



## *Technical Guideline:*

# **TRUSSES IN CORROSIVE ENVIRONMENTS**

**THE PROBLEM:** Deterioration of metal truss gusset plates is a major concern in buildings that contain high humidity and corrosive environments. Normal galvanized steel plates exposed to moisture, condensation, and ventilation air containing manure gases will corrode rapidly. Many of these buildings show severe corrosion within five to ten years. This corrosion can weaken the building and could potentially lead to structural failure. The buildings most affected by this corrosion are cold, naturally ventilated beef and dairy barns with slatted floors and deep manure storages. Also affected are warm, naturally ventilated, swine barns. In all cases, the roof trusses have been included in the building's environmental air space. This exposes the entire truss assembly to a potentially wet service condition. In most cases, farm trusses are designed for a dry service condition.

**THE SOLUTION:** Mechanically ventilate the environment or create a reliable partition to separate the trusses from the corrosive environment.

- a) A good ventilation system should move enough fresh air through the building to reduce the levels of moisture, gas, and dust to acceptable levels. A well-designed system will minimize corrosion problems. Proper ventilation requires good building design and good ventilation management. A ventilation specialist, equipment supplier or building contractor can help to ensure that ventilation will not contribute to a corrosion problem.
- b) The alternative is to partition off the trusses from the corrosive environment. A 4 or 6 mil polyethylene vapour barrier is necessary to prevent migration of moisture and corrosive elements into the truss space. It should be noted that ongoing maintenance of such a barrier may need attention.

Where there is a potential for exposure to corrosive conditions, it is also highly recommended that a protective coating be brush applied to the embedded truss plates per the coating manufacturer's recommendations. The Truss Plate Institute of Canada suggests the following:

- Epoxy-Polyamide Primer (SSPC-Paint22)
- Coal-Tar Epoxy-Polyamide Black or Dark Red Paint (SSPC-Paint 16)
- Basic Zinc Chromate-Vinyl Butyral Wash Primer (SSPC-Paint 27) and cold applied Asphaltic Mastic (Extra Thick Film) Paint (SSPC-Paint 12)
- Any other coating or treatment acceptable to the building designer/engineer

**MOST IMPORTANT:** Wherever a potential for a corrosive environment exists, the trusses and the system of controlling ventilation and/or partitioning should be inspected regularly to ensure performance as intended and that there are no deleterious effects on the truss plates.

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***This is a guideline only and appropriate specialists are required to design effective systems to reduce building component exposure to acceptable levels. It is intended to provide a basic understanding of the causes and effects of deleterious building environments.***

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