

### Completed S&T Projects on Coal Exploration and Hydro-geology

Sl. No.	Title of the Project	Project Code	Imple- menting Agency	Year of completion	Total Approved Cost (in lakh)
1	Hydrogeological investigation	CE/1	CMPDI	1985	36.00
2	Carbolite coke oven	CE/2	CMPDI	1986	5.00
3	Introduction of Geophysical logging of boreholes	CE/3	CMPDI	1983	41.51
4	Electrical Resistivity survey for estimation of overburden, locating out-crops and mapping bed-rock geology	CE/4	CMPDI	1982	0.80
5	Resistivity survey for estimation of river sand	CE/5	CMPDI	1982	0.80
6	Seismic refraction survey for sub-surface geological mapping	CE/6	CMPDI	1982	10.15
7	Geophysical strategy to solve coal exploration problem	CE/8	CMPDI & Osmania Univ.	1982	1.50
8	Physico-mechanical properties of rocks and coal from exploration data	CE/11	CMPDI	1984	8.00
9	Development of Computer Based Geo-data Bank	CE/12	CMPDI	1988	34.60
10	Estimation of reserves of coal volume of overburden by electronic data plotter	CE/13	CMPDI	1983	13.87
11	Computerisation of geophysical logging data	CE/14	CMPDI	1985	2.20
12	Geo-statistical analysis for optimisation of drilling	CE/15	CMPDI	1985	2.89
13	Geothermal investigations in Managuru area of Godavari valley coalfield	CE/20	SCCL	1988	10.85
14	Identification and delineation of abandoned underground colliery workings in Raniganj Coalfield	CE/22	MGMI	1991	4.50
15	High resolution shallow seismic reflecton survey	CE/9	CMPDI	1992	224.63
16	Development of methodology for thermal studies of mine fires using remote sensing technique in Jharia Coalfield	CE/23	CMPDI & NRSA	1992	179.00
17	Identification and delineation of abandoned and unsurveyed colliery workings in Raniganj Coal Fields - Geophysical Studies Development & trial of new mining methods	CE/24	CMPDI & MGMI	1995	57.50
18	In-seam seismic survey	CE/21	CMPDI	1999	184.00
19	Development of methodology for characterisation of Indian coal by Computer Aided petrographic image analysis	CE/26	CMPDI	2001	114.50
20	Study on enhancement of recharge potential in the recharge area to the Neyveli deep seated aquifers	MT/128	NLC & IIT Madras	2007	115.54
21	Coal Bed Methane recovery and its commercial utilisation	CE/27	CMPDI & BCCL	2010	9242.70
22	Hydrogeological studies for control of ground water for safe and economic mining of lignite deposits in Nagaur Dist of Rajasthan	CE/28	RSMML, Udaipur	2010	182.12
23	Development and optimisation of coal bed methane recovery process by CO <sub>2</sub> sequestration	CE/29	ISM, Dhanbad	2013	26.98

**Completed S&T projects on Mining Methods**

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of completion	Total Approved Cost (in lakh)
1	Study of adoption of sub-level caving at East Katras and Kendwadih collieries	MT/18	BCCL	1983	11.50
2	Tests of sub-level caving from galleries in developed area in East Katras Colliery	MT/37	BCCL	1990	141.00
3	Optimisation of extraction of coal from pillars below surface structure using technique of partial stowing	MT/43	CMRS	1987	17.60
4	Evaluation of new mechanised system performance using SDL, LHD and roof bolting	MT/49	CMRS	1989	33.74
5	Development of method of mining for extraction of thick and steep seams of NEC	MT/78	NEC	2000	120.00
6	Hydraulic Mining	MT/11	CMPDI & BCCL	1989	818.67
7	Field trial of wide stall method	MT/44	CMRS	1991	19.45
8	Induced caving of sub-level coal numerical evaluation of some geological and mining parameters	MT/71	BHU	1993	2.00
9	Mechanised depillaring of 6m thick seam III of Chirimiri with cable bolted support	MT/77	SECL & CMRI	1995	213.25
10	Extraction of coal locked in pillars of multiple and thick seams	MT/107	NIRM & SCCL	2003	26.20
11	Application of ground penetrating radar (GPR) technique to locate water logged workings in coal mines	MT/110	NIRM & CMPDI	2003	47.00
12	Scientific investigation on shearer longwall faces	MT/1	CMPDI & ECL	1982	3.00
13	Stability of slopes in opencast mines	MT/10.3a	ISM	1982	13.18
14	Evaluation of workability indices of Indian coal seams and coal measure rocks	MT/8.3	ISM	1984	4.30
15	Slope stability in pit walls, dump stability ground monitoring in and around pit with geo-technique studies	MT/40	CMRS	1987	11.00
16	Workability indices of coal seams	MT/55	CMRS	1989	24.11
17	Mine accident analysis and control a socio psychological approach in coal mines.	MT/57	BHU	1991	5.00
18	Computerised mine planning for opencast coal mines	MT/50	ISM	1990	11.59
19	Analysis of some time & cost overrun projects	MT/75	IIM, Ahmedabad	1993	8.54
20	Assessment of status of coal mining in the state of Meghalaya	MT/79	CMPDI	1994	15.00
21	Underground coal gasification	MT/62	CMPDI	1995	322.00
22	Development of integrated mine operation management system for a large opencast coal mine	MT/142	Anna. Univ	2007	35.70
23	Feasibility study for the application of radar technique for detection and mapping of geological faults and water bodies in UG coal mines	MT/144	IIT, Kharagpur & CMPDI	2007	20.45
24	Optimisation of pillar parameters for development and final extraction of highly inclined seams at SCCL Mines	MT/115	SCCL & NIRM	2008	24.90
25	High resolution seismic monitoring for early detection of slope failures in opencast mines	MT/155	Anna Univ. Chennai.	2011	124.30
26	Delineation of barrier thickness against waterlogged workings in underground coal mines	MT/153	CIMFR, Dhanbad	2012	382.12

**Completed S&T Projects on Strata Control**

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of completion	Total Approved Cost (in lakh)
1	Strata control studies of longwall faces	MT/3	CMPDI	1985	20.00
2	Investigations into problem of rock bursts in deep coal mines	MT/8	ISM	1987	15.74
3	Investigations into different strata control parameters in and around longwall mining	MT/9.1	CMRS	1982	8.12
4	Physico-mechanical properties of coal measure rock	MT/9.2	CMRS	1981	3.89
5	Control of massive and hard roof by water injection under high pressure	MT/86	CMRI	2000	49.55
6	Assessment and control of ground movement around extraction perimeter in longwall and Bord & Pillar workings	MT/10.3 (d)	ISM	1988	1.25
7	Fracturing of massive sand stone roof	MT/15	CMPDI/ECL	1979	15.00
8	Establishment of cavability parameters of coal measure strata of Manuguru area (SCCL) for longwall caving	MT/31	KSM & Osmania Univ.	1985	3.00
9	Development of roof supports for mechanised Bord & Pillar workings and fast drivage and their field evaluation	MT/33	CMRS	1986	17.30
10	Geo-mechanical classification of coal measure rock vis-a-vis roof supports	MT/34	CMRS	1986	3.45
11	Stability analysis of subsidence and strata behaviour using three dimensional analogue simulation and computer technique	MT/39	BHU	1989	1.65
12	Development and evaluation of norms for longwall support system in coal mines in India	MT/41	ISM	1987	10.20
13	Design of support for mine roadways	MT/60	ISM	1989	25.40
14	Simulation of large underground excavations in coal mines using numerical methods (Finite element technique) with special reference to longwall face	MT/58	BHU	1990	2.33
15	Development and application of acoustic emission technique in the mines of SCCL	MT/52	NGRI	1992	18.38
16	A study of bump proneness of Indian coal seams and measures to alleviate the bump hazard	MT/72	CMRS	1994	3.70
17	Design and experimentation of cable bolting under adverse ground conditions in thick seams containing clay bands	MT/87	SCCL & NIRM	1997	18.98
18	Development of fibre reinforced shotcrete for supporting underground openings against failure due to rock discontinuity and induced stresses	MT/88	ISM	1998	14.02
19	In-situ stress measurement in underground coal mines and its application to stability analysis	MT/95	CMRI	2000	57.12
20	Design and experimentation of cable bolting under adverse ground condition in thick seams for longwall gate roads and face dips	MT/105	SCCL	2000	1.80
21	Evaluation of stability of pillars and barriers	MT/10.2 (a)	BHU	1983	1.63
22	Investigation into creep properties of Indian coals	MT/28	BHU	1984	1.75
23	Optimisation of design of mine pillar parameters and feasibility of extraction below water-logged workings.	MT/9.3	CMRS	1988	15.18
24	Development & design norms for	MT/67	CMRS	1992	7.20

## contiguous seam pillars

25	Development of model vis-a-vis study of parameters influencing abutment loading of pillars at a depillaring face of shallow depth cover under massive roof strata	MT/112	CMRI & SCCL	2003	40.45
26	Development of fly ash based support suitable for underground coal mines	MT/114	CMRI & BCCL	2004	46.21
27	Development of light weight steel props for underground coal mines	MT/124	RDCIS & CMPDI	2004	55.11
28	Monitoring of strata behaviour during longwall mining using micro-seismic monitoring technique and estimation of caving height	MT/116	SECL & NIRM	2004	80.00
29	Measurement of in-situ stress by hydro-fracture method and investigation on redistribution of in-situ stress due to local tectonics at WCL, Tandsi /Thesgora region to devise a local tectonics at WCL , Tandsi/Thesgora region to devise suitable support plan/SSR	MT/117	NIRM,CMPDI & WCL	2004	49.77
30	Application of roof bolting in depillaring operation for replacement of timber under roof conditions difficult to cave at Kuardih/Patmohna/Methani Collieries of ECL	MT/120	CMRI /ECL	2004	26.35
31	Trial of fibre reinforced shotcrete bold support in an underground gallery in coal subjected to high induced stresses	MT/127	ISM & BCCL	2006	24.13
32	Study into extent of abutment loading trend and design of advance support during pillar extraction by stowing in a coal mines	MT/133	SCCL & NIRM	2007	35.79
33	Development of high strength corrosion resistant roof bolts and guidelines for selection of bolts and accessories	MT/140	RDCIS & CMPDI	2007	72.91
34	Development of support guidelines for depillaring panels in Indian coal mines	MT/126	CMRI	2008	21.78
35	Application of high pressure water injection for hard roof management at Churcha West Colliery ,SECL	MT/132	CMRI	2009	58.80
36	Development of micro-seismic monitoring system for stability analysis of UG mine workings under "difficult to cave" roof conditions	MT/145	CMRI & ECL	2010	47.849
37	Investigation of cavability of overlying strata and development of guidelines of support capacity for longwall faces	MT/151	CIMFR,NIRM, ISM, CMPDI,SECL, SCCL, ECL & BCCL	2011	461.37
38	Stability of parting between coal pillars workings in level contiguous seams during depillaring	MT/137	CIMFR	2011	50.54
39	Application of high strength steel roof-bolts in underground coal mines	MT/156	RDCIS, Ranchi & CMPDI	2011	103.22
40	Assessment of horizontal stress fields in deeper horizons and development of roof hazards maps of coal resources in SCCL	MT/165	NIRM, Bengaluru & SCCL, Kothagudem	2019	358.40

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### Completed S&T Projects on Mine Subsidence & Stowing

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of completion	Total Approved Cost (in lakh)
1	Surface subsidence in Mining Areas	MT/9.4	CMRS	1990	118.23
2	Assessment of surface movement and structural damage due to mineral exploration	MT/10.3 (c)	ISM	1981	1.25
3	Correlation of surface subsidence with deformation parameters in U\G and intervening strata	MT/54	CMRS & IIT(K)	1989	90.64
4	Subsidence studies for development of models with special reference to multi-seam mining in India	MT/89	CMRI	1999	4.40
5	Experimental stowing plant to study flow characteristic of different stowing materials	MT/17	KSM & Osmania Univ.	1988	24.64
6	Stabilisation of water filled void through hydraulic sand stowing at Ramjbanpur Colliery	MT/36	ECL & CMPDI	1989	44.84
7	Waste material stowing	MT/4	BCCL	1989	176.88
8	Development of appropriate technology for removal of clayey material from overburden of the Opencast mines	MT/82	CMPDI	1995	59.60
9	Development of suitable subsidence prediction models for single seam working in South Eastern Coalfields Area	MT/122	CMRI & SECL	2006	10.00
10	Models studies on the efficiency of gravity blind back filling method and evaluation of a pre-jamming indication parameters	MT/147	IIT, Kharagpur	2008	14.77
11	Model studies on gravity blind back filling method and eval of a pre-jamming indication parameter in the field	MT/154	IIT, Kharagpur	2011	402.66
12	Development of software for prediction of subsidence by numerical modeling for SCCL mines	MT/160	Anna Univ. & SCCL	2015	53.80

### Completed S&T Projects on Mine Ventilation

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of completion	Total Approved Cost (in lakh)
1	Methane drainage at Amlabad Colliery	MT/2.1	BCCL	1978	16.56
2	Sawang Degasification	MT/2.2	CCL & CMPDI	1983	8.52
3	Ghusick Degasification	MT/2.3	ECL & CMPDI	1985	77.05
4	Heat flow studies and problems of heat and humidity in coal mines	MT/8.2	ISM	1982	1.92
5	Estimation of fire damp emission from different coal mines in the country and establishing the correlation with different controlling parameters	MT/10.1b	IIT(K)	1980	1.55
6	Study of parameters affecting flow of air in mines and developing measuring instruments	MT/10.2b	BHU	1982	1.00
7	Methane emission and control in mines	MT/10.3b	ISM	1981	2.60
8	Determination of ventilation co-efficient	MT/16	CMRS	1986	10.00
9	In-situ investigations into feasibility of bacterial oxidation of methane	MT/32	CMRS	1987	7.56
10	Development of sealants	MT/38	CMRS	1988	5.48
11	Studies into heat & humidity in coal mines	MT/45	CMRS	1991	20.40
12	Study of air leakage in coal mines	MT/84	CMRI	1995	3.50
13	Virgin strata temperature and geothermic gradient measurement in Jharia coalfield	MT/48	ISM	1989	6.00
14	Specific gas emission study to predict methane emission in mines	MT/65	CMRS CMPDI	1992	13.18
15	Integrated monitoring and communication system for toxic and combustible gases in mines using ceramic sensors	MT/102	CG&CRI CMRI	2002	42.83
16	Studies on simulation of open fires in mine galleries under varied air flow for seperation of fire and fire damp explosions in underground coal mines	MT/101	CMRI	2003	145.35
17	Study for early detectionof the occurrence of spontaneous heating in blasting gallery method and to evaluate suitable measures to prevent and control spontaneous heating in thick coal seams	MT/118	CMRI & SCCL	2003	26.32
18	Development of room temperature sensors for methane using carbon nanotubes and nanofibres	MT/152	Jadavpur Univ. & ISM	2009	84.63

### Completed S&T Projects on Blasting

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of completion	Total Approved Cost (in lakh)
1	Optimisation of blasting parameters in coal mines	MT/24	CMPDI	1983	6.80
2	Control of pollution due to toxic gases produced during blasting operation with explosives in U\G coal mines	MT/51	CMRS	1991	18.92
3	Investigation into thermal behaviour of explosives to assess their safety characteristics use in hot borehole conditions	MT/64	CMRS	1993	25.90
4	Techno-economic assessment of drilling and blasting parameters vis-a - vis establishment of cost effective optimum blast pattern for open cast mines.	MT/92	CMRI	1998	10.50
5	Evaluation of damages to underground coal mines caused by surface blasting vis-a-vis establishment of blast vibration threshold	MT/93	CMRI & CMPDI	2001	44.32
6	Evaluation of explosive performance through in the hole detonation velocity measurement	MT/96	NIRM & SCCL	2001	23.84
7	Development of innovative models for optimisation of blast fragmentation and muck profile applying image analysis technique and sub system analysis concept in Indian Surface Coal Mining regime	MT/103	CMRI	2001	42.20
8	Workability parameters of drilling and augering machines (including raise borers and road headers) in mines	MT/56	BHU	1990	8.63
9	Investigation to optimise blast design and charge loading parameters in coal and ring hole blasting and in stone for induced blasting in degree -I seams for blasting gallery methods in underground mines of SCCL	MT/125	CMRI & SCCL	2003	38.30
10	Response of structures and damage of structures caused by ground vibration from opencast mine blasting	MT/108	CMPDI & ECL	2005	44.76
11	Study on the effect of delay timing, total charge and direction of initiation on blast induced ground vibration	MT/123	CMRI, CMPDIL, ECL, NCL & SECL	2005	47.07
12	To study the role of blast design parameters on ground vibration and correlation of vibration level to blasting damage to surface structures	MT/134	NIRM, SCCL & WCL	2006	37.60
13	Optimisation of production from underground coal mines by achieving longer pull	MT/135	CMRI, SCCL & CMPDI	2006	13.61
14	Standardisation of blast vibration damage threshold for the residential structures in mining areas	MT/131	CMRI, CMPDI & ECL	2007	32.50
15	Effect of production blasts on ground water and geo -tech properties on pit-wall and dump stability in open pit coal mines	MT/129	CMRI	2008	36.24
16	A study on effect of underground blasting on surface structures vis - a - vis standardisation of blast vibration damage threshold	MT/138	CMRI	2008	30.39
17	Characterisation of rock and explosive parameters for optimal explosive energy utilisation in opencast blasting	MT/146	CMPDI & CMRI	2010	270.37
18	Blast design and fragmentation control-key to productivity	MT/164	CIMFR,	2017	303.86

**Completed S&T Projects on Environment & Ecology**

<b>Sl. No.</b>	<b>Title of the Project</b>	<b>Project Code</b>	<b>Implementing Agency</b>	<b>Year of completion</b>	<b>Total Approved Cost (in lakh)</b>
1	Study relating to noise arising out of coal mining activities	EE/2	CMRS	1985	0.99
2	Study of effluents of coal washeries coke oven plants and evolve efficient effective and economical treatment processes	EE/3	CMRS	1985	2.79
3	Reclamation and consolidation of worked out coal mine site and improvement of environment and ecology through scientific land management	EE/6	CMRS	1988	3.40
4	Restoration and reclamation of abandoned Tikak Opencast Mine	EE/9	NEC	1995	75.00
5	Environmental impact and management in and around opencast coal mining complex	EE/11	BHU	1996	4.00
6	An integrated ecological study on revegetation of mine spoil.	EE/8	BHU & State Forest Deptt. of UP & MP	1996	48.71
7	Soil enrichment and reclamation of backfilled areas of Neyveli opencast mines.	EE/7	NLC & Anna uni.	1997	44.47
8	Environment Management of O.B. Dumps	EE/10	CMRI	1997	35.00
9	Study of green belt regarding its noise attenuation and dust arresting capacity in coal mining areas	EE/12	ISM	1998	12.47
10	Development of technology for conversion of back filled areas in Ballarpur Area for agriculture	EE/13	WCL & IISc	1999	7.93
11	Geoplant ecological and aerobiological studies of coal mine areas	EE/17	Vinobha Bhave Univ. Hazaribagh	2000	6.09
12	Biological method of employing VAM Fungi and Nitrogen fixing bacteria	EE/14	NLC	1999	13.96
13	Environment and eco-system studies in Godavari Valley Coalbelt - a geo-chemical and biological appraisal and redressal	EE/15	Osmania Univ.	2000	12.23
14	Bio- restoration of dumps through the plation of selected efficient photosynthetic / soil conserver species in Eastern Jharia, BCCL	EE/20	CFRI	2004	43.08
15	Frequency analysis and modelling of Noise Pollution for an opencast coal project	EE/23	KREC & SCCL	2004	6.30
16	Pond ash reclamation and possibilities of utilisation of industrial waste for revegetation and developing green cover	EE/18	NLC & AMU	2005	112.7
17	Field studies on application of lignite humic acid on various crop response in different agro climatic conditions	EE/21	TNAU & NLC	2005	58.68
18	Reclamation of mining wastelands and restoration of native vegetation through microbial technology in Rajmahal Coalfield area of ECL	EE/24	TM Bhagalour Univ, ECL	2005	11.2066
19	Characterisation and leaching studies of Indian fly ashes for evaluation of their suitability as mine fill material	EE/25	CMRI, BCCL & SCCL	2005	19.92
20	Bio-processing of lignite and bio-remediation of its sulphur rich wastes for development of environment friendly value added products	EE/22	NLC & IIT Delhi	2006	74.45
21	Air pollution resistance and filtering capacities in trees and shrubs of surround opencast coal mines area	EE/26	Vinoba Bhave University	2006	9.45
22	Development of cost effective high performance highway using fly ash composite	EE/19	NLC & Anna Univ.	2008	38.10
23	Studies on the impact of atmospheric biotic/abiotic particulates on the environment of Jharia Coalfields and their abatement strategies	EE/29	CFRI	2008	33.90
24	Studies on the use of bottom slag in crop production	EE/32	NLC & TNAU	2008	92.3244
25	Development of emission factors for various mining machineries and operations in opencast mines	EE/27	CMPDI	2009	78.01
26	Environmental impact of subsidence movements caused due to caving on ground water and forest cover in Godavari Valley Coalfields	EE/28	CMRI & SCCL	2009	72.03

27	Environmental clean up and remediation of coal mining overburden sites of Tirap collieries, Assam	EE/33	RRL, Jorhat	2009	18.9
28	Investigation into low cost liner for disposal of coal for disposal of coal ash in abandoned opencast mine	EE/34	CMRI	2009	44.14
29	Survey and ecological conservation of NLC environment through bio-remediation with tree species	EE/37	NLC & TNAU	2010	77.87166
30	Low cost input technology for re-vegetation of coal mine spoils in order to protect the environment	EE/38	T M Bhagalpur Univ., MCL & NCL	2010	26.263
31	Development of suitable biological waste water treatment technology through constructed wetlands for treatment of acid mine drainage from coal projects.	EE/31	CMPDI	2011	78.62
32	Study on blasting dust management system in an opencast coal mine	EE/35	NIRM, MCL & NCL	2011	48.33
33	Development and use of fly ash based pesticides	EE/36	NLC, Annamalai Univ. & VCRC, Pondichery	2011	304.92
34	Fly ash characterisation for mine void reclamation	EE/30	CMPDI	2012	287.68
35	Carbon sequestration in re-vegetated coal mine wastlands	EE/40	CIMFR, Dhanbad	2012	64.76
36	Treatment of acid mine water generated in Indian coal mines using low cost material	EE/41	CIMFR, Dhanbad	2013	44.17
37	Emission from coal-based industries- development of predictive models	EE/42	NEIST, Jorhat	2013	82.46
38	Development of methodology for stimation of Green Gas (GHG) Emissions in mine fire areas and their mitigation through terrestrial sequestration	EE(EoI) /39	CIMFR, Dhanbad & BHU, Varanasi	2014	354.491
39	Sustainable livelihood activities on reclaimed open cast coal mines: a technology enabled integrated approach in Indian coal sector	EE/44	TERI University, New Delhi, CMPDI, Ranchi & BCCL, Dhanbad	2019	371.69
40	Possible implications of bioavailable iron in coal mine dust on coal workers' lung disease	EE/48	NIMH, PIET, CIIME & WCL, Nagpur	2019	96.54

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**Completed S&T Projects on Mine Fires**

<b>Sl. No.</b>	<b>Title of the Project</b>	<b>Project Code</b>	<b>Implementing Agency</b>	<b>Year of completion</b>	<b>Total Approved Cost (in lakh)</b>
1	Application of CO in combating mine fires	MT/9.6	CMRS	1981	5.30
2	Chemical eradication of green growth	MT/20	ECL & CMPDI	1979	0.60
3	Coal stack heating	MT/22	CMPDI & CMRS	1982	4.25
4	Study of spontaneous heating of coal	MT/23	CMPDI	1985	4.65
5	Nitrogen infusion	MT/26	CMPDI	1988	43.00
6	Development of fire extinguishing foam including application technology for use in mines and allied industries	MT/42	CMRS	1987	3.00
7	Thermal infrared imager	CE/16	CMPDI	1982	1.00
8	Assessment of status and control of u/g coal mine fires	MT/46	CMRS & IIT	1990	27.23
9	Development of suitable fire protective coating for preventing spontaneous combustion in the benches of open cast / underground mines vis-a-vis consolidation of dust.	MT/83	CMRI	1996	7.00
10	Development of a mechanised spraying system for spraying the fire protective coating material for industrial application in the coal benches of large opencast projects	MT/100	CMRI	1999	5.27
11	Handy method of coal categorisation and prediction of spontaneous risks in mines	MT/90	CMRI,CFRI & ISM	1999	28.06
12	Study of problems of spontaneous heating of coal pillars and development of techniques for its prevention and early detection and control	MT/109	CMRI, ISM & ECL	2006	36.10
13	Studies on the advance detection of fires in coal mines with special reference to SCCL	MT/130	Andhra Univ. & SCCL	2009	166.51

**Completed S&T Projects on Coal Beneficiation**

<b>Sl. No.</b>	<b>Title of the Project</b>	<b>Project Code</b>	<b>Implementing Agency</b>	<b>Year of completion</b>	<b>Total Approved Cost (in lakh)</b>
1	Development of computer programme for simulation of coal beneficiation processes	CP/8	IIT(K)	1983	2.20
2	Flocculation of coal fines and clarification of washery water	CP/10	ISM & CMPDI	1986	8.00
3	Development of a process of coal preparation eliminating slurry handling and its beneficiation	CP/14	CMPDI	1986	10.36
4	Studies on beneficiation characteristic of non-coking coal from Talcher coalfield viz. reduction of ash content and alpha quartz	CP/21	CMPDI	1986	1.00
5	Response to beneficiation of low grade coking coal at finer sizes	CP/22	RRL(B)	1989	5.25
6	Development of an effective frother systems for the recovery of fine coal by flotation	CP/23	RRL(B)	1988	4.93
7	20 TPH eleo flotation, pilot plant for beneficiation of fine coal	CP/24	CMPDI, BCCL & CFRI	1989	10.00
8	Modernisation of crushing circuits to maximise the yield of clean coal	CP/20	ISM	1990	11.07
9	Pilot plant to simulate different dewatering system at Rajrappa Washery	CP/18	CMPDI	1992	56.00
10	Modelling and scale up studies on water only cyclones treating coal	CP/25	ISM RRL(Bhopal)	1996	11.00
11	2 TPH oil agglomeration plant at Lodna	CP/1	BCCL & CFRI	1986	34.18
12	Installation of 5 TPH Batac Jig at Patherdih washery	CP/2	CMPDI	1985	61.50
13	Installation of 120 TPH Modular washery	CP/15	CMPDI	1992	340.00
14	10TPH Oil Agglomeration Pilot Plant at Patherdih Coal Washery, BCCL	CP/7	CMPDI	1993	72.84
15	Testing of coal samples at photometric ore sorter in Canada	CP/11	CMPDI	1986	2.48
16	Trial of beneficiated non-coking coal from Nandan Washery at Satpura Thermal Power Station	CP/19	CMPDI	1988	476.00
17	Performance evaluation of air-sparged hydrocyclone to clean Indian Coal Fines	CP/27	RRL,Bhopal	1997	10.30
18	Application of GCV method for classification of non-coking coal	CP/29	CFRI	1998	5.80
19	Development of viable techno-economic know-how for beneficiation of non-coking coal for power generation	CP/26	CFRI	1999	24.00
20	Industrial application of vorsyl separator in BCCL/CCL Coal washeries	CP/28	RRL (B)	1999	4.20
21	Introduction of Automation System in the Coal Preparation plant at Swang Washery	CP/16	CMPDI	1999	334.10
22	Installation of 1 M dia column flotation pilot plant at Sudamdih Washery	CP/12	CMPDI	2000	41.35
23	10 Tph Slurry Jig Spiral Concentrator Pilot Plant at Rajrappa Washery CCL	CP/13& CP/17	CMPDI	2001	207.48
24	Utilisation of rejects of coal washeries and beneficiation plants	CP/5	CMPDI & CBRI Roorkee	1985	2.50
25	Deminerlisation of North Eastern Coal using chemical dispersants	CP/30	RRL, Jorhat	2002	11.55
26	Performance evaluation of Tri-flow separator	CP/31	RRL, Bhopal	2002	28.36
27	Beneficiation of non-coking coal by dry methods	CP/34	RRL Bhubaneswar & CMPDI	2002	15.00
28	Development of operator friendly simulation package for coal preparation plant	CP/35	ISM & CMPDI	2002	15.95

29	Dry Beneficiation of High Ash non-coking coal using air dense medium fluidised bed separator	CP/36	RRL Bhubaneswar & CMPDI	2004	17.00
30	Study on Kelsey centrifugal jig for treating coal fines	CP/37	RRL Bhopal & CMPDI	2004	12.8
31	Non destructive rapid estimation of ash by nuclear technique	CE/17	CMPDI	1989	2.70
32	Application of chemical treatment and centrifugation in environment friendly disposal of coal washery tailing / effluent slurry	CP/32	CMPDI & CCL	2006	798.41
33	Studies on multi gravity separator for treating fine coal	CP/39	CMPDI	2006	34.00
34	Development of a process for clarification of inlet water and waste water on coal washery by using magnetic particle technology	CP/41	RRL, Bhub. & CMPDI	2006	10.2
35	Separation of marcasite from pulverised lignite using fluidised bed	CP/40	NLC & IIT Madras	2007	17.56
36	Development of user friendly models for design and operation of jigs and heavy media cyclones for treatment of different coals	CP/43	RRL, Bhopal ISM & CMPDI	2009	61.14
37	Development of tribo-electrostatic separator for beneficiation of high ash Indian coal fines.	CP/44	IMMT, Bhubneswar	2014	47.67
38	Design and development of coal winnowing system for dry beneficiation of coal based on CFD modeling and simulation.	CP/45	CIMFR Nagpur, Unit & NCL, Pune.	2014	181.41
39	Design and development of truck mounted mobile coal sampler for instant coal ash & moisture analyser at site from railway wagon/truck	CP/46	CIMFR, Dhanbad & M/s Pranay Enterprises Pvt. Ltd., Hyderabad	2018	167.6
40	Development of an on-line coal washability analyser	CP/47	CIMFR, Dhanbad & M/s Ardee Hitech Pvt. Ltd. , Vishakhapatnam	2018	849
41	Optimization of various parameters of lab scale Coal Winnowing System (Phase-II)	CP/48	CIMFR Nagpur, Unit & CMPDI, Ranchi	2017	18.55
42	Design of water network to optimize water consumption in coal washeries for removal of impurities	CP/49	IIT, Roorkee, CMPDI, Ranchi & CCL , Ranchi	2019	24.94

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**Completed S&T project on Coal Utilisation**

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of Completion	Total Approved Cost (in lakh)
1	Coal Pelletisation plant	CU/1	BCCL	1988	73.55
2	Domestic briquettes from non-coking coal fines	CU/3	CMPDI	1980	1.50
3	Experimental mechanised production of soft coke	CU/4	CMPDI	1987	54.45
4	Development of coal fired domestic chullah	CU/7	CMPDI	1984	0.67
5	Coal based lighting aid for domestic fuels	CU/8	CMPDI	1980	0.35
6	Development of smokeless coal block	CU/10	CMPDI	1984	12.00
7	Briquetting of non-coking coal slack for production of domestic fuel	CU/14	CMPDI & WCL	1986	2.35
8	Development of smokeless coal block	CU/19	CMPDI	1988	56.50
9	Pilot plant for production of coal agglomerate from low rank low grade slack coal for domestic use	CU/16	CMPDI	1990	111.47
10	Testing and development facilities for coal utilisation projects	CU/17	CMPDI	1990	35.50
11	Application of Indian coal in hot briquetting (BFL Technology)	CU/2	CMPDI	1979	1.00
12	Feasibility study of DKS formed coke technology	CU/9	CMPDI	1983	2.00
13	Carbonisation of middlings from Bhojudih and Dugda-II washeries in Salem Hearth Calciner	CU/11	BCCL	1981	0.53
14	Preliminary survey for potential of desulphurisation of high sulphur Assam coals	CU/12	ISM	1982	0.52
15	Chemical desulphurisation of high sulphur Assam coal	CU/28	CFRI	1992	24.05
16	Briquetting of leco fines for production of matallurgical broquettes	CU/29	NLC	1996	38.75
17	Conversion of Lancashire boiler to fluid bed combustion system	CU/5	CMPDI	1981	5.00
18	Getting coal from trials in RRL(H) coal gasification plant	CU/20	RRL(H) & IICT	1988	10.00
19	Evaluation of coal gasification technologies for IGCC programme	CU/26	CSIR & CMPDI	1990	26.50
20	Development of oscillatory combustor for very high efficiency utilisation of coal & coke	CU/24	IISC	1991	6.82
21	Fluidized bed gassification of coal	CU/23	IICT	1991	10.12
22	Data generation and scale up on moving bed pressure gasification using coal containing 40% ash	CU/25	IICT & BHEL	1991	155.91
23	Development of 100-200 kW oscillatory combustor utilising low grade coal.	CU/33	IISc. (Bangalore)	1996	9.36
24	Design and installation of two coal fired inert gas generators for combating mine fires	CU/22	CFRI	1994	22.30
25	Preparation of FR for recovery of tar from Beehive Coke Ovens	CU/13	CMPDI	1984	1.50
26	Drying of lignite and extraction of humic acid	CU/15	NLC	1985	8.65
27	Synthesis of olefines chemicals and selected fractions of hydrocarbons from synthesis gas from modified RT Process	CU/18	CFRI	1992	56.00
28	Characterisation studies of Indian Coals and lignite ashes for promoting rational utilisation of coal and lignite	CU/27	CFRI	1992	36.50
29	Automatic sampling of coal and rapid determination of its calorific value	MT/61	CMPDI	1994	22.30
30	Production of biofertiliser using lignite as carrier material	CU/30	NLC	1997	15.00
31	Lignite Fines - oil - Lignite Tar slurry firing to substitute petroleum fuel in utility boilers	CU/31	NLC & BHEL Trichy	1997	21.50
32	Utilisation of syn-gas from coal synthesis of higher olefins through oligomerisation of olefins from syn-gas	CU/32	CFRI	1999	14.50
33	Development of technology for production of additives based on coal tar products for coal water slurry fuels	CU/35	CFRI	1999	11.20

34	Utilisation of fly ash in Agriculture	CU/34	CFRI,CARD & NLC	2000	33.00
35	Bio-technological conversion of lignite to humic acid	CU/36	NLC & CFRI	2003	81.24
36	The influence of rank and mecerals/ microlithotypes and physico chemical composition on cumbustion of pulverised coal	CU/38	CFRI	2003	44.40
37	Development of 25 KW industrial power generator using high ash coal in an oscillatory combustor	CU/39	IISc, Bangalore	2003	9.26
38	Development equivalency chart between UHV and GCV	CU/41	CFRI	2003	150.00
39	Assessment and evaluation of molten carbonate fuel cell technology using Indian coal	MT/80	TERI	1997	16.00
40	Development of pressurised fluidised bed combustion system for high ash Indian coals	CU/37	CFRI	2005	18.00
41	Development of reconstituted Coal -Water emulsion as clean coal technology for power generation	CU/40	CFRI	2005	122.84
42	Development of equivalency chart between UHV & GCV	CU/42 (2nd Phase)	CFRI	2005	90.00
43	Production of clean fuel gas from coal derived gases using reactive, regenerable sorbents for sulphur removal and candle filters for fine particulates control	CU/43	IICT, Hyderabad & CET Osmania Univ.	2006	72.72
44	Evaluation of Combustion behaviour of coal at different ash levels	CU/44	CFRI	2007	194.80
45	Development of process for potential utilisation of natural coke (Jhama) in Industrial Application	CU/45	CFRI	2007	40.00
46	R&D leading to gainful industrial utilisation of heat affected Jharia Coals	CU/50	CFRI	2007	52.87
47	Development of process/technique for potential utilisation of less matured non-coking coal for making hard coke by utilising stamp charging	CU/47	CFRI & CMPDI	2008	98.88
48	Development of a process for the production of activated carbon from Neyveli Lignite	CU/49	NLC & RRL(Trivandrum)	2008	98.60
49	Development of cheap, energy efficient by product coke oven for production of hard coke for steel/metallurgical use	CU/46	CFRI & CMPDI	2009	286.67
50	Direct sourcing of coal for value added chemicals	CU/51	CFRI & IICT Hyderabad	2009	70.30
51	Agglomeration formation in reducing condition in presserised fluidised bed gasification(PFBG) with low rank high ash coals	CU/48	CFRI, CET, Osmania Univ. & CMPDI	2010	338.58
52	Pulse detonation combustion of coal for energy applications	CU/53	IISc, Bangalore	2010	22.60
53	Production of {60} {70} fullernes, heterofullernes and carbon nanotubes from coal	CU/52	CIMFR & BHU	2011	175.80
54	Re-design and fabrication of biomass gasification plant coal fuel utilisation	CU/56	R.V. College Engg. Bangalore	2011	40.06
55	Biological Production of Clean Fuels from Coal/lignite	CU/55	R.V. College Engg. Bangalore	2012	45.36
56	Catalytic Liquefaction of Neyveli Lignite	CU/54	MEPCO Schlenk Engg. College, Sivakasi	2012	14.00
57	An approach to explore the applicability of spectyro-radiometry as a tool for assessment of coal quality	CU/58	CIMFR, Dhanbad	2014	147.61

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**Completed S&T Project on Equipment Development**

Sl. No.	Title of the Project	Project Code	Implementing Agency	Year of Completion	Total Approved Cost (in lakh)
1	Development of water spray and fog nozzles and dust suppression studies	MT/10.1a	IIT(K)	1983	0.56
2	Remote sensing of Damodar flow level	AE/5	CMPDI	1985	1.85
3	Goaf temperature monitoring system	AE/6	CMPDI & SIRDO	1985	0.20
4	Run-away coal tub alarm and protection system	AE/7	CMPDI & SIRDO	1985	0.70
5	Coal tub weigher and counter system	AE/8	CMPDI & SIRDO	1985	1.54
6	Development, trial and evaluation of Auger-cum-drill	AE/27	CMPDI	1987	33.00
7	Improvement in the life of mine implements through tribological studies.	AE/30	RRL (Bhopal)	1997	36.79
8	Failure analysis of certain cage suspension gear components and standardisation of ultrasonic testing technique for examination of suspension gear components.	AE/31	CMPDI	1995	8.91
9	Development of sensors and micro-processor based switching system for intrinsically safe power supply for u/g use	AE/28	CMRS	1990	23.50
10	Improved track system	MT/68	ECL	1991	11.5
11	Development of instrument for coal mine stability monitoring	MT/76	NIRM	1994	10.39
12	Powered Support characteristics recorder	MT/70	CPRI & CMPDI	1997	25.15
13	Shearer performance optimisation by drum design and speed control	MT/74	ISM	1997	63.80
14	Development and application of continuous strata monitoring system for evaluating roof stability in coal mines	MT/85	NIRM	1997	13.30
15	Development of processed continuous mining equipment condition monitoring for maximum machine available time in mines	AE/32	CMRI	1997	11.00
16	Development of hydraulic roof bolt drilling equipment and drilling accessories for mechanised bord & pillar workings and fast roadway drivages	MT/91	NIRM	1998	25.00
17	Development of an instrument for prediction of roof falls in the goaf area in coal mines	MT/98	NIRM & SCCL	1998	14.50
18	Development of instruments for continuous recording of methane	MT/7	BCCL & CMRS	1980	8.00
19	Field trial of data acquisition system developed by CMRI	MT/97	CMRI	2000	7.10
20	Development of micro - processor based solid state controller for improving hauler's efficiency	MT/113	NIRM & SCCL	2002	17.50
21	Development of a micro controller based system for monitoring of Longwall Powered Supports and its application for continuous automatic evaluation of Strata Behaviour	MT/111	SCCL & NIRM	2004	47.24
22	Corrosion research	MT/5	ISM	1988	13.02
23	Study of corrosion problem due to mine water its causes and prevention	MT/29	BHU	1984	2.16
24	Pipeline transport of sand and coal	MT/6	CMPDI & BCCL	1979	1.50
25	Preparation of DPR for demonstrator coal slurry pipeline project.	MT/66	WCL	1992	93.00
26	Design and development of wireless multi media monitoring system for coal mines	MT/136	IISc. Bangalore	2005	12.99
27	Development of high strength corrosion resistant roof bolts and guidelines for selection of bolts and accessories	MT/140	RDCIS & CMPDI	2007	72.91
28	Development of an experimental subterranean robot(SR) for feasibility study of robotic application in underground coal mines	MT/148	CMERI, Durgapur CMPDI & CMRI	2009	89.17
29	Indigenous development of prototype Longwall supports (Chock-shield)	MT/143	SCCL	2010	228.47

30	Integrated communication system to communicate and locate trapped underground miners	MT(EoI)/158	Adcept Technologies Pvt. Kolkata & CMPDI, Ranchi	2014	459.59
31	Development of Self Advancing (mobile) Goaf Edge Supports(SAGES) for depillaring operations in underground coal mines	MT(EoI)/159	ISM, Dhanbad & Jaya Bharat Equipment Pvt. Ltd	2015	197.75
32	Development of customized organic coatings for corrosion protection of special mining equipment at Neyveli Lignite mines	MT/161	NLC & CECRI	2015	79.48
33	Enhancing life of de-watering pipes in coal/lignite mines by prevention of erosion-corrosion with nano-crystalline surface Engineering Treatments	MT/163	NLCIL & NITT, Tiruchirappalli	2017	299.97
34	Techno-economic evaluation and performance behavior of Self Advancing (mobile) Goaf Edge Supports (SAGES) (Phase - II)	MT/166	IIT-ISM & Jaya Bharat Equipment Pvt. Ltd	2019	73.27

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