

Laboratory Testing and Analysis of Geopolymer Pipe-lining Technology for Rehabilitation of Sewer & Stormwater Conduits, Part II – CMP Culvert Analysis

According to ASCE, capital investment needs for the nation's wastewater and stormwater systems are estimated to total \$298 billion over the next twenty years. Specifically, there is growing recognition that many of the hundreds-of-thousands of corrugated metal culverts used to convey storm water across embankments and roadways will be approaching the end of their useful service life over the next 20 years. Asset owners and engineers around the world are in search of cost-effective and environmentally friendly solutions that solve these infrastructure challenges. This paper reviews a geopolymer mortar system that has been used in the U.S. since 2011 for trenchless rehabilitation of storm and wastewater conveyance infrastructure. The system is spray cast either by rotary nozzle or via traditional shotcrete delivery systems placed inside the existing structures to create a new structure. In 2016 we presented on the testing and engineering design of RCP pipes that were repaired using this methodology. This paper will report observations made during an extensive laboratory testing program, consisting thirty-seven 37 geopolymer-mortar lined CMP host pipes specimens. The test specimens featured various liner thicknesses, pipe diameters and pre-loading conditions. The observed test data was compared with design predictions made using published engineering models.