



PROJECT TITLE: INVESTIGATION OF THE I88 CARRS CREEK GEOFOAM FAILURE

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INSTITUTION: SYRACUSE UNIVERSITY

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Figure 1 Aerial view of the I88 Carrs Creek culvert failure.

The Carrs Creek culvert collapsed during the Mid- Atlantic States Flood in June 2006. Rapid construction with geofoam fill enabled partial reopening of I88 by Labor Day. Soon after opening, excessive settlements developed and the geofoam was replaced with lightweight aggregates and I88



Figure 2 Excessive settlement and removal of the geofoam fill.

was again re-built. Figure 2 Excessive settlement and removal of the geofoam fill.

The previous investigation of the failure was reviewed. Additional tests and computer simulations were performed. Because of the relative stiffness of the culvert edge and the pile foundation, loading from the overlying soil would have been amplified by negative arching. The up to 2.7m of geofoam fill reduced the dead loads on the culvert. However, the geofoam blocks below the east and westbound roadways became overloaded and deformed excessively. Explanations for the failure that are presented in the report are different from likely causes identified in the previous investigation. Quality assurance for geofoam blocks, installation method, provision of internal drainage and considerations of creep under both confined and unconfined loading were important. The report provides suggestions for improving rapid construction with geofoam. An alternative design with reduced and uniform stress levels in the geofoam along the length of the culvert is presented.

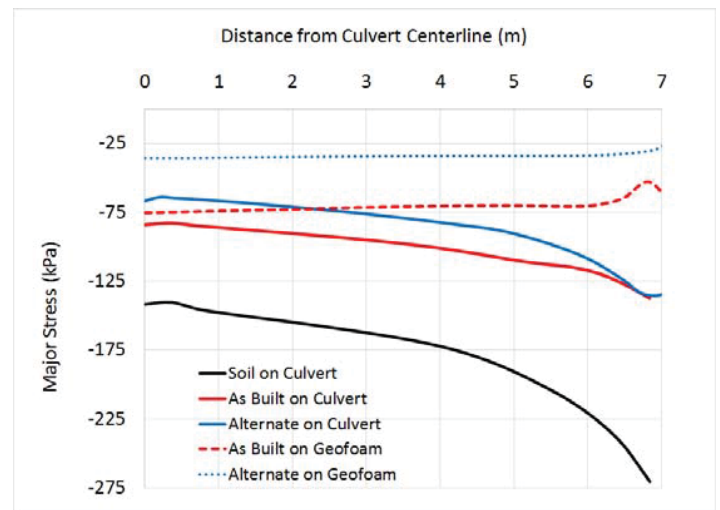


Figure 3 Stresses on the culvert and the geofoam.