A STUDY ON HISTORICAL TALL WOOD BUILDINGS IN CANADA

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ABSTRACT: Historical tall wood (up to 9 storeys) buildings have been built all across Canada and United States. With increasing interest on modern tall wood buildings in the 21st century, questions are being raised relating to the construction of these historical buildings; the condition that they are in and how many of these buildings are still serving their owners in a satisfactory manner. This study confirms that there are a substantial number of historical tall wood buildings in Toronto and Vancouver. Current rules and regulations on the retrofitting and renovation of the historical tall wood buildings are applied according to regional rules and regulations. The historical tall wood buildings have unique features such as high ceilings, exposed structural wood beams and columns, sandblasted brick walls, solid hardwood floors and exposed forged metal connectors and mechanical systems.

KEYWORDS: Historical buildings, tall wood buildings, brick and beam buildings, retrofitting, renovation

1 INTRODUCTION

Tall wood buildings were built all across Canada from the 1850s and up to 1940. These buildings were built with unreinforced brick with mortar in exterior walls and heavy timber beam and posts inside. They were originally built as factories, warehouses and manufacturing plants during the industrial era. The buildings were up to 9 storeys with ceilings height up to 22 feet (6.9 m). The building height can be as tall as 100 feet (30 m) and some buildings were large with total floor space up to 312,000 ft² (29,000 m²).

This study provides background on the historical tall-wood buildings in the city of Toronto and Vancouver in Canada as well as discussions on how relevant building codes are addressing the historical tall wood buildings in Canada.

2 BACKGROUND

The term “Brick and Beam building” (B & B) is used to describe the adaptive re-use or re-purposing of the industrial old brick buildings constructed in the late 1800s and early 1900's into unique work or living environments. Urban renewal of Canadian cities has led to the renovations of these former industrial buildings into trendy office and loft condominiums. The B & B buildings have the unique combination of high open ceilings, exposed wood structural frames, open steel connections, exposed mechanical systems and sand blasted brick walls. As a result, these attributes offers unique interior environments that appeals to people on many levels.

Corporate culture is a driving factor for tenants of B & B office space. They are located in close proximity to central business districts and well-served by public transportation. There are high demands for the B & B offices and the tenants are willing to pay premium rates.

3 STUDY

This study focuses on the historical B & B buildings in Toronto and Vancouver. The buildings have all been converted to offices and high-end luxurious loft condominiums. They are located at the center core of Toronto such as the Entertainment District, Fashion District, St Lawrence Market, Distillery District and Liberty Village area. The historical buildings in Vancouver are in the downtown areas such as Gastown and Yaletown.

In Canada, there are companies that specialize in the acquisition, renovation, retrofitting and management of historical buildings to provide a dignified and sophisticated alternative to costly conventional office space. They acquired a reputation for the adaptive reuse of historical complexes and received numerous heritage and community awards. The designers created space that is youthful, exhilarating and attractive to a new corporate culture. They are now fully updated with the latest modern technology
and amenities and recognized as a distinct and important office category. The top clients are in the telecommunication and information technology, business and professional services and media & entertainment industry.

This study identified 61 buildings that are 5 storeys and higher and 25 buildings that are 7 to 9 stories in Toronto and Vancouver respectively.

**Figure 1: The Landing, Vancouver**

### 4 DISCUSSION

With the adaptive re-use or re-purpose of the historical industrial old B & B buildings, there is a need to renovate and retrofit with considerations for structural, seismic, fire, acoustic and other performance issues to satisfy the requirements of the local jurisdiction. The approach varies widely in terms of construction quality, material and current condition. This is crucial as some buildings may be in poor shape due to neglect or poor maintenance. As a result, there is guidance to satisfy the safety requirements in accordance to local building codes or city By-laws.

The approach to address the issues for historical buildings varies across Canada. National Building Code of Canada (NBCC) addresses this issue in the User Guide – NBC 2010 Structural Commentaries [1]. In Ontario, such works falls under the Ontario Building Code 2006 (OBC) - Part 10: Change of Use and Part 11: Renovations [2]. The Ontario Building Code requires evaluation of the building when a renovation occurs and requires the completed building to maintain its level of structural performance. All retrofit and renovation of historical buildings for new occupancy must conform to Part 10 and Part 11 of OBC. Province of British Columbia has adopted the NBCC with amendments which applies throughout the province with the exception of the City of Vancouver. The City of Vancouver adopts the NBCC with amendments as the Vancouver Building Bylaw [3]. A study on upgrading of the historical buildings has identified the need to satisfy the current seismic requirements [4].

In the United States, ICC IEBC - International Existing Building Code 2012 [5] encourage the use and reuse of existing buildings. The scope covers repair, alteration, addition and change of occupancy for existing buildings and historic buildings, while achieving appropriate levels of safety without requiring full compliance with the new construction requirements contained in the other I-Codes.

In 1941 the Federal Government of Canada published the first National Building Code. The maximum permitted building height for a building constructed with combustible construction was limited to 4-stories with building height limited by the measured height in feet from the grade. The limit for Light Wood Frame construction was 3 storeys with a building height up to 40 feet (12 m) of while the limit for Heavy Timber construction was 4 storeys with a building height up to 75 feet (23 m) [6]. No tall wood buildings had been erected in Canada since 1940s.

### 5 CONCLUSIONS

This study confirms that historical tall wood buildings were built up to 9 storeys with building height of 100 feet (30 m) and floor space up to 312,000 ft² (29,000 m²). Existing buildings have been retrofitted and renovated to conform to the regional rules and regulations. The publication of the first NBCC in 1941 effectively placed a limit on the number of 4 storeys of combustible construction.

Modern heavy timber products such as Glued-laminated timber, Structural Composite Lumber (SCL) and Cross Laminated Timber (CLT) are accepted as “alternative solutions” in the Objective-Based approach as currently permitted in NBCC. It is interesting to note that the 21st century’s first modern high-rise wood buildings are about the same height as those were built at the beginning of 20th century!

### REFERENCES

[3] Vancouver Building By-law, Vancouver, British Columbia