

BACKGROUND

The roof structure of an industrial facility was suspected to be in danger of failure or collapse. Induspec was contacted to assess the situation and conducted a site visit on the same day.

INITIAL CONDITION

Several timber purlins were observed to have completely cracked, and were deemed to be unable to safely support any load. Based on a visual inspection, the snow load on the roof was expected to be significant, and perhaps even exceed the original design loads of the building. A thorough inspection of the roof structure from the interior revealed that the purlins were also cracked in substantial portions of the roof. The building was determined by the regulating body having authority to be unsafe for work to continue within. Therefore, work could not continue inside the facility until the structural issues of the roof were identified and corrected. However, access to the building was prohibited until the additional weight (i.e. snow load) was removed from the roof.

ANALYSIS

The structural layout and components of the building were determined based on the structural drawings provided by the client, in corroboration with readily observable features. Where information was insufficient or unavailable, conservative assumptions regarding the construction of the structure were used. Deviations between the structural drawings and as-built conditions were identified and taken into account.

It was determined that the snow could be removed from the roof via mechanical means, only if a well-organized procedure was carefully followed, and if the condition of the structural members was carefully monitored by a competent person.

OUTCOME

A shoring design was provided to support the portion of the roof where several purlins had failed. The shoring was installed progressively by first removing small sections of snow in the affected area before moving to the next shoring location.

A comprehensive snow removal procedure was developed and implemented to remove the snow from the rest of the roof in such a way that risk was minimized. The procedure was approved by the regulating body having authority, provided that it was coordinated by a licensed professional engineer. All staff undertaking snow removal work were required to attend a training session coordinated by the engineer responsible.

RECOMMENDATIONS

Ongoing supervision was provided by Induspec to ensure compliance with the snow removal procedure that was developed. Daily reports were prepared for the client to document the work progress and proactively plan the execution of remaining work. Specific areas of the roof were prioritized based on the observed conditions of the interior roof structure to minimize the risk of additional purlin failures.

IMPLEMENTATION

The affected areas of the roof were safely cleared as quickly as possible by following the procedure that was provided by Induspec. The structural retrofit of the roof structure, to address the deficiencies that were identified, was to be undertaken during the subsequent summer season.

Gallery

