

**List of R&D projects of CIL completed since 1997 to 2014-15**

| Sl.No. | Title of the Project   | Implementing Agency | Project Code    | Approved Outlay (Rs. in lakh) |
|--------|--|---------------------|-----------------|-------------------------------|
| 1      | Liquidation of standing pillars at W-4 Panel in Jhanjra ECL  | ECL                 | CIL/R&D/1/01/97 | 10.90                         |
| 2      | High capacity sand flushing through boreholes at Madhuband colliery, BCCL  | BCCL                | CIL/R&D/1/02/97 | 276.00                        |
| 3      | Resource survey characterisation and blending studies of low volatile coking coal for their use in steel industry  | CMPDIL              | CIL/R&D/1/03/97 | 457.00                        |
| 4      | Fire fighting for winning coal from developed pillars under fire by opencast method at Central sector of selected Dhori  | CCL                 | CIL/R&D/1/04/98 | 214.60                        |
| 5      | Depillaring by caving with yield pillar technique at Parascole Colliery, ECL   | ECL                 | CIL/R&D/1/05/98 | 17.00                         |
| 6      | Depillaring with cable bolting using LHD at Madhusudanpur Colliery, ECL  | ECL                 | CIL/R&D/1/06/98 | 40.75                         |
| 7      | Development of computerised continuous mining equipment condition monitoring system for maximum machine available time of working machines in mines-SECL/ CMRI   | SECL/CMRI           | CIL/R&D/1/07/99 | 29.00                         |
| 8      | Strata control, roof support design for development and depillaring operations at andsProject, Kanhan Area WCL with detailed geotechnical study including measurement of in-situ stress and its effect-WCL / CMPDI | WCL/CMPDI           | CIL/R&D/1/08/99 | 249.90                        |
| 9      | Geomining statistical database of South Karapura Coalfields, CCL   | CCL                 | CIL/R&D/1/09/99 | 215.93                        |
| 10     | Establishment of Longwall starta control services  | CMPDI               | CIL/R&D/1/10/01 | 62.50                         |
| 11     | Introduction of shortwall technology for extraction of standing pillars with power roof support in pillars of Passang seam of Balrampur underground project.   | SECL                | CIL/R&D/1/11/01 | 3513.05                       |
| 12     | Flyash hydraulic stowing at Jarangdh colliery, Kathara area, CCL near Bokaro Thermal Power Station   | CCL                 | CIL/R&D/1/13/02 | 20.37                         |

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|--------|---|------------------------------------|-----------------|-------------------------------|
| 13     | Characterisation of cleats in coal from Raniganj and Jharia coalfield   | CMPDI                              | CIL/R&D/1/14/02 | 240.35                        |
| 14     | Capacity building for creation of an e-information centre on coal & lignite   | CMPDI                              | CIL/R&D/1/15/04 | 82.50                         |
| 15     | Interactive Geo-Mining and Hydro-Geological Models for Augumentation of coking coal and ground water resources at West Bokaro Coalfields  | CCL                                | CIL/R&D/1/17/04 | 239.49                        |
| 16     | Development of accurate and rapid method of correlation survey of UG Mines  | CMPDIL                             | CIL/R&D/1/20/04 | 181.85                        |
| 17     | Application of chemical treatment & centrifugation in environment friendly disposal of coal washery tailings / effluent slurry  | CMPDI/CCL                          | CIL/R&D/2/01/99 | 798.41<br>R&D--289.52         |
| 18     | Restoration of bio-diversity of OB dump and backfilled areas using integrated bio-technology  | WCL / NEERI                        | CIL/R&D/4/01/97 | 21.43                         |
| 19     | Optimisation of ambient air quality monitoring network and application of mathematical models of air pollution control at North Karanpura Coalfields  | CMPDI / BIT                        | CIL/R&D/4/02/97 | 29.94                         |
| 20     | Utilisation of OB materials through modification of physico-mechanical properties for the construction of haul road.  | BIT/CMPDI                          | CIL/R&D/4/03/98 | 41.87                         |
| 21     | Determination of the efficacy of soil sediment etc for prevention of spontaneous heating in coal stock pile at Samleshwari OCP, MCL   | MCL                                | CIL/R&D/4/04/99 | 4.28                          |
| 22     | Assessment of qualitative impacts of dust on the agriculture crops around Padampur OCP, WCL   | WCL/NEERI                          | CIL/R&D/4/05/02 | 12.32                         |
| 23     | Assessment of assimilative capacity and resource apportionment analysis of air pollution in ambient air in Wardha Valley Coalfields   | WCL                                | CIL/R&D/4/06/02 | 13.51                         |
| 24     | Resource Assessment and characterisation study of non-coking coals for sponge iron industries   | CMPDIL                             | CIL/R&D/1/18/04 | 295.00                        |
| 25     | Application of high precision satellite imaging and DGPS Technology for online wide area subsidence monitoring study in Raniganj area, ECL  | ECL/ IIT KGP                       | CIL/R&D/1/19/04 | 242.42                        |
| 26     | Technical study for old & active OB dumps of open cast mines in WCL to determine stability characteristics and dimensional parameters   | IIT Kgp./                          | CIL/R&D/1/21/05 | 359.65                        |
| 27     | Development of methodology for rapit volumetric analysis of excavated insitu overburden integrating high resolution satellite, air borne laser scanner data supported with ETS through digital photogrammetric technique. | CMPDIL/                            | CIL/R&D/1/24/06 | 388.00                        |
| 28     | Exploration and determination of coal fire hot spots to prepare the strategy to put off the fire in Nimcha & Sandih mines.  | ECL / Ms DMT-Avantika, Hyderabad   | CIL/R&D/1/29/08 | 444.23                        |
| 29     | Development of CIL/CMPDI's capacity for pursuing exploration of CBM in deep seated coal deposits of Jharia/Raniganj coalfields.   | CMPDI & ONGC                       | CIL/R&D/1/16/04 | 1991.91                       |
| 30     | Inventory and monitoring of underground and surface coal mine fire for modelling fire dynamics and rate of fire movements, Jharia Coalfields, Jharkhand using satellite thermal remote sensing data .                     | Presidency College, Kolkata & BCCL | CIL/R&D/1/23/06 | 138.4                         |

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|--------|---|------------------------|-----------------|---|
| 31     | Investigation on augmentation of life of dump truck tyres through the improvement of tyre retreading compound and development of an optimum road maintenance management system. | IIT Kgp/<br>ECL/NCL    | CIL/R&D/1/22/05 | 148.69                                  |
| 32     | Indigenous development of PLC based integrated control and monitoring system for conveyors and other equipment of underground   | RDCIS(SAIL) &<br>CMPDI | CIL/R&D/1/26/06 | 182.00<br>RDCIS-151.50<br>CMPDI-31.50   |
| 33     | Delineation of workings below railway lines near Ratibati colliery, stability analysis by numerical modeling and possible remedial measures.                                    | CIMFR & ECL            | CIL/R&D/1/31/08 | 20.90518                                |
| 34     | Development of immediate roof fall prediction system in U/G mines using wireless network  | IIT, KGP and ECL       | CIL/R&D/1/27/08 | 216.98                                  |
| 35     | An investigation on Adsorption Characteristics of Indian coal and to ascertain recoverability of CBM from deep-seated coal and lignite resources.                               | CMPDI & IIT, KGP       | CIL/R&D/1/40/10 | 98.07<br>CMPDI- 8.05<br>IIT, KGP- 90.07 |
| 36     | Establishment of co-relation between physico-mechanical properties, chemical properties and bonding strenght of cement & resin capsule used in roof bolting.                    | UMD Deptt, CMPD        | CIL/R&D/1/37/10 | 126.98                                  |

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|--------|---|---|-----------------|---|
| 37     | GPS based production reporting system in OCP<br>Project Code: CIL/R&D/1/33/09   | Systems Department<br>CIL (HQ),Kolkata/<br>BCCL   | CIL/R&D/1/33/09 | 54.00   |
| 38     | Development of CMPDIL capacity for delineation of viable coal mine methane (CMM)/ Abandoned mine methane (AMM) blocks in the existing and would be mining areas having partly de-stressed coal in virgin coal seams | CMPDI, Ranchi   | CIL/R&D/1/28/08 | 522.00  |
| 39     | Generation/analysis of coalfield wise database of physico-mechanical charecteristics of rock/coal and representative numerical models for appropriate solution to strata control problems.                          | UMD Deptt, CMPDI  | CIL/R&D/1/36/10 | 241.8   |
| 40     | Development of guidelines for safe dragline dump profile under varying geo-engineering condition in opencast coal mines of Coal India   | BIT, Mesra and<br>CMPDI, Ranchi   | CIL/R&D/1/38/10 | 75.60<br>BIT, Mesra-59.00<br>CMPDI-16.60                      |
| 41     | Eliminating the possibility of ignition of gas and incidences of explosion in underground coal mines due to electrical faults by application of innovative technology of fault diversion.                           | Safety & Rescue<br>Division (S&R), CIL,<br>Kolkata & Society for<br>Mining Research<br>Sustainable<br>Development and<br>Environment , Kolkata  | CIL/R&D/1/44/10 | 11.022  |
| 42     | Development of Indigenous tool for carrying out Random Sampling & Testing of Explosives and Accessories used in mines of Coal India Limited.  | Blasting Cell,<br>CMPDI(HQ), Ranchi<br>and IIT, KGP   | R&D/1/50/2012   | 428.06<br>CMPDI - 130.00,<br>IIT, KGP-298.06                  |
| 43     | Analysis of in-situ stress for CBM exploration in Jharia Coalfield  | CMPDI & ISM , Dhanbad   | CIL/R&D/1/32/09 | 41.06679<br>ISM- 34.9419<br>CMPDI-6.12489                     |
| 44     | Effective utilization of low rank and low volatile high rank Indian coking coals for Blast Furnace (BF) coke making   | CMPDI, Ranchi and<br>(SAIL), Ranchi   | CIL/R&D/3/1/09  | 265.00<br>CMPDI-245.00<br>RDCIS - 20.00                       |
| 45     | Assessment of performance of explosives/ blast results based on explosive energy utilisation  | Blasting Cell, CMPDIL<br>& NITK, Surathkal  | CIL/R&D/1/41/10 | 236.35<br>CMPDI- 107.44<br>NITK-128.91                        |
| 46     | Investigations of Bolt Behaviour in Development and Depillaring Panels under Blast Induced Dynamic Loading.   | CMPDI, Ranchi<br>IIT, Kharagpur<br>and RDCIS, Ranchi  | CIL/R&D/1/42/10 | 491.08<br>CMPDI-198.50<br>IIT,KGP-229.54<br>RDCIS(SAIL)-63.04 |
| 47     | Feasibility study of High Angle Conveying System (HAC) in Open Cast Coal Mines by Computer Modeling and Simulation.   | Open cast Division<br>CMPDI, Ranchi and<br>E&M Department ,<br>CMPDI , Ranchi   | CIL/R&D/1/43/10 | 211.5   |
| 48     | Investigation on augmentation of life of dump truck tyres through the improvement of the tyre retreading compound and development of an optimum road maintenance management system-Phase-II                         | IIT, Kharagpur and<br>BCCL, Dhanbad   | CIL/R&D/1/45/10 | 64.37   |
| 49     | Development of a notch cutting machine to facilitate construction of stoppings in underground coal mines.   | Safety and Rescue<br>(S&R)Division, CIL,<br>Kolkata & Society for<br>Mining Research<br>Sustainable<br>Development and<br>Environment , Kolkata | CIL/R&D/1/47/11 | 11.15   |

Completed during 2014-15

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|--------|--|---|--------------------|---|
| 50     | Studies on determination of free silica( $\alpha$ -quartz) content in respirable air borne dust in coal mines and preparation of data bank of free silica and other minerals present in dust as well as in coal. | CIMFR, Dhanbad and S&R Deptt., CIL, Kolkata   | CIL/R&D/1/39/10    | 353.82<br>CIMFR- 353.82<br>S&R(CIL)- Nil                    |
| 51     | Assessment of prospect of shale gas in Gondwana basin with special reference to CIL areas.   | CBM(Cell), CMPDI(HQ), Ranchi and Advance Resources International, Washington, DC, USA   | CIL/R&D/1/46/11    | 512.20<br>For CMPDI- 424.90<br>For ARI, USA- 87.30          |
| 52     | Indigenous development of Integrated Dumper Collision Avoidance system for opencast mines.   | Mine Electronics Deptt, CMPDI(HQ), Ranchi and BEL, Panchkula, Haryana   | CIL/ R&D/1/51/2012 | 354.51 CMPDI<br>- 60.00, BEL,<br>Panchkula-294.51           |
| 53     | Studies on shrinkage swelling characteristics of some Indian coals to ascertain recoverability of CBM from deep seated coal and shale resources. Project Code:..   | CBM Cell, CMPDI, Ranchi and IIT, Kharagpur  | CIL/ R&D/1/53/2013 | 182.60<br>CBM, Cell, CMPDI- 55.70<br>IIT, Kharagpur- 126.90 |
| 54     | Research and development on efficient energy management pilot study and action plan. Project Code:.. Impl. agencies:   | Indian Institute of Social Welfare and Business Management (IISWBM), Kolkata and DFIC Management Consultants Pvt. Ltd., Kolkata | CIL/ R&D/1/55/2013 | 66.19<br>IISWBM-21.94<br>DFIC-44.25                         |