

# ASH AT WORK

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## Energy Alert

How are the newly approved Congressional energy package and the proposed new Environmental Protection Agency regs going to impact the ash industry?

NAA Director John H. Faber advises emerging trends mandate that ash interests join forces with coal and electric utility task forces to combat the irresponsible scientific assumptions now surfacing.

"We need to examine all aspects of these programs and be prepared to make constructive recommendations that will lead to the ultimate adoption of realistic and practical guidelines," Faber asserts.

The energy proposals contain, among other items, these provisions:

1. New plants on which construction began after April 20, 1977, to burn coal instead of oil or natural gas;

2. Existing power plants to stop using natural gas by 1990.

The "cradle to grave" concept in the Resource Conservation & Recovery Act (RCRA) draft appear headed toward the classification of coal ashes as "hazardous wastes" requiring elaborate monitoring, record keeping, security, and reporting systems, Faber explained.

"The cost of implementing such a program would be dramatic," he added, "and could result in a massive shift away from coal as the prime utility fuel."

The NAA spokesman said, "on the other hand the EPA's Resource Recovery Division is working dili-

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## Wertman, Faber to Direct Symposium

William T. Wertman, senior staff specialist-internal operations at the Morgantown Energy Research Center, and NAA Director John H. Faber are to serve as co-chairmen for the Fifth International Ash Utilization Symposium to be held on February 25-27 in Atlanta, GA.

All convention activities are scheduled at the 30-story Atlanta Hilton—the largest full-service hotel in the Southeast.



William T. Wertman

In accepting the appointment, Wertman disclosed the Department of Energy facility will again assemble, publish, and distribute the symposium proceedings. The center has supplied this publication service for each of the previous four

ash programs that began in 1967.

Wertman holds a B.S. degree in chemical engineering from Grove City College in 1942 and joined the Bureau of Mines six years later. He served at the Bradford and Franklin, PA, field offices before being transferred to Morgantown.

Although his work at the Center has been centered around secondary and tertiary oil recovery and coal gasification, the co-chairman is conversant with the DOE's ash utilization research. The facility has pioneered the use of fly ash as a soil amendment in the re-vegetation of abandoned strip-mined land and coal refuse piles.

Faber, who is coordinating the program formulation, noted letters of acceptance have been mailed to approximately 70 persons offering to present papers at the two-day symposium. Manuscripts are due by December 15, Faber stated.

Theme of the symposium is "The Economy of Ash." Papers were solicited in the areas of collection and storage, resource recovery, research, product specifications, and applications.

Faber indicated it may be necessary to go to concurrent sessions to accomo-

date all the speakers. Presenters will be limited to 15-20 minutes to allow for a question and answer period at the close of each session, he added.

### Exhibitors Requested

Provisions are being made to accept exhibit displays at the Hilton convention site, according to Co-Chairman Faber.

Space will be allocated in the area immediately adjoining the conference center, he added. Applications are available from the NAA's Washington office.

Proceeds from the exhibit rental will be used to co-sponsor the Social Hour on Monday, February 26.

"World-wide interest in all aspects of the production and utilization of power plant ash plus apprehension over the possible adverse effect of harsh new environmental regulations has resulted in the receipt of an above average

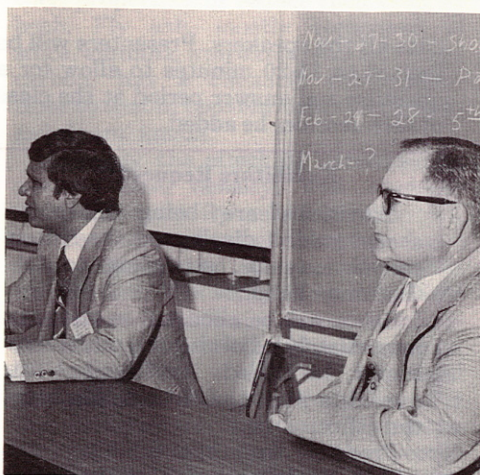
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**TEXAS CONFERENCE**—A three-day Ash Management Conference at College Station, TX on the campus of Texas A. & M. University on September 25-27 attracted 166 registrants—which was well in excess of anticipated attendance. The top photo shows the group enjoying a "Texas style" lunch while in the lower pictures Dr. Ramesh Joshi of the University of Calgary, left, and Robert E. Long of Texas State Department of Highways and Public Transportation (at right) field questions following their presentations on structural fills and lime-fly ash-soil mixtures, respectively. Dr. W. B. Ledbetter, a member of the Aggie Civil Engineering staff and a research engineer with the Texas Transportation Institute, organized the program.



**IOWA COUNTY TESTS FLY ASH CONCRETE ON HIGHWAY**—A five-mile stretch of highway in Monona County, Iowa, was paved this past summer with a six-inch concrete slab which utilized various proportions of fly ash up to 15 percent as a cement replacement in four of the six sections of the experimental road project. Initial results show that the use of fly ash saved construction dollars while still providing a good quality concrete product. The above photo shows the actual placement of the fly ash concrete on a section of the highway. A more detailed report will appear in the next issue of *ASH AT WORK*.

(Photo: Courtesy—Mid-West Construction News)

## Personal Profile

### John C. Rosner

Dr. John C. Rosner, program coordinator and the prime mover behind the Ash Short Course at Arizona State University, is no stranger to the field of ash utilization. He has been a speaker and panelist at past NAA sponsored symposiums and technical meetings.

A native of Indiana, the 42-year old Rosner received his B.S. degree in Civil Engineering at Purdue University in 1959, a Master's from Lehigh University in 1961, and doctorate from Purdue in 1969. In between graduate degrees, he spent five years as an associate professor at Arizona State University.



He joined Engineers Testing Laboratories, Inc., a Phoenix-based consulting firm, in 1974.

Dr. Rosner was the principal investigator on a three-year study for the Arizona Department of Transportation in cooperation with the Federal Highway Administration to evaluate the "The Utilization Waste Boiler Ash in Highway Construction in Arizona." The two areas examined were the use of fly ash in Portland cement concrete and in lime-fly ash soil mixtures. This work led to a soil stabilization test strip on a 3,500-foot section of State Route 169 near Dewey.

Work on a second joint project with ADOT and FHWA is expected to begin within a month to evaluate the use of fly ash as a substitute for lime or portland cement as an anti-strip agent in asphalt mixes.

His paper at the St. Louis symposium titled: "Let's Design Fly Ash Concretes, Not Compare Them!" was well received.

## Cain Honored

**CHICAGO**—Craig J. Cain, president of American Admixtures, has been awarded an Honorary Membership in the American Society for Testing and Material (ASTM).

The prestigious award was accorded to Cain for "twenty-two continuous years of service, leadership and dedication in advancing the philosophy of voluntary standards among all levels of ASTM and the concrete and concrete pipe industries."



## 20 Countries Are Represented at London Ash Congress

Twenty-eight delegates from North America were among the 206 persons attending the first International Ash Congress held in London, England, Oct. 22-27. Twenty countries were represented.

The ash technology exchange was co-sponsored by the Central Electricity Generating Board, AERE Harwell, and the National Ash Association.

NAA Director John H. Faber stated he felt the presentations were challenging and led to penetrating and often heated floor discussions.

He noted the event gave several countries—namely Sweden, New Zealand, Israel, Nova Scotia—the opportunity to obtain first-hand data on ash production, handling, and applications to aid them in developing ash management programs. Many of these nations are just getting into coal-fired electric generation and will soon be producing their first coal ash, he explained.

G. N. Stone, Director-General of the CEGB's South Eastern Region, was the keynote speaker for the Congress. He reviewed the CEGB's ash marketing program in the United Kingdom and predicted an exciting future for the coal by-products. Stone also stressed the need for closer cooperation between the producer and ultimate consumer.

The conference was concluded with a dinner at the prestigious Glaziers Hall overlooking the Thames River. Mr. Jim Porteous, Director-General, CEGB's Midlands Region, was the guest speaker.

The program also included a series of tours to various ash projects and the Didcot Power Station. Applications included a land reclamation project at Peterborough, a structural fill on road and bridge work in Kent and Southeast London, restoration grouting at Winchester Cathedral, a lightweight aggregate plant.

The registrants included Director John Faber; Craig J. Cain, American Admixtures; R. M. Cannon, Oak Ridge National Laboratory; D. R. Chapman, Exxon Research & Engineering; R. A. Cole, Ontario Hydro; T. A. Evins, Metromont Materials; Leo H. Gerbus, Trans Ash; R. H. Hall, Pozzolan, Products Co.; B. J. Jones, Radian Corp.; R. Martin, Del Val, Inc.; William E. Morton, Highway Materials, Inc.; R. J. Joshi, University of Calgary; R. H. Pennell, Metromont Materials; William F. Scriminger, Muskogee Environmental Conservation Co.; Dr. Roger K. Seals, West Virginia University; John Slonaker, WVU Coal Research Bureau.

Mr. and Mrs. John Del Val, Del Val, Inc.; Paul J. Wright, Woodbine, Corp.;



**ASH CONGRESS**—The recently concluded International Ash Congress in London, England, was well-attended as shown in accompanying photographs. (1) Shows delegates intently listening to one of the panelists; (2) G. N. Stone of CEG in opening remarks to 206 delegates; (3) Depicts participants in elegant dinner that closed the ash marketing conference. (Left to Right) Mr. and Mrs. Craig Cain of American Admixtures, CEGB's John K. Dent and Jim Porteous, and John H. Faber of NAA. Mr. Porteous was the guest speaker and Mr. Cain responded on behalf of the attendees.

Ed Mangotich, Engineering Testing Laboratories, George Salow, General Electric; Dr. C. Raba, Raba & Associates; B. J. Kirk and G. Lethbridge, Nova Scotia; Harold Stirling, Stirling Processing Co.; Allan W. Babcock, Allegheny Power Service Corp.; Phil Buckingham and David Oates, Ontario Hydro.

### Conference Preceedings

Copies of the proceedings of two recently concluded ash conferences may be ordered through the National Ash Association.

NAA Director John H. Faber said these include the Ash Management Conference held at Texas A & M University and the International Ash Marketing Congress staged at the Central Electricity Generating Board in London, England.

The Texas proceedings are available at \$25.00 each and the London material has been priced at 12.50 (English pound) and will be ready for distribution early in 1979.

Requests should be addressed to the National Ash Association, 1819 H Street, Northwest, Washington, D.C. 20006.



# Waste Fly Ash Used as Filler for Polypropylene Plastic

Written by Barbara Hildenbrand

WARREN, MI.—What do you do with 200 million kilograms of fly ash? That's approximately how much fly ash General Motors Corporation recovers annually from the flues of its coal-fired power houses.

Dr. Roger L. Kaas, a chemical engineer in the Polymers department of the General Motors Research Laboratories, has one answer. "Use it as a filler in polypropylene plastics," he suggests. "GM makes heavy use of filled polypropylene for many applications, such as heater and air conditioner cases, and radiator fan shrouds."

Fillers are added to plastics to modify their properties, or reduce their cost, or both. Fly ash, mostly composed of silica, alumina, iron oxide, and unburned carbon, has a chemical composition close to that of conventional fillers, such as talc and kaolin.

To study the effect of variations in particle size, density, and chemical composition in fly ash from different sources, Kaas obtained samples of ash from nine power houses within the corporation. The samples varied widely in average particle size—from 40 micrometers to greater than 420 micrometers. With help from co-workers, he mixed the samples with polypropylene. The Researchers then injection molded the resultant materials just as they would conventional filled polypropylene compositions and evaluated their properties.

"We found that we have to watch the size of the particles of fly ash we use for some applications," Kaas reports. "Plastics containing larger particles exhibited lower impact strengths and elongations at break than those with smaller particles. The obvious answer here is to grind the larger particles into smaller ones."

Certain components in the fly ash may catalyze thermal oxidation of the polypropylene during compounding and molding, and also in use, if elevated temperatures are involved. Antioxidant/metal deactivator mixtures added to the filled polypropylene minimize this reaction. "These additives give fly-ash-filled material a thermal stability comparable to that of commercial talc-filled material," says Kaas.

What about strength and stiffness? Tests show that polypropylene filled with pulverized fly ash has a tensile strength of about 23 MPa and tensile modulus of about 2.3 GPa. Typical values for talc-filled polypropylene are a tensile strength of 30.2 MPa and tensile modulus of 4.6 GPa. The difference in tensile strengths and moduli between

## GENERAL MOTORS LOOKS AT FLY ASH—

Dr. Roger L. Kaas, senior research engineer, and Technician Mary Ann Podlack are shown pulverizing fly ash with a jet mill at GM's Technical Center.



fly-ash- and talc-filled materials largely derives from the shape of the particles. Fly ash particles are irregular, about as long as they are thick, while talc particles are pre-dominantly plate-like with large length-to-thickness ratios.

"Although talc gives the material higher tensile strength and modulus values," says Kaas, "the values with fly ash are satisfactory for many plastics applications."

The fly ash filler makes plastics black. In most cases, this is an advantage, eliminating the use of carbon black which is generally added to talc-filled polypropylenes to blacken them.

"Using this waste material as a plastics filler would provide an ecologically acceptable solution to a waste disposal problem," concludes Kaas. "It would also save the cost of dumping fly ash in land-fill projects and save the cost of the

conventional filler it replaces. This particular study was a spin-off of a more extensive research project involving surface modification of fillers. We're pleased with its potential environmental as well as economic payoff."

Average Particle Size (Micrometers)	Elongation at Break (%)	Unnotched Impact Strength (J/m)
40	9.2	175
50	10.7	175
125	3.8	137
130	2.9	101
160	3.2	113
260	6.8	121
> 420	3.0	93

Preliminary studies by GM Researchers indicate that fly ash may be used in materials other than polypropylene. "We visualize it in any filled plastics," states Kaas.

## Energy . . .

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gently to promote the increased recycling of coal by-products."

He further suggested that ash producers and users read an article titled "New Fears Surround the Shift to Coal" appearing in the November 20, 1978 issue of FORTUNE magazine.

A reference to ash on Page 56 reads as follows: "But both ash and sludge contain a rich variety of heavy metals and assorted other chemicals, many of which are known to be carcinogenic or otherwise toxic. These materials can leach out and possibly endanger streams, flood plains, and sources of drinking water, such as aquifers. Under provisions of the 1976 Resource Conservation and Recovery Act, it is likely that the EPA will declare ash and sludge to be 'Hazardous' wastes, ineligible either for sale or for disposal by conventional open dumping. No one knows what, then is to become of them."

## Wertman, Faber . . .

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number of quality of technical papers," Faber stated.

"This was quite evident in the recently concluded Ash Congress in London," Faber asserted.

Registration fee for the symposium has been set at \$80. The assessment will cover pre-prints of the technical papers, an early bird reception, Continental breakfast, two lunches, and all coffee breaks.

Hotel accommodations have been priced at \$46 for a single room and \$58 for a double. Reservations can be made through the NAA or direct with The Atlanta Hilton. Exhibitor suites are available upon request. (See enclosed inserts)

Symposium sponsors in addition to the Department of Energy include the National Coal Association, Edison Electric Institute, American Public Power Association, Resource Recovery Division of Environmental Protection Agency, and the National Ash Association.