

Case Study

Wood use: Post & beam, interiors

Project: Private residence, Himachal Pradesh



**Canadian
Wood**

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Douglas-fir post & beam
construction with SPF center table

Canadian Wood species:
Making Inspiring Interiors

Project Overview

The house is spread across 1970 sq.ft. with a large leisure & living area, kitchen, four bedrooms and expansive outdoor decking area. It is located in a pristine and picturesque Reserve Forest Area with the backdrop of snow clad peaks perched at an altitude of 7,500 feet in Himachal Pradesh. The site falls in **earthquake seismic zone 5**.

The residence is built on one of the farming terraces, with views and vistas on three sides, the longer length facing the south side to let in sunlight and opening over the lower terrace allowing breathtaking views.

Challenge

The key objective was to turn the open plan design specified by the client and architect into reality. The design required large spans of solid wood to be the main feature.

Other applications such as doors, windows, furniture and millwork also needed to be produced in wood, in alignment with the aesthetic feature of the home.

Opportunity

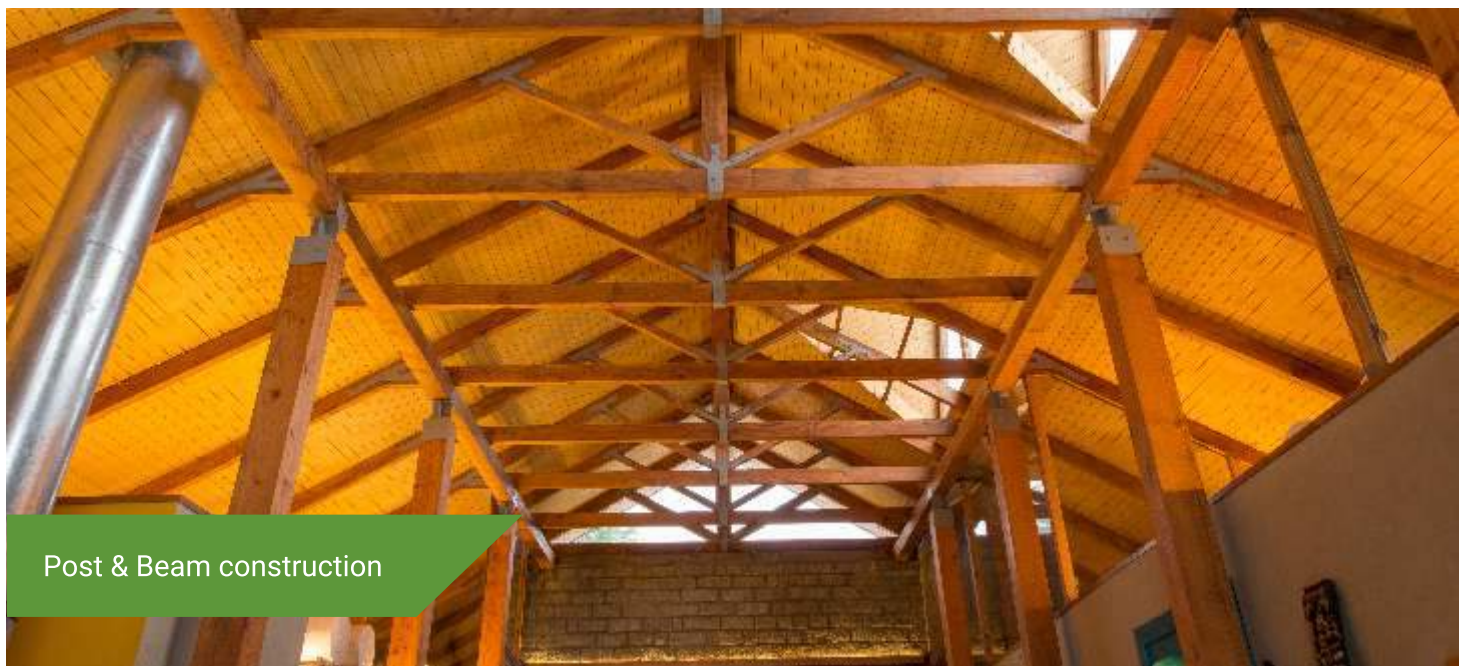
Wood has inherent characteristics that offer advantages over concrete, masonry and steel building designs. It is lightweight, provides load paths for earthquake forces via numerous connections, thereby ensuring inherent building ductility and connects securely to a structure's walls, floors and roof, achieving the necessary racking resistance. As a result, wood is an ideal material in areas prone to seismic activity.

The crucial step was to first identify the appropriate wood variety and grade for the large wood spans. **Post and Beam construction** was the chosen solution, requiring large section and long length timbers plus custom made steel fasteners, brackets and plates to tie the major components together. For the structural, vertical and horizontal load bearing components, wood selected was Douglas-fir given its:

- Strength and stiffness
- Availability in the desired 8x8 or larger and 3x6 or larger sections
- Lumber lengths ranging from 16-20 feet

Wood species used for window and exterior door applications need to meet very demanding standards, especially in India where the weather conditions are extreme. While Douglas-fir is only moderately durable in external applications, mitigating factors were location at altitude, low risk of termite attack, moderate climate and the wood's visual appeal.

For the **window and door** joinery, Douglas-fir was again chosen due to its availability in clear grade. The wood's popular colour and grain highly complemented the structural Douglas-fir components as well.



Wood Use in Project

House structure

- Wood and stone are two natural building materials that complement each other very well. The external walls of the house were created in the traditional 18" thick stone and timber laced construction to withstand earthquakes and also retain heat inside during the extreme winter months.
- The entire roof structure including vertical posts, wooden trusses, purlins, joists and inner skin are also in timber. The entrance is sheltered by an overhanging roof which compliments with the Douglas-fir shutters and trim.
- Two triangular skylights in Douglas-fir form an integral part of the roof structure, bringing abundant natural light into the open plan space, bathing the wooden surfaces and creating a warm and welcoming atmosphere.
- The two structural systems i.e. frame and roof structure are expressed independently of walls adding to the aesthetic purity of the house.

Post & Beam construction

- The single-storey building has a simple post and beam frame constructed on top of a conventional concrete slab on grade.
- Engineering was yet another challenge as the metal fasteners had to be designed and created in India. Ultimately, The General Contractor selected a steel fabricator willing and able to adapt and produce precision hardware, a critical element for the structure to succeed.

Large openings in form of

- Solid wood doors, sliding doors, oversized glass and timber framed entrance doors
- Window frames and shutters
- Louvered shutters
- Skylights

These were the main architectural features, expressed to their optimum with the use of Douglas-fir.

Furniture

A wonderful addition is the 16 feet long dining table which is the centrepiece of the living/family room. Constructed in Canadian spruce-pine-fir (SPF) 2x6, structural grade boards were cross-cut into 4 feet lengths and finger-jointed to ensure a straight and true table top at an affordable price, then finished with a transparent coating.

Innovative Millwork

- Douglas-fir was selected for the oversized frames, internal and external joinery, including doors, windows and internal trims and mouldings.
- The species was also specified for rustic internal flooring throughout the house and outdoor deck and posts. The result is a marvellous combination of colour and texture which contrasts impressively with the walls constructed in local stone.
- A bookshelf of Douglas-fir trim with bricks and OSB board were also produced.

Key Takeouts

Douglas-fir along with the other Canadian Wood species can be used in external and internal applications, where design is well considered and good quality wood coatings are used.



Why Use Canadian Wood?

Sustainable, Green Building Material

British Columbia, Canada is a world leader in sustainable forest management. The rigor of B.C.'s forest management laws is demonstrated by third-party forest certifications (PEFC/FSC).

Long-Term Performance

Wood's versatility, character and individuality are unmatched. When it is properly maintained, wood can be reused, repurposed, and reapplied to other projects. Canadian wood species produce stable lumber with consistently straight grain. The wood is easy to work, finish and glue.

Easy to Manufacture

With low to moderate density values, species like western hemlock, Douglas-fir, yellow cedar, western red cedar and Spruce-Pine-Fir (S-P-F) are all easy to face-laminate, edge-glue, and/or finger-joint.

Quality Assurance

Canadian wood species from B.C. are separated into a wide variety of grades and each grade is intended for a specific end use. Factory grades are intended for ripping or cross cutting to recover the wood's clear fibre; the clear grades help produce knot-free products in a length range of 8-20 feet. This variety of grades allows buyers to choose a quality that suits both their needs and their price considerations.

Multipurpose Applications

Because of their low tangential to radial shrinkage (T/R) ratio, softwoods typically have better stability than hardwoods. Softwoods are well suited to many applications across outdoor, interior and structural uses.



If you're interested in incorporating Canadian wood species into your product line, the 'Try Canadian Wood' initiative is an ideal way to use, experiment and understand wood's numerous advantages.

For free technical/procurement assistance write to FII India at info@canadianwood.in or call +91 2249221600.

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Canada 

Western hemlock | Douglas-fir | Yellow cedar | Western red cedar | Spruce-Pine-Fir (S-P-F)

FII India has made every attempt to ensure the accuracy and reliability of the information provided with input from each trial partner.

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