

Purpose:

Measure the effects of typical pressure washing equipment and conditions on Concrete Cloth. Provide a basic guideline for use of pressure washing as a cleaning method for Concrete Cloth.

Procedure:

Concrete Cloth CC13 material was submersed in hydration water for 24 hrs and then allowed to cure an additional 24 hrs prior to testing.

A 1600 psi hand operated electric pressure washer with a cylindrical shaped nozzle was used to generate the test conditions. The pressure washing wand was then attached to a metal strut and held at a constant position above the CC13. A close up view of the experimental apparatus is shown in Figure 1. The distance above the CC13 surface and the duration of exposure were both varied during the experiment in order to demonstrate typical damage that might be expected during cleaning operations.



Figure 1: Experimental equipment showing both the CC13 sample on the stand and the 1600 psi pressure washing wand held at a constant 3 inches above the sample.

Experimental Data:

Effect of Wand Distance:

The first experiment conducted was to hold the time of exposure constant, 3 minutes, and vary the distance between the wand tip and the CC13 surface. Two distances were chosen, 1 inch and 3 inches respectively. In addition to exposing CC13 to these two conditions a sample of concrete block material was also tested.

Effect of Time:

A second experiment was then performed holding the distance at a constant 1 inch and varying the time from of exposure from over three levels: 3 minutes, 30 minutes and 1 hour.

Experimental Results:

As detailed in Figure 2, when CC 13 is exposed to a 1600 psi pressure washer at either 1 or 3 inches of separation for the nozzle exit to the surface of the material for a duration of 3 minutes no damage to the concrete occurs. With the 1 inch separation distance some damage to the top layer of fabric has occurred. With the concrete samples no visible damage to the surface occurred other than a cleaning action.

If the exposure time is increased by holding the wand in a constant position (Figure 3) severe damage of the fabric from both the water pressure and the heat generated from water impact with the surface fabric can act to melt the surface of the fabric. However, even at the 1hr exposure no damage to the concrete underneath the fabric is observed.

Conclusions:

Pressure washing of Concrete Cloth can be an effective method of cleaning the surface and, if done properly, will not harm the surface. If the pressure washing wand is moved (as would be typical to clean

a large surface area) and the exposure distance is greater than 3 inches, nothing other than cleaning of loose cement trapped in the surface fibers will be observed. If higher pressures or longer exposure times are used the fabric can be damaged by both cutting action of the water or heat generation from a repeated single point of impact. It is recommended that before starting pressure washing of a Concrete Cloth field installation that a sample area that will not impact the integrity of the existing installation be first tested prior to undertaking a full clean of the complete surface.

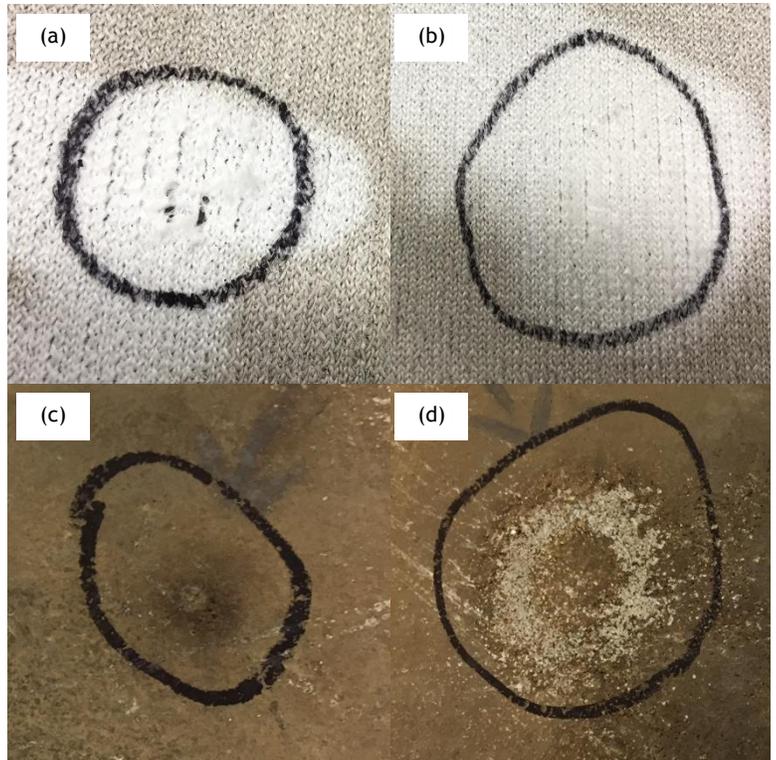


Figure 2: 3 minute exposures to 1600 psi pressure washing for (a) CC13 - 1 inch elevation, (b) CC13 - 3 inch elevation, (c) concrete - 1 inch elevation, (d) concrete - 3 inch elevation.

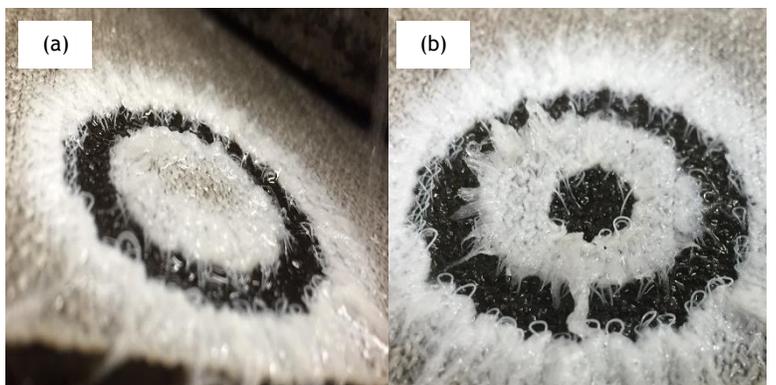


Figure 3: CC13 at exposure distance of 3 inches for exposure times (a) 30 minutes (b) 1 hour.