PRI Construction Materials Technologies LLC

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Email Correspondence

To: Frank Carman **Date:** April 13, 2021

From: Jason Simmons

Subject: Test Status: Proprietary testing for treatment of asphalt shingles

Background: Client requested testing in accordance with a proprietary test method to evaluate and compare the effects of a specific treatment for asphalt shingles. The property evaluated was resistance to water penetration.

Specimen: Three different types of speceimens were evaluated: 1) unaged asphalt shingles with no treatment, 2) unaged asphalt shingles with a proprietary treatment applied and 3) 20yr aged shingles with the proprietary treatment applied.

Specimens were excised from a larger, client supplied sample of the each of the identified samples. Specimens were cut approximately 4 inches by 6 inches and the perimeter of the cut specimens was coated in wax to prevent uptake of water through the exposed shingle edges.

Methods: Specimen weights were recorded prior to and during a series of exposure to wetting and subsequent drying. An initial weight was recorded for each specimen followed by a 3 minute exposure to a controlled and uniform water spray in accordance with the water spray requirements of ASTM G154. Specimen weights were recorded immediately following water exposure and after 15 minutes, 30minutes, and 60 minutes of a drying exposure to UV light and heat in accordance with ASTM G154 Cycle 1.

Observations: Refer to page 6.

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Representative Photographs:

Untreated Specimens – As Received

Untreated Specimens – After Testing

Treated Specimens – As Received

Treated Specimens – After Testing

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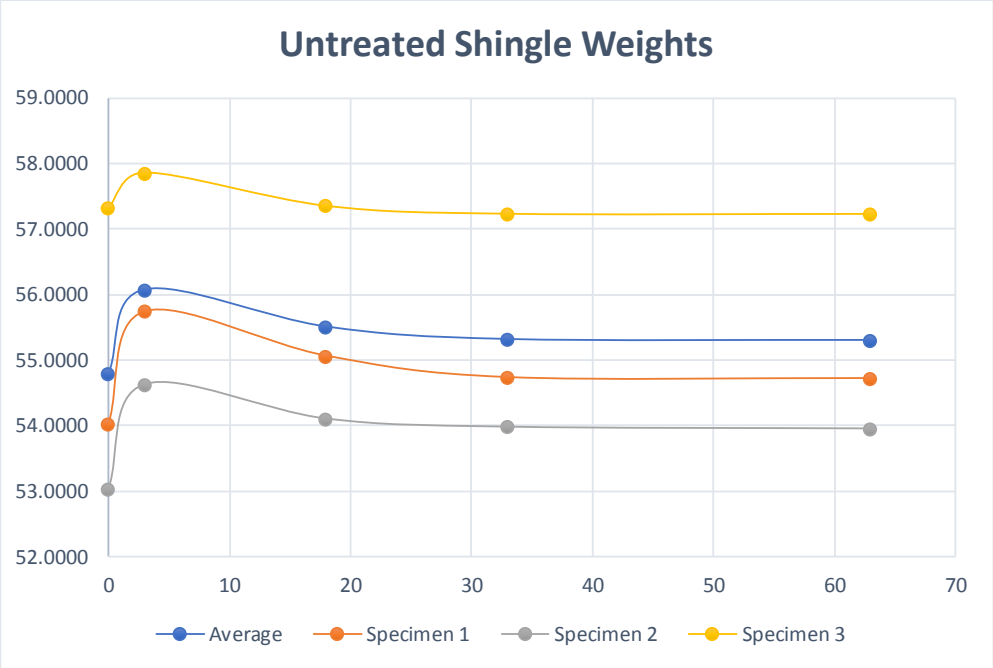
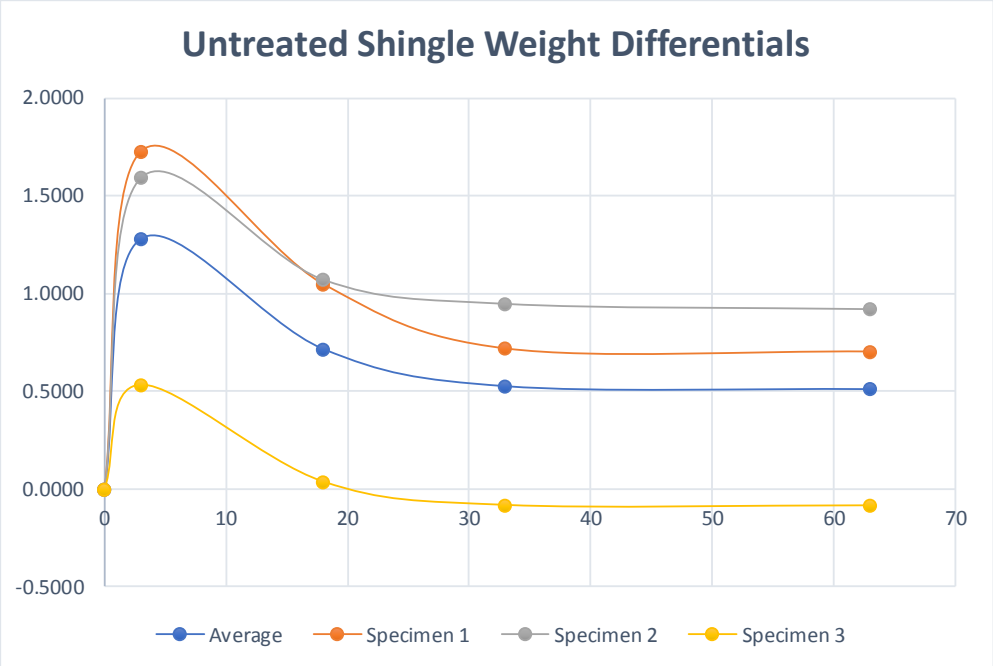
Test Data: Untreated shingles





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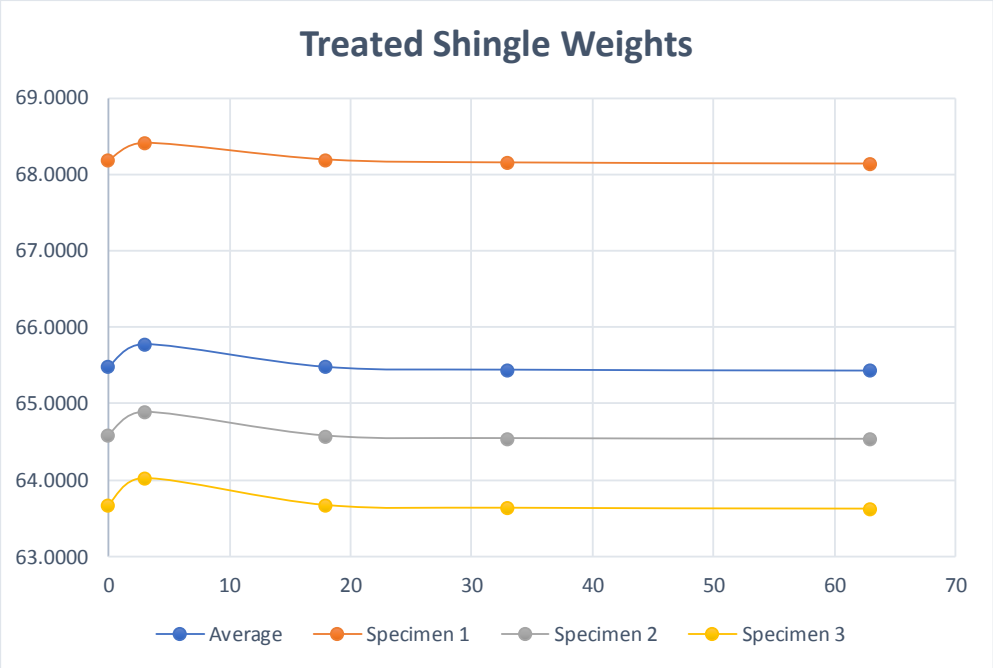
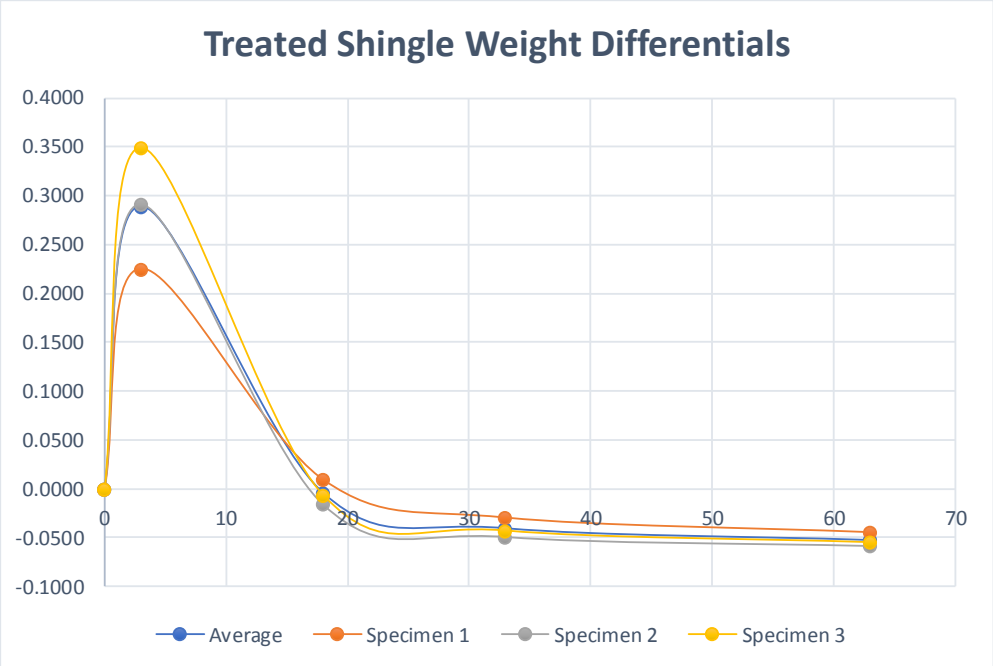
Test Data: Treated shingles





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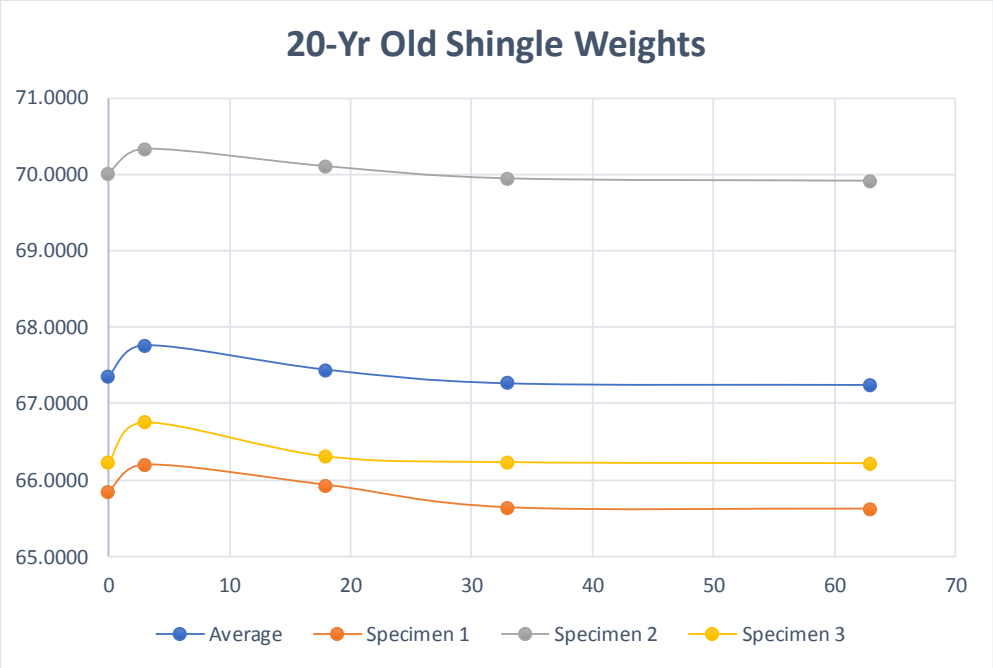
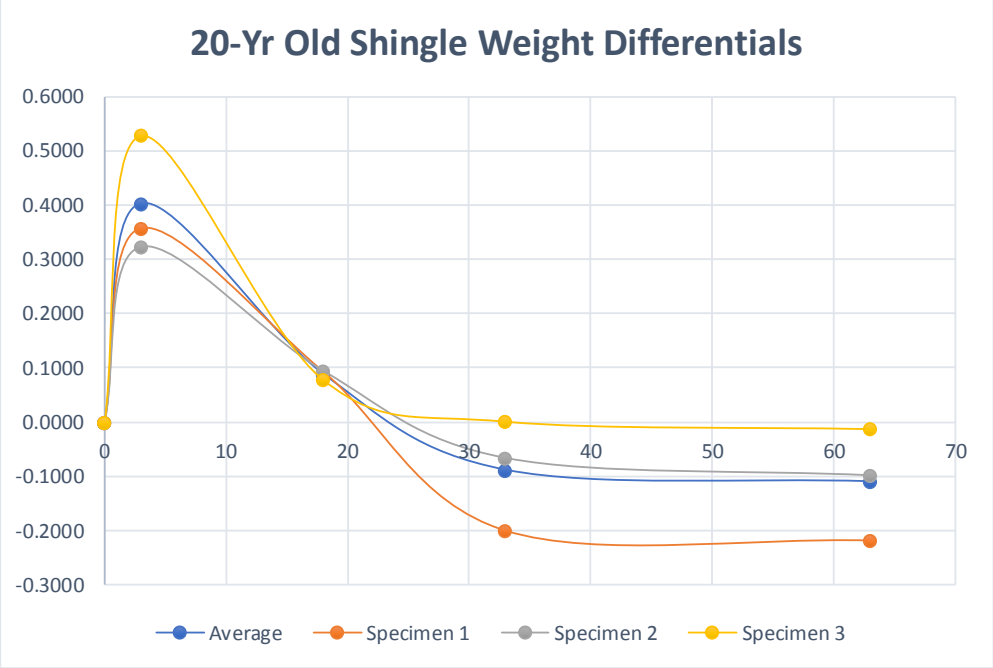
Test Data: Treated 20yr old shingles





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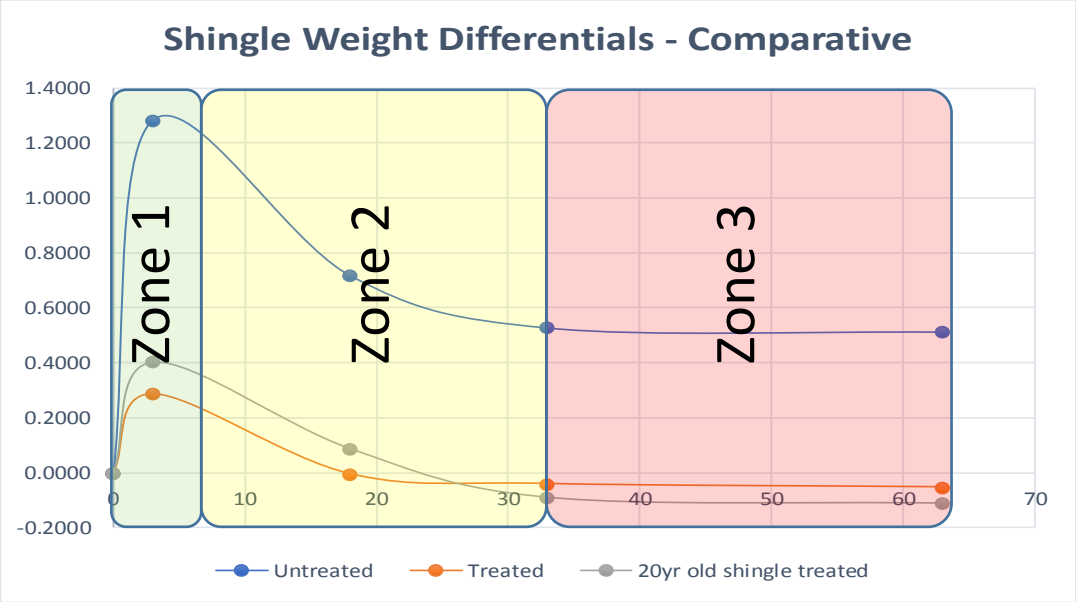

Observations: The treatment of the asphalt shingle specimens did appear to have a significant effect on the resistance to water penetration of the asphalt shingle specimens that were tested.

Zone 1: Illustrates the increased specimen weight due to water – both the surface water "on" the specimen as well as the absorbed moisture "in" the specimen. The lower peak, or initial increase in weight is due to the repellency caused by the treatment. The surface repellency is likely the more significant contributor, minimizing the exposure of the inner asphalt coating to the liquid water. Notice the treated unaged specimens and the treated aged specimens took on 22% and 31% as much water weight as the untreated specimens respectively.

Zone 2: Illustrates the effectiveness of the treatment and relative rapid loss in weight of the specimens primarily due to the drying of surface water on and in the granulated surface of the shingle. Notice the treated unaged specimens and the treated aged specimens both lost more weight in Zone 2 than they gained in Zone 1 while the untreated shingle only lost 60% of the weight that it gained in Zone 1. This indicates that the untreated shingle absorbed a significant amount of water while the treated shingles absorbed little to no water.

Zone 3: The weight loss in Zone 3 is minimal for all shingles – indicating the moisture content of the specimens themselves. The more easily evaporated surface water was removed in Zone 2, while the moisture that was absorbed into the shingle in zone 1 is more difficult to drive off and thus will take considerably more time. Of note in Zone 3 is the difference between the treated aged specimens and the treated unaged specimens. The average overall weight change of the treated aged specimens was -0.11g, twice that of the treated unaged specimens at 0.05g. This observation is not unexpected due to the combination of the ability for moisture to both entire as well as exit the oxidized asphalt coating.

END OF TEST STATUS

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