

Roof Inspection Report
3840 Greenway Circle, Lawrence Kansas, 66046
Sauer-Danfoss Building

Prepared For:

Ms Marilyn Bittenbender
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805 New Hampshire St
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Prepared By:

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1. Introduction

At the request of Marilyn Bittenbender of Colliers International, on behalf of Sauer Danfoss, Leon L Mayfield RRO of Diamond Roof Management performed a roof inspection of the above referenced facility. The purpose of the inspection was to visually review the condition of the roof system and its components, and to make recommendations of any repairs or re-roofing the facility may require.

The observations, recommendations and conclusions contained in this report are the opinions of Diamond Roof management are based on the conditions observed during our site visit, information supplied by facility personnel and our previous experiences.

2. Building History

The 146,400 square foot building was constructed in 1998 by Story Construction of Ames Iowa... The building consists of a concrete slab, precast wall panels, steel structural members and steel roof deck. The roof was installed by Diamond Everley Roofing. A request for final inspection to the manufacturer (Versico) was submitted on November 20 1998 the day the warranty went into effect. The roof warranty expired on November 20 2008.

3. Roof Components bottom to top.

- Steel roof deck
- Expanded polystyrene insulation (R-20)
- 45 mil EPDM
- Rock Ballast

4. Observations

Drainage:

The structure of the building supplies adequate slope to a series of interior located roof drains and overflow drains. Tapered insulation saddles and crickets provide lateral drainage to the roof drains. No evidence of ponding water was observed.

Field Membrane:

We observed shrinkage of the 45 mil ballasted EPDM throughout the entire roof section as evidenced by bridged flashing membrane at perimeter walls and penetration flashings. Due to the rock ballast we were unable to inspect all of the field fabricated laps/seams, however we removed the rock ballast in two separate locations and noted that the laps/seams were of proper width and adequately adhered. These seams observed represent approx 20 foot of the 3400 foot plus of field fabricated laps/seams.

Displaced ballast was noted at random locations throughout the roof section. Approx 16-20 broken and damaged pavers were observed at the North and South perimeters of the roof section.

Perimeter Flashings:

Due to shrinkage of the field membrane the 45 mil EPDM flashing membrane has pulled away from the substrate at numerous locations throughout the roof section. These areas range in length from 4 foot to 20 foot in length. This condition seems to be mostly confined to the East and south perimeters. This condition does not appear to have torn the flashing membrane away from termination points as of this site visit.

Punctured /Damaged flashing membrane was noted at one location along the north perimeter. With the exception of the above deficiencies the perimeter flashings laps/seams appear well adhered and properly terminated.

Penetration Flashings:

Shrinkage of the 45 mil EPDM field membrane has affected virtually all of the Curbed smoke hatch penetrations. We observed that this condition has pulled the flashing membrane away from the substrate and in some instances has torn the membrane from termination points exposing the curbs substrate. We also noted bridged flashing membrane at mechanical equipment curbs. Numerous split and damaged corner flashings were observed at both smoke hatch and mechanical equipment curbs. This condition is attributed to the shrinkage of the EPDM field membrane.

Prefabricated pipe flashings appear to be adequately adhered but are stressed due to shrinkage of the field membrane.

Roof related sheet metal:

The pre manufactured metal edge appears to provide proper coverage and has been adequately secured. No Roof related sheet metal deficiencies were noted during our site visit.

Miscellaneous/ Adjacent conditions:

A damaged /displaced air filter we noted near the west central portion of the roof section. This condition could allow damage to the field membrane from a moderate wind event.

4. Conclusions/ Recommendations

The 12 plus year old ballasted EPDM roof system is in marginal condition due to shrinkage. Shrinkage can be caused by loss of oils and the carbon black molecule from the EPDM sheet induced during the manufacturing process from exposure to heat and the elements. The typical life span of this type of roof is 10-18 years.

There is approx 3300 square foot of penetration flashings sealing the curbed penetrations with approx 80% of these being affected by the shrinkage of the EPDM field membrane. This condition is a typical mode of failure for roof systems of this type and age. Numerous conditions exist that will allow water entry into the roof system and interior spaces. Torn flashings at termination points could also allow damage or failure of the roof system from a wind event.

Although we believe these flashing can be repaired short term we can not assure their long term serviceability due to continued shrinkage of the field membrane.

Option # 1 Repairs

Repair scope as follows

- Remove the rock ballast from around affected penetrations.
- Cut back the field membrane from the base of the penetration.
- Let the field membrane relax a minimum of one hour.
- Mate a new EPDM sheet to the bottom of the existing field membrane.
- Terminate the new field sheet.
- Re-flash the penetration and install new pre-finished counter flashing beneath the curb flange.

Estimated 2011 repair budget- \$33,000.00 \$38,000.00

Estimated 2011-2015 year repair/ preventive maintenance \$10,000.00

Repairs and preventive maintenance costs are based on the assumption that initial recommended repairs are performed

Option # 2 Re-Roof

Scope of work as follows

- Remove the existing rock ballast.
- Remove and re-use the existing pavers
- Tear off the existing field and flashing membranes.
- Install new 60 mil EPDM field and flashing membranes.
- Re-use the existing pre fabricated metal edge.
- Provide a 15 year no dollar limit warranty.

2011 re-roofing budget \$288,000.00

Please call with any questions or comments regarding the contents of this report.

Respectfully submitted
Leon L Mayfield RRO
Director: Roof Management
Diamond Roof Management