

ASIA PACIFIC CONCLAVE 2017

ON

DRY EXTRACTION AND EFFECTIVE UTILIZATION OF BOTTOM ASH AND
TECHNOLOGICAL ADVANCES IN OTHER COAL COMBUSTION PRODUCTS
AND EMISSIONS IN THERMAL POWER PLANTS

Preamble

In all countries and regions the power plants are increasingly operating in a more competitive climate and in a world, short of mineral resources, coal continues to be the fuel of choice and correspondingly by-products from coal combustion are increasing. This, as we all know, is more pertinent to India, where there is an overwhelming dependence on high-ash coal for power generation. According to the latest report of the Central Electricity authority, between April and September 2015, 132 thermal power plants (TPPs) of 58 Utility Companies having an installed capacity of 130428 MW consumed 251.69 million tonnes of coal with an average ash content of 33.23%. This led to generation of 83.64 million tonnes of coal ash, out of which only 46.87 million tonnes (or 56.04%) was gainfully utilized.

If we have to bridge the gap between the generation and utilization of coal ash – a task which is imperative from the environmental management perspective – we have to focus on the more effective use of the *bottom ash* that constitutes tentatively 20% of the total coal ash generated, the balance 80% being the more widely known component *fly ash*. The extensively prevalent practice of wet extraction of the bottom ash obviously comes in the way of achieving its properties that are required for its gainful use. The ash handling and engineering companies, however, in recent times have designed and implemented systems by which the bottom ash can be extracted, cooled and conveyed in a dry state. Systems like Magaldi's MAC Ash Cooler, Qingdao Songling's DAP Dry Ash Processor, Clyde Bergemann's DRYCON, United Conveyor Corporation's VAX Vibratory Ash Extraction, etc. are operational worldwide but with limited

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appearance in the Indian TPPs. This edition of the Asia-Pacific Conclave has therefore chosen the dry extraction and effective utilization of bottom ash as the primary focus area.

Another important area of environmental management in TPPs is the adoption of stricter regulatory norms particularly for emissions. According to the Ministerial notification of December 2015, TPPs to be commissioned after 1 January 2017 will have to observe the following emission norms: Particulate Matter 30mg/Nm³; SO₂ 100mg/Nm³; NO_x 100 mg/Nm³ and Hg 0.03mg/Nm³. In fact, the PM, SO_x and NO_x values in the new plants are prescribed to be substantially lower than the existing units, for which the PM, SO_x and NO_x limits are 100, 600 and 600 mg/Nm³ respectively. It is therefore extremely important to take a stock of the technological options and our preparedness to meet the future regime of flue gas emission norms. It should also be borne in mind that the process of desulfurization of flue gas is likely to generate calcium sulfate or gypsum as a by-product, which also will have to be gainfully utilized. Hence, the Conclave intends to deal with also the best available technologies for emission control including that of mercury in the TPPs. Further, the requirement of water per megawatt of power generated also will have to be drastically reduced.

Last but not the least is the imperative need of enhanced use of fly ash, as the overall utilization of coal ash in India has been hovering around 56%. Broadly it has been observed that while the generation of coal ash from the TPPs has been increasing in the recent years at the rate of 9 – 10 million tonnes per year, the rate of growth of ash utilization falls behind to a level of 6 -7 million tonnes annually. Hence, there is, on one hand, the accumulation of unused fly ash in ponds and, on the other hand, there is a pressure of increasing generation of coal ash due to growth of coal-based power generation capacity. In order to meet this critical situation, a high degree of innovation and research is called for along with commercialization of new products and technologies. It may be relevant to mention here that certain technologies like the High Volume Fly Ash Concrete, Fly Ash Based Zeolite manufacture and Ultrafine Grinding of Fly ash for expanded use of the material have been worked upon in pilot scale with even field trials in some cases but for various reasons these technologies are still not in the regular commercial streams. The Conclave, therefore, intends to take a stock of the status of these technologies as well in a global perspective.

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The Coal Ash Institute of India had embarked on holding the first Asia Pacific Conclave in 2007, which was followed by the second Conclave in 2013 and the present one is the third in the series.

Coal Ash Institute of India

It is a not-for-profit professional society registered in West Bengal for promoting gainful but eco-friendly application, disposal and overall management strategies for coal combustion products and emissions. More than two decades back in September 1994 the Institute was established by the experts in the field of power generation in the state of West Bengal in order to tackle the environmental problems caused by the generation of massive quantities of ash from the coal-fired thermal power plants. The primary objects of the society were to arrange and organize lectures, debates, discussions, seminars and other awareness programs; to publish useful literature, papers, magazines, books, monographs, etc.; to maintain or manage schools, colleges, libraries etc. for the benefit of public from the institutional perspectives; and several other acts and deeds in the utilization and disposal of ash generated by power plants. Over the last two decades many of the above objects of the society have been successfully met by the Institute. For example, apart from the three Asia-Pacific Conclaves, the Institute has organized many other important seminars such as Sino-Indian Initiatives for Coal ash Management, National Seminar on Use of Fly Ash in Agriculture, etc. and it has also organized expert lectures, provided solutions to various field problems, and published monographs on selected themes. The Institute brings out a quarterly newsletter and also a journal.

Specific themes of the Conclave

1. Different commercially available dry extraction systems for bottom ash.
2. Quality and quality upgradation of bottom ash.
3. Multifarious applications of bottom ash.
4. Desulfurisation technologies.
5. Quality and application of FGD gypsum.
6. DeNOx technologies.
7. Capture and use of CO₂.
8. Environmental issues pertaining to mercury in coal combustion.

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9. High volume fly ash concrete and its commercial applications.
10. Feasibility of making zeolite from fly ash
11. Ultrafine grinding technologies for fly ash
12. Applied research and innovation in coal ash use.

Expected participation for the Conclave

Based on the scope and content of the Conclave, it is expected that the event would particularly be useful to:

- Operational and managerial professionals of the coal-based TPPs
- Users of fly ash, such as the cement and concrete industry
- Construction industry looking for alternative and green building materials
- Equipment and technology suppliers for dry bottom ash extraction systems
- Technology suppliers for FGD, deNO_x, etc.
- Environmental scientists and engineers
- Academicians and researchers in the field of waste recycling and new products development

Needless to mention that the above list is only illustrative and not exhaustive.

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