

U.S. Department of Labor

Mine Safety and Health Administration
Pittsburgh Safety & Health Technology Center
P.O. Box 18233
Pittsburgh, PA 15236
Roof Control Division



06AB82

March 16, 2007

MEMORANDUM FOR RICHARD A. GATES
Lead Accident Investigator

FROM:


JOSEPH C. ZELANKO
Acting Chief, Roof Control Division

SUBJECT: Evaluation of the Uniaxial Compressive Strength of Burrell
"Omega" Blocks

As requested, laboratory tests were conducted to determine the uniaxial compressive strength of "Omega" block samples obtained from various sources. The procedures used to prepare specimens and perform the laboratory tests are presented in the attached report, along with the raw test results and a statistical interpretation of the results. An executive summary is included below for your convenience.

Executive Summary

At the request of the MSHA team investigating the January 2, 2006, fatal accident at the Sago Mine, Roof Control Division (RCD) personnel conducted uniaxial compressive strength tests on Burrell "Omega Block" samples. Samples were provided from a variety of sources, including multiple production facilities and the Sago Mine.

Representative specimens were prepared and tested from these samples by RCD personnel. There is no specific American Society for Testing and Materials (ASTM) standards for this material. However, portions of several pertinent standards were used to develop appropriate preparation and test procedures.

Two sets of data were generated to evaluate the uniaxial compressive strength of Omega blocks. One set of data was developed using a factorial experimental design. This design provided an evaluation of the influence of sample source (e.g. production facility), moisture condition, and orientation. The second set of data represents the uniaxial compressive

strength of numerous individual blocks (or block remnants) recovered from the failed seals at Sago Mine. In all cases, statistical analyses were performed using a commercial software package called "Statistix."

Analyses of test results indicate that there are no differences in the average compressive strengths between wet and dry specimens or between core drilled horizontally and vertically. There appears to be a difference in strength between blocks U/H (i.e. those produced in the west) and SY (blocks obtained from the supply yard at Sago). However, there is no significant difference between blocks recovered underground at Sago Mine and blocks evaluated from any other location. Blocks from the failed seals at Sago Mine that were tested "as received" (regarding moisture condition) yielded the highest average uniaxial compressive strength of any group.

If you have any questions regarding this work or any additional testing needs, you can reach me at 412-386-6169.

cc: R. Stoltz, PSHTC, Ventilation Division