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Fly Ash Drying Plants

**With Patented
Wet Ash Distribution System and
COFLOW Bag Filter**

Green Cementech 2010
Theme: *Make Indian Cement Plants World Class in Green*
14th May 2010: Hotel Westin, Hyderabad

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Why Fly Ash Drying?

Cement industry perspective:

Usage of Dry Fly Ash means increase
in capacity / production which results

in net savings

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Fly Ash Drying Process

- Ø Generate Hot Air
- Ø Expose Wet Fly Ash to Hot Air
- Ø Get the dried Fly Ash

“appears very simple, but needs a
Well Engineered Drying Plant to make it successful”

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Introduction

- Wet Bulb Drying process



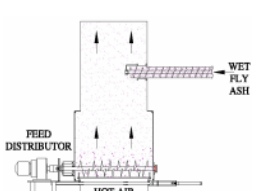
- § Hot Air Temperature : 450 °C
- § Fly Ash Temperature : 60 to 65 °C

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Introduction (Contd...)

- Uniform mixing of hot air and wet fly ash



Material gets dried in less than a second, hence the name
“Flash Drying”

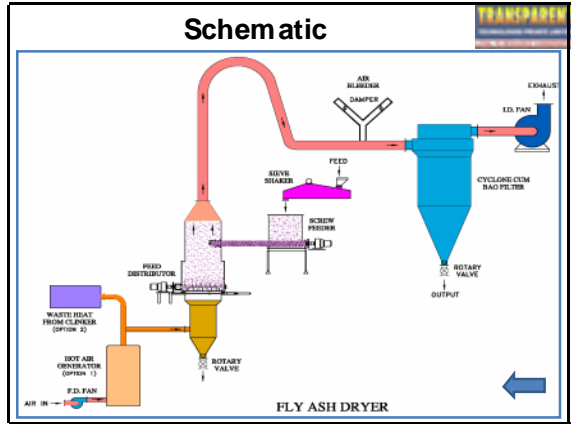
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Parameters affecting plant sizing and cost

- Inlet Air Temperature
- Outlet Air Temperature
 - Ø Fuel to be used for Hot Air Generator (HAG)
 - Ø Permissible moisture content in dried material
- Plant Location and Layout

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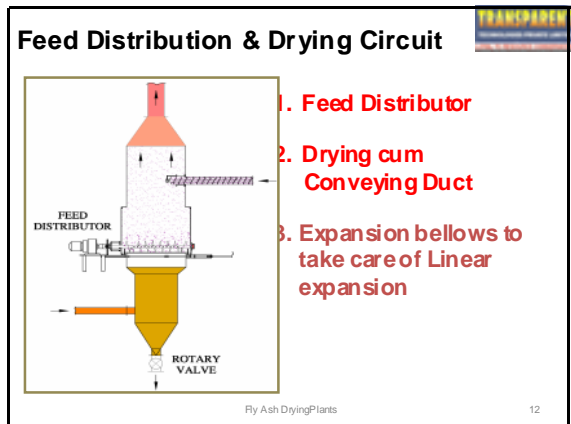
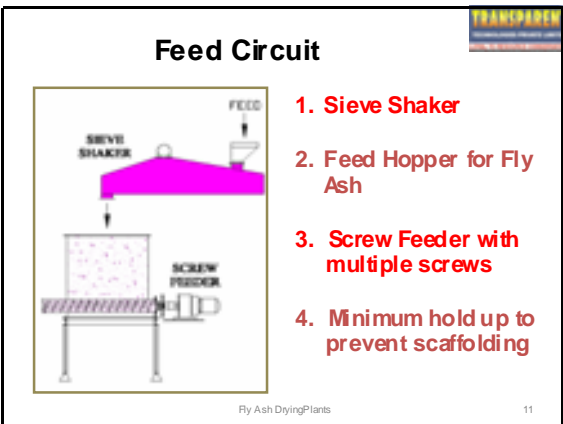
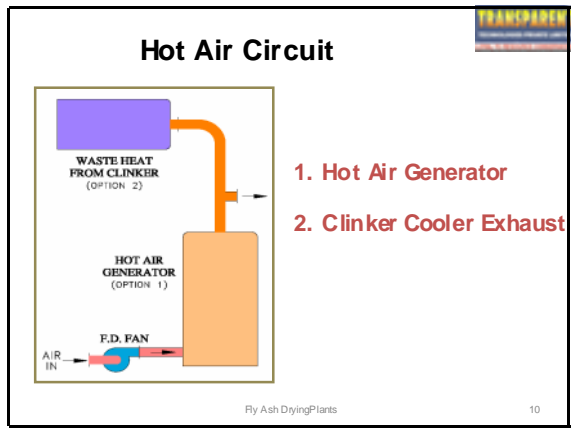
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Fly Ash Dryer Components

1. Hot Air Circuit
2. Feed System
3. Feed distribution System (Patented)
4. Drying cum conveying System
5. COFLOW Bag House (Patented)
6. All the intermediate ductings and pipings
7. Instrumentation & Control Panel

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COFLOW Bag House

1. COFLOW Bag Filter - patented design for reduced Fan Power
2. Air Bleeder – for Bag Protection
3. ID fan
4. Rotary Valve

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Controls and Safeties

Control Loops

- Dry Ash Moisture Control
- Wet Ash Feed Control
- Wet Ash Supply Control
- Bag House Safety Control

Safety Interlocks

- High Inlet Air Temperature
- Low Hot Air Flow
- High Outlet Air Temperature

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Exclusive Features

- ∅ Fully Automatic Plant – needs little running attention
- ∅ Patented Feeding and Distribution system – Uniform distribution of wet ash and thorough mixing with hot air
- ∅ Low Speed Screw Feeder for Wet Ash – Reduced abrasion and wear

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Exclusive Features (contd.)

- ∅ Patented design of Cyclone cum Bag Filter – Effective ash collection and reduced emission
- ∅ Capacity Modulation – Control system is designed to absorb reasonable variations in hot air and wet ash parameters
- ∅ Safeties and Controls – Reliable instrumentation with safety trips and alarms

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Problems and Remedies

<h3 style="color: red;">Sieve Chocking</h3>	<h3 style="color: green;">Remedies</h3> <ul style="list-style-type: none"> • Sieve Inclination – more than the material angle of repose. • Shape of sieve opening – Straight Bars without any horizontal obstruction to flow
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Problems and Remedies


<h3 style="color: red;">Foreign Materials</h3>	<h3 style="color: green;">Remedies</h3> <ul style="list-style-type: none"> • Pre sieving of fly ash for Plant roots and large stones • Controlled discharge of the wet material on the sieve to avoid overloading
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Problems and Remedies

Point Feeding



Remedies


- Distributing the material all along the sieve width.
- Optimum Vibration level for effective sieving

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Problems and Remedies

Tunnel Formation



Remedies

- Air blasters are provided to blast the scaffolding
- More number of screw to ensure the uniform spreading of material before entering the dryer

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Problems and Remedies

Air Channelization

- Non uniform distribution of material and air
- Dryer capacity gets drastically reduced
- Wet Material fall down Increases

Remedies

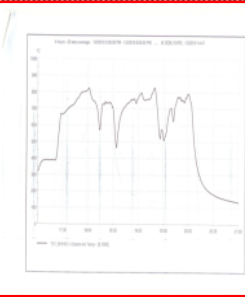
- Patented Feed Distribution system
- Material get distributed throughout the conveying duct cross-section area
- 100% material dried from Dryer

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Problems and Remedies

HAG Temperature Variation



Remedies

- Keeping the Fuel control point as close as possible to HAG.
- Proper Sizing of Coal Feeder Rotary Valve
- Proper fuel modulation system with fast response

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Problems and Remedies (contd..)

Clinker Cooler Exhaust Temperature Variation

Remedies

- Modulating Control System
- Instrumentation

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Problems and Remedies

Air to Material Ratio

- Hot air quantity may fall short to convey the entire feed material
- Reduces Drying Capacity
- Increases recycling load

Remedies

- Part material gets conveyed & dried
- Balance material gets dried in the distributor system itself. Necessary residence time is made available

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Problems and Remedies

<p>Acid Corrosion</p> <ul style="list-style-type: none"> • Condensation of SO₂ / SO₃ due to Sulphur present in Fuel. 	<p>Remedies</p> <ul style="list-style-type: none"> • Proper Selection of Dryer Outlet temperature considering the dew point of the flue gas • Bag Material suitable for this duty
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Problems and Remedies

<p>Dryer Performance</p> <ul style="list-style-type: none"> • Performance of Dryer and HAG may get suffered due to Pressure drop variation across the Dryer components. 	<p>Remedies</p> <ul style="list-style-type: none"> • Constant air flow modulation instrumentation & controls takes care of variations in the system pressure drops. • Consistent & Constant Product output
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Flue Gas Desulphurization (FGD)

- For Captive Power Plants utilizing high sulphur fuels (Coal, Pet Coke, Heavy Oil etc)
- Superior alternative compared to limestone injection in furnace :
 - § 90-95% reduction in SO₂ emissions
 - § Effective utilization of limestone
 - § Generates gypsum as by-product

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