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Practice Note: Solar Panel Installations

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The Investigation Committee has become aware that some solar panel installations have not adequately addressed the structural considerations that arise from the associated change in loading. Prior to undertaking review of roof-mounted solar panel installations, practitioners should consider the following, particularly with respect to wood framed roof structures.
Prefabricated Metal Plate Connected Roof Trusses are warrantied by the supplier. Changing the load invalidates that warranty and transfers it to the entity instructing and authorizing the load change.

Structural designers should refer to the Western Wood Truss Association (WWTA) Solar Panel Info sheet, first presented to the Manitoba Building Officials' Association (MBOA) at their seminar in April of 2017. As noted in the WWTA document, any existing roof considered for new Solar Panel applications must undergo a structural evaluation by an Engineer familiar with the design of the roof structural components, roof snow load design and installation details of the proposed Solar Panel project.

Structural designers should also refer to the Truss Plate Institute of Canada (TPIC) Technical Bulletin #7, which is the detailed requirement that must be followed by Truss Fabricators in the design of Prefabricated Wood Trusses for support of Solar Roof Panels. The Manitoba Building Code (MBC) references TPIC as the document for prefabricated truss design. Therefore, Bulletin #7 is required by code for the design of installation of solar panels that will be supported by trusses.

Further with respect to wood trusses, attention should be given to the connection system. TPIC trusses are not designed to accommodate lagging directly into truss top chords.

For prefabricated wood trusses, the design should be reviewed by a Truss Fabricator and their Engineer as they are the only ones that have proprietary Truss Software that conforms to the Truss Design Procedures And Specifications For Light Metal

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Plate Connected Wood Trusses (TPIC 2017) and that can design in accordance with TPIC Technical Bulletin #7 and the impact on members and truss plate joints.

Truss plate joints are a critical component of the capacity of trusses. Therefore, only Truss Fabricators can provide a reliable evaluation of an existing truss roof or on-site reinforcement to an existing truss. Since Truss plates come in multiple increment sizes, trusses are initially designed with the smallest plates that meet the required design. Even a change in load of 1 psf can cause joint plate sizes to increase. Site reinforcing is possible, but consideration must be given to the issue of access to the bottom chord and heels.

In the case of "Solar Ready" trusses, consideration has already been made for the changes in loading and the potential anchoring of the solar system. However, the fabricator should be contacted for any design limitations and assumptions made at the time of the original design.

In the case of wood rafter roofs, the applicable codes are MBC (Part 9 and Part 4) and CSA 086-19. Part 4 of the MBC would be required for any load other than uniform load design, even in the case of single-family residential structures. In other words, with a point load system, the Part 9 rafter Tables are invalid as the load sharing and system factors are not applicable.

Please contact Engineers Geoscientists Manitoba if you have any questions.