

Roof Collapse Under Ponding Conditions (\$20,000)

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One of the most common types of structural failure is the collapse of roof systems. By some estimates, over 2000 roof failures occur each year and these are generally attributed to overload events such as rain micro-bursts, ice and snow storms, or rain occurring after snow. Modern long-span quasi-flat roof systems, like those used in many low-rise commercial and industrial buildings can be particularly sensitive to ponding failure from overload, lack of maintenance of roof drains, or improper design. Roof failures can result in needless loss of life and expensive property damage. An example of a recent roof collapse that occurred in Portland, OR is illustrated in Fig. 3. To help identify the cause of these failures and better understand ponding induced collapse, the Kiewit Center is funding research that will produce the first ever full-size laboratory tests of realistic roof systems under ponding loads to collapse. Results from these tests will help engineers and constructors develop better design and construction methods for roof systems to resist ponding. Kiewit Center funds of \$20,000 will be matched by the Steel Joist Institute of Myrtle Beach, SC through in-kind donations for support of the test setup and laboratory specimens. Professor Christopher Higgins of the Department of Civil, Construction, and Environmental Engineering at Oregon State University will be directing this research.



Figure 3 – Partial collapse of Fred Meyer store roof in Portland, OR, January 10, 2004.
(photo from KGW.com)