Curing Power Station “Headaches” from Biomass

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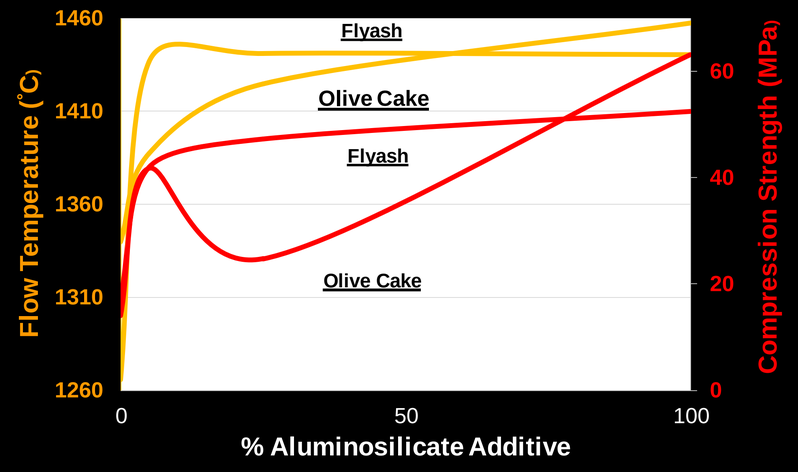
The Problem

- Ash Build up, **Slagging**, on surfaces in boilers causes inefficient power production and is the **biggest problem** affecting the industry.
- The understanding of these problems comes from coal research and technology, this is **outdated** and **inaccurate** for biomass.



The Cause

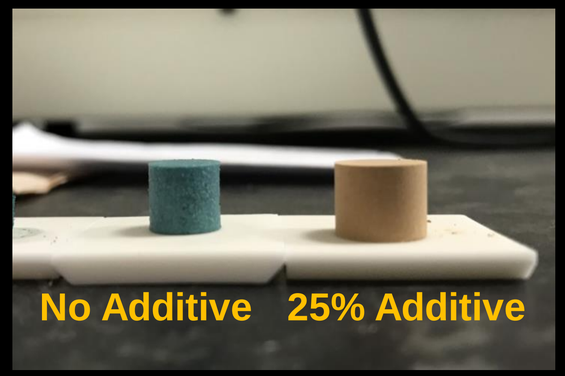
- Biomass is more complex then coal in its **composition.**
- Higher levels of **Potassium** are held responsible for the **low melting temperature** of ash which causes slagging and fouling.

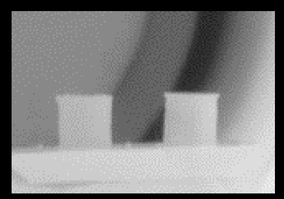
Component	Olive Cake	Flyash	Additive
SiO_2	16.69	50.05	59.33
Al_2O_3	1.79	19.59	21.21
Fe_2O_3	1.34	6.05	9.48
TiO_2	0.15	0.82	0.92
CaO	15.35	11.18	2.96
MgO	4.47	2.77	1.43
Na_2O	0.89	1.03	2.34
K_2O	48.14	6.56	1.73
Mn_3O_4	0.15	0.41	0.10
P_2O_5	7.45	0.92	0.20
SO_3	3.58	0.62	0.30
Total	100	100	100

The Aim

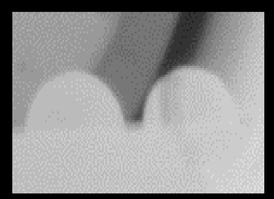
To use an **aluminosilicate additive** to **increase** the **ash fusion temperature** and **reduce** the **compression strength** of ash pellets.

Room Temperature





1070°C



1310°C

Methods

- The standard convention of **Ash Fusion Tests** is a subjective measure showing the **change in shape with temperature**, the additive aids the pellet to retains its shape up to a higher temperature therefore increases ash fusion temperature. Increase in flow temperature means there will be reduced slagging and fouling which is desired in power stations.
- The **sinter strength tests** measure the **hardness** and **density** of sintered as pellets by breaking them under **compression**. The additive has an **inconclusive result** on the compression strength. Increased hardness means the slags formed will be harder to break and thus remove using standard existing techniques.

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