THIRD INDO-US WORKING GROUP MEETING ON COAL

CMPDI

COAL BENEFICIATION

Indian Coals - Characteristics

CMPDI

FAVOURABLE

- Low sulphur content (less than 0.5 %) in general
- In general, contain less trace elements
- Indian coals are more environment friendly (due to less Sulphur, Trace element etc.)

UNFAVOURABLE

- Unlike Western Coal, most of the Indian coals contain high percentage of inorganic impurities (due to Drift origin). 65% of non-coking coal belongs to high ash category (grade 'E' and below)
- Contain high percentage of Near Gravity Materials (NGM)

Coal Preparation Indian Perspective

- Substantial reserves of High Ash (>34%) Non-coking coal in the country
- Deterioration in coal quality due to increased mechanization of mines
- MOEF's mandatory requirements
- Varying customers' needs & need for market retention
- To reduce load on Railways Transportation system

Consumers' Coal Quality Need

Coal Consumers	Acceptable limit of Ash%
Steel Sector	17±0.5
Sponge Iron Technology	About 25
Corex Technology for Steel	20-25
Heat Intense Industries	About 25
Coal Dust Injection (CDI)	About 15
Cement Sector	20-25
Power Sector	≤ 34

Coal Washeries In India : At A Glance

CMPDI

Sl. No.	Washery operators	Cocking Coal		Non-coking coal		Total	
		Nos	Cap. (Mty)	Nos	Cap. (Mty)	Nos.	Cap. (Mty)
1	CIL	11	19.68	7	20.20	18	39.88
2	Non-CIL	7	11.27	27	69.60	34	80.87
	Total	18	30.95	34	89.80	52	120.75

CMPDI

Prospect Of Coal Beneficiation : 2011-12

Sl. No.	Type of Coal	Projected Production MTY	Existing Washing Cap, MTY	Capacity Addition required
1	Coking Coal	26	31	Existing washeries to be Modernized/ Replaced
2	Low Volatile High Rank (LVHR), i.e., high ash Coking coal	13	Nil	13
3	Non-Coking Coal			
3.1	Superior Grade	147		Need based
3.2	Pit Head TPP linked low grade Coal (approx)	160		Need based
3.3	Remaining Low Grade Coal (approx)	275	90	185

Indicative Quality Of Thermal Coal Of Major Coalfields

CMPDI

Quality parameters	Name of the Coalfields			
	North Karanpura	Ib-Valley	Talcher	Korba
Ash%	39-45	39-44	38-44	36-39
Moisture%	6-8	6-8	6-8	4-4.8
GCV (Kcal/Kg)	3721-3447	3721-3541	3815-3541	4469-4303

Likely Product Balance At 34% Ash Level
(FOR USE IN POWER PLANTS)

CMPDI

Name of Coalfields	Washed Coal		Rejects	
	Wt%	Ash%	Wt%	Ash%
North Karanpura	80 – 66	34	20 – 34	59 – 66
Ib-Valley	70 – 58	34	30 – 42	51 – 58
Talcher	85 – 70	34	15 – 30	61 – 67
Korba	90 – 82	34	10 – 28	54 - 62

Thrust Area (Coking Coal)

- Beneficiation & Recovery of Coking Coal Fines with ‘zero reagent’ :
  - Froth Flotation the most widely used fine coal beneficiation technique in India has following demerits:
    - Sensitive to process variables
    - Sensitive to surface characteristics of particles
    - Costly process due to consumption of costly reagents
  - Hence an efficient cost effective ‘zero reagent’ Technique for fine Coal Beneficiation is required

CMPDI

Thrust Area (Coking Coal)

CMPDI

- **Integrated Control of Jigs**

  Development of control mechanism of existing Jigs with provision of automatically changing the operating parameters in accordance with the coal characteristics to achieve optimum yield at desired ash

- **Efficient Technology for Beneficiation of high ash difficult-to-wash Coking coal of BCCL & CCL to obtain:**
  - Metallurgical grade coking coal (Ash % $\underset{\sim}{}$ 17.5 $\pm$ 0.5) as Cleans
  - Power grade coal (Ash $\leq$ 34) as Middlings
  - Low Carbon Rejects

Identification Of Projects

CMPDI

COKING COAL

- ‘zero reagent’ Fine Coal Beneficiation & Recovery at Sudamdih washery, BCCL
- Integrated Control of Jigs is to be established at Bhojudih washery, BCCL
- Efficient Technology for Beneficiation of High Ash difficult-to-wash Coking coal of BCCL (V, VI, VII, VIII seams)

NON- COKING COAL

- The optimum cut-off ash% are to be ascertained for Ib-valley coal (MCL) for the three category of power stations located at
  - Pit Head
  - Upto 1000 kms
  - Beyond 1000 kms

Identified Projects On Coking Coal : 1

CMPDI

Fine Coal Beneficiation & Recovery at Sudamdih Washery, BCCL with “Zero Reagent’ technique

- Plant Capacity : 1.60 Mty
- Raw Coal Ash : 30 - 35%
- Moisture : 3 %
- Generation of coal fines : 0.16 Mty (Approx)
- Washing Circuit :
  - HM Cycloid : Particle Size 37 - 0.5 mm
  - Froth Flotation : Particle Size below 0.5 mm
  - Clean Coal Ash % : 19 $\pm$ 0.5
  - Middling Ash % : > 39
  - Reject Ash % : > 64

Identified Projects On Coking Coal : 2

CMPDI

Establishing Integrated Control of Jigs in Bhojudih Washery, BCCL

- Plant Capacity : 1.70 Mty
- Raw Coal Ash : 28 – 35 %
- Raw Coal Moisture : About 2 %
- Washing Circuit :
  - Deshaling Jig : Particle Size 75- 0 mm
  - HM Bath : Particle Size 75-25mm
  - Batac Jig : 25-0 mm (Control mechanism to be developed)

Identified Projects On Coking Coal : 3

Efficient Washing Technology for Beneficiation of High Ash difficult-to-wash Coking Coal in a washery at BCCL

Characteristics of such difficult-to-wash Coal :-

- Volatile Matter (VM) : < 22%
- Ash Content : 36 – 42 %
- Near Gravity Material content : 50 to 60 %
- Intimate mixing of micro components viz. Macerals (Vitrinite, Inertinite etc.), Mineral Matter etc.
- Extremely poor liberation characteristics

CMPDI

CMPDI

Thank You