

COAL PREPARATION

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Coal Washing Pilot Plant



Fine Coal Treatment Pilot Plant

Thrust Areas

- Washability Investigations on more than 2000 Coal samples
- Development of flow sheet for beneficiation of coal
- Planning of Existing Coal Washeries
- Feasibility studies and technical assistance in Tender Evaluation
- Performance Evaluation and Guarantee test for all Washeries
- Investigation on Beneficiation of Power Coals of India
- Multi-stage Washing of Low Volatile Coking Coal of Jharia Coal Field
- Prediction of practical yield based on the washability data
- Quality Monitoring of Imported and Indigenous coals.
- Pilot scale Investigation on the cleaning potentialities of Indian coals, both coking & non-coking



Rotary Breaker for Crushing and destoning



Spiral for fine coal treatment

Capabilities

Control Room for Integrated Coal Washing Pilot Plant



- Full Scale washability studies to determine cleaning characteristics of coking and non-coking coals including heat affected coals.
- Washability & Characterization of Large dia Bore-Hole Cores
- Development of Process Flow Sheets for the Beneficiation of Coals.
- Pilot Plant investigations
- Performance Evaluation and Technical Audit of Washeries
- Quality Monitoring of Imported & Indigenous coals.

Infrastructural facilities

1) Large coal washing pilot plant, 40 tph capacity comprising of

- a) Jig : Capacity 20 tph
- b) Heavy Medium Drum Separator : Capacity 20 tph

Fully equipped with transfer units, screens, crushers, PL controlled instruments to operate the plant in 8 different circuits.

Heavy Medium Drum for deep beneficiation



2) Modern Fine Coal Treatment Pilot Plant with on line instruments and PL control comprising of the following facilities/circuits :

- i) Experimental Batch Rotary Breaker, 3.5m dia.
- ii) Primary Crushers x 100/50 mm (in closed circuit) operating on different principles a. Shear b. Impact c. Compression
- iii) Closed Circuit Secondary Crushing House to achieve product size of 13/6/3 mm
- iv) Size classification circuit equipped with 3 mm and 0.5 mm wedge wire screens with provision of controlled spray water.
- v) 200 mm HM cyclone Unit complete with sump, pump, sieve bend and D.R. screen.
- vi) Spiral, 1 m dia, circuit with provision of size classification.
- vii) A battery of Flotation Cells with de-watering devices.

The above facility is also utilized to carryout tests on Oleo flotation process with the incorporation of centrifuge etc. for dewatering.

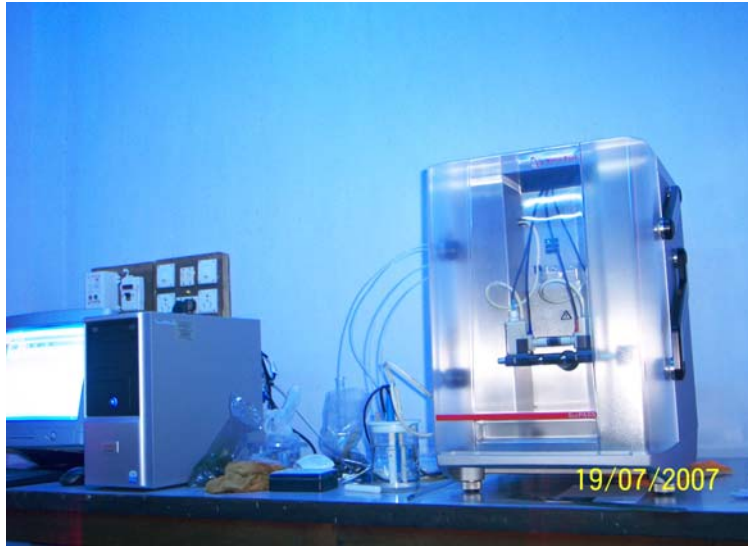
- viii) Oil agglomeration Unit to produce ultimate cleans from ultrafine coal, A complete unit with closed circuit continuous wet grinding and classification.

3) Drop breakage test rig

Selective Drop Breakage tests on individual coal, shale & stone samples obtained from various coalfields were carried out to find out the breakage characteristics. The data generated was used for design of Experimental Batch Rotary Breaker.



4 Zeta Potential Analyzer



5. Water-Only Cyclone & Heavy Medium Cyclone Test Rig



6. Contact Angle Measuring Device



7. Laboratory Flotation Cell



Laboratory Facilities

The Coal Preparation unit is fully equipped with the following facilities to study the washability characteristics and beneficiation potentialities of coking and non-coking coals and to carry out laboratory investigations and analysis of samples

- Crushers of various types and sizes
- Screens
- Batch and continuous grinding mills
- Facilities for full scale washability tests
- Laboratory flotation cells of different capacities
- Ash furnaces
- Moisture ovens
- Tumbler Machine
- Laboratory Classifiers
- Centrifuges
- Magnetic Separators
- Vacuum filters
- Oil Agglomeration unit

Instrumental Facilities

- Particle Size Analyser: Analysette-3
- Tensiometer
- Contact Angle
- Zeta Potential Analyser

Test Rigs

- Hydro Cyclone Test Rig
- H.M. Cyclone Test Rig

Services offered:

1. Data for Design of Coal Washeries

Activities	Sample required	Time	Deliverables
• F& S test	3-10t	1 Month	Washability results
• Computer Simulation	(Data from I)	15 days	Optimum flow sheet
• Pilot Plant testing	50t	2-3 Months	Innovative Flowsheet Specs. of Washers, Crusher, Screen, etc.

2. Data for installation of coal slurry flotation Plant,

Activities	Sample required	Time	Deliverables
Lab. Flotation test	25 kg	15 days	Floatability
Pilot Plant testing	1 t	1-2 Months	Commercial Viability

List of Publications for the year 2007

1.	Improving the quality of raw coal by application of sustainable coal preparation technique.	National Seminar on Productivity in Indian Coal Mines on 18 th & 19 th January'2007 at New Delhi <i>Organized by World Confederation of Productivity Science</i>	<u>T.Gouricharan,</u> <u>K.K. Sharma, U.S.</u> <u>Chattopadhyay,</u> <u>K.M.K. Sinha, &</u> <u>D.D. Haldar</u>
2.	Studies on the effect of some variables on beneficiation of Indian coal fines by froth flotation	Proceedings of the International Seminar on Mineral Processing Technology, MPT-2007	<u>K.K. Sharma, S.</u> <u>Choudhury, K.</u> <u>Rao, K.M.K. Sinha,</u> <u>U.S</u> <u>Chattopadhyay &</u> <u>D.D. Haldar</u>
3.	Performance Evaluation of 5-inch Water-Only Cyclone treating Low Volatile Coking Coal of Western Part of Jharia Coalfields	--- do ---	<u>K.M.K.Sinha,</u> <u>S.C.Maji, Rajaram</u> <u>Prasad,</u> <u>T.GouriCharan,</u> <u>S.Kabiraj,</u> <u>K.K.Sharma and</u> <u>D.D.Haldar</u>
4	Technological options for Beneficiation of Non-coking coals from Eastern Coalfields, a Subsidiary of Coal India Limited for different end users	--- do ---	<i>U.S.Chattopadhyay, T.Gouri Charan.</i> <i>K.M.P.Singh,</i> <i>G.S.Jha, A.N.Mitra</i> <i>and D.D.Haldar</i>
5.	Beneficiation Studies on Coking Coals from Seam VII (Q-AB) West Bokaro Coalfields	--- do ---	T.Gouri Charan, U.S.Chattopadhyay, K.M.K.Sinha, S.Kabiraj, S.C.Maji and D.D.Haldar
6.	Selection of reagents for lab scale flotation studies of non-coking coal fines	--- do ---	K.K.Sharma, Sanjoy choudhury, Komal Kumari, Subir Santra,D.K.Chakar borty and D.D.Haldar

7.	Characteristic Ash of Some Beneficiated Indian Non-Coking coals and its Importance for Power Generation	--- do ---	K.M.P.Singh, U.S.Chattopadhyay, T.Gouri Charan, A,Majumdar, P.S.Prasad and D.D.Haldar
8.	<u>“Koyla ka Tel Sampindyan barik koyla pariskaran ki ek utkrisht vidhi.”</u>	Presented on Koyla Sansadhan –07, Rastriya Sangosthi, “Bhartiya Udhogon ke sandharbh mein koyla ka sansadhan, 26-27 March 2007, NML, Jamshedpur	<i>G.S.Jha,S.Chaudhuri,K.M.K.Sinha,K.K.Mishra and D.D.Haldar</i>
9.	Coal Washing Performance of Autogenous Cyclone	Advanced Gravity Separation NML, Jamshedpur	Nikkam Suresh, T.Gouri Charan & D.D.Haldar
10.	Dry Beneficiation of Non-coking coal with Allair Jig – A case study	Advanced Gravity Separation NML, Jamshedpur	T.Gouri Charan, U.S.Chattopadhyay, S.K.Kabiraj & D.D.Haldar
11.	TECHNOLOGIES FOR FINE COAL BENEFICIATION IN INDIA	CIMPDI - Ranchi	D. D.Haldar & T. Gouri Charan
12.	CLEANING POTENTIAL OF SAMLESHWARI NONCOKING COAL BY WASHABILITY INVESTIGATION	Coal Preparation Vol: 27: 138–148, 2007	T. GOURI CHARAN G. S. JHA P. C. CHATTOPADHYAY D. D. HALDAR KALYAN SEN
13.	Beneficiation of Coking Coal in India including Coal Fines Upgradation	International Conference on beneficiation of Fines and its Technology, TATA STEEL Jamshedpur 10 – 11, 2007	D. D.Haldar & T. Gouri Charan
14.	Laboratory Flotation Studies of Coking Coal Fines	International Conference on beneficiation of Fines and its Technology, TATA	Sunil Tripathi, A. Srivastava, Sanjay Choudhari,

		STEEL Jamshedpur 10 – 11, 2007	U. S.Chattopadhyay T. Gouri Charan & D. D.Haldar
15.	Gasification Kinetics of ECL Coal – Chitra Colliery	Millienium Energy Summit (MES-2007) Sept'2007 held at CGCRI- Kolkata	K.M.K.Sinha D.D.Haldar T.Sharma

R & D Projects during 2007-2008

Completed Projects

Sl. No.	Project No.	Project Title	Sponsor	Project Cost	Completion Report No.
1.	SSP-1085	Sampling and Analysis of Imported Coal unloaded at Port ends-MV HANJIN NEW ORLEANS (2006-2007)	SAIL	3,91,440.00	TR/CIMFR:CFRI/1.40 /07-08 March'08
2.	SSP-1083	Washability studies for sorted ROM Coal for proposed washery at Sarshatali open Cast Mine	INTEGRATED COAL MINING	3,64,880.00	TR/CIMFR:CFRI/1.27 /07-08, January'08
3.	SSP-1086	Washability Studies of MCL coals, as supplied to Kolaghat Thermal Power Station	WBPDCCL	2,24,508.00	TR/CIMFR:CFRI/1.15 /07-08, November'07
4.	SSP-1089	Sampling, Screen Analysis and washability studies of Feed, Cleans and Rejects of an operating Jig (JCOAL)	JCOAL	5,05,080.00	TR/CIMFR:CFRI/1.16 /07-08, November'07
5.	SSP-1092	Sampling and Analysis of Imported Coal unloaded at Port ends - MV IKAN SUJI	SAIL	4,23,425.00	TR/CIMFR:CFRI/1.41 /07-08 March'08
6.	SSP-1095	Sampling and Analysis of imported coal unloaded at Vizag Port, IMFA	IMFA	93,889.00	TR/CIMFR/CFRI/1.06 /07-08
7.	SSP-1093	Washability studies of coal from Khas Kusunda Colliery (VII & VIII Seam) OCP	BCCL	2,52,540.00	TR/CIMFR:CFRI/1.17 /07-08, November'07
8.	SSP-1098	Sampling and Analysis of imported coal, IMFA	IMFA	1,38,280.00	TR/CIMFR:CFRI/1.07 /07-08, July'07
9.	SSP-1099	Sampling & analysis of Rejects (reject slurry) lying at Bhojudih washery site.	BCCL	2,91,880.00	TR/CIMFR:CFRI/1.21 /07-08, November'07
10.	SSP-1107	Washability investigations of X, IX, VIII & VII seam coals of Gare IV/1 coal block	JINDAL	80,0000.00	TR/CIMFR:CFRI/1.14 /07-08, October'07
11.	SSP-1100	Sampling and Determination of Total Moisture of imported coal	SAIL	2,41,012.20	Kept in Abeyance

		unloaded at Port ends – MV JAGER (2007-2008)			
Sl. No.	Project No.	Project Title	Sponsor	Project Cost	Completion Report No.
12.	SSP-1110	Washability studies on a coal sample to be provided by M/s Monnet Ispat & Energy Ltd.	Monnet	302529.00	TR/CIMFR:CFRI/1.28 /07-08, January'08
13.	SSP-1112	Washability investigation on a coal sample from Jharia Coalfields and generation of celans at two different ash levels through pilot plant operation	RDCIS	16,85,277.00	TR/CIMFR:CFRI/1.39 /07-08, March'08
14.	SSP-1118	Washability investigation of X, IX, VIII & VII seam coals crushed to 50 mm of IV/2 and IV/3 sub coal block in Gare Area of Mand Raigarh coalfield.	JPSL	9,98,600.00	TR/CIMFR:CFRI/1.36 /07-08, March'08
15.	SSP-1123	Sampling and Analysis of Imported Coal unloaded at Port ends for ship MV GRACIOUS SKY.	SAIL	4,14,400.00	TR/CIMFR:CFRI/1.42 /07-08 March'08
16.	SSP-1125	Sampling and Analysis of Imported Coal unloaded at Port ends for ship MV NORD ENTERPRISES	SAIL	4,14,400.00	TR/CIMFR:CFRI/1.43 /07-08 March'08