Utah State University

July 22, 2016

Subject: **Expected Life of PVC Pipe**

To: Mesers. Albert Thomas, Bharadwaj R. K. Mantha, and Carol C. Menassa and whom it may concern:

Many researchers have done in-depth studies of what should be the expected life of a PVC pipe. This was the subject of a paper I wrote two years ago for the 2014 Plastic Pipes Conference in Chicago, Illinois. The paper titled "Validation of the Long Life of PVC Pipes" documents testing done at Utah State University and also reviews papers from **15 other authors** from around the world. They all conclude that a properly design and installed PVC pipe will have an expected life in excess of 100 years. Several of these studies dug up existing PVC installations with some exceeding a service life of 50 years and found the pipe still met the qualification tests of new pipe (i.e. no reduction of pipe integrity). Thus, a minimum of 100 years of life is a very reasonable expectation.

One can easily find failure reports that show PVC pipe failing a less than 100 years. In nearly every case that we have personally investigated these situations we found that the pipe was improperly installed. On rare occasions defective pipes are at fault. PVC pipe from the 1970's did have issues with proper gelation because of low extrusion temperatures, but those situations are rare. All pipe materials in use today require proper installation to achieve the desired life.

A 50-year expected life is an often quoted expected life for PVC. This was based on a very conservative estimate done in the 1970's. We now have data on PVC pipe in use for more that 50 years to prove that this was a conservative estimate and needs to be updated. The paper "A Framework to Evaluate the Life Cycle Costs and Environmental Impacts of Water Pipelines" by Thomas, Mantha, and Menassa in the ASCE 2016 Pipelines Conference has incorrect references to my own work on failure rates in water mains. It references a paper I did in 2012 on "Water Main Breaks Rates in the USA and Canada" and claim that I stated that the expected life of PVC pipe is 41-60 years. There is no such statement in that paper. I would suggest these authors review the 15 other authors who agree with myself that a 100-year life is a very reasonable expectation for PVC pipe. Perhaps you should revise your paper with a more accurate value of 100 years for the expected life of PVC pipe.

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