

# Historical Perspective of Coal Ash Marketing and Promotion in the USA

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KEYWORDS: fly ash, coal, ash, NAA, ACAA, concrete

## ABSTRACT

John H. Faber, the first executive director of the National Ash Association (NAA), 1968–80, was the planner of the first Ash Utilization Symposium in 1967 in Pittsburgh, Pennsylvania. A summary of his history of the first 40 years of ash marketing, beginning in 1946, is presented in this paper. Due mainly to his efforts, the NAA was formed in 1968 and became recognized as the world's leading authority on coal ash technology and utilization. Faber initiated the publication of a NAA newsletter entitled "Ash at Work." In 1985, the NAA became American Coal Ash Association (ACAA). The formation and early history of the NAA, compiled from Ash at Work, are presented in this paper, as well as highlights from the NAA and ACAA. Ash at Work continues today with its fourth logo.

There have been 15 Fly Ash Symposiums sponsored by NAA and ACAA, five by the University of Kentucky, and eight International Conferences on Fly Ash, Silica Fume, Slag and Natural Pozzolans in Concrete, sponsored by the Canada Center for Mineral and Energy Technology/American Concrete Institute.

Oscar E. Manz, Professor Emeritus of Civil Engineering at the University of North Dakota, has been a lifetime associate of Faber and promoter of fly ash since 1963. He spent 9 years having high-lime Class C fly ash incorporated into American Society for Testing and Materials C618 for fly ash for use in concrete. A summary of his lifetime association with fly ash promotion is also included. The Coal Ash Resources Research Consortium (CARRC<sup>®</sup>) at the Energy & Environmental Research Center at the University of North Dakota continues the work that Manz started in the 1960s.

## INTRODUCTION

Oscar E. Manz, Professor Emeritus of Civil Engineering at the University of North Dakota, has been a lifetime associate of John H. Faber since 1963, when Faber was at

the U.S. Bureau of Mines (USBM) Morgantown Energy Research Center. Manz's promotional efforts, initiated in 1963, led him to research North Dakota lignite fly ash and its potential for use first in ceramics and, later, in concrete. Manz's education as a ceramic engineer sparked his interest in the glassy fly ash that was formed under high-temperature conditions, and his early experience in Canada working in the brick-making industry allowed him to recognize the potential for fly ash as a material rather than a waste. His research on the use of western U.S. coal fly ash for concrete was used in the 9-year effort in ASTM to incorporate the specification for high-lime Class C fly ash into ASTM C618 for use of fly ash as a mineral admixture in concrete. Manz's involvement in coal ash research and promotion for more than 40 years provides a unique perspective on the history and development of the coal ash industry in the United States. Relating that history is important to the continued growth of the coal ash industry.

Since 1968, the U.S. coal ash industry has been represented by a national trade association that led efforts to market and promote the utilization of coal ash. Throughout its history, the ash association encouraged the participation of all interested parties including members of the research and university communities.

## **THE FIRST FORTY YEARS OF COAL ASH MARKETING**

Faber made a presentation in 1987 on the first 40 years (1946–1986) of the fly ash marketing industry in the United States, and some of his observations are summarized here.

Prior to 1946, about the only ash available were cinders or bottom ash because there were very few fly-ash collection facilities and these only collected the large particles not suitable for use. With the advent of the development of the pulverized fuel boilers in World War II and growing environmental concerns, fly ash started to be produced in the mid 1940s in adequate quantities to develop utilization markets. In the mid 1930s, Professor R.E. Davis of California performed and reported on research done on fly ash and fly ash use in concrete and developed a specification for fly ash to be used in making concrete.

Faber (1987) included the following highlights in his presentation:

- The first formal fly ash company, the Chicago Fly Ash Company, was formed in December, 1946, by Harry Cain, his son Craig Cain, and others.
- One of the early employees of this new company was Walter N. Handy who in the early 1950s formed his own company, the Walter N. Handy Co., which was located in Springfield, Missouri.
- Cain and Handy, using the specification developed by Davis, were successful in these initial ash marketing efforts in the Mississippi River Basin because of a rapid growth in construction in that area and the presence and construction of

power plants that produced quality fly ash. The growth of the market for fly ash from these plants was to the east and to the south near the fields of bituminous coal, which was the primary fuel for the electric generating plants.

- It was not until the late 1960s and early 1970s that fly ash production brought fly ash marketing west of the Mississippi River Basin.
- The initial markets opened up by the Chicago Fly Ash Co. were in the concrete area. Fly ash was being used as a cement replacement and to enhance the qualities of concrete to meet the new postwar demands. The technology used to establish these markets came from the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers, which had been using natural pozzolans for mass concrete in dam construction for many years. This technology, of course, dates back to Roman times in the building of the aqueducts and the coliseums.
- The first market that gave breath to early sales from both the Walter N. Handy Co. and the Chicago Fly Ash Co. was the construction of dams throughout the United States using fly ash as a cement replacement up to 60% or more. The first dam to use fly ash was the Hungry Horse Dam in Montana in 1949. The fly ash for the Hungry Horse Dam was sold by Handy while he was an employee of the Chicago Fly Ash Co. The contract was for 130,000 tons @ \$1.00 per ton. In the 1950s, there were five dams built by the Bureau of Reclamation and the Corps of Engineers; in the 1960s, there were 30 dams built with fly ash supplied by Chicago Fly Ash Co., some as the sole supplier and some supplemented by other sources. It is easy to see how these two companies survived.
- The second large fly ash market was the well drilling industry, where fly ash was found to be beneficial in the cementing of oil wells.
- In the late 1960s, USBM and the mining industry opened up the lignite coal fields of the Dakotas which led to the development of a second fly ash specification by Manz. This specification addressed itself to the new ashes which were high in free-lime content and were in themselves hydraulic as well as pozzolanic. This new ash was named Class C to distinguish it from the first one, which was Class F. In the 1970s, another area of coal from the western states came into the utility markets which was also high in lime content and met the Class C specification.
- Faber indicated that in 1986 the ash marketing industry was only utilizing 15%–20% of the ash produced; the remainder was being discarded. He also said that the primary challenge to the fly ash marketing industry at that time was the identification of uses for the fly ash that could not be consumed in the concrete market.

## DEVELOPMENT OF THE U.S. COAL ASH TRADE ASSOCIATION

In 1958, within the framework of the Coal Committee of the United Nations Economic Committee for Europe, a group of researchers started work on problems related to the utilization of coal ash. They held their first meeting at Paris in 1960; they met 12 times in various locations throughout Europe, including countries with existing experience in ash utilization such as the Federal Republic of Germany, France, Poland, and the United Kingdom. The final meeting was held in France, May 23–27, 1966. In September 1966, this group became the Group of Experts on the Utilization of Ash. Its first session was held at Pittsburgh, Pennsylvania, March 13–17, 1967, as part of the first Ash Utilization Symposium, which was cosponsored by the Edison Electric Institute, National Coal Association (NCA), and the USBM. Ash production increased between 1959 and 1967 by 50 percent in the countries taking part regularly in the work of the Group of Experts (Austria, Belgium, the former Czechoslovakia, Federal Republic of Germany, France, Poland, and the United Kingdom). More notably, the quantity of ash used industrially increased eightfold over the same period, resulting in an ash utilization rate of about 30% of production.

The concept of a National Ash Association (NAA) evolved from discussions among a few key individuals attending the first Ash Utilization Symposium in 1967. Presentations at the Pittsburgh symposium helped set the stage for the establishment of the NAA. Among those promoting the formation of a trade association with international affiliations were: Henry W.G. Deadman, Central Electricity Generating Board, London; Adolphe Jarrige, a retired consulting engineer from Paris; Antoni Paprocki, Assistant Professor, Institute of Building Technics, Warsaw, Poland; and Herman Erythropel, Chief of the Research and Development Department, Steinkoklen-Electrizat AG, Essen, Germany. Remarks from other distinguished individuals from the United States further defined the basis for the establishment of the NAA.

After the 1967 symposium, interest in establishing a U.S. trade association continued to build, and in October 1967, more than 50 representatives of coal companies, electric utilities, and railroads held a formal meeting in New York. The association was formally incorporated on March 8, 1968, in Washington, D.C. Its office was opened on July 8, 1968, when promotion activities began in earnest. Faber was the first NAA executive director and continued in that capacity until 1980. Six additional individuals have held that position since 1980: James Covey, 1980–1983; Toby Anthony, 1983–1986; Erast Borissoff, 1987–1993; Sam Tyson, 1993–2001; Corey Trench, 2001–2002; and David Goss, 2002–present.

High profile activities initiated by the NAA were:

- The publication of a newsletter—Ash at Work—to inform the membership and other interested readers of the latest advancements in ash technology and specific NAA activities. Ash at Work was first published in 1969.
- Assembly and distribution of the annual Ash Production and Utilization Survey.

- Sponsorship and organization of Ash Utilization Symposium.

These activities have continued throughout the duration of NAA and now the American Coal Ash Association (ACAA), making the NAA, and its successor, ACAA, a recognized world leading authority on coal ash technology and utilization.

In 1978, environmental concerns relating to coal ash increased substantially and led to the creation of an ad hoc committee known as the Utility Solid Waste Activity Group (USWAG). USWAG's function was to address the regulations promulgated by the U.S. Environmental Protection Agency (EPA) under the 1976 Resource Conservation and Recovery Act (RCRA). The association joined in the fight to limit the impact of RCRA and to influence the adoption of practical and realistic guidelines. A Technical Awareness Program was initiated in 1979 to further increase coal ash utilization, attract new members, and continue the fight against the imposition of harsh environmental regulations. Today USWAG, Edison Electric Institute (EEI), and ACAA share the work load of many joint action programs with ACAA taking the lead on utilization issues.

In March 1985, the ACAA Board of Directors adopted the symbol of the phoenix and the name "American Coal Ash Association".

## **COMMUNICATION IN THE COAL ASH INDUSTRY**

NAA/ACAA has promoted the utilization of coal ash through a wide variety of communication and marketing efforts. These include the following:

- Fifteen Fly Ash Utilization Symposiums: 1967, Pittsburgh, 1970 Pittsburgh, 1973, Pittsburgh; 1976, St. Louis; 1979 Atlanta; 1982, Reno; 1985 Orlando; 1987, Washington, D.C.; 1989, Orlando; 1993, Orlando, 1995, Orlando; 1997, Orlando; 1999, Orlando; 2001, San Antonio; 2003, St. Petersburg Proceedings of each symposium included full papers of submissions from the United States and around the world.
- The Ash at Work newsletter which has been transformed into a biannual trade journal.
- Publishing of the annual ash production and utilization surveys, and now cooperating with U.S. Geological Survey to incorporate coal ash into its annual Minerals Yearbook.
- Sponsorship of annual technical meetings workshops and short courses on topics related to coal ash utilization.
- Sponsorship of coal combustion managers training programs.
- Sponsored and attended technical exchanges with the European Ash Association, Canadian Industries Recycling Coal Ash, Center for Coal

Utilization, Japan, and other international coal ash groups leading to the formation of the Worldwide Coal Ash Council in 1999 which is now called the Worldwide Coal Combustion Products Council (WWCCPC). ACAA hosts the WWCCPC Web site.

- Published the Fly Ash Facts for Highway Engineers jointly with the Federal Highway Administration (FHWA), and most recently (2003), with EPA.
- Produced videos on coal combustion by-products (CCBs), flowable fill, and power plant ash in highway construction.
- Published the Flexible Pavement Manual, the Soil and Pavement Base Stabilization with Self-Cementing Coal Fly Ash Manual, and a series of Technical Briefs on topics related to coal ash and coal ash use.
- Supported the development of the EPA Coal Combustion Products Partnership (C2P2) and cosponsored C2P2 Workshops with EPA, the U.S. Department of Transportation, USWAG, and others to inform end users of the benefits of coal ash use.

In addition to these broadly varied communication activities, NAA/ACAA has exhibited at numerous trade shows and other venues, encouraged member participation in ASTM committees related to coal ash use and testing, and acted as a communication hub for the coal ash industry the following.

Other groups have also worked to facilitate communication within the coal ash industry and to communicate information on coal ash to other industries and stakeholders. Noteworthy activities include:

- Seven international conferences on Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete have been sponsored by the Canada Center for Mineral and Energy Technology (CANMET)/American Concrete Institute. They were held in Montebello, Quebec (1983), Madrid, Spain (1986), Trondheim, Norway (1989), Istanbul, Turkey (1992), Milwaukee, Wisconsin (1995), Bangkok, Thailand (1998), Madras, India (2001), Las Vegas, Nevada, (2004).
- The University of Kentucky Center for Applied Energy Research (CAER) has sponsored five international ash utilization symposiums in Lexington, Kentucky, since 1995.
- In 2005, ACAA joined with CAER, DOE National Energy Technology Laboratory and the Office of Surface Mining to sponsor the World of Coal Ash Symposium in Lexington, Kentucky. The World of Coal Ash is expected to become another highlight in the history of the coal ash industry.

## REFERENCES

[1] Faber, J. H. 40 Years of Ash Marketing in the U.S.A. In *Proceedings of the Utilization of Ash Workshop*, May 13–15, 1987. University of North Dakota, Grand Forks, ND; pp I-1–I-7.