

RPT bond test in ramp

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SNO-STR-95-15

Purpose: To make an acrylic bond in the cavity in order to check that bonds can be made at that atmosphere pressure and to check the safety procedures for handling the bonding syrup.

On Friday morning, Feb 25, Dave Duff gave a presentation on the acrylic vessel fabrication to a safety group called together by Ken Languille in the Creighton Auditorium. The presentation described the status of the construction equipment and how the vessel would be supported during bonding. Details of the bonding procedure was also presented. There were a number of questions particular about the syrup. In response to questions, Davis commented on his experience during the 4600' bonding and with vaporizing acrylic at CRL. The assembled group was informed about the test planned for that afternoon.

12:30 pm Carol Woodliffe, Dave Duff, Eddie Azumia and Davis Earle left the surface for the cavity. We carried a plastic cooler containing a gallon of MMA syrup already mixed with catalysts in a wide mouth plastic bottle, blocks of acrylic already prepared with dams for the pouring of bonds and a tool box containing a respirator, paper towels, caulking containers and a caulking gun.

1:15 Left the lunch room for the car wash to pick up the material.

1:30 Left the car wash.

1:45 Opened the syrup container in the ramp clean room and poured about 300 ml into one of the caulking containers. We could smell the MMA at about 10'. The container was close to the return air vent and the cover was left off for about 2 minutes. The MMA could just be detected at about 20'.

1:48 Stood over Eddie while he injected the syrup into the 12" by 2" bond. Eddie smells it at 18". I just can at 2'. Dennis Pharand came in from the cavity and starting smelling the MMA at the mat which was 30' away.

1:51 Eddie, using the second caulking gun, filled the second bond. Dave had taken the cover off the container and filled the second container without us noticing an increase in the smell.

So it took about 10 minutes from first opening the container to sealing up the second bond.

1:55 Doug Hallman arrived with the Drager tubes and hand pump for measuring the MMA vapors quantitatively. The pump is hand held and the tubes are like glass pencils. One breaks off the ends of the glass tube, inserts one end in the pump opening and pumps 20 times causing room air to pass through the glass tube through the crystals in the tube. Upon contact with the crystals the MMA changes the color of the crystals from pale yellow to dark blue. By noting the fraction of the crystals which have turned color one can measure the concentration of MMA in the air from 15 to 200 ppm. The glass tube is calibrated in ppm. The safe working level for MMA is 200 ppm for an eight hour day and the nose can detect it at levels below 1 ppm.

The first measurement was with the lid of the container off and the monitor 5' away. After twenty pumps no crystals had changed color so the level was less than 15 ppm. With the monitor 2' away and between the container and return air vent there was still no change in the crystals.

2:02 With the monitor immediately above the opening of the container as shown in the photograph #1, the level on the monitor was 60 ppm which when corrected for atmospheric pressure is actually 46 ppm.

2:18 The entire contents of the container, 3/4 of a gallon, were poured into the cover of a garbage can in the middle of the cavity. The surface area was 24" and the depth about 3/4". The MMA can not be detected at 3' but is at 1.5' Carol, using the monitor, measures 35 ppm (corrected) one foot from the garbage can cover. See photograph #2 & #3.

Finally with a third Drager tube Carol got nothing at 6' and a trace, about 10 ppm, at 3'. See photographs #4 & #5.

2:40 Left the garbage cover, with the MMA in it to set up, in the ramp clean room. Could just smell the MMA at the door of the ramp.

Martin reported that he had checked every compartment in the laboratory while we were working and he had smelt nothing.

2:50 ready to leave lab with our mine drift clothes on.

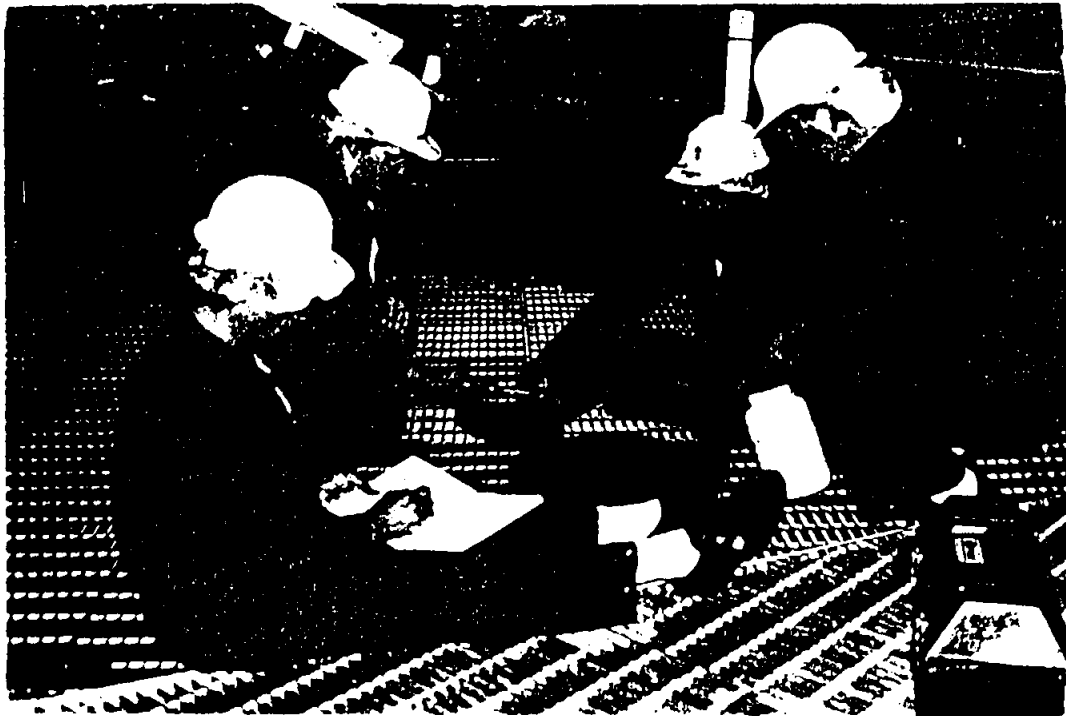
3:15 Arrived at the cage.

4:10 Back in the surface building.

Monday Feb 27 - The surface of the bonds were still tacky and the syrup in the garbage lid had not set up. RPT expected that the syrup in contact with the Al tape would not have set up. By Friday it had. By Friday most of the syrup in the garbage lid was rock hard and some of it was rubbery. One bonded sample will be sent to RPT for testing. The other is to remain in Sudbury. The syrup in the lid is to be thrown out.

As far as the vapors are concerned this test confirms the experience from the 4600' tests and that is that there is absolutely no problems associated with handling the MMA. Spilling 3/4 gallon and not cleaning it up must be a worst case scenario as far as vapors are concerned.

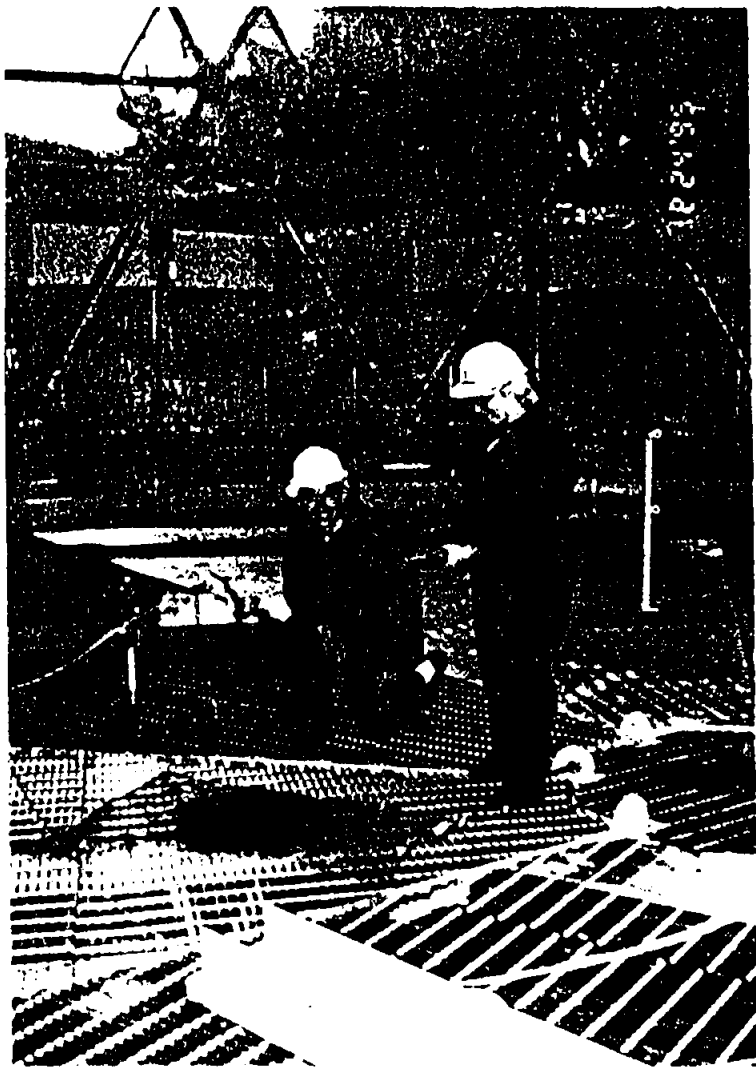
#2



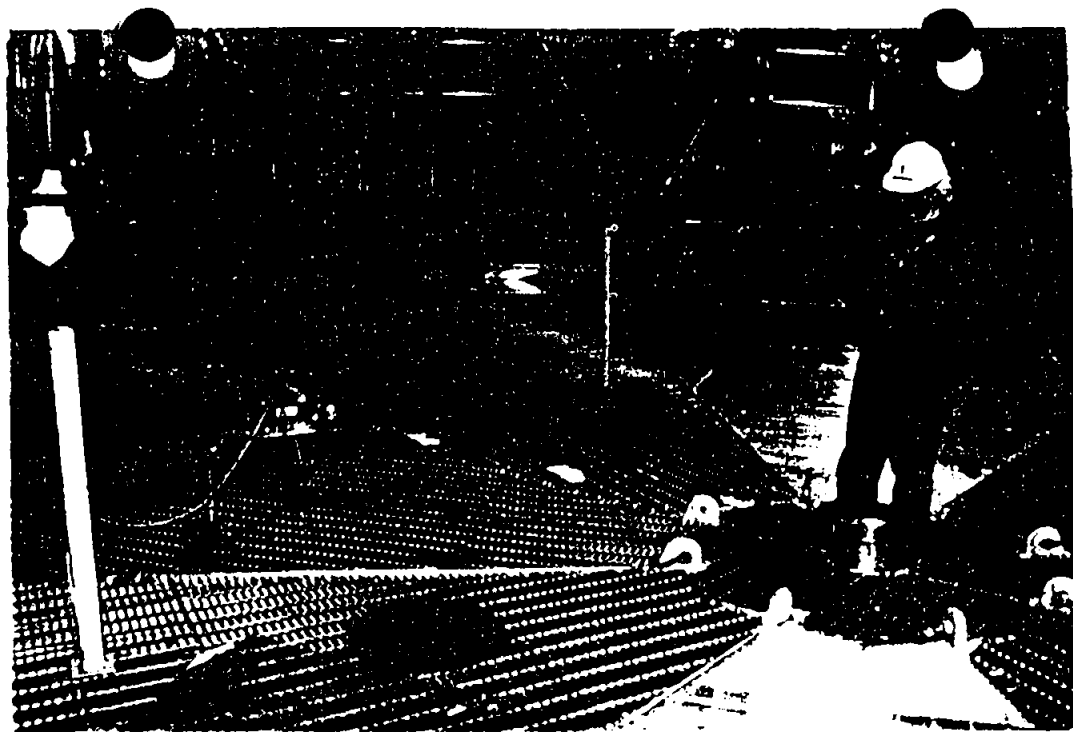
#1



2 24 '95



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