

# A CASE STUDY OF THE COST OF FM GLOBAL'S VERY SEVERE HAIL (VSH) RATING

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We recently published in our **Proven Perspectives** newsletter an article by Tom Irvine entitled "Roof Design and Building Codes: Making the Pieces Fit". In the article Tom reviewed, among other things, the recent change in FM Global's *Loss Prevention Data Sheet 1-34 - Hail Damage*. This updated data sheet created a new hail standard of "Very Severe Hail", and delineated a VSH hail zone which covers a large swath of the center of the country. This change was based on FM Global's loss experience and weather history. FM Global then created a new test protocol, to certify assemblies as **Very Severe Hail** (VSH) rated.

Without going into detail, the testing is considerably more difficult to pass than the Severe Hail test. Not only does the roof membrane have to pass a more severe hail impact (higher impact energy) than with the Severe Hail test (previously the highest hail rating), but the roof membrane also first undergoes artificial weathering, which is new to the hail testing protocol. The test protocol also evaluates damage done to the underlying cover board.

The end result, as Tom's article points out, is that there are currently many fewer roof system options available that meet the VSH rating, roughly 600 VSH rated assemblies of the 1 million FM Global RoofNav assembly listings.

We write this article not to argue against the need for more robust, or resilient roof construction, as we have witnessed the roof damage and business disruption that often is revealed in the aftermath of severe hail and wind events. Making roofs less vulnerable to weather events is a worthy goal, but comes at a cost. The purpose of the article is to shed some light on the cost differential to improve the resilience of roof construction, based on a recent case study.

## Case Study

In a recent hail event at a Midwest facility, an existing 15-year-old mechanically attached PVC membrane roof system was subjected to 2.5" hail, causing the roof membrane to be irreparably damaged. The decision was made to remove and replace the roof. This roof covered over 100,000 square feet, so we felt it would be a good example of the cost difference between the prior Severe Hail and Very Severe Hail rated roof systems.

The client wished to have two costs for replacement: replacing in "like kind" (or the same basic assembly that existed), and replacing with a new roof meeting the VSH hail rating. Both new assemblies had to be updated to meet the higher R-value requirements in the International Energy Conservation Code, but otherwise the work scope was essentially the same for both roof options.



The "like kind" Severe Rated (SR) replacement assembly, from the top down, consisted of:

- 60-mil mechanically attached PVC membrane
- 4.0" polyisocyanurate insulation, mechanically attached
- 6-mil polyethylene air retarder, loose laid
- Steel roof deck

The VSH Rated replacement assembly, from the top down, consisted of:

- 60-mil adhered fleece back Thermoplastic Polyolefin (TPO) membrane
- 0.5" Oriented Strand Board, mechanically attached
- 4.0" polyisocyanurate insulation
- Steel roof deck

Based on our research of the available 600 or so VSH-rated roof assemblies, the fleece back TPO assembly was chosen as it was expected to be the lowest cost of the current VSH-rated assemblies.

The client received bids for both assemblies. **The premium for the VSH rated assembly ranged from 25 to 50 percent above the severe hail rated assembly.**

In context, if the original roof had been a built-up or modified bitumen roof system, or even a thermoplastic roof system, with a high density coverboard, the difference between the "like kind" and VSH rated assembly would perhaps not be as large, as it would be coming from a higher base cost.

Nonetheless, Benchmark has several recent experiences where clients have a roof replacement budget based on a roof system that was, until this year, acceptable to FM Global, only to be confronted with the additional cost of meeting the VSH requirement.

This is a market disruption that will eventually be worked through, as more roof assemblies are tested and approved, and new innovative solutions are brought to market.