Leadership in Sustainable Infrastructure
Leadership en Infrastructures Durables

Case Study

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S-TIMBER: INTEGRATED TIMBER DESIGN BY S-FRAME SOFTWARE

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Abstract: Timber plays an essential role as a key construction material in structural engineering industry. As timber technology and fabrication quality has increased, constructing taller timber structures have been made possible and gained more attention and popularity. Thus, the design of such structures has become more complicated. This has resulted in the need for automated design means to let the engineers iterate between thousands of designs and get to the most efficient one. In a collaboration, S-FRAME Software Inc. and the University of British Columbia (UBC) at the Okanagan campus have initiated development of the product S-TIMBER to accompany S-FRAME structural analysis and design software. This product features analysis and design of timber structures and is capable of capturing the demand and capacity for sawn lumber, glued-laminated (glulam) and cross-laminated (CLT) timber elements based on CSA O86-14, Engineering Design in Wood. The product is tested using thousands of unit tests and verified against Wood Design Manual published by Canadian Wood Council. This presentation will showcase the unique and user-friendly features of this upcoming product.

Keywords: S-FRAME; S-TIMBER; Timber Design; Wood Design; Finite Element; Structural Design and Analysis; Integrated Timber Design

1 Analysis and design

S-TIMBER offers an A-to-Z analysis and design for timber structures, in one place, from modeling to detailed design reports. It is capable of analyzing and designing a single timber member as well as a full timber structure.

2 Modeling and graphical user interface (GUI)

Ease of use: S-TIMBER features a user-friendly GUI that makes convenient and flexible modeling possible. It offers an easy 3-D modeling using one- or two-click actions to model your members.

Precision: S-TIMBER enables the user to see the real look of the members in real dimensions. You can choose to see your model in Finite Element, Physical Element or Object view for a full control on your model. It is also possible to switch between the views at any time to see the full details.

High-level objects: High-level objects in S-TIMBER enable easy modeling of complicated objects such as stud walls and flooring systems with simple clicks. This feature lets the user model a stud wall or a flooring system instantly with all the internal members and openings, if any. It also gives the user full control over the size, material and other properties of the object by editing the provided numerical fields.

Script Editor: The Script editor in S-TIMBER is made available to professional users to gain a better control on large and more detailed models.

3 Material database

S-TIMBER offers a comprehensive material database, covering a wide range of materials existing in North American and European markets. In addition to conventional sawn lumber, this includes newest glued-laminated (glulam) and cross-laminated (CLT) timber products available in the market. Furthermore, the user is given the option to define a customized material, as desired.

4 Design reports

Following the analysis and design, S-TIMBER generates highly detailed reports for each member, making the design transparent to the user. This includes providing the factored loads, calculated factored capacities, relevant code-checks, design factors and intermediate design calculations. This feature makes the design comprehensive for experts and, at the same time, easy enough for junior engineers.

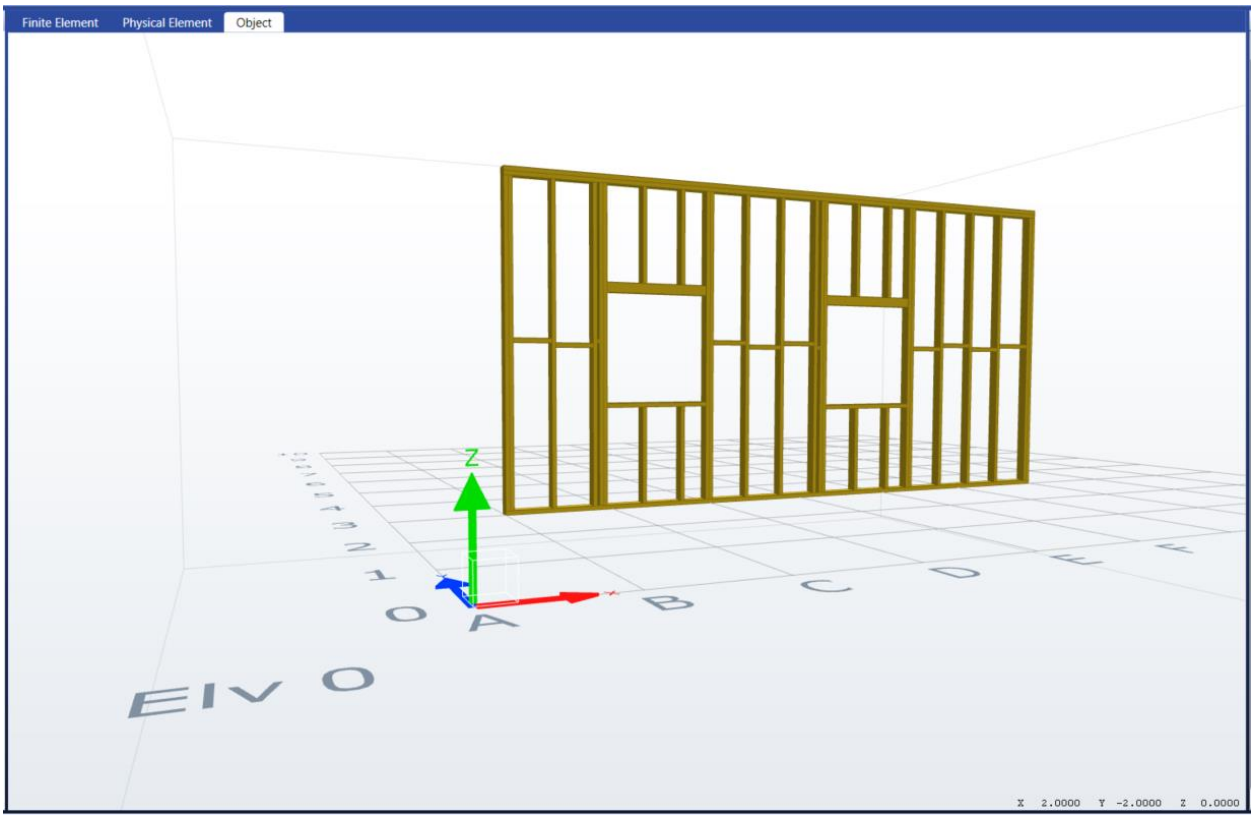

Figure 1. 3D View of a stud wall with openings as a high-level object, including studs, bottom and top plates, blocking and sill plates, header and trimmer

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