AGGREGATE update

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ICAR

CENTER FOR AGGREGATES RESEARCH

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ICAR symposium unveils the state-of-the-aggregate

Symposium attendees discuss alkali-silica reaction with Norman Nelson of Lyman-Richey Sand & Gravel Company

Craig Browne, l. foreground, recipient of the Charles A Machemehl Scholarship #1, and Prof. Alan Rauch, r. foreground, learn about the Exhibitors' latest product developments.

ICAR's Ninth Annual Symposium on Aggregates: Concrete, Bases, and Fines took place in Austin, Texas April 22-25, 2001, at the DoubleTree Hotel. Experts presented their findings on topics such as aggregates classification, handling, and specification; frictional properties of aggregates; performance parameters for aggregates in pavements; prediction and mitigation of alkali-silica reaction; and applications for microfines (-#200 sieve).

ICAR Director David Fowler welcomed 242 attendees representing industry, academia, and government, including 44 employees from 19 DOTs and nine delegates from the FHWA, the United States Geological Survey, the National Institute of Standards and Technology, the American Association of State Highway and Transportation Officials, the Ontario Ministry of Transportation, and Natural Resources Canada. Keynote speakers included Byron Lord of the FHWA and James O. Jirsa, immediate past president of the American Concrete Institute. John J. Allen, ICAR, closed the welcome session with an update on the status of ICAR research initiatives.

The rigorous technical program was punctuated by frequent breaks in the Exhibit Hall, pictured aboveright, which housed eleven companies. The John B. Long Company, Gilson Co., Sci-Tec Inc., W.S. Tyler, Rainhart Company, Brandt-A Varco Company, Ecocrete of Texas, HSS: A Division of McLanahan, Linatex, Bowser-Morner Testing, and Phoenix Process Equipment Company showcased their innovative products. One repeat Exhibitor remarked, "I always enjoy the ICAR show because of the high caliber of questions that the attendees ask about my products."

Many attendees played an active role in the task force meetings. The task forces are integral to the identification and evaluation of aggregates issues and problem statements. Any interested party may participate.

A highlight of the symposium was the Award Luncheon, where Richard C. Meininger received the AFTRE/ICAR Award for Distinguished Research. Mr. Meininger's long career as a DOT materials engineer and a staff engineer with the National Aggregates Association, along with his invaluable contributions to aggregates research, led to his selection.

The technical program ended with a discussion of aggregates issues by a panel of Department of Transportation (DOT) and Federal Highway Administration (FHWA) representatives. These annual DOT panel sessions give officials the opportunity to voice their states' aggregates-related initiatives and research plans. *continued on next page*

ICAR's Technical Advisory Committee (TAC) to meet

The TAC, short for Technical Advisory Committee, is a group of experts from industry, government, and academia who evaluate proposed research topics, rank the competing ideas, and recommend program content to the ICAR Board. This body receives ideas from our task forces, DOTs, members of the industry, and researchers as they attempt to ensure that scarce funding addresses the most important research issues.

This year, the TAC will meet in Austin, Texas, August 22 and 23. In addition to input received from the task force meetings held during the recent symposium, we are seeking suggestions for research topics from industry.

Please contact ICAR's Managing Associate Director, Dr. Joe Allen, at 512-471-4498 or icar@mail.ce.utexas.edu. ■

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Symposium salutes innovation in aggregates production & handling

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The attendees left with with a new definition of the state-of-the-practice in the aggregates industry.

Don't miss out on the chance to have your own organization impact ICAR research goals; make plans to join us in Baltimore, April 14-17, 2002 for our 10th Annual Symposium.

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Task force #2 on Superpave Aggregates Specifications & Fine Aggregate Properties & Their Influence on End Products, chaired by David Jahn, Martin-Marietta Aggregates, was one of seven task forces that met.

ICAR project 503 develops prototype aggregate scanner

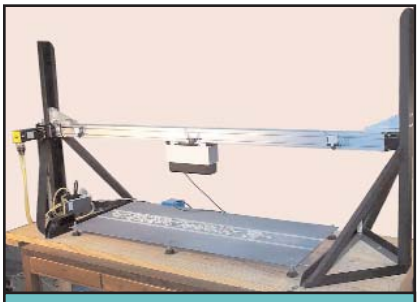

photo by Hyoungkwan Kim

Laser-based Aggregate Scanning System (LASS) developed by ICAR 503 researchers

"...The LASS measurements showed very good correlation with manual measurements..."

ICAR Project 503 Researchers, University of Texas professors Carl Haas and Alan Rauch, and graduate students Hyoungkwan Kim and Craig Browne, have developed the Laser-based Aggregate Scanning System (LASS) for characterizing various properties of construction aggregates accurately and rapidly. The laboratory prototype determines the shape and size parameters for aggregates using a "virtual proportional caliper" and "virtual sieve."

For the determination of shape and size parameters for aggregates, particles are first separated in the captured image by a segmentation algorithm using a Canny edge detector and Watershed transformation. 3D data captured on each particle are digitally rotated about different axes to find elongation and flatness ratios as well as the smallest mesh opening size through which the particle can pass.

How the LASS works

The LASS consists of a laser line scanner, a linear motion slide, and a personal computer. The laser scanner scans the aggregate sample with a vertical laser plane. The flexible system can study different scanner velocities and spread patterns while repeatedly scanning the same field of randomly-scattered aggregates. A laser source projects a stripe onto the surface of the object to be measured, while a camera captures the reflection. The laser plane can be defined geometrically if the position and orientation of the laser source are known.

Likewise, if the position and orientation of the camera are known, a mathematical line can be defined that connects a point on the surface of the object with a charge coupled device (CCD) cell through the camera's focal point. The 3D coordinates can then be determined by the intersection of the laser plane and the image line.

All the data points on the laser stripe can be determined in this manner. The LASS measures profiles of the aggregate particles, and relatively accurate aggregate shape data can be obtained by integrating the profiles, given the scanner velocity.

The researchers measured 200 particles both manually with a proportional caliper and with the LASS for six parameters: elongation; flatness; shortest, intermediate, and longest dimensions; and volume. The samples included aggregates of four types: granite, quartzite, traprock, and river gravel. In all cases, the LASS measurements showed very good correlation with the manual measurements.

The LASS Advantages

The LASS inventors found that the device not only measures particles quickly and accurately, but allows for determination of size and dimentional (e.g. elongation and flatness) ratios, and, potentially, surface texture.

Plans for modifications

Future plans to improve the LASS include perfecting the software used to interpret findings with a more user-friendly interface. Also, the reseachers believe that manless operation of the device is possible, so that the LASS could be placed in the field and its measurements could be read remotely. This kind of field application would involve pairing the LASS with an appropriate sampler to enable high-quality characterization of aggregates without halting operations.

Publications and presentations

The researchers presented papers on the LASS at the 17th International Symposium on Automation and Construc-tion as well as the 9th Annual ICAR Symposium. ■

WHO SHOULD ATTEND?

Industry producers, researchers, sales personnel, & engineers

Construction contractors

DOT employees involved in research, design, & construction

University researchers & professors

ICAR'S 10TH ANNUAL SYMPOSIUM

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