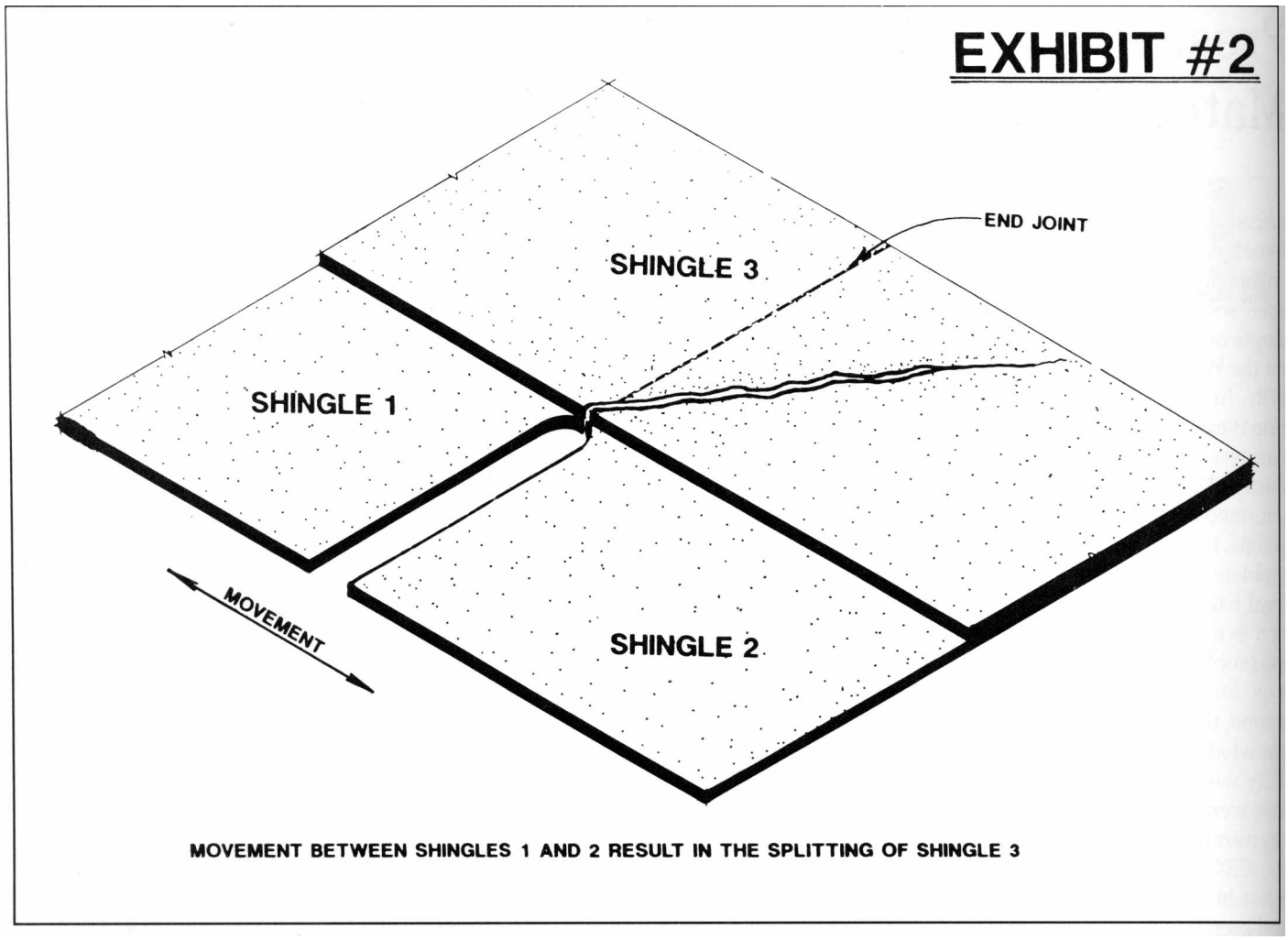


Fiberglass Shingles

Shingle Splitting Problem Observed in a Number of Western Applications

OVER THE PAST 15 years, the use of fiberglass mat shingles has become commonplace within the roofing industry. These shingles are typically used for residential, multi-family dwellings, and small commercial structures. The fiberglass mat product has, in many instances, replaced the conventional organic shingles. These newer fiberglass shingles are manufactured in a wide variety of configurations, from the conventional three-tab configuration to the heavier layered shingles somewhat resembling wood roofs.

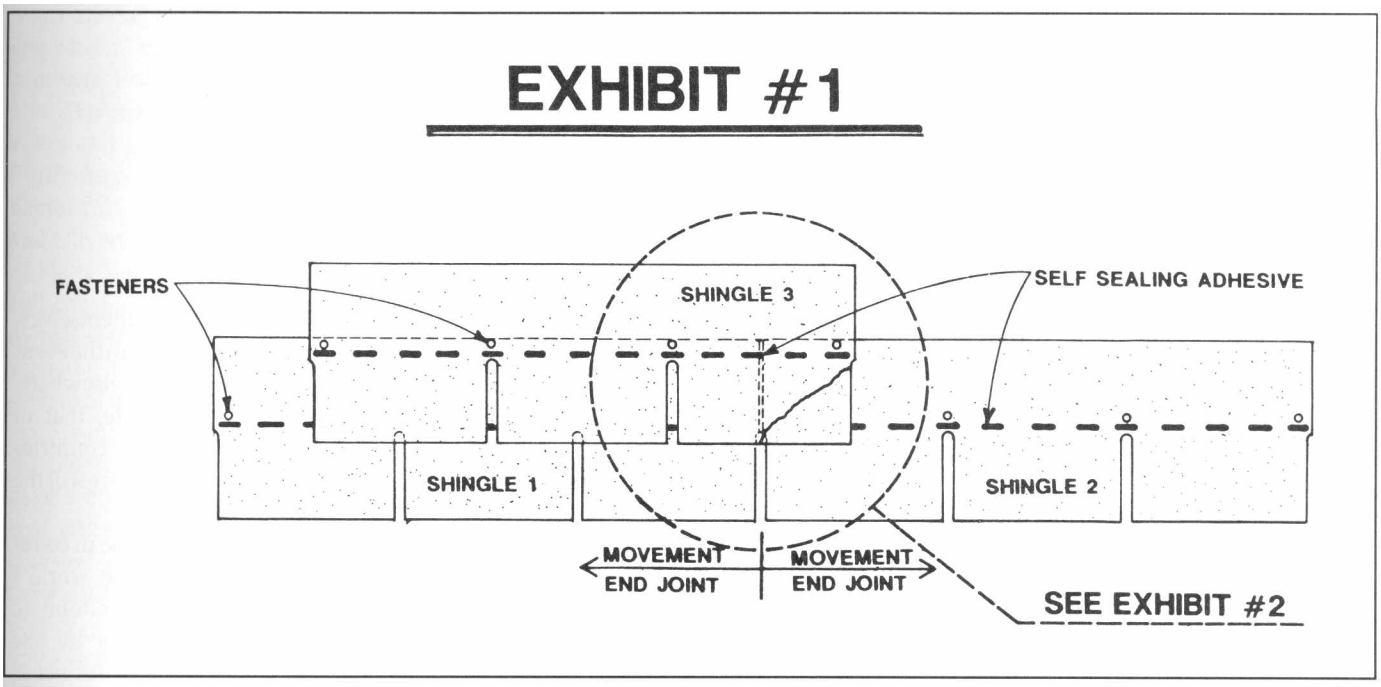
In recent years, a very noticeable problem has developed in the fiberglass three-tab asphalt shingle line. These particular shingles are typically manufactured in compliance with ASTM D 3018, Type I, and generally carry a UL Class A rating. These shingles have been splitting in the face of the shingle directly above the edge joint of the preceding shingle. The splitting problem in the fiberglass shingle appears to be independent of either substrate or fastener type.

Prior to discussing the problem, a brief overview of application technique should be reviewed. The three-tab shingles are typically installed with four fasteners (nail or staple). The shingles are installed over felt underlayment in either a diagonal or straight-up methodology.

As the shingles are installed, the self-sealing adhesive melts and adheres each subsequent shingle to the preceding underlying shingle. This self-sealing adhesive provides a vital function in preventing wind damage to the three tab shingle. The adhesive in many cases, however, adheres tightly across the end joint of the underlying shingle.

The fiberglass shingles have a tendency to expand and contract with thermal changes along the longitudinal basis. As the shingle expands and contracts, a stress builds up in the face of the shingle directly over the end joints of the underlying shingle. This produces a split in the face of the three-tab shingle.

In examining many of these shingles, it has been observed that the splitting action begins predominantly in the southward and westward exposures of the building. If one examines these structures in the early morning hours when the roof is cool, these splits are very obvious, and tend to run in a diagonal fashion. As the roof warms



during the day, the shingles expand, and the splits are not quite as obvious.

The failure mode is a combination of three factors: a lack of sufficient tensile strength in the fiberglass mat; thermal expansion and contraction of the shingles; and a full adhesion of the self-sealer strip over the end joints. From a tensile strength standpoint, it has been observed that in some cases, when an individual shingle is picked up and held vertically, it will tear under its own weight. In performing a tensile strength test, it has been observed that shingles with the greatest tear tendency have a tensile strength below 60 pounds per inch at the time of failure.

At the present time, the bulk of these shingles fall under ASTM D 3018-79 Type 1. There is not a clear-cut industry standard for tensile strength or the quantity or spacing of self-sealer adhesive. Areas such a minimum tensile strength, adhesive spacing, and quantity should be addressed by the industry.