

COAL BENEFICIATION

TATA STEEL

Tata Steel and Coal Mining

	Coal Grade	Clean Coal Production	Quality			
		mtpa	Ash %	VM%	Ro mean	NGM%
Jharia Group of Collieries (UG)	Prime Coking Coal	1.1	22-26	22-26	1.05-1.21	25-47*
West Bokaro Colliery (OC)	Medium Coking Coal	1.9	22-40	22-27	0.93-1.10	25-47*

* Difficult to wash

History of Coal Beneficiation in Tata Steel

1952 :

- First Coal Washery in Asia put up by Tata Steel West Bokaro & Jharia : Chance Cone Process

1982 :

- 1.8mtpa Washery at West Bokaro :
 - Dense Medium Separation & Froth Flotation.
 - Gravity Fed Cyclone Lo-High Separation
- Old washeries converted to Dense Media and froth flotation

1993 :

- Started 2.1mtpa Washery at West Bokaro and 1mtpa Washery at Bhelatand.
- High Low Separation, Pump Fed Cyclones, U Bottom Cells
- Increased Automation
- Radial Blender, AMDEL Coal Slurry Analyser

Comprehensive Approach to Coal Beneficiation : 2002 onwards

- Areas were identified as :
 - Mining
 - Sizing
 - Beneficiation
 - Monitoring
- Objective :
 - To reduce clean coal ash from 17% to 14% and below in phases.
 - Improve technology and efficiency of beneficiation to prevent yield loss

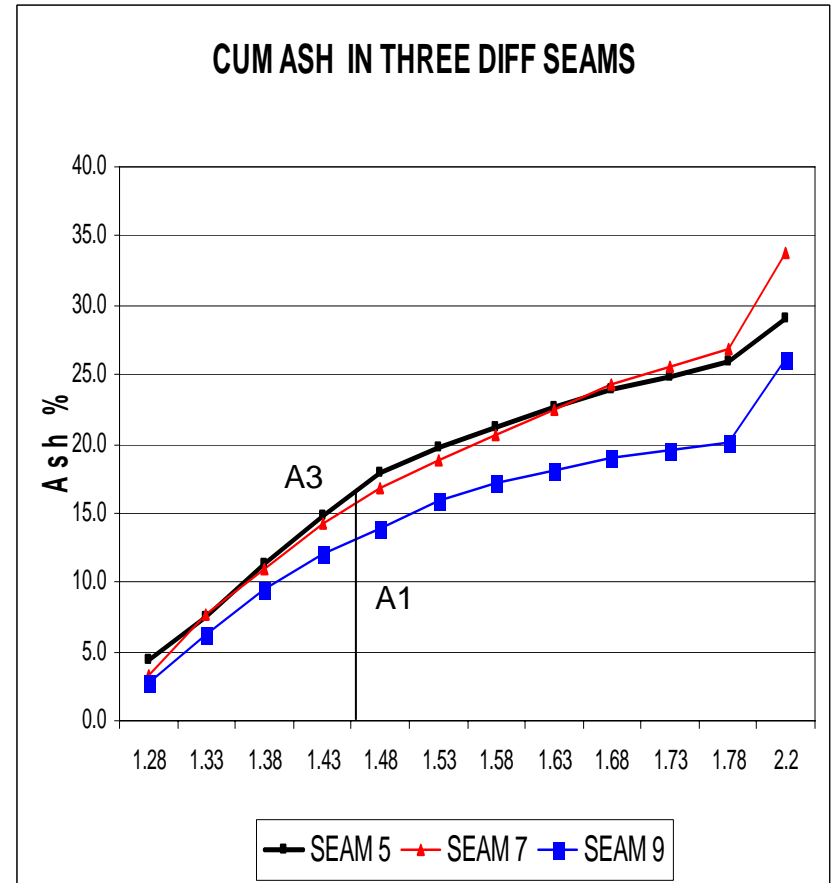
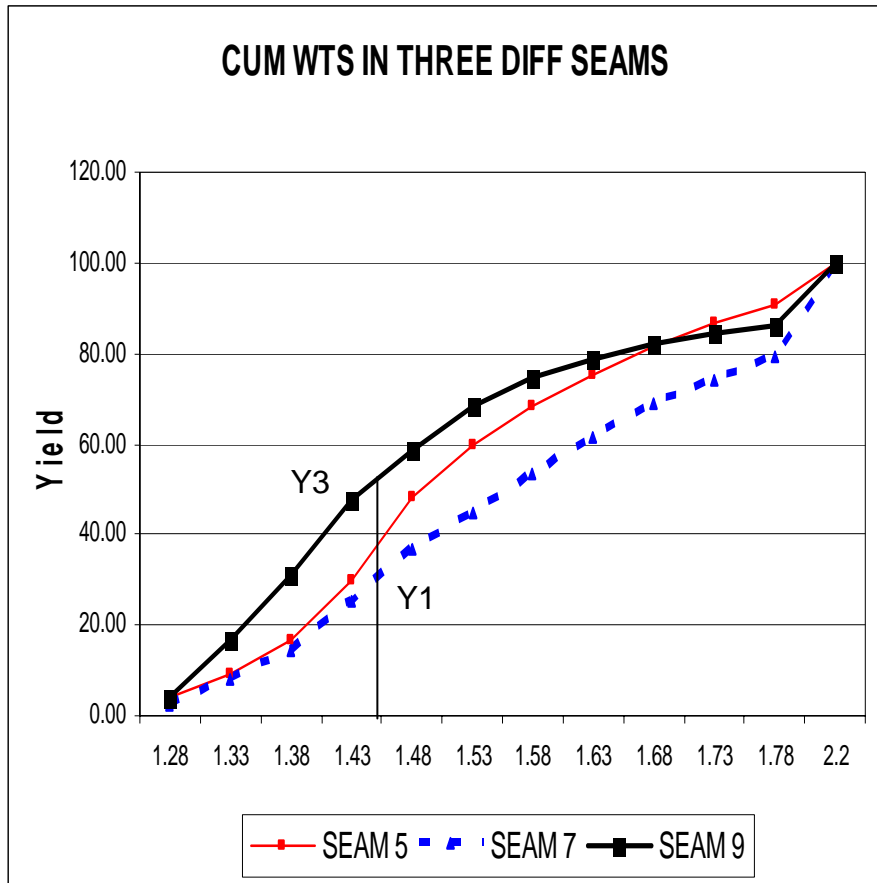
Mining : Quality Control Strategy

- Mine face management improved.
 - Blasted coal Inventory
 - Controlling Dilution
- Thin Seam Mining : Introduction of ripper for mining of thin seam without blasting - Less contamination.
- Installation of heavy duty crusher : For crushing inferior coal separately.
- Mine planning : Minex Planning Software introduced : Balanced mining and optimum exploitation.

Sizing - Optimisation

- Crusher RPM & gap settings changed for maximising 3mm-6mm size particle for best liberation.
- Ring granulators modified with heavy duty rings to reduce oversize generation.
- Introduction of sizers in new coal handling plant for improved sizing and better liberation.
- Introduction of rotary breaker for deshaling and crushing simultaneously for Jharia coal.

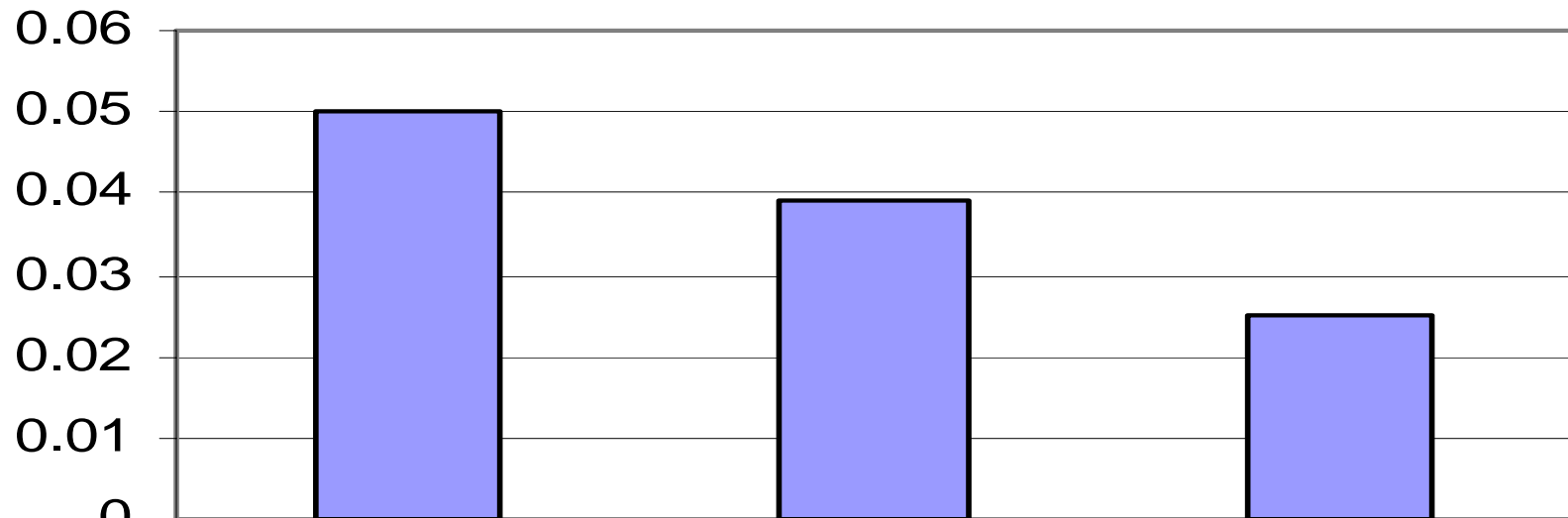
Beneficiation : Seam processing strategy



Beneficiation : Dense Medium Cyclone

- Started use of viscosity modifier in DSM cyclone circuit
- Shifted to scrolled involute design cyclones from dsm design

Ep of cyclones



■ "Ep"	0.05	0.039	0.025
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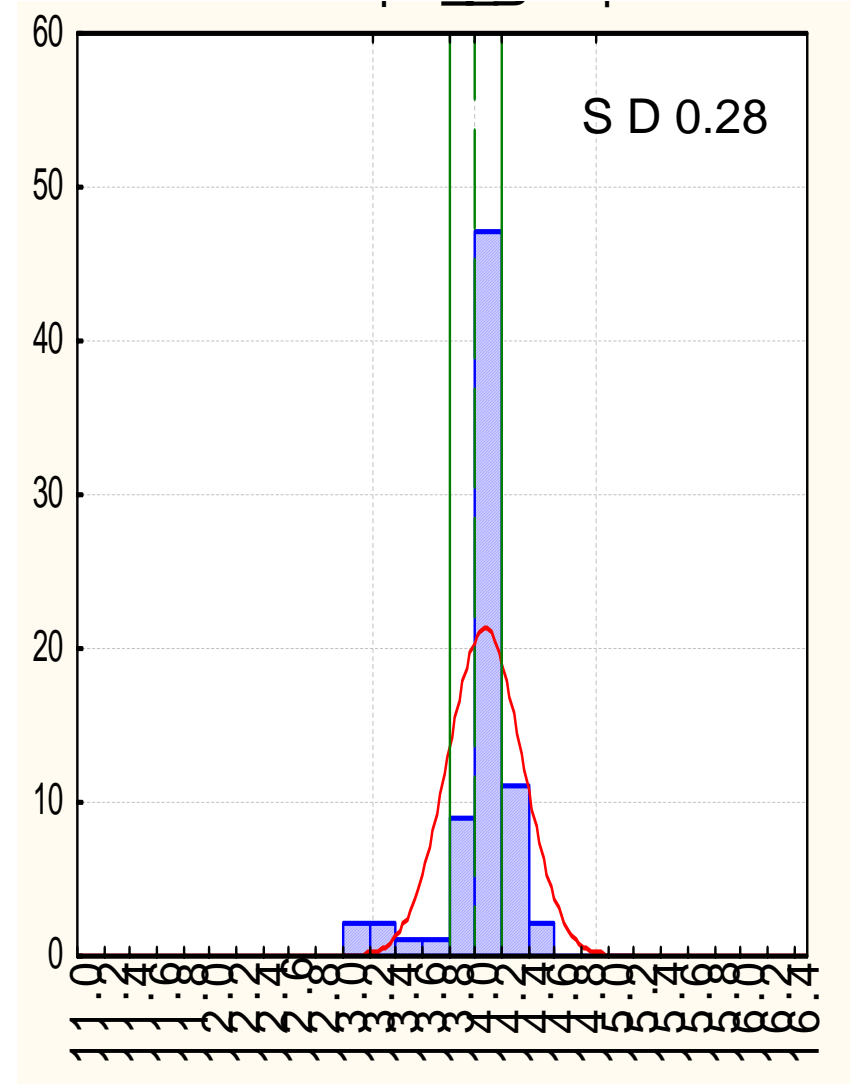
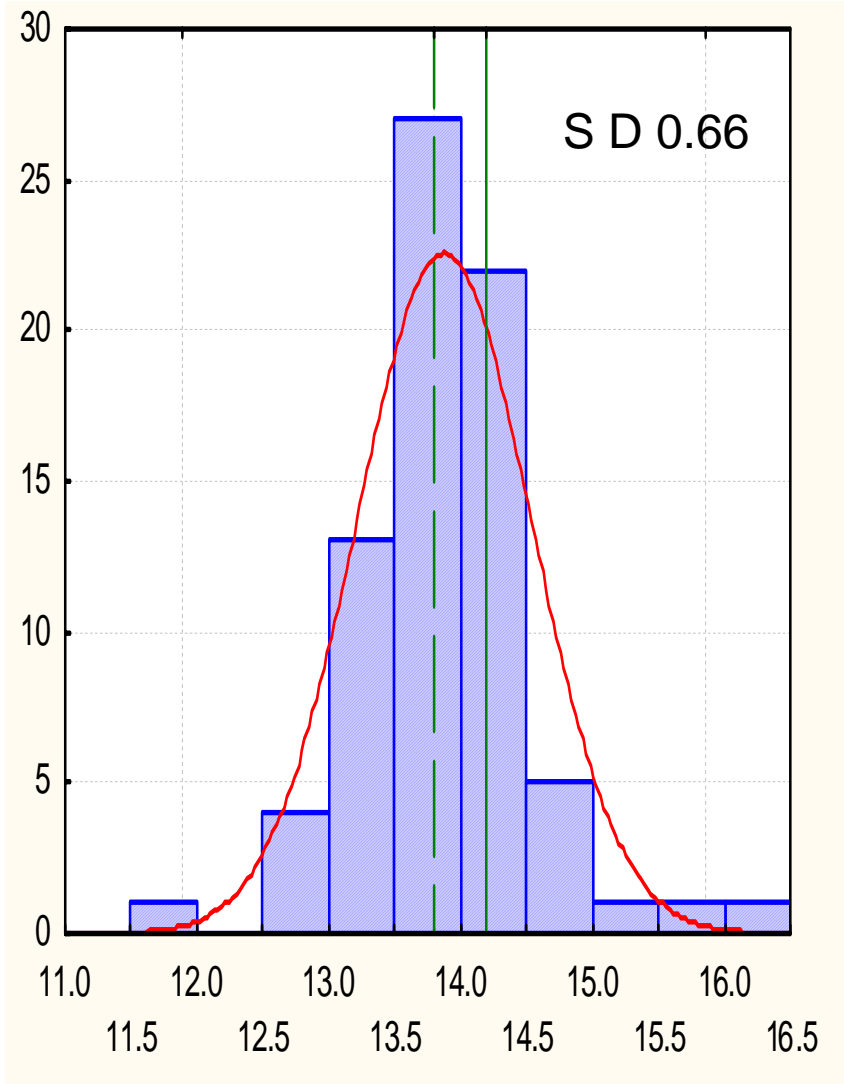
Further improvements

- Introduction of Speed controllers for cyclone feed pumps to ensure uniform inlet pressure.
- Improved magnetite quality of domestic supply(cut off grade changed from 88% to 92% magnetics)
- Trial of imported magnetite (97-99% magnetics) undertaken.

Beneficiation : Froth Flotation

- Multi stage dosing of reagents.
- Reduction in oversize coal from 18% to < 6% in FF Cell.
- Installation of hydrocyclone to optimise recovery of fine coal.
- Replacement of flat bottom cells by U Bottom cells.

Monitoring : Product Consistency in Clean Coal ash Installation of "ON LINE REAL TIME ASH ANALYSER"



THANK YOU