

# Efficient and economical retrofit

In 1999, JG Smith Construction commenced maintenance and service repairs on metal roof systems at the Mills Pride complex in southern Ohio. Professional roof inspections were executed to ascertain the current condition of the system components. The report categorized roof system conditions in three categories: currently maintainable, repairs needed to achieve a level of maintainability, and recommended replacement due to oxidation and severe deterioration. Several buildings fell into the third category, and recommendations for near term replacement were proposed.

During the 1980s and 1990s Mills Pride experienced growth that precipitated an aggressive building program to accommodate expansion. Over a 15-year period, more than a dozen pre-engineered metal buildings, totaling more than 4 million square feet were erected.

The early metal buildings were assembled with conventional, 12-inch on-center R panels. These through-fastened metal roof systems were installed over EPS thermal blocks and vinyl-faced fiberglass insulation. Most of the manufacturing facilities at the complex exceed 100,000 square feet. These large roofs were installed without vertical or horizontal expansion joints, and endured thermal cycle transients exceeding 200 degrees each year.

For 15 years, repetitive roof panel expansion and contraction slowly caused purlin fasteners to lose preload and disengage from the panel surface. Subsequent water infiltration under the EPDM washers and down the thread path established a modest collection of moisture in the insulation, between the vapor barrier and the metal panels. Because the moisture could not escape, it continuously cycled through the evaporation-condensation phases. The result was severe under panel oxidation. Many panels were rusted through at fastener heads and at panel flutes in the field.

The deterioration created a safety



*JG Smith Construction tried different methods of installation, but found the Roof Hugger to be the most efficient metal roofing retrofit system for its uses at the Mills Pride furniture manufacturing complex in Waverly, Ohio. JG SMITH CONSTRUCTION PHOTOS*

issue. Conventional R panel roofs depend on proper purlin fastening to maintain a diaphragm effect. The through-fastened roof panels provide rigid bridging between the purlins to minimize buckling and failure. These characteristics were being compromised.

Installation of new Galvalume Plus standing seam metal roof systems was recommended for two buildings. Mills Pride management agreed and provided JG Smith Construction authorization to begin work on the Lincoln building. The 175,000-square foot facility received a Star standing seam metal retrofit roof in 2003. Prior to the project an evaluation of the building structure indicated that it could support the additional 1.8 pounds per square foot for the proposed roof retrofit without a tear-off.

The new standing seam metal roof panels on the Lincoln building were supported by 3-inch stand-off clips. However, variations in modularity during the original R panel assembly, and likewise during the standing seam panel

installation, created unforeseen problems. Many of the panel clips were often positioned over existing R panel ribs. This created the demand for a bridging component. On this particular project approximately 5,000 heavy gauge hat sections were cut to accommodate the interfere issue. This unscheduled work added about one month and thousands of extra dollars to the job.

This spring, Mills Pride awarded a second roof retrofit project to JG Smith for the Washington building. This 110,000-square foot facility had many of the same rusting and deterioration problems as the Lincoln building. To eliminate the same expensive mistake incurred during Lincoln building roof retrofit project JG Smith went with the Roof Hugger retrofit support system, a lightweight heavy gauge framing system which installed over the existing purlin structure. The Roof Hugger eliminated high rib interference, and provided for the reestablishment of panel-to-purlin clamp loading, and the subsequent enhancement of structural integrity. ■