OWTFA Position Statement – Solar Panel Installation on Roof Trusses

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Photovoltaic solar panels continue to grow in popularity across Ontario. Whether ground mounted or rooftop systems, it is now common to see a solar panel arrays generating energy throughout the province.

Roof top systems essentially fall into three categories: retrofit, solar ready and custom installations (new roof systems where solar panels are a pre-determined integral feature). Each of these presents their own challenge when it comes to the analysis and review of the supporting roof truss structure.

At first glance, it is often assumed that the addition of solar panels will only require an analysis based on the additional dead load of the panel system. Unfortunately, this is far from correct in almost every instance. The rooftop panel arrays that we currently see on the market make use of a support system consisting of rails mounted to brackets that are fastened to the roof below. Since there is no guarantee the snow will clear from the panels, designers have to assume full design snow load across the surface of the panels. When mounted, this will translate into a number of point loads where the brackets are connected to the structure below, rather than a uniform load across the roof members.

The following outlines the OWTFA's position on the three categories.

1. Retrofit

ALL retrofit projects require that a qualified structural engineer be engaged in the review of existing roof trusses and building structure where a solar panel array is being added.

Some of the areas that will need to be considered include:

- Overstressing the original truss or truss members originally analyzed for uniform loading
- Overall condition of the existing building and structural elements
- Potential for snow accumulation as a result of the panel array
- Suitable connection to the roof system without damage to the roof truss members
- Long term protection of the structure from deterioration
- Possible introduction of wind loading issues previously not considered

Unfortunately with solar panel retrofits, it is not uncommon to discover that the financial benefits of solar energy generation is often outweighed by the overall cost of the installation – including the engineering and the cost of reinforcing the structure for the proposed solar panel array.

The OWTFA does not recommend adding solar panel arrays to existing agricultural roof truss systems that were not previously designed for this feature.

2. Solar Ready

In recognition of the need for a comprehensive approach to designing roof systems for solar panels, TPIC (Truss Plate Institute of Canada) and NRC (Natural Resources Canada) have developed a new procedure to design a

roof system that will allow for the possibility for the future addition of solar panels. The guidelines "Solar Ready" incorporate both design issues that are easily managed by your OWTFA member truss fabricator and installation requirements outlined by the NRC (available on the CanmetENERGY website).
The OWTFA client need only to request a Solar Ready roof system design from the OWTFA fabricator and the truss designer has the ability to provide the truss designs that will allow you to offer the home owner the option of adding a solar panel array without the need for a structural review. The cost is often in the range of 25%-35% higher for the roof trusses, but not necessarily significant to the overall cost of building the home.

Solar Ready truss design is only available for Part 9 roof systems, housing and small buildings with clear spans less than 40'

It is the builder's responsibility to follow the NRC Solar Ready installation procedures and attachment methods outlined in the TPIC Technical Bulletin for solar ready roof systems.

3. Custom Installations

When a building is being designed with a solar panel array as part of the project, the panel and support system will have been specifically selected for the structure.

The project engineer is responsible for determining the magnitude and location of the individual point loads that will need to be supported.

The project engineer is responsible for providing a support system that is suitable to carry the design loads and will not affect the structural integrity of the roof truss members that will be designed for the specified load supplied.

The project engineer is responsible to review the proposed designs that will be provided by the OWTFA member to confirm and approve their suitability for the structure, including in some cases engineered wood beams and headers where required

The builder is responsible to follow the layout of the structural support system of the solar panel array when fastening to the roof system to ensure that the truss members will be supporting the load specified by the engineer as intended.

For further information and clarification, we suggest that you contact your local OWTFA member truss fabricator, consulting engineer or the OWTFA directly.

Links:

Truss Plate Institute of Canada	www.tpic.ca
Natural Resources Canada	www.canmetenergy.nrcan.gc.ca
Ontario Wood Truss Fabricators	www.owtfa.com