

# ASH AT WORK

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## By-product Lime and Fly Ash For Use As A Road Base On Secondary Roads

by: Dennis Jones  
JTM

Ash Management Corporation, (a subsidiary of JTM Industries, Inc.), Container Corporation of America, and Nassau County, Florida teamed up to solve the problem of the high cost of road base construction in North Florida.

In many areas along Florida coasts, crushed stone base is extremely expensive or, in some cases, non-existent. Most of the rock quarries are located in Central Florida or along the Gulf Coast. Since transportation to the Nassau County area is very costly, Nassau County Engineer Dick King looked for an alternate method of stabilizing the fine sand at an economical price for his county.

Ash Management Corporation, by contract with Container Corporation of America, land farms by-product paper sludge generated at the CCA paper mill in Fernandina Beach, Florida. AMC trucks must travel roads in the timberlands which are constructed using in situ sand. The sand material is non-cohesive and when dry, the roads are unstable; when wet, they become unpassable. As a result, AMC had many of the same problems that Nassau County faced and also looked for an alternate method of stabilizing the in situ sand.

Container Corporation produces several by-products in the paper manufacturing process, two of which are by-product lime and fly ash. As a demonstration project, AMC spread several inches of the wet lime

sludge and fly ash, mixing the lime/fly ash with several inches of in situ sand, then compacted the mixture. After several weeks, the base had hardened enough that AMC trucks weighing 70,000 pounds could pass without getting stuck. After about 30 days, the lime/fly ash base was extremely hard and gets harder with time because of the chemical reaction of the lime and fly ash.

When AMC approached Mr. King of Nassau County, he was quick to pick up on the use of these valuable low cost resources in Nassau County. Several roads have been constructed the past year with

much success. In fact, the results have been so successful Mr. King and his road crews are presently constructing 4.8 miles of secondary roads using the lime/fly ash mixture, with many more to follow.

Approximately \$100,000 per mile is the construction cost of roads in Nassau County using crushed stone base. Using the lime/fly ash mixture, the construction cost is less than \$70,000 per mile. Mr. King is writing a manual for placement procedure so that developers can use the lime/fly ash base material as an alternate base material in the Nassau County specifications.

## ACAA Places Nationwide Advertisement

"*Insight*" — the newest entry into the community of national news magazines — offered "introductory" complimentary display advertising space for the first few months of its publication. The American Coal Ash Association took the magazine up on its offer, and the ad appearing in current issues is shown on page 4 of this Ash at Work publication.

The ad has been well received, and is generating many inquiries for further information on coal ash utilization.

A slightly modified version of the advertisement will be placed by the ACAA in the special "*Concrete Today*" edition of

the *Engineering News Record* in May of this year.

The ENR special, entitled "*Concrete Today — Markets, Materials and Methods*" will be circulated to a half-million regular readers plus special distribution to members of Congress, Governors, Deans of Civil Engineering Schools, contractors from the publication's Top 400 Listing, and the Top 500 Engineering Design Firms in the U.S.

The ACAA has also announced it is creating a special fund to continue the placement of institutional advertising on coal ash utilization in other major maga-

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# ASH AT WORK

Jack Weber, *Chairman of the Board*  
Tobias Anthony, *President*

Published quarterly by the American Coal Ash Association, 1819 H Street, NW, Washington, DC 20006, for its members, their friends and supporters.

zines and trade journals throughout the country.

The advertisement seen on page 4 of this publication is also available as a full-color poster through the ACAA. A charge of \$10 for each poster will be made by ACAA to offset its production cost. Poster orders are directly through ACAA. ■

## American Electric Power Service Corp. Reports: "Fly Ash Used in Coal Mine Subsidence"

Once coal mines are worked out and abandoned with no roof support, the shale and rock stratum above starts to fall into the void left by the removal of the coal seam. This process continues, possibly for many years, until the subsidence reaches the ground level above the old mine, with attendant damage to property or structures.

Currently remedial procedures involve drilling into the mines and filling the voids with some suitable material that will provide sufficient support to stop or prevent further sinking.

Approximately 5,000 tons of Amos dry fly ash was recently used with Portland cement (seven parts fly ash to one part cement) to produce a low strength grout for a mine subsidence project in Wellston, Ohio. Conditioned fly ash from the Glen Lyn Plant (moistened ash) is being considered for the same type of project in the Beckley, West Virginia area.

Mine subsidence represents high volume usage. Marketing efforts are underway to include AEP fly ash in mine subsidence projects throughout the coal fields of the AEP service area. ■

## Plaque Presented to Jim Plumb

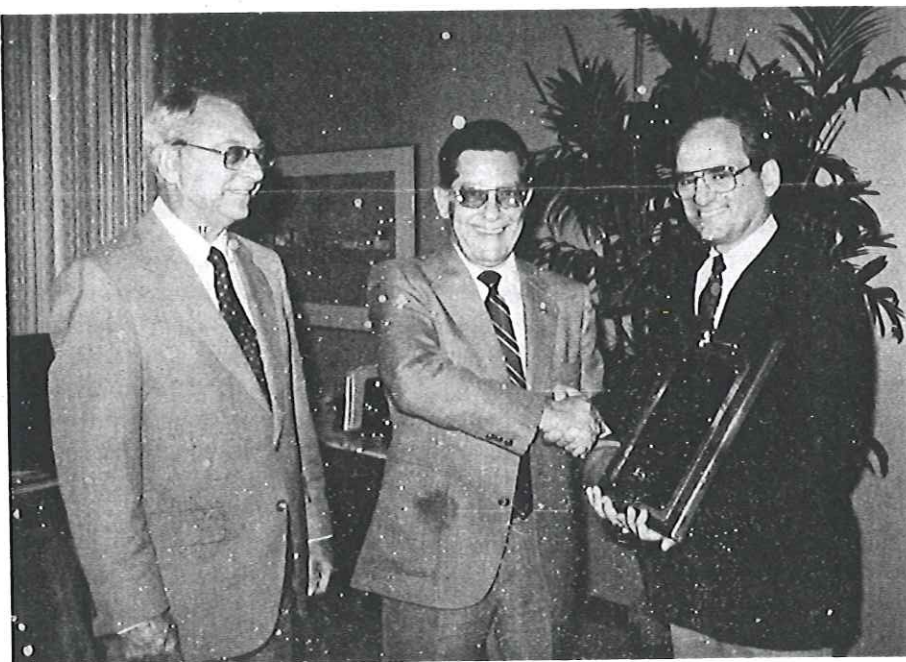
"Jim Plumb was one of the most effective Chairmen of the American Coal Ash Association in its sixteen year history" so said Tobias Anthony, president of the association. This accolade took place during an award ceremony in Mr. Allen Beavers' office on July 17th, 1985.

The two-term chairman of the 100 member international association of electric utilities, marketing companies, and engineering firms based in Washington, D.C., is Division Manager of System Purchasing under Mr. Beavers. "Houston Lighting & Power Company believes its executives should take part in activities that better our industry," said Mr. Beavers. "We also like to think our know-how and successful management of coal com-

bustion by-products should be shared with other members of our industry," he said.

Mr. Anthony went on to say that Jim Plumb was the reason he accepted the salaried position of President. That took place during Mr. Plumb's first year as chairman, a time when the association was struggling. The twosome proceeded to double its membership revenues, establish a strong presence on Capitol Hill and with allied associations, and to produce an ambitious growth program. Mr. Plumb served as Chairman in 1983 and 1984.

The purpose of the association is to promote the utilization and sale of coal ash. Houston Lighting & Power Company is one of the top five in the country in terms of ash sales which amount to 60% of all ash produced. ■



L to R: A. R. Beavers, Jim Plumb, Tobias Anthony, President — American Coal Ash Association



## Message from the President

Support for utilization of recoverable resources has been a predominate concern of every Administration going back to the oil embargo of 1974. That embargo, that threat to the security of our nation was the motivation behind the Congress and the Carter administration putting into law the Resource Conservation and Recovery Act of 1976.

The debate that took place in Congress over the sudden realization that for the first time in our history as an industrial leader our national security was threatened by energy insecurity. The shock brought to the forefront what was obvious to the then stagnant coal industry, that our country had more energy available in its domestic coal supply than existed in all of the oil in the Middle-East. Electric Utilities responded immediately to the price differential between oil and coal and increased coal utilization from 1973 to 1977 an average of 5.28% a year. When OPEC doubled oil prices in 1977, coal consumption by Electric Utilities in one year, from 1978 to 1979 jumped almost 10%.

Consequently, ash deposits increased dramatically over that period. As a result, coal ash has become the 4th largest mineral resource in the United States exceeded only by stone, sand, and coal itself.

Because coal ash is not energy sensitive, the Congress in 1976, decided to promote coal ash use wherever it was technically feasible and it was cost effective. The Resource Conservation and Recovery Act, commonly known as RCRA, mandated that federal agencies had to promote utilization in all federally-sponsored projects. Since ash can be used to replace 20% to 30% of an energy sensitive mineral, portland cement, in concrete construction, the first set of guidelines that EPA was directed to provide had to do with ash in concrete which will boost ash-use substantially. To put this in perspective, in 1983 before the concrete guidelines were in effect, some 60 million tons of portland cement was consumed in both public and private construction. So at a minimum of 20% replacement, 12 million tons of the most popular type of coal ash — fly ash — could have made its way into the market place. Instead only 3.6 million tons were used, or 30% market penetration.

While 30 percent market penetration without guidelines in effect may seem to be encouraging, we must seek much more utilization. While 70 million tons of coal ash were produced in 1983, the Department of Energy forecasts that by the year 2000, this nation could produce 170 million tons of ash more than double the amount produced in 1983.

Congress is concerned that it is likely most of this ash will be disposed rather than utilized unless something is done to accelerate use. Since subsidies are out of the question these

days, Congressman John Dingle, Chairman of the House Interstate and Foreign Commerce Committee has applied leverage through federal funding of construction projects. That is why we have federal guidelines for procurement of cement and concrete containing fly ash, mentioned earlier, or 40CFR 249 Federal Register dated January 28, 1983, and why additional transportation guidelines are now being reviewed which will encourage the use of fly ash in bases, subbases, soil stabilization, around roads, under airports, and parking fields. That is also the reason to make sure that mechanisms exist at the state and county level to allow ash to be considered equally with competitive, natural minerals. The Environmental Protection Agency has issued guidelines as well for designing ash for constructing sewage treatment systems.

The Environmental Protection Agency in its advisory to The Federal regions, concluded that: a) concrete including fly ash can be equivalent or even superior to concrete which doesn't include fly ash, b) there's a long and successful history of fly ash being used by private concrete producers, the U.S. Army Corp of Engineers, the Bureau of Reclamation and most state highway departments, c) procuring agencies should include provisions in all construction contracts to allow for the use of concrete or cement which contains fly ash unless the use of fly ash can be determined to be inappropriate for technical reasons documented by the procuring agency or architect, engineer or other qualified person. It was further concluded that there should be a review process available in the event of disagreement regarding such technical reasons.

On January 24, 1986, Mr. Lester Lamm, Deputy Administrator of the Federal Highway Administration, sent a directive on concrete guidelines to all of the Federal regional offices. In that directive he said, "basically the guideline requires that all affected agencies revise the specifications standards and procedures to remove any discrimination against the use of fly ash and cement and concrete unless such use is found to be technically inappropriate in a particular application. A finding of technical inappropriateness should be documented, open for public scrutiny and a review process established to settle any disagreements." He goes on to say, "EPA expects a high-level of compliance with the guideline." This is an indication of the seriousness behind the federal intent to open up the doors to fly ash use.

There has been some concern expressed over the possibility of degradation of the environment where large-scale disposal or use of ash is practiced. Penelope Hanson, of the Environmental Protection Agency, addressed this issue in September 1984 in a paper presented in London.

She said "the studies conducted to date show the following: while finding reuse opportunities for many other wastes is usually difficult and frequently impossible, fly ash from coal combustion proves to be a happy exception. The feedback from that portion of the American Cement and Concrete Industry that wish to market fly ash cement products has been most encouraging. Not only have government contracts been opened up to fly ash, but the hope for a ripple effect in which government procurement practices are duplicated by other institutions and even by private industry has proven to be the case."

This is a clear signal from the EPA that coal ash use, particularly in concrete and certainly for use in buildings, highways, sewer systems, and airports, is safe.

The American Coal Ash Association has a history of practices which will satisfy two objectives. First, we can utilize coal ash in an environmentally sound manner while providing a benefit to the public. Second, we have a national commitment to the ever-increasing use of these materials to conserve energy and to substitute for natural minerals which must be gouged out of hillsides. Third, we provide guidance for this material's proper use. Furthermore, the ACAA believes that the engineering profession has an opportunity during periods when funds for construction are sparse to produce more projects for the same dollars for the reason that ash is priced, usually, at 30% of the cost of portland cement or other minerals. Finally, ash is used widely in increasing quantities for very large projects. An exciting project outside of Baltimore provides us with an outstanding example of the way ash can be used in huge quantities.

The Baltimore Gas & Electric Company is building a 200-acre site for industrial parks which will contain 1.8 million tons of ash or roughly a ten-year one-power-plant-supply. When completed, this industrial park will be valued at \$100 million dollars, generating one million dollars a year in real estate tax revenue. That project alone proves that fly ash structural fill for real estate development provided a benefit to the private and the public sector as well.

It proves further the wisdom of using a material that is both benign and available in huge quantities to allow it to substitute for clay

fill, or sand and gravel. Coal Ash applications such as this should be at the forefront of the national objective to utilize by-products from combustion processes so we can be assured of our energy security, our environmental quality and our public welfare. ■



Tobias Anthony



# Half of America's Electricity is Generated by Burning Coal. But That's Only Half the Story.

*Electric Utility Companies in the United States burn almost 700 million tons of coal every year in generating half of our electric energy requirement.*

*Left behind after all that power is sent down the lines is the 4th largest available mineral in this country:*

## COAL ASH



70,000,000 tons of coal ash are produced each year by America's electric utility companies, adding to a constantly growing inventory that's already at 800 million tons stored and ready-to-use.



Coal Ash is a readily available mineral resource. It is our 4th largest, after stone, sand and coal.



Coal Ash is a valuable commodity used for structural fill and land development, for road base construction and to supplement cement, for buildings, dams and ocean reefs, for filtration fillers and fertilizing.



And yet, less than a fourth of this inexpensive, readily-available recoverable resource is being utilized today.



Because not enough people know about it. Or think about it.



We wanted you to know.