

Press Release

Safety and cost-efficiency rise from the ashes with meticulous ash management

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Most fuels produce ash and effective ash management - encompassing safety, efficiency, environmental maintenance and sustainability is crucial, says boiler operations and maintenance expert Associated Energy Services (AES) Commercial Director Dennis Williams.

In South Africa, ash management ranges from sophisticated overhead storage systems and wet conveyors to manual trolley-based solutions. Throughout, Williams emphasises that AES is meticulous about how ash is handled, stored and disposed of.

A solid approach to ash management

Typically, local ash generation and management relates to solid fuels.

“The most common solid fuel source in South Africa is coal. Differing composition due to different seams and geographic locations mean it fires differently – a key factor when recovering ash after combustion,” points out Williams.

In comparison, biomass produces a significantly smaller volume of ash than coal, reducing system requirements. However, the ultimate ash management solution depends on individual client preferences - with location of the boiler in relation to the production facility and specific operational preferences varying radically.

Larger plants typically include a wet submerged conveyor belt: ash discharges into a water-filled ash conveyor, creating a water seal which prevents air from moving back through the ash port into the boiler. Ash is then carried away via the conveyor to an ash receiving skip or storage point.

Ash may also be conveyed to an overhead hopper beneath which a truck can be positioned for loading or placed into bins for later transport.

“On old Dutch oven-fired biomass boilers, there is a lot of manual ash removal. However, on the newer systems, a wet ash system similar to that used in coal-fired boilers removes wet ash. Ash solids are carried out, and water is returned to the ash system,” Williams points out, adding that this is particularly valuable for clients concerned about dust or site cleanliness.

From ash types to water

There are two main ash classifications - bottom ash and fly ash. Bottom ash is coarser, featuring larger particles. Depending on coal type, varying degrees of clinkering occurs when ash components fuse together.

In some ash, there is also unburnt carbon – something which AES tries to limit: “Every carbon molecule we do not burn is a loss in terms of what we paid for that energy,” Williams notes.

Then there are fine particles that move through the boiler into the flue gas stream during steam generation. These are removed by grit arrestors, bag filters or electrostatic precipitators.

Fly ash and bottom ash differ in composition – relevant when determining handling and disposal methods. In addition, ash management requires close attention to operational detail. Excessive build-up of hot ash behind the stoker damages the rear roller around which the chain grate rotates. Periodic inspections are needed to identify and clear build-up.

Water temperatures in submerged ash conveyors must also be carefully managed: “If the rubber conveyor belt is continually exposed to heated water, the ash system must be rinsed to top it up with cooler water. Any build-up of fines underneath the conveyor belt must also be cleaned out. Without this, the conveyor belt will fail. When the ash system is down, boilers must be de-ashed manually - which creates considerable health and safety risks.”

Water run-off from ash storage is another major consideration: “Usually there is a point at which we would separate out the particulate, such as fine ash and coal dust. Water overflow then goes to the effluent treatment plant,” Williams advises.

Where ash is stored before being uplifted, run-off water must ideally pass through settling traps before entering the effluent system, as Williams clarifies: “If you have an overhead hopper with a conveyor belt carrying wet ash up to the top, you will have water slowly leaching out of it and dripping onto the ground. That water needs to be managed.”

Legislation, safety and sustainability

Ash is categorised as waste in terms of the National Environmental Management Act 2008, and must be tested and classified at least every five years to determine how it is managed.

Mostly, qualifying boiler ash can be sent to general landfill. However, appropriate personal protective equipment (PPE) is required, such as gloves and dust masks.

“Significant risk points need to be managed across the entire chain of generating, handling, storing, collecting, transporting and disposing of ash. In every instance, we look at optimisation: proposing a solution to the client which addresses all of the operational standards and legal

risks associated with the generation and disposal of ash - as cost-effectively as possible,” outlines Williams.

The same legislation also provides for the declassification of ash so it can be recycled and reused - either as an aggregate in concrete products such as cinder blocks, in brick manufacturing or - in the case of biomass ash - for the production of eco-friendly fertiliser.

However, viability depends on location: “The big thing is proximity: as soon as the ash is transported any significant distance, value is eroded on both sides,” he explains.

Symbiotic ash disposal

Instead, AES has used ash disposal as a way to incentivise entrepreneurs as part of its enterprise development initiatives.

Alternatively (although never likely to be a viable income generator) the sale of ash can also be used to offset disposal costs for major clients: “For example, as part of a recent contract, we saw that a client’s production facilities - operating in close proximity in a remote area - could benefit from an integrated logistics solution. The volumes, together with the relationship which AES leveraged, created a competitive solution for all,” Williams concludes.

(929 words)

Note to Editors:

As the leading and most experienced Operations and Maintenance (O & M) service provider in South Africa’s steam and boiler industry, AES has been an innovator and pioneer for over 25 years. It is the ‘go-to’ company for manufacturers to optimise their energy generation and operations, diversify energy resources, improve site operations, and reduce their carbon footprints through the production of the maximum amount of energy, reduction of risk and minimisation of the total cost of production through an energy plant’s operational life.

Current long-standing contracts average at least 10 years – with client savings achieved extending from 10% to over 35%. The company has concluded more than 50 outsourcing contracts (28 currently active) and has over 75 boilers under management. Client sites benefit from AES’s significant expertise and skill, which spans operations, maintenance and mitigating the risk associated with energy and combustion vessels under pressure.

The industry sectors in which AES operates include power generation, chemical, plastics and rubber, timber, pulp and paper, textiles, food and beverage, and mining. The company not only

assists with the day-to-day generation and supply of steam from coal, liquid fuels, biomass and gas, but has assisted numerous clients in converting to more sustainable fuels.

The substantial value added by AES is evident across the entire manufacturing supply chain via the mitigation of risk and the reduction of plant downtime, the cost- effective procurement of fuel and logistics management, assistance with asset maintenance over a plant's lifetime, improvement in site operations and lead times, minimisation of wastage and a reduction in carbon footprint.

AES subscribes to the strongest ethics and operates according to high safety standards, prioritising process safety management and occupational safety so that clients know that their assets are legally compliant, cared for, safely operated and managed.

The company is also proud of its commitment to service delivery, technology advancement and the development of its people. AES upskills and promotes talented people on an equal opportunity basis into the industrial operations environment. The company believes that making a positive difference to communities and the environment is the best way to ensure that everyone benefits.

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