609	na ⁸	2	3	na	1	57	2,666	4,989	0	4,989	na	4,989	5,161
Atlantic Provinces	29	na	0	0	na	0	6	35	67	0	67	na	67	68
Quebec	1,003	na	1	1	na	1	19	1,022	1,914	0	1,914	na	1,914	1,979
Ontario	1,577	na	1	2	na	0	31	1,609	3,009	0	3,009	na	3,009	3,113
West Canada	1,852	na	0	3	na	4	109	1,961	4,685	0	4,685	na	4,685	4,304
Prairie Provinces	1,455	na	0	2	na	0	32	1,487	3,528	0	3,528	na	3,528	3,251
British Columbia	397	na	0	1	na	4	77	474	1,158	0	1,158	na	1,158	1,053
Canada	4,461	na	2	6	na	4	166	4,627	9,675	0	9,675	na	9,675	9,465
COMMERCIAL														
East Canada	24,854	na	3,639	64	na	0	4,673	29,527	29,098	6,211	35,308	na	35,308	47,181
Atlantic Provinces	275	na	130	2	na	0	155	430	353	2	355	na	355	607
Quebec	10,180	na	2,537	24	na	0	2,924	13,104	13,212	716	13,927	na	13,927	20,068
Ontario	14,399	na	973	39	na	0	1,594	15,993	15,533	5,493	21,027	na	21,027	26,507
West Canada	11,630	na	853	59	na	8	1,932	13,562	17,290	2,293	19,583	na	19,583	23,354
Prairie Provinces	8,032	na	690	31	na	0	1,188	9,220	12,294	1,607	13,902	na	13,902	16,171
British Columbia	3,598	na	163	28	na	8	744	4,342	4,995	686	5,682	na	5,682	7,183
Canada	36,484	na	4,492	123	na	9	6,605	43,089	46,388	8,504	54,892	na	54,892	70,535
INSTITUTIONAL														
East Canada	14,445	na	278	67	na	1	1,362	15,807	9,943	780	10,723	na	10,723	21,168
Atlantic Provinces	1,676	na	26	5	na	0	111	1,786	906	45	951	na	951	2,262
Quebec	9,561	na	193	53	na	1	1,056	10,617	7,022	533	7,554	na	7,554	14,394
Ontario	3,208	na	59	9	na	0	195	3,404	2,016	202	2,217	na	2,217	4,512
West Canada	3,528	na	103	20	na	0	419	3,948	4,689	366	5,055	na	5,055	6,475
Prairie Provinces	2,294	na	72	13	na	0	280	2,573	3,075	326	3,401	na	3,401	4,274
British Columbia	1,235	na	31	7	na	0	140	1,374	1,614	40	1,654	na	1,654	2,201
Canada	17,973	na	381	87	na	1	1,781	19,754	14,632	1,146	15,778	na	15,778	27,643

Table 8.-Lumber, engineered wood, and wood panels used in wall framing, and wall sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 8.-Lumber, engineered wood, and wood panels used in wall framing, and wall sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
ALL BUILDINGS														
East Canada	41,908	na	3,919	134	na	2	6,092	48,000	44,030	6,990	51,020	na	51,020	73,510
Atlantic Provinces	1,979	na	156	7	na	0	272	2,251	1,326	47	1,372	na	1,372	2,937
Quebec	20,744	na	2,731	77	na	2	3,999	24,743	22,147	1,248	23,395	na	23,395	36,440
Ontario	19,185	na	1,033	49	na	0	1,821	21,006	20,558	5,695	26,253	na	26,253	34,132
West Canada	17,011	na	956	82	na	12	2,460	19,471	26,664	2,659	29,324	na	29,324	34,133
Prairie Provinces	11,780	na	762	46	na	0	1,500	13,280	18,897	1,933	20,830	na	20,830	23,695
British Columbia	5,231	na	193	36	na	12	960	6,191	7,767	727	8,494	na	8,494	10,438
Canada	58,918	na	4,875	216	na	14	8,552	67,470	70,694	9,650	80,344	na	80,344	107,642
Total use for:														
Interior wall framing	20,611	na	0	0	na	na	0	20,611	na	na	na	na	na	na
Exterior wall framing	28,405	na	915	92	na	14	2,602	31,007	na	na	na	na	na	na
Headers	9,023	na	3,934	122	na	na	5,886	14,910	na	na	na	na	na	na
Columns	879	na	25	2	na	na	63	942						
Total	58,918	0	4,875	216	0	14	8,552	67,470	na	na	na	na	na	na

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 9.-Lumber, engineered wood, and wood panels used in roof framing and roof sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
INDUSTRIAL														
East Canada	4,577	1,258	334	74	57	0	4,065	8,642	6,394	0	6,394	na ⁸	6,394	11,839
Atlantic Provinces	15	3	1	0	0	0	11	25	17	0	17	na	17	34
Quebec	1,800	496	132	29	33	0	1,608	3,408	2,520	0	2,520	na	2,520	4,668
Ontario	2,763	759	201	45	25	0	2,446	5,209	3,858	0	3,858	na	3,858	7,138
West Canada	4,140	1,007	308	60	52	0	3,320	7,460	5,904	0	5,904	na	5,904	10,412
Prairie Provinces	3,178	775	237	46	30	0	2,543	5,721	4,533	0	4,533	na	4,533	7,987
British Columbia	962	231	72	14	22	0	777	1,740	1,372	0	1,372	na	1,372	2,425
Canada	8,718	2,264	642	134	109	1	7,385	16,102	12,298	0	12,298	na	12,298	22,252
COMMERCIAL														
East Canada	21,402	3,066	779	197	143	11	10,311	31,712	59,426	0	59,426	na	59,426	61,425
Atlantic Provinces	72	12	2	1	0	0	36	107	296	0	296	na	296	255
Quebec	6,920	1,204	307	71	79	11	4,070	10,991	22,946	0	22,946	na	22,946	22,464
Ontario	14,410	1,849	470	125	64	0	6,204	20,615	36,184	0	36,184	na	36,184	38,706
West Canada	14,032	2,643	719	153	135	1	8,532	22,564	33,424	0	33,424	na	33,424	39,276
Prairie Provinces	10,142	1,959	552	116	76	0	6,359	16,501	22,041	0	22,041	na	22,041	27,521
British Columbia	3,890	684	167	37	58	1	2,173	6,063	11,383	0	11,383	na	11,383	11,754
Canada	35,434	5,709	1,498	350	278	12	18,842	54,276	92,850	0	92,850	na	92,850	100,701
INSTITUTIONAL														
East Canada	22,120	1,024	1,119	20	53	3	3,563	25,682	20,825	2,304	23,129	na	23,129	37,247
Atlantic Provinces	2,291	110	200	2	7	0	458	2,749	1,985	146	2,130	na	2,130	3,814
Quebec	16,277	795	499	14	36	3	2,372	18,649	14,289	1,547	15,836	na	15,836	26,567
Ontario	3,552	120	420	4	10	0	733	4,285	4,551	612	5,163	na	5,163	6,867
West Canada	6,552	239	447	6	16	4	1,096	7,647	8,151	1,060	9,211	na	9,211	12,253
Prairie Provinces	3,966	116	223	4	8	0	522	4,488	5,807	940	6,747	na	6,747	7,861
British Columbia	2,586	122	224	2	8	4	574	3,159	2,344	120	2,465	na	2,465	4,392
Canada	28,671	1,263	1,566	26	69	7	4,659	33,330	28,976	3,365	32,340	na	32,340	49,500

Table 9.-Lumber, engineered wood, and wood panels used in roof framing and roof sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 9.-Lumber, engineered wood, and wood panels used in roof framing and roof sheathing in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
ALL BUILDINGS														
East Canada	48,099	5,348	2,232	291	253	14	17,938	66,037	86,644	2,304	88,949	na	88,949	110,512
Atlantic Provinces	2,377	126	202	3	7	0	504	2,881	2,298	146	2,443	na	2,443	4,103
Quebec	24,997	2,495	938	114	147	14	8,050	33,047	39,755	1,547	41,302	na	41,302	53,698
Ontario	20,725	2,728	1,092	174	99	0	9,384	30,109	44,592	612	45,204	na	45,204	52,711
West Canada	24,724	3,888	1,474	219	202	5	12,948	37,671	47,479	1,060	48,540	na	48,540	61,941
Prairie Provinces	17,286	2,850	1,012	166	114	0	9,424	26,710	32,380	940	33,320	na	33,320	43,370
British Columbia	7,438	1,038	463	53	88	5	3,524	10,962	15,099	120	15,219	na	15,219	18,572
Canada	72,823	9,236	3,706	511	455	19	30,886	103,709	134,124	3,365	137,488	na	137,488	172,453
Total use for:														
Trusses/rafters	44,930	9,236	na	0	na	19	18,781	63,711	na	na	na	na	na	na
Rim boards	1,009	na	na	127	455	na	2,265	3,274	na	na	na	na	na	na
Beams	26,883	na	3,706	383	na	na	9,840	36,723	na	na	na	na	na	na
Total	72,823	9,236	3,706	511	455	19	30,886	103,709	na	na	na	na	na	na

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 10.-Lumber, engineered wood, and wood panels used in siding, soffit, fascia, and exterior trim in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels														
	Lumber & Engineered Wood								Wood Panels						TOTAL
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷		
		I-Joist	Glulam	SCL ²	Rim	CLT ⁴	Total ⁵		Softwood	OSB	Total				
					Board ³									Th. ft ²	
Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe		
INDUSTRIAL															
East Canada	35	na ⁸	na	na	na	na	na	35	0	0	0	na	0	35	
Atlantic Provinces	0	na	na	na	na	na	na	0	0	0	0	na	0	0	
Quebec	12	na	na	na	na	na	na	12	0	0	0	na	0	12	
Ontario	23	na	na	na	na	na	na	23	0	0	0	na	0	23	
West Canada	18	na	na	na	na	na	na	18	0	0	0	na	0	18	
Prairie Provinces	14	na	na	na	na	na	na	14	0	0	0	na	0	14	
British Columbia	4	na	na	na	na	na	na	4	0	0	0	na	0	4	
Canada	53	na	na	na	na	na	na	53	0	0	0	na	0	53	
COMMERCIAL															
East Canada	2,777	na	na	na	na	na	na	2,777	3,788	0	3,788	na	3,788	4,671	
Atlantic Provinces	39	na	na	na	na	na	na	39	8	0	8	na	8	43	
Quebec	1,499	na	na	na	na	na	na	1,499	2,244	0	2,244	na	2,244	2,621	
Ontario	1,239	na	na	na	na	na	na	1,239	1,536	0	1,536	na	1,536	2,007	
West Canada	777	na	na	na	na	na	na	777	1,619	0	1,619	na	1,619	1,587	
Prairie Provinces	488	na	na	na	na	na	na	488	923	0	923	na	923	949	
British Columbia	289	na	na	na	na	na	na	289	696	0	696	na	696	637	
Canada	3,554	na	na	na	na	na	na	3,554	5,407	0	5,407	na	5,407	6,257	
INSTITUTIONAL															
East Canada	470	na	na	na	na	na	na	470	98	311	408	na	408	674	
Atlantic Provinces	57	na	na	na	na	na	na	57	4	26	30	na	30	72	
Quebec	289	na	na	na	na	na	na	289	64	217	282	na	282	430	
Ontario	124	na	na	na	na	na	na	124	29	67	97	na	97	172	
West Canada	132	na	na	na	na	na	na	132	17	25	43	na	43	153	
Prairie Provinces	90	na	na	na	na	na	na	90	10	12	21	na	21	100	
British Columbia	42	na	na	na	na	na	na	42	8	14	22	na	22	53	
Canada	602	na	na	na	na	na	na	602	115	336	451	na	451	827	

Table 10.-Lumber, engineered wood, and wood panels used in siding, soffit, fascia, and exterior trim in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 10.-Lumber, engineered wood, and wood panels used in siding, soffit, fascia, and exterior trim in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels														
	Lumber & Engineered Wood								Wood Panels						
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>	
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>				
ALL BUILDINGS															
East Canada	3,282	na	na	na	na	na	na	3,282	3,885	311	4,196	na	4,196	5,380	
Atlantic Provinces	96	na	na	na	na	na	na	96	12	26	38	na	38	115	
Quebec	1,801	na	na	na	na	na	na	1,801	2,308	217	2,526	na	2,526	3,063	
Ontario	1,385	na	na	na	na	na	na	1,385	1,565	67	1,633	na	1,633	2,201	
West Canada	927	na	na	na	na	na	na	927	1,637	25	1,662	na	1,662	1,758	
Prairie Provinces	591	na	na	na	na	na	na	591	933	12	945	na	945	1,063	
British Columbia	336	na	na	na	na	na	na	336	704	14	718	na	718	694	
Canada	4,208	na	na	na	na	na	na	4,208	5,522	336	5,858	na	5,858	7,138	

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 11.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building finishing applications by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-Structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
INDUSTRIAL														
East Canada	1,158	na ⁸	na	na	na	na	na	1,158	na	na	na	610	610	1,462
Atlantic Provinces	38	na	na	na	na	na	na	38	na	na	na	3	3	40
Quebec	372	na	na	na	na	na	na	372	na	na	na	99	99	422
Ontario	747	na	na	na	na	na	na	747	na	na	na	507	507	1,000
West Canada	1,152	na	na	na	na	na	na	1,152	na	na	na	323	323	1,314
Prairie Provinces	828	na	na	na	na	na	na	828	na	na	na	149	149	903
British Columbia	323	na	na	na	na	na	na	323	na	na	na	174	174	410
Canada	2,310	na	na	na	na	na	na	2,310	na	na	na	933	933	2,776
COMMERCIAL														
East Canada	59,448	na	na	na	na	na	na	59,448	na	na	na	6,735	6,735	62,815
Atlantic Provinces	2245.29	na	na	na	na	na	na	2,245	na	na	na	128	128	2,309
Quebec	41576.2	na	na	na	na	na	na	41,576	na	na	na	1,983	1,983	42,568
Ontario	15626.5	na	na	na	na	na	na	15,626	na	na	na	4,623	4,623	17,938
West Canada	4,589	na	na	na	na	na	na	4,589	na	na	na	3,751	3,751	6,464
Prairie Provinces	3163.88	na	na	na	na	na	na	3,164	na	na	na	2,307	2,307	4,317
British Columbia	1424.97	na	na	na	na	na	na	1,425	na	na	na	1,444	1,444	2,147
Canada	64,037	na	na	na	na	na	na	64,037	na	na	na	10,485	10,485	69,280
INSTITUTIONAL														
East Canada	13,674	na	na	na	na	na	na	13,674	na	na	na	8,524	8,524	17,936
Atlantic Provinces	1,268	na	na	na	na	na	na	1,268	na	na	na	465	465	1,500
Quebec	7,621	na	na	na	na	na	na	7,621	na	na	na	4,198	4,198	9,720
Ontario	4,785	na	na	na	na	na	na	4,785	na	na	na	3,861	3,861	6,716
West Canada	3,222	na	na	na	na	na	na	3,222	na	na	na	2,753	2,753	4,599
Prairie Provinces	2,368	na	na	na	na	na	na	2,368	na	na	na	1,853	1,853	3,294
British Columbia	855	na	na	na	na	na	na	855	na	na	na	900	900	1,305
Canada	16,897	na	na	na	na	na	na	16,897	na	na	na	11,277	11,277	22,535

Table 11.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building finishing applications by building type and geography, Canada 2012

Table 11.-Summary of all lumber, engineered wood, and wood panels used in low-rise nonresidential building finishing applications by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-Structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
ALL BUILDINGS														
East Canada	74,280	na	na	na	na	na	na	74,280	na	na	na	15,868	15,868	82,214
Atlantic Provinces	3,552	na	na	na	na	na	na	3,552	na	na	na	596	596	3,850
Quebec	49,569	na	na	na	na	na	na	49,569	na	na	na	6,281	6,281	52,710
Ontario	21,159	na	na	na	na	na	na	21,159	na	na	na	8,991	8,991	25,655
West Canada	8,963	na	na	na	na	na	na	8,963	na	na	na	6,827	6,827	12,377
Prairie Provinces	6,360	na	na	na	na	na	na	6,360	na	na	na	4,309	4,309	8,515
British Columbia	2,603	na	na	na	na	na	na	2,603	na	na	na	2,518	2,518	3,862
Canada	83,243	na	na	na	na	na	na	83,243	na	na	na	22,696	22,696	94,591

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 12.-Lumber, engineered wood, and wood panels used in finished floors, walls, and ceilings in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
INDUSTRIAL														
East Canada	0	na ⁸	na	na	na	na	na	0	na	na	na	24	24	12
Atlantic Provinces	0	na	na	na	na	na	na	0	na	na	na	0	0	0
Quebec	0	na	na	na	na	na	na	0	na	na	na	8	8	4
Ontario	0	na	na	na	na	na	na	0	na	na	na	16	16	8
West Canada	0	na	na	na	na	na	na	0	na	na	na	25	25	12
Prairie Provinces	0	na	na	na	na	na	na	0	na	na	na	19	19	10
British Columbia	0	na	na	na	na	na	na	0	na	na	na	5	5	3
Canada	0	na	na	na	na	na	na	0	na	na	na	49	49	24
COMMERCIAL														
East Canada	369	na	na	na	na	na	na	369	na	na	na	889	889	813
Atlantic Provinces	28	na	na	na	na	na	na	28	na	na	na	5	5	30
Quebec	142	na	na	na	na	na	na	142	na	na	na	406	406	345
Ontario	199	na	na	na	na	na	na	199	na	na	na	478	478	438
West Canada	492	na	na	na	na	na	na	492	na	na	na	464	464	724
Prairie Provinces	479	na	na	na	na	na	na	479	na	na	na	266	266	612
British Columbia	13	na	na	na	na	na	na	13	na	na	na	198	198	112
Canada	861	na	na	na	na	na	na	861	na	na	na	1,353	1,353	1,537
INSTITUTIONAL														
East Canada	4,768	na	na	na	na	na	na	4,768	na	na	na	138	138	4,837
Atlantic Provinces	458	na	na	na	na	na	na	458	na	na	na	27	27	472
Quebec	2,050	na	na	na	na	na	na	2,050	na	na	na	71	71	2,086
Ontario	2,260	na	na	na	na	na	na	2,260	na	na	na	39	39	2,279
West Canada	588	na	na	na	na	na	na	588	na	na	na	68	68	622
Prairie Provinces	351	na	na	na	na	na	na	351	na	na	na	54	54	378
British Columbia	237	na	na	na	na	na	na	237	na	na	na	14	14	244
Canada	5,356	na	na	na	na	na	na	5,356	na	na	na	205	205	5,458

Table 12.-Lumber, engineered wood, and wood panels used in finished floors, walls, and ceilings in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 12.-Lumber, engineered wood, and wood panels used in finished floors, walls, and ceilings in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural		TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood Plywood	OSB	Total	Panels ⁶	Total ⁷	
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
ALL BUILDINGS														
East Canada	5,136	na	na	na	na	na	na	5,136	na	na	na	1,051	1,051	5,662
Atlantic Provinces	486	na	na	na	na	na	na	486	na	na	na	32	32	502
Quebec	2,192	na	na	na	na	na	na	2,192	na	na	na	486	486	2,435
Ontario	2,458	na	na	na	na	na	na	2,458	na	na	na	533	533	2,725
West Canada	1,080	na	na	na	na	na	na	1,080	na	na	na	556	556	1,358
Prairie Provinces	830	na	na	na	na	na	na	830	na	na	na	338	338	1,000
British Columbia	250	na	na	na	na	na	na	250	na	na	na	217	217	358
Canada	6,216	na	na	na	na	na	na	6,216	na	na	na	1,607	1,607	7,020

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 13.-Lumber, engineered wood, and wood panels used in doors, windows, interior trim and moldings in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹ <i>Th. bf</i>	Engineered wood						TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glulam <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>		Softwood Plywood <i>Th. ft²</i>	OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>			
INDUSTRIAL														
East Canada	1,123	na ⁸	na	na	na	na	na	1,123	na	na	na	0	0	1,123
Atlantic Provinces	38	na	na	na	na	na	na	38	na	na	na	0	0	38
Quebec	368	na	na	na	na	na	na	368	na	na	na	0	0	368
Ontario	717	na	na	na	na	na	na	717	na	na	na	0	0	717
West Canada	1,135	na	na	na	na	na	na	1,135	na	na	na	0	0	1,135
Prairie Provinces	821	na	na	na	na	na	na	821	na	na	na	0	0	821
British Columbia	314	na	na	na	na	na	na	314	na	na	na	0	0	314
Canada	2,258	na	na	na	na	na	na	2,258	na	na	na	0	0	2,258
COMMERCIAL														
East Canada	58,759	na	na	na	na	na	na	58,759	na	na	na	304	304	58,911
Atlantic Provinces	2,211	na	na	na	na	na	na	2,211	na	na	na	5	5	2,214
Quebec	41,359	na	na	na	na	na	na	41,359	na	na	na	171	171	41,444
Ontario	15,189	na	na	na	na	na	na	15,189	na	na	na	127	127	15,252
West Canada	3,920	na	na	na	na	na	na	3,920	na	na	na	98	98	3,969
Prairie Provinces	2,574	na	na	na	na	na	na	2,574	na	na	na	59	59	2,603
British Columbia	1,347	na	na	na	na	na	na	1,347	na	na	na	39	39	1,366
Canada	62,679	na	na	na	na	na	na	62,679	na	na	na	401	401	62,880
INSTITUTIONAL														
East Canada	8,660	na	na	na	na	na	na	8,660	na	na	na	4,345	4,345	10,833
Atlantic Provinces	798	na	na	na	na	na	na	798	na	na	na	256	256	926
Quebec	5,489	na	na	na	na	na	na	5,489	na	na	na	2,917	2,917	6,948
Ontario	2,373	na	na	na	na	na	na	2,373	na	na	na	1,173	1,173	2,959
West Canada	2,564	na	na	na	na	na	na	2,564	na	na	na	1,413	1,413	3,270
Prairie Provinces	1,977	na	na	na	na	na	na	1,977	na	na	na	1,149	1,149	2,552
British Columbia	586	na	na	na	na	na	na	586	na	na	na	265	265	718
Canada	11,224	na	na	na	na	na	na	11,224	na	na	na	5,759	5,759	14,103

Table 13.-Lumber, engineered wood, and wood panels used in doors, windows, interior trim and moldings in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 13.-Lumber, engineered wood, and wood panels used in doors, windows, interior trim and moldings in low-rise nonresidential building construction, by building type and geography, Canada 2012
cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Softwood	OSB	Total			
<i>Th. bf</i>	<i>Th. lf</i>	<i>Th. bf</i>	<i>Th. cf</i>	<i>Th. ft²</i>	<i>Th. cf</i>	<i>Th. bfe</i>	<i>Th. bfe</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. ft²</i>	<i>Th. bfe</i>	
ALL BUILDINGS														
East Canada	68,542	na	na	na	na	na	na	68,542	na	na	na	4,649	4,649	70,867
Atlantic Provinces	3,048	na	na	na	na	na	na	3,048	na	na	na	261	261	3,178
Quebec	47,216	na	na	na	na	na	na	47,216	na	na	na	3,088	3,088	48,760
Ontario	18,279	na	na	na	na	na	na	18,279	na	na	na	1,299	1,299	18,928
West Canada	7,619	na	na	na	na	na	na	7,619	na	na	na	1,511	1,511	8,374
Prairie Provinces	5,372	na	na	na	na	na	na	5,372	na	na	na	1,208	1,208	5,976
British Columbia	2,247	na	na	na	na	na	na	2,247	na	na	na	303	303	2,398
Canada	76,161	na	na	na	na	na	na	76,161	na	na	na	6,160	6,160	79,241

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 14.-Lumber, engineered wood, and wood panels used in cabinetry and built-in furniture in low-rise nonresidential building construction, by building type and geography, Canada 2012

Building type & geography	Lumber, Engineered Wood, and Wood Panels														
	Lumber & Engineered Wood								Wood Panels						
	Lumber ¹ <i>Th. bf</i>	Engineered wood							TOTAL <i>Th. bfe</i>	Structural Panels			Non-structural Panels ⁶ <i>Th. ft²</i>	Total ⁷ <i>Th. ft²</i>	TOTAL <i>Th. bfe</i>
		I-Joist <i>Th. lf</i>	Glula <i>Th. bf</i>	SCL ² <i>Th. cf</i>	Rim Board ³ <i>Th. ft²</i>	CLT ⁴ <i>Th. cf</i>	Total ⁵ <i>Th. bfe</i>	Plywood <i>Th. ft²</i>		OSB <i>Th. ft²</i>	Total <i>Th. ft²</i>				
INDUSTRIAL															
East Canada	34	na ⁸	na	na	na	na	na	34	na	na	na	585	585	327	
Atlantic Provinces	0	na	na	na	na	na	na	0	na	na	na	3	3	2	
Quebec	4	na	na	na	na	na	na	4	na	na	na	91	91	50	
Ontario	30	na	na	na	na	na	na	30	na	na	na	491	491	275	
West Canada	17	na	na	na	na	na	na	17	na	na	na	299	299	166	
Prairie Provinces	7	na	na	na	na	na	na	7	na	na	na	130	130	73	
British Columbia	10	na	na	na	na	na	na	10	na	na	na	169	169	94	
Canada	51	na	na	na	na	na	na	51	na	na	na	884	884	493	
COMMERCIAL															
East Canada	321	na	na	na	na	na	na	321	na	na	na	5,542	5,542	3,092	
Atlantic Provinces	6	na	na	na	na	na	na	6	na	na	na	118	118	65	
Quebec	75	na	na	na	na	na	na	75	na	na	na	1,406	1,406	778	
Ontario	239	na	na	na	na	na	na	239	na	na	na	4,018	4,018	2,248	
West Canada	176	na	na	na	na	na	na	176	na	na	na	3,189	3,189	1,771	
Prairie Provinces	111	na	na	na	na	na	na	111	na	na	na	1,982	1,982	1,102	
British Columbia	65	na	na	na	na	na	na	65	na	na	na	1,207	1,207	669	
Canada	497	na	na	na	na	na	na	497	na	na	na	8,731	8,731	4,863	
INSTITUTIONAL															
East Canada	228	na	na	na	na	na	na	228	na	na	na	4,041	4,041	2,249	
Atlantic Provinces	11	na	na	na	na	na	na	11	na	na	na	181	181	102	
Quebec	69	na	na	na	na	na	na	69	na	na	na	1,210	1,210	674	
Ontario	148	na	na	na	na	na	na	148	na	na	na	2,650	2,650	1,473	
West Canada	64	na	na	na	na	na	na	64	na	na	na	1,272	1,272	700	
Prairie Provinces	33	na	na	na	na	na	na	33	na	na	na	651	651	358	
British Columbia	31	na	na	na	na	na	na	31	na	na	na	622	622	342	
Canada	292	na	na	na	na	na	na	292	na	na	na	5,313	5,313	2,949	

Table 14.-Lumber, engineered wood, and wood panels used in cabinetry and built-in furniture in low-rise nonresidential building construction, by building type and geography, Canada 2012

Table 14.-Lumber, engineered wood, and wood panels used in cabinetry and built-in furniture in low-rise nonresidential building construction, by building type and geography, Canada 2012 cont.

Building type & geography	Lumber, Engineered Wood, and Wood Panels													
	Lumber & Engineered Wood								Wood Panels					
	Lumber ¹	Engineered wood						TOTAL	Structural Panels			Non-structural Panels ⁶	Total ⁷	TOTAL
		I-Joist	Glulam	SCL ²	Rim Board ³	CLT ⁴	Total ⁵		Plywood	OSB	Total			
	Th. bf	Th. lf	Th. bf	Th. cf	Th. ft ²	Th. cf	Th. bfe	Th. bfe	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. ft ²	Th. bfe
ALL BUILDINGS														
East Canada	583	na	na	na	na	na	na	583	na	na	na	10,168	10,168	5,668
Atlantic Provinces	17	na	na	na	na	na	na	17	na	na	na	303	303	169
Quebec	149	na	na	na	na	na	na	149	na	na	na	2,707	2,707	1,502
Ontario	417	na	na	na	na	na	na	417	na	na	na	7,159	7,159	3,997
West Canada	257	na	na	na	na	na	na	257	na	na	na	4,761	4,761	2,637
Prairie Provinces	151	na	na	na	na	na	na	151	na	na	na	2,763	2,763	1,533
British Columbia	106	na	na	na	na	na	na	106	na	na	na	1,998	1,998	1,105
Canada	841	na	na	na	na	na	na	841	na	na	na	14,929	14,929	8,305

¹Includes framing lumber, boards, and wood trusses.

²Structural Composite Lumber (SCL) includes includes laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber.

³Includes OSB and strand lumber rim boards.

⁴Cross laminated timber (CLT). Small volumes due to product infancy.

⁵Includes glulam, and the board foot equivalent (bfe) of engineered wood (1 lf I-joist = 2 bfe; 1 ft³ SCL and CLT = 16 bfe, 1 ft², 3/8" basis = 0.5 BF bfe).

⁶Includes hardboard, insulation board, particleboard, medium density fiberboard, and hardwood plywood.

⁷1 ft², 3/8" basis = 0.5 bfe.

⁸na = Not Applicable

Table 15.-Actual and potential floor areas for wood construction in new low-rise nonresidential buildings, by building type, Canada 2012

Building type	Actual Floor Area of New Buildings & Additions						
	Wood		Concrete		Steel		TOTAL
	<i>Th. ft²</i>	%	<i>Th. ft²</i>	%	<i>Th. ft²</i>	%	<i>Th. ft²</i>
Industrial	1,126	6%	2,831	14%	15,936	80%	19,892
Commercial	7,138	9%	20,083	25%	53,639	66%	80,860
Institutional	3,075	13%	8,033	34%	12,302	53%	23,411
All Buildings	11,339	9%	30,947	25%	81,877	66%	124,163
Building type	Potential Wood Floor Area of New Buildings & Additions						
	Wood		from Concrete		from Steel		TOTAL
	<i>Th. ft²</i>	%	<i>Th. ft²</i>	%	<i>Th. ft²</i>	%	<i>Th. ft²</i>
Industrial	--	--	1,779	16%	9,659	84%	11,438
Commercial	--	--	9,170	22%	32,504	78%	41,675
Institutional	--	--	5,673	35%	10,315	65%	15,987
All Buildings	--	--	16,622	24%	52,478	76%	69,100

Table 15.-Actual and potential floor areas for wood construction in new low-rise nonresidential buildings, by building type, Canada 2012

Table 16.-Net potential change in wood volume in low-rise nonresidential building construction, by building type, application and geography, Canada 2012

Building type	Application				Region		Province					CANADA
	Floors	Walls	Roofs	Siding ¹	East Canada	West Canada	Atlantic Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	
	Lumber (Th. bf)											
Industrial	94,750	4,653	6,362	43	51,737	54,071	1,669	26,683	23,386	32,163	21,908	105,808
Commercial	232,989	110,030	42,910	18,254	252,443	151,740	1,390	108,129	142,925	91,595	60,145	404,183
Institutional	83,009	26,851	27,960	1,013	108,574	30,260	12,088	75,441	21,045	17,168	13,091	138,834
All Buildings	410,748	141,534	77,233	19,310	412,755	236,070	15,147	210,253	187,356	140,926	95,144	648,825
	Engineered Wood (Th. bfe)											
Industrial	7,515	3	5,317	0	6,368	6,467	20	3,809	2,540	3,458	3,009	12,836
Commercial	35,267	10,452	13,386	0	36,706	22,399	183	15,769	20,755	12,616	9,783	59,105
Institutional	78,211	1,615	5,269	0	66,313	18,782	11,978	33,111	21,224	9,886	8,896	85,095
All Buildings	120,993	12,070	23,972	0	109,387	47,649	12,180	52,689	44,518	25,960	21,689	157,036
	Structural Panels (Th. ft ²)											
Industrial	13,611	10,564	8,886	0	13,506	19,556	42	7,713	5,751	10,106	9,450	33,062
Commercial	43,831	152,874	151,917	39,831	269,852	118,601	1,167	117,839	150,846	68,686	49,915	388,453
Institutional	16,870	21,543	28,418	1,182	48,418	19,595	6,267	28,427	13,725	13,634	5,961	68,013
All Buildings	74,313	184,981	189,221	41,013	331,775	157,752	7,476	153,978	170,321	92,426	65,327	489,528
	Nonstructural Panels (Th. ft ²)											
Industrial	0	na ²	na	0	0	0	0	0	0	0	0	0
Commercial	0	na	na	0	0	0	0	0	0	0	0	0
Institutional	10,078	na	na	0	8,655	1,424	1,740	3,865	3,049	678	745	10,078
All Buildings	10,078	na	na	0	8,655	1,424	1,740	3,865	3,049	678	745	10,078
	Lumber, Engineered Wood, Structural Panels, and Non-Structural Panels (Th. bfe)											
Industrial	109,071	9,938	16,123	43	64,859	70,316	1,709	34,349	28,801	40,674	29,642	135,175
Commercial	290,171	196,920	132,255	38,169	424,076	233,439	2,156	182,817	239,103	138,553	94,886	657,515
Institutional	174,694	39,238	47,438	1,604	203,423	59,551	28,069	124,698	50,656	34,211	25,341	262,974
All Buildings	573,937	246,095	195,816	39,817	692,357	363,307	31,934	341,864	318,559	213,438	149,868	1,055,664

¹Includes siding, soffit, fascia and exterior trim.

²Not applicable.

Table 16.-Net potential change in wood volume in low-rise nonresidential building construction, by building type, application and geography, Canada 2012

Table 17.-Percentage net potential change in wood volume in low-rise nonresidential building construction, by building type, application and geography, Canada 2012

Building type	Application				Region		Province					CANADA
	Floors	Walls	Roofs	Siding ¹	East Canada	West Canada	Atlantic Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	
	Lumber (% bf)											
Industrial	15%	1%	1%	0%	8%	8%	0%	4%	4%	5%	3%	16%
Commercial	36%	17%	7%	3%	39%	23%	0%	17%	22%	14%	9%	62%
Institutional	13%	4%	4%	0%	17%	5%	2%	12%	3%	3%	2%	21%
All Buildings	63%	22%	12%	3%	64%	36%	2%	32%	29%	22%	15%	100%
	Engineered Wood (Th. bfe)											
Industrial	5%	0%	3%	0%	4%	4%	0%	2%	2%	2%	2%	8%
Commercial	22%	7%	9%	0%	23%	14%	0%	10%	13%	8%	6%	38%
Institutional	50%	1%	3%	0%	42%	12%	8%	21%	14%	6%	6%	54%
All Buildings	77%	8%	15%	0%	70%	30%	8%	34%	28%	17%	14%	100%
	Structural Panels (ft ²)											
Industrial	3%	2%	2%	0%	3%	4%	0%	2%	1%	2%	2%	7%
Commercial	9%	31%	31%	8%	55%	24%	0%	24%	31%	14%	10%	79%
Institutional	3%	4%	6%	0%	10%	4%	1%	6%	3%	3%	1%	14%
All Buildings	15%	38%	39%	8%	68%	32%	2%	31%	35%	19%	13%	100%
	Nonstructural Panels (Th. ft ²)											
Industrial	0%	na ²	na	0%	0%	0%	0%	0%	0%	0%	0%	0%
Commercial	0%	na	na	0%	0%	0%	0%	0%	0%	0%	0%	0%
Institutional	100%	na	na	0%	86%	14%	17%	38%	30%	7%	7%	100%
All Buildings	100%	na	na	0%	86%	14%	17%	38%	30%	7%	7%	100%
	Lumber, Engineered Wood, Structural Panels, and Non-Structural Panels (Th. bfe)											
Industrial	10%	1%	2%	0%	6%	7%	0%	3%	3%	4%	3%	13%
Commercial	27%	19%	13%	4%	40%	22%	0%	17%	23%	13%	9%	62%
Institutional	17%	4%	4%	0%	19%	6%	3%	12%	5%	3%	2%	25%
All Buildings	54%	23%	19%	4%	66%	34%	3%	32%	30%	20%	14%	100%

¹Includes siding, soffit, fascia and exterior trim.

²Not applicable.

Table 17.-Percentage net potential change in wood volume in low-rise nonresidential building construction, by building type, application and geography, Canada 2012

Table 18.-Requested LEED certification for new low-rise nonresidential buildings, by building type, Canada 2012

Building type	Floor area of New Buildings								Percent of requested floor area				
	Not requested <i>Th. ft²</i>	Requested						TOTAL <i>Th. ft²</i>	Requested				
		Basic <i>Th. ft²</i>	Silver <i>Th. ft²</i>	Gold <i>Th. ft²</i>	Platinum <i>Th. ft²</i>	TOTAL			Basic %	Silver %	Gold %	Platinum %	TOTAL %
						<i>Th. ft²</i>	%						
Industrial	19,743	66	72	12	0	149	0.75%	19,892	44%	48%	8%	0%	100%
Commercial	79,943	322	405	190	0	917	1.13%	80,860	8%	44%	21%	0%	100%
Institutional	22,390	87	844	90	0	1,021	4.36%	23,411	1%	83%	9%	0%	100%
All Buildings	122,077	474	1,321	292	0	2,086	1.68%	124,163	23%	63%	14%	0%	100%

Table 18.-Requested LEED certification for new low-rise nonresidential buildings, by building type, Canada 2012

APPENDIX B – DEFINITIONS

Nonresidential Building Characteristics

Value of new construction (put in place). A measure of the value of construction installed or erected at the site during a given period, including:

- Cost of materials installed or erected.
- Cost of labor and a proportionate share of construction equipment rental cost.
- Contractor's profit and overhead.
- Miscellaneous overhead and office costs chargeable to the project on the owner's books.
- Interest and taxes paid during construction.

Floor area. Area measured from the outside of the exterior walls, and including all enclosed, usable floor space.

Building application. Major systems in a building, including foundation, first and upper floors, exterior and interior walls, roofs, and exterior siding.

Principal construction type. Classification of the principal type of construction activity. Principal construction types are:

- **New**—New construction where floor area is added, and not associated with any other existing building.
- **Addition**—Attached or free-standing major additions to existing buildings or structures where floor area is added.
- **Alterations and renovations**—Changes made to existing buildings and structures for maintenance, upgrades, improvements, change of use, etc. Typically, no new floor area is added. Framing type is not applicable.

Principal framing type. Classification based on the principal type of building material used to construct the exterior wall of a new building or major addition. Principal framing types are:

- **Wood**—Exterior walls are primarily framed with lumber, or other wood products.
- **Concrete**—Concrete, masonry, stone, brick or block exterior walls.
- **Steel**—Steel framed or supported exterior walls.

Nonresidential Building Types

Building type. The expected predominant use of a newly constructed or remodeled building. If mixed use, based on relative floor area for each use. Three nonresidential building type groupings are defined by Statistics Canada and used in this report. Building types not included in this study have been removed.

- **Industrial building construction**
 - Plants for manufacturing, processing and assembling goods
 - Maintenance garages, equipment storage, workshops
 - Aircraft hangars
 - Other industrial construction
- **Commercial building construction**
 - Laboratories, research and development
 - Warehouses and freight terminals
 - Service stations including self-serve and car washes
 - Automotive dealerships
 - Office buildings
 - Hotels, motels, convention centers
 - Restaurants, fast food outlets, bars
 - Shopping centers, plazas, malls, stores
 - Theatres, performing arts and cultural centers
 - Indoor recreational buildings
 - Other commercial construction
 - Student residences
 - Post offices
 - Passenger terminals

- **Institutional building construction**
 - Schools, colleges, universities and other educational buildings
 - Churches and other religious buildings
 - Hospitals, health centers, clinics, other health care
 - Nursing homes, homes for the aged
 - Day care centers
 - Libraries
 - Historical sites
 - Penitentiaries, detention centers and courthouses
 - Museums, science centers, archives
 - Fire stations, halls
 - Other institutional and governmental construction
 - Other building construction

Provincial Groupings

Province groupings and provinces:

- **East Canada**
 - **Atlantic Provinces**
 - New Brunswick
 - Newfoundland, Labrador
 - Nova Scotia
 - Prince Edward Island
 - **Quebec**
 - **Ontario**
- **West Canada**
 - **Prairie Provinces**
 - Alberta
 - Manitoba
 - Northwest Territories
 - Nunavut
 - Saskatchewan
 - Yukon
 - **British Columbia**

Wood Product Types

- **Lumber**—Solid sawn timber, including dimension, boards and squares, as well as beams, timbers and millwork.
- **Engineered Wood**—Composite wood products designed to substitute directly for dimension lumber in many building and structural applications. Includes prefabricated wood I-joists, glued laminated timber and structural composite lumber (laminated veneer lumber, parallel strand lumber, laminated strand lumber, and oriented strand lumber)
 - **Glued Laminated Timber (Glulam)** —An engineered stress-rated product created by adhesively bonding individual pieces of lumber or structural composite lumber having a thickness of 50 mm (2 in.) or less. It can be easily shaped into forms ranging from straight beams to complex curved members and is used for a wide variety of structural applications in both residential and nonresidential construction.
 - **Cross-Laminated Timber (CLT)** —A prefabricated solid engineered wood panel made of at least three orthogonally bonded layers of solid-sawn lumber or structural composite lumber (SCL) that are laminated by gluing of longitudinal and transverse layers with structural adhesives to form a solid rectangular-shaped, straight, and plane timber intended for roof, floor or wall applications.
 - **Prefabricated Wood I-Joist**—A structural member manufactured using sawn or structural composite lumber flanges and structural panel webs, bonded together with exterior exposure adhesives, forming an “I” cross-sectional shape. These members are primarily used as joists in floor and roof construction.

- **Structural Composite Lumber (SCL)** — Structural composite lumber includes laminated veneer lumber (LVL), parallel strand lumber (PSL), laminated strand lumber (LSL), and oriented strand lumber (OSL). According to ASTM D 5456, these materials are intended for structural use and are bonded with exterior exposure adhesives. The following SCL definitions come from ASTM D 5456.
 - **Parallel Strand Lumber (PSL)** PSL is a composite of wood veneer strand elements with wood fibers primarily oriented along the length of the member. The least dimension of strands shall not exceed .25 in. (6.4mm) and the average length shall be a minimum of 300 times the least dimension. PSL is commonly used for beam and column applications.
 - **Laminated Strand Lumber (LSL):** LSL is a composite of wood strand elements with wood fibers primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54 mm) and the average length shall be a minimum of 150 times the least dimension. LSL can be used for a variety of applications, including beams, headers, studs, rim boards, and I-joist flanges.
 - **Laminated Veneer Lumber (LVL):** LVL is a composite of wood veneer sheets whose fibers are primarily oriented along the length of the member. Veneer thickness shall not exceed .25 inches (6.4mm). LVL can be used in a variety of applications, including I-joist flanges, beams, headers, and studs.
 - **Oriented Strand Lumber (OSL):** OSL is a composite of wood strands whose fibers are primarily oriented along the length of the member. The least dimension of the strands shall not exceed 0.10 inches (2.54mm) and the average length shall be a minimum of 75 times the least dimension. OSL may be used in a variety of applications, including beams, headers, studs, and rim boards.
- **Structural Wood Panels**
 - **Structural Plywood:** Plywood consists of veneers arranged in perpendicular layers. Performance-rated plywood is typically used in roof, floor and wall construction applications, although there are also a variety of grades for industrial applications.
 - **Oriented Strand Board (OSB):** A structural, performance-rated panel product, OSB consists of wood strands. Unlike glulam, the strands of OSB are not random, but are layered and oriented for maximum strength and stability. Designed to be used in the same construction applications as plywood.
 - **Nonstructural wood panels**—Wood-based panels not specifically designed for structural applications. Includes particleboard, medium density fiberboard, hardboard, insulation board, and hard-wood plywood. Uses include siding, floor underlayment, interior wall paneling, and numerous industrial applications.

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