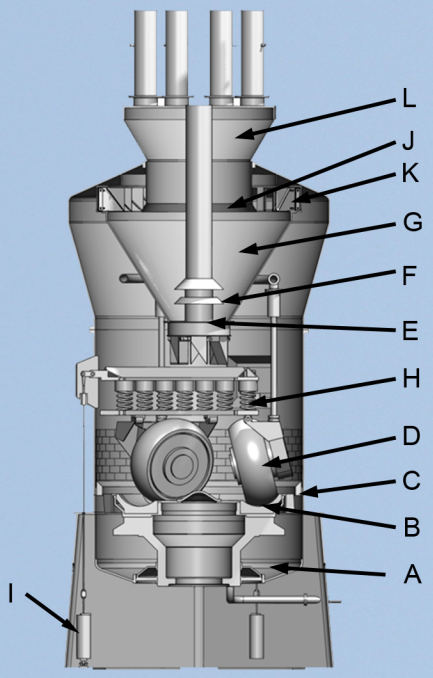
Performance Driven Maintenance for Pulverized Coal Fueled Plants

Maintenance Planning on Coal Pulverizers

These are challenging times to operate and maintain a coal fueled power plant. Faced with low natural gas prices, the EPA's war on coal with mangled public perceptions of coal and ever increasing costs of generation due to improvements in reductions of emissions. These are daunting challenges for coal plants to generate reliable, low cost, clean, efficient electricity. Our goal of this newsletter is to focus on how to get the best performance, reliability, efficiency, emissions and capacity from a pulverized coal fueled power plant. Let's get back to the basics:

The coal pulverizers are in fact the heart of a pulverized coal fired power plant. The pulverizers provide the greatest number of opportunities to keep combustion optimized, or to put it another way, the coal pulverizers present the most "variables" to achieving optimum combustion.



A. Pyrite Sweep Condition/Clearances
B. Grinding Element Condition/Clearances
C. Throat Dimensions/Opening
D. Roll/Journal Condition
E. Feed Pipe Clearances
F. Inverted Cone/Conical Baffle Clearances
G. Classifier Cone Condition
H. Button Clearance/Spring Height
I. Preload of Spring Canisters or Hydraulic Pressure
J. Outlet Cylinder Height in relation to Classifier Blades
K. Classifier Blade Condition/Length/Stroke/ Synchronized Angles
L. Outlet Smooth, free of any obstructions or spin arresting protrusions into the spinning two phase mixture of coal and air

Since the 1960's, we have seen various approaches to planning maintenance on coal pulverizers. Some of those are:

- Preventive Maintenance – a classic PM that nearly every plant claims to do.
- Condition Based Maintenance (CBM) – This, as I understand it, began in the aerospace industry and then spread to petrochem. Mostly helpful in predicting failures beforehand such as for bearings, alignment of rotating equipment, gearing and complex machinery. Reliability, safety and reduced costs are the drivers. One definition by the DOD (Dept. of Defense) "Condition-based maintenance (CBM) is to be implemented to improve maintenance agility and responsiveness, increase operational availability, and to reduce life cycle total ownership costs."
- Planned Preventive Maintenance (PPM) – is the most common maintenance practice that we have seen. Usually this is based on coal throughput; say 500,000 tons or a certain number of hours of operation/months/years.

IN THIS ISSUE:

Storm Technologies, Inc.
PO Box 429
Albemarle, NC 28002

Phone: (704) 983-2040
Fax: (704) 982-9657
www.stormeng.com

So what is the best maintenance program? As far as our experience shows us, all of the above are good, sound, maintenance programs. However, we have seen time and time again, a pulverizer that has been recently overhauled but has poor fuel fineness and/or poor fuel distribution. Add to it excessively high and inaccurately measured and controlled primary airflows and you have a classic case of poor pulverizer performance, when it was thought that all of the right things were completed for good results. Even though everything was done in accordance with the OEM (original equipment manufacturers) recommendations, and well accepted maintenance planning such as CBM, PPM or PM it is not uncommon to find poor pulverizer performance.

Here is what we recommend. Periodic pulverizer performance tests that include all of the following, then use the airflow, fineness and distribution data to plan maintenance. Seven steps:

1. Hot K Calibration of the primary airflow because if the airflow is higher than optimum then the fineness and distribution will nearly always be poor.
2. Full isokinetic coal line sampling by the Storm isokinetic coal sampling method with all coal pipes, 24 points each pipe, and using the dirty air velocity probe to set the isokinetic sampling rate.
3. Obtain a representative raw coal sample.
4. Weigh the individual coal pipe samples and determine the “as sampled” air/fuel ratio.
5. Sieve the individual coal pipe samples for fineness through four sieves of 50-100-140-200 mesh.
6. Perform a PM and calibrate the coal feeder if a gravimetric belt type feeder.
7. Analyze the data and compare to past results.

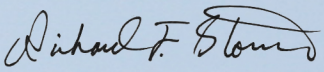
These seven steps should be completed at least several times per year on each coal pulverizer, especially to determine when a mill inspection and/or overhaul are required. This is the essence of what we call “Performance Driven Maintenance.” To perform the seven steps listed above to use before an inspection or overhaul may seem to be an obviously good idea. Of equal importance is; after the mill is overhauled, tolerances, dimensions, spring tensions and clearances “blue printed” then the mill should be tested again.

It has been our experience that just because a mill is “overhauled” it does not mean that desired performance will be achieved. Poor fuel fineness, high primary airflows and poor fuel distribution can cause serious boiler reliability, capacity, efficiency, and emissions problems. Frequently we find high primary airflows and poor fineness to be related to superheater slagging, high CO, high furnace NO_x production, high carbon in ash, and other issues.

Want to learn more about how we work with coal plant operations and maintenance teams to help deliver “Performance Driven Maintenance?” Consider participating in our January 2013 boiler course. Come join other operations and maintenance engineers and managers to discuss and see more details of how it is done. You can learn more on our website and also register for the course at www.stormeng.com.

To all of you, who we have worked with in the past, let me take this opportunity on behalf of all our employees to say thank you! We enjoy doing our jobs and we sincerely appreciate your business!

Yours truly.



Richard F. (Dick) Storm, P.E.
CEO/Senior Consultant

Large Electric Utility Boiler Combustion and Performance Optimization Seminar

When : January 30th & 31st, 2013

Where : Charlotte Marriot SouthPark
2200 Rexford Road
Charlotte, NC 28211

Registration:
Online: www.stormeng.com
Phone: Contact Laura Lorch at (704) 983-2040

An interactive learning event for plant owners and managers who are exploring fuel strategies, operational strategies and enviromental compliance options.

Pricing Includes : Registration, learning materials, breakfast and lunch

Standard Rate : $995 / person
Groups of 5-9 (15% discount) : $845 / person
Groups of 10+ (25% discount) : $745 / person
*Limited to 25 Participants

Continuing Education Credits: 16 PDH