
About Coal Mining in India & SCCL



Coal in India

- Coal deposits are spread over 27 major coalfields.
- The lignite are around 36 billion tonnes.
- 248 Billion tonnes of coal resources including 93 Bt proved reserves have been established in the country as on 1.1.2004.
- Singareni has 17 Bt total reserves including 8.3 Bt proved.



Number of Coal Mines in India

As on 31.03.04

■ CIL	470
■ SCCL	60 As on 1.04.05
■ TISCO	07
■ IISCO	03
■ DVC	01
■ BSMDC	01
■ J&K Minerals	04
■ Bengal Emta	01
■ Jindal Strips	01
■ Total	547



Coal Production in India: 2004-05 (million tonnes)

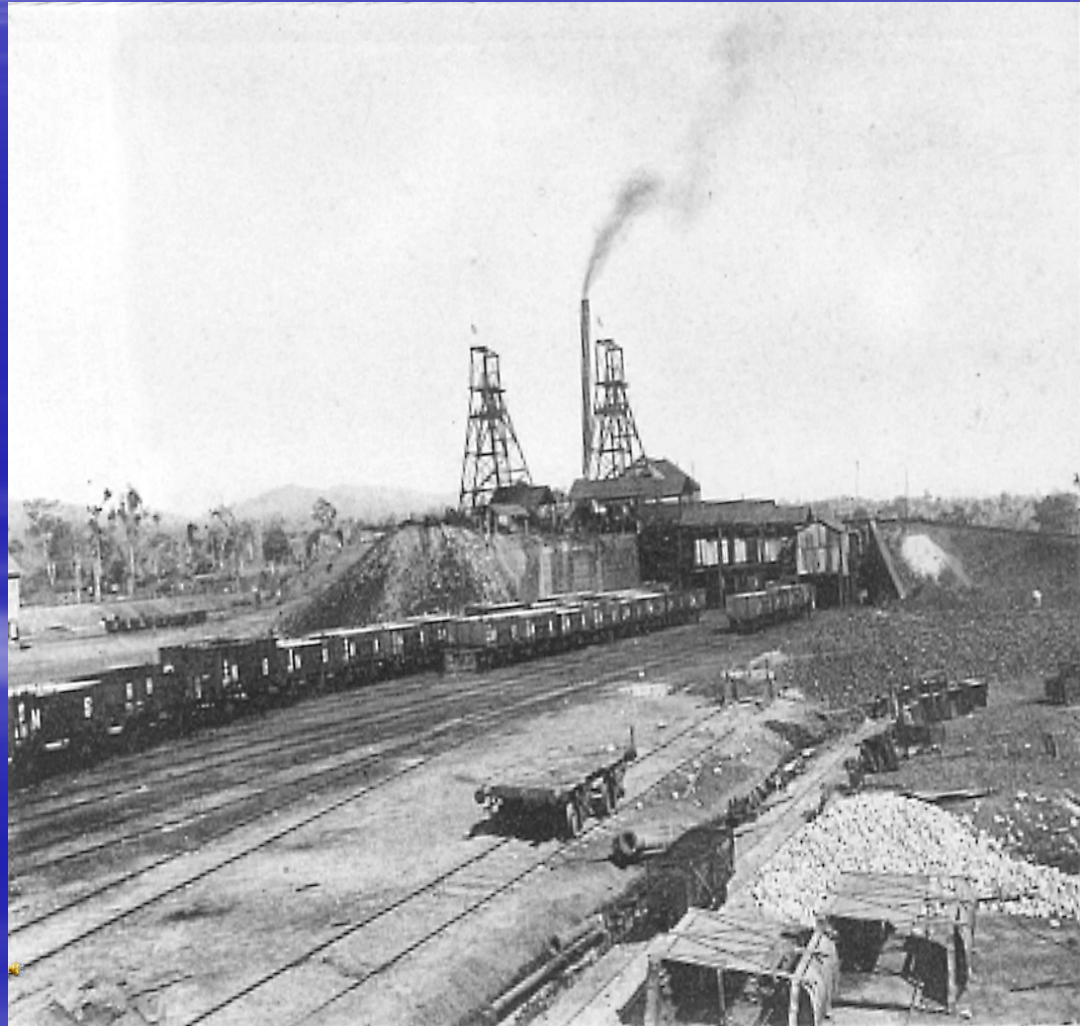
■ CIL	323.00
■ Singareni	35.30
■ Captive mining	15.49 (2003-04)
■ Meghalaya	4.00 (2003-04)

Total Country *377.79*

Singareni



- Dr. William King discovered coal in Singareni Village.
- Singareni is mining coal since 1889.



Geography

- Godavari Valley Coalfields of Singareni are spread out over 350 Kms.
- Mines are located in the 4 Districts of Adilabad, Karimnagar, Warangal and Khammam Districts of A.P.



MINES

- The Singareni Collieries Company Limited currently operates
 - 9 Opencast and
 - 49 Underground Mines (Coal Producing)
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Regions/Areas

- For the purpose of Administrative convenience the coalfields are divided into 3 Regions & 11 Areas.

REGIONS	KOTHAGUDEM	Mine s	RAMAGUNDAM	Mines	MANDA MARRI	Mines
AREAS						
1.	Kothagudem	3 + 2 OC	RG- I	11	SRP	8+3
2.	Yellandu	2 +1 OC	RG- II	5	MM	9
3.	Manuguru	2 + 2 OC	RG- III	2 OC	BPA	1
4.			RG-IV	2 OC		
5.			BHPL	5		

Mile stones - Technology



■ 1975: Opencast mining



- 1979: Side Discharge Loaders
- 1981: Load Haul Dumpers and Road Headers
- 1983: Longwall mining



Mile stones - Technology

- 1986: Walking Dragline
- 1989: French Blasting Gallery method
- 1994: In-pit crushing and conveying
- 2004: Phasing out manual Coal filler launched.





Let us proceed to Rescue

HISTORICAL DEVELOPMENT OF MINE RESCUE IN INDIA

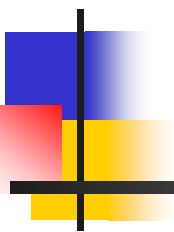
• The first mines rescue station in India was established in Kolar Gold Fields as early as Nov 1923.

The necessity of having well equipped rescue stations was deeply felt after a series of disastrous fires and explosions shook the Indian mining industry during the 1930's.

- In the coal mining sector, the first coal mines rescue rules were promulgated in India in 1939 and two central rescue stations were established in August 1941 at

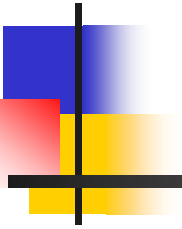
1. Dhansar (Jharkhand) &
2. Sitarampur (West Bengal)

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- The Mines Rescue Rules were modified in 1959 and made applicable to all the coal companies in India.
 - Thirteen Additional Rescue Stations were established including two in Singareni at Kothagudem and Bellampalli.
 - The major metalliferous underground mines also established six Rescue Stations.
 - Central Coal Mines Rescue Station Committee (CCMRSC) was formed and Rescue Stations were brought under its control.
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- The coal Mines Rescue Rules 1959 were replaced by the Mines ***Rescue Rules 1985*** as per the recommendations of the Mitra Committee.
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- CCMRSC was made defunct and all the mine rescue stations were handed over to the respective companies in the mining industry.

- At present, 46 Rescue Stations in Coal Mining industry and 6 rescue stations in Metal mining industry are functional in India.



Rescue Equipments

- **The rescue stations started in India, with Proto Mark-IV self-contained breathing apparatus and Novox reviving apparatus.**
 - **The Self-contained breathing apparatus used in Indian Rescue Stations underwent a progressive transformation.**
 - **Drager BG-172 Breathing Apparatus was introduced in 1958. This was found to be more efficient than Proto Mark- IV.**
 - **One set of BG-172 apparatus was presented by M/s Drager Germany to PANDIT JAWAHARLAL NEHRU (LATE PRIME MINISTER OF INDIA).**
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- Drager BG-174 was introduced in India in the year 1992 and became the standard equipment gradually replacing proto.
 - The latest Generation Breathing Apparatus BG-4 was introduced for the First Time in India at SINGARENI IN 2002.
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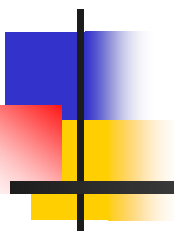
Rescue Equipment

- ➡ Maxaman Resuscitator manufactured by M/s. Siebe Gorman was introduced in 1992 replacing Novox but no longer being manufactured.
- ➡ Later Pulmotor and Oxylog La Mining were introduced but no longer being manufactured.
- ➡ Presently, a *suitable resuscitator for mine rescue matching the features of Maxaman Resuscitator and approved by DGMS is not available.*

STATUTORY PROVISIONS

- Mines Rescue Rules 1985 has been established under section 58 (v) of mines Act 1952.
- The rules provide for the formation of the Rescue Service points , training, functions, composition and duties of rescue brigades, equipment and generally for the conduct of rescue work in mines.

RESCUE STATION

- A Rescue station is established for a group of mines. (generally for all the mines of one coal company).
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RESCUE STATION

Man power.

- **At every rescue station there are**
 - one Superintendent(first Class),
 - at least two instructors (Second Class) and
 - a Rescue Brigade of not less than 18 rescue trained persons.
-

Equipment:

Provide 54 Breathing Apparatus and other rescue equipment's as per schedule-I

MANNING OF RESCUE STATIONS:

- The Rescue Service Points are manned by Rescue Brigades selected from the rescue trained persons of the mines on rotation .
 - This system helps in exposing the rescue trained persons to emergencies thus developing their skills in addition to obtain expertise in maintenance and repair of equipment and apparatus.
 - Rescue Brigades are posted for a minimum of one year and maximum of 5 years.
 - Rescue Brigades are required to do refresher practices for 18 days a year.
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MANNING OF RESCUE STATIONS:

- Accommodation for the Rescue Brigades are provided for their term of 5 years within the Rescue Station complex. With this arrangement the Brigades are available round the clock enabling faster response during emergencies.
 - The Duties of the Rescue Brigades is to maintain the equipment and apparatus, assist in imparting Initial Training and Refresher Training, attend the communication room and perform rescue and recovery work in mines.
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RESCUE STATION

Functions:

- Provide facilities for storage, assembly, testing and adjustments of breathing apparatus and other rescue equipment's and apparatus .
- Impart Initial training in rescue and recovery work

Functions:

Impart refresher training to rescue trained persons.

Attend major accidents, and support rescue rooms in case of long lasting rescue and recovery operations.

Provide rescue coverage to the mines within 35 kilometers.

RESCUE ROOM

- Established within 35 kilometers of a group of mines with total underground employees not exceeding 5000 persons.



- Generally a rescue room is established for serving the needs of the mine of an area.

RESCUE ROOM

Manpower:

- One In-charge (Over man) and
 - Rescue Brigade of five rescue trained persons
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Equipment:

- Provide 15 Breathing Apparatus and other rescue equipment's as per Schedule -II

RESCUE ROOM

Functions:

- Provide facilities for storage, assembly, testing and adjustments of breathing apparatus and other rescue equipment's and apparatus and their speedy transport to mines.

- Attend emergencies in the mines within 35 kilometers

/

RESCUE ROOM WITH REFRESHER TRAINING FACILITY (RRRT)

Establishment:

- Established within 35 kilometers of a group of mines where total underground employees exceeds 5000.

- Generally RRRT is established for serving the needs of the mine in a Region consisting of Areas.

RESCUE ROOM WITH REFRESHER TRAINING FACILITY(RRRT)

Man Power:

- One In charge (IInd Class)
 - One Over man and
 - ten brigade Members.
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Equipment:

- Provide 30 breathing apparatus and other rescue equipment's as per schedule-II

RESCUE ROOM WITH REFRESHER TRAINING FACILITY(RRRT)

Functions:

➤ Provide facilities for storage, assembly, testing and adjustments of breathing apparatus and other rescue equipment's and apparatus and their speedy transport to mines.

➤ Attend emergencies for the mines with in 35 kilometers.

➤ Imparting refresher training to rescue trained persons.

REQUIREMENT OF RESCUE TRAINED PERSONS IN MINES

↳ The rescue trained persons are the trained field volunteers from the mines who report at the site of emergencies whenever summoned.



↳ **More than 100 persons below ground : 5 rescue trained persons should be readily available at surface at any time.**

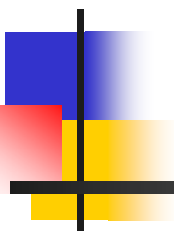
↳ **More than 500 persons below ground : 1 rescue trained person for every 100 persons or part thereof.**

Qualifications of persons for initial training

- Age : 21 to 30 .
- Possess First Aid Certificate.
- 3 yrs Underground Experience.
- Medical fitness certificate.
- Examination and Interview for suitability of rescue work by Superintendent of Rescue Station.

COURSE OF INITIAL TRAINING

General:

- **Duration of Initial training in rescue : 14 days.**
 - 12 practices with breathing apparatus &
 - 2 practices with smoke helmets.
 - Practices are given in simulating conditions of fire and smoke.
 - Practices with breathing apparatus commence in ordinary air and progress gradually until persons are acquainted and able to work in hot, humid and irrespirable atmospheres.
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PRACTICES

← Practices includes,

- ← raising and lowering weights,
- ← constructing stoppings,
- ← supporting,
- ← clearing roof falls,
- ← rescue of persons
- ← Establishing communication,
- ← collecting samples,
- ← determining environmental conditions and
- ← gas detection.

COURSE OF INITIAL TRAINING

Instructions:

- Methods of dealing with fires below ground,
- recovery of mines after fires and explosions.
- Construction, use, repair, maintenance and testing various types of breathing apparatus and other equipment's provided.
- Use of methods and apparatus for reviving persons using resuscitators.

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- **Properties and methods of detection of noxious and inflammable gases which are found in mines.**
 - **Taking of gas samples in irrespirable atmosphere.**
 - **Reading of mine plans.**
 - **Mines Rescue Rules.**
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REFRESHER TRAINING

To remain in Active Duty/ Rescue Trained persons have to undergo

- ← 8 refresher practices in a year.

 - ← 4 in training gallery.

 - ← 4 in mines.

- ← Undergo Annual Medical Examination.

- ← Lapse of Rescue Status if the gap between refresher practice is more than 4 months or if declared unfit in medical examination.

- ← The most common causes for the rescuers to retire is age & fitness.

REFRESHER TRAINING



BOOSTER TRAINING

← For reactivation of rescue status application for booster training can be made to Regional Mining Inspector.

← On permission he has to undergo a special course of 5 refresher practices and again become Active rescue trained person.



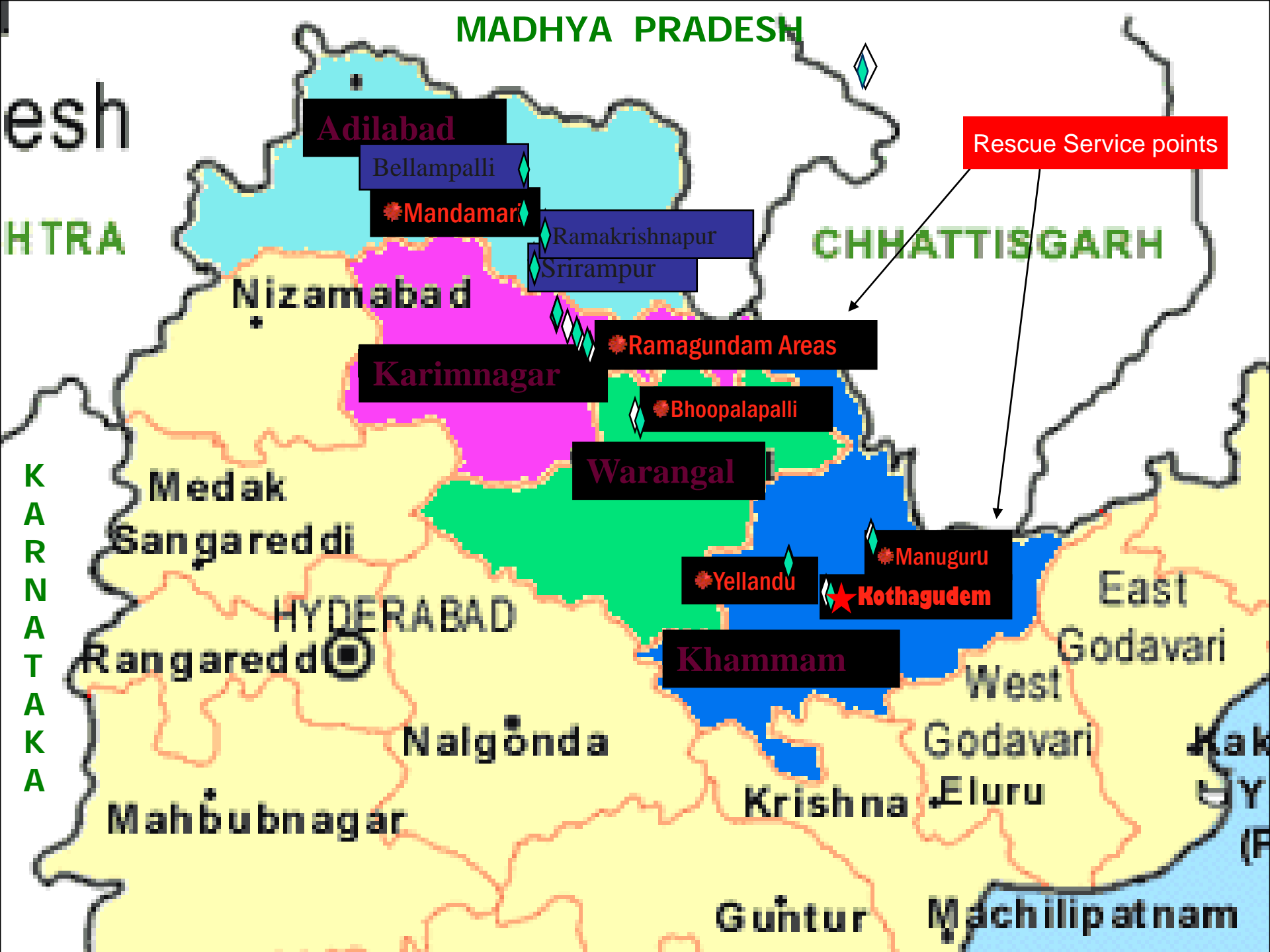
MINES RESCUE SERVICES

SINGARENI COLLIERIES COMPANY LIMITED
A GOVT COMPANY



Rescue Service Points

- SCCL has established 6 Rescue Service Points for catering the Rescue needs of the mines (established within 35 Kms of mines as per the Mines Rescue Rules 1985).
 - The 6 Rescue Service Points are manned by 60 Rescue Brigades and assisted by 650 rescue trained personnel from the mines.
 - One out of every 100 persons employed belowground are trained in rescue.
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MINES RESCUE STATION - SCCL



MINES RESCUE STAFF: SELECTION

Selection of Rescue Brigades is done by conducting a written and practical test for 500 marks comprising:

- Educational Qualifications, Experience in mining & Age,
 - Experience in dealing mine emergencies as rescue trained and his seniority in rescue.
 - Technical knowledge in maintenance of apparatus and equipment.
 - Physical capability in carrying sand bags, props, lowering and raising heights etc.
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MINES RESCUE STAFF: SELECTION

- Performance and experience in rescue and competitions in National Level and Company Level.
 - Knowledge in First Aid & Medical Fitness.
 - Rescue and Mining Theory.
 - Expertise in Resuscitation techniques.
 - Loyalty, Dedication, Discipline, Bravery, Courage and Sacrifice.
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MINES RESCUE STAFF : TRAINING

- Refresher Training with Breathing apparatus in mines and training gallery: 18 per year.
 - Specialized training in hydraulic rescue tools : 4/year.
 - Specialized training in Gas Detection, Use, maintenance, repair and calibration through manufacturers: 4/year
 - Training in surface fire fighting, using nozzles, monitors, fire suits etc : 4 days/year.
 - Maintenance of Rescue Apparatus & Equipments : 10 days/year.
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OPERATIONAL ACTIVITIES

■ Normal day, week or month

Normal day:

- 24 hrs (3 shifts of 8 hrs each).
- For the maintenance and training crew it is 8: AM to 5 : PM with one hour lunch break in between.

Week:

- 7 days Sunday to Saturday.
- 6 days are working and one day is Rest.
- The Rest day is scattered for different Areas.

Month:

It is the Calendar month.

ACTIVITIES - TRAINING

- Initial Training and Refresher Training in Rescue.
 - Training in practical first aid for miners and for civilians like drivers, mechanics.
 - Training of miners in use of Self Rescuers.
 - Refresher/Booster training in rescue to metal mining companies.
 - Advanced training in hydraulic rescue tools, lifting bags, rock breaking etc for dealing various disaster situations including roof falls.
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ACTIVITIES - TRAINING

- Training in surface fire fighting.
 - Maintenance of Self Rescuers pertaining to the mines.
 - Maintenance, repair and calibration of gas detectors pertaining to the mines and the rescue stations.
 - Conducting Competitions in Mine Rescue and First Aid.
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ACTIVITIES - EMERGENCIES

- Attending Emergencies in Mines like influx of gases, fires, roof falls, Inundation.
 - Reopening of sealed off/Sectionalised areas.
 - Exploration of unused workings.
 - Attending outside emergencies in other neighboring industries, like fires in power stations, paper manufacturing units and tackling village fires.
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ACTIVITIES - EMERGENCIES

- Rescue during wild honey bee attacks.
 - Rescue operations during building collapses, road accidents and flash floods.
 - Inertization of sealed off areas/sectionalized areas/working BG Panels with nitrogen/CO2 & foam to tackle and prevent fires.
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ACTIVITIES - EMERGENCIES

- Ventilation pressure/ quantity survey and application of dynamic pressure balancing technique to prevent and control fires.
 - Rescue of persons collapsed/fall in water wells.
 - Tackling chlorine leakages at water filter beds and during transportation of cylinders.
 - Dewatering Open Cast Workings.
-

MOST COMMON EMERGENCIES

- DEALING AND CONTROLLING MINE FIRES.
 - REOPENING OF SEALED OFF/SECTIONALISED AREAS.
 - RESCUE DURING ROOF FALLS.
 - RESCUE & DEWATERING DURING MINE INUNDATIONS.
 - DEALING FIRES IN INDUSTRIES, IN POWER PLANTS AND VILLAGES.
 - TACKLING CHLORINE LEAKAGES.
 - DEWATERING OPEN CAST WORKINGS
-

EMERGENCIES IN LAST 5 YEARS (2000- 2005)

- Dealing of major mine fires: 18
 - Reopening of sectionalised/ sealed off areas : 13
 - Rescue during major roof falls: 4
 - Major Inundations leading to disasters : 2.
 - Surface Fires in substations, industries, Timber yards, village fires : 15
 - Chlorine leakages: 4
 - Major Building collapses : 1
 - Dewatering Opencast & underground workings : 6
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Equipments to deal underground fires

BREATHING APPARATUS

- BG-4 : 30 Nos.
- BG-174 : 166 Nos.
- Travox-120 : 23 Nos.

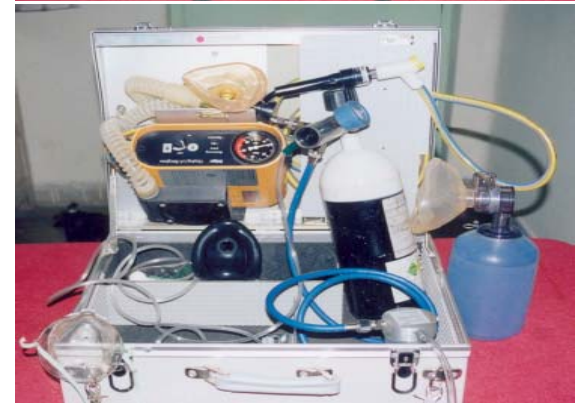


Equipments to deal underground fires

RESUSCITATORS

- **MAXAMAN: 24 Nos.**
(manufactured by Siebe Gorman)

- **OXYLOG : 12 Nos.**
(Oxylog LA mining, Oxylog- 1000
& Oxylog-2000 manufactured by Drager)



Testing Equipments



- Quaestor – III Computerised Testing Equipment for Breathing Apparatus: 1 No.
 - Rz-25 Universal Tester : 9 Nos.
 - Lung Tester for resuscitators : 7 Nos.
 - Oxygen purity testing equipment. : 6 Nos.
-



Detectors

- Drager Mini warn
- Pac-Ex Methanometers
- Pac-III Toximeters
- Pac- III Oxymeters
- Micropac Oxygen
- Micropac CO
- Drager Chip Measurement system



Isolating Mine Fires

- The mine fires are quickly isolated by Rescue Teams using Foam Stoppings (Vent-seals manufactured by Aeorcell Pvt. Ltd Johannesburg South Africa).
- The foam stoppings are then strengthened by Ash Brick stoppings and later by Explosion proof stoppings if required.



SELF RESCUERS

- 300 Chemical oxygen Self Rescuers model Drager Oxybox – K.
- 20 Nos of Compressed Oxygen Self-Rescuers model MO2 – 30 manufactured by Siebe Gorman.
- 20,000 Filter Self Rescuers (MSA) in mines.



Equipments to deal surface fires

- Open Circuit Breathing Apparatus
Drager PSS – 500 : 6 Nos.
- Air line Breathing Apparatus: 6 Nos.
- Nomex Fire suits : 12 Nos.
- Different types of Akron Nozzles and Monitors along with hoses.
- High Expansion Foam Pyrocool.



Hydraulic & Pneumatic Rescue Equipments to deal Roof Falls & Vehicle Accidents.

- Lukas Spreaders.
- Lukas Cutters.
- Lukas Combitools.
- Lukas Lifting Jacks.
- Lukas Rescue Rams:
- Vetter Lifting Bags.
- STIHL Concrete Cutters.
- STIHL Saw Cutters.



Pumps for dealing Inundation

SUBMERSIBLE:

- 60 HP, 1000 GPM, 30 M Head : 3 Nos.
- 110 HP, 2000 GPM, 30 M Head : 3 Nos.
- 100 HP, 1000 GPM, 50 M Head : 3 Nos.
- 130 HP, 1000 GPM, 70 M Head : 3 Nos.

CENTRIFUGAL:

- 240HP, 190 HP & 125 HP pumps are also provided.
-

Equipments under procurement

- Large Diameter Drill Rig for rescue of persons through bore hole during Inundation : 1 No.
- Multi-purpose Fire Fighting Vehicles: 3 Nos.
- Micro Gas Chromatograph GC- 3000 for gas analysis from SIMTARS: 1 No.
- Thermal Image Cameras: 3 Nos.
- Search Cameras : 3 Nos.



Rescue Competitions

- Inter Company & All India Mines Rescue Competitions are held every year to enhance the emergency preparedness of rescue teams.
- SCCL won Overall First and Second Prizes in the All India Mines Rescue Competitions held at Singareni in 2003 & 2004.



Rescue Allowances

- Refresher Training Allowance/Year : Rs. 3900.
 - Rescue Bonus/Year : Rs. 390.
 - Emergency Allowance
 - Proto Allowance per spell : Rs. 190
 - Standbye allowance : Rs. 130
 - Group Insurance : Rs. 5 Lakhs.
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Future up-gradations planned

- Providing Fall Protection Equipments.
 - Chemical protection suits with integral cooling breathing air supply to deal with chlorine leakages.
 - Modern training gallery with controlled simulations of heat, humidity, smoke and monitoring the training with thermal image cameras and telemetry.
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Assistance Required

- Faster and effective Inertization of sealed off areas to enable reopening operations within short time.
- Designs of rescue training galleries.
- Underground communications systems for rescue teams during emergencies. Ex: Inductive communication systems, Personnel Emergency Device, Leaky feeder & microcellular communications.



Assistance Required

- Breaking of rocks by implosion for rescue during roof falls – Ex: Dexpan non explosive, controlled breaking, cutting and demolition agent.
- Faster sealing off mine areas by quick sealing compounds or inflatable stoppings having adequate strength.
- Cooling vests to prevent heat stress and heat strain.

Assistance Required

- Ground penetrating radars for determining coal rib thickness.
- Escape chambers both against influx of gases and also against inundation. Ex: Cowan, Shairzal chambers.



ORGANIZATION OF RESCUE SERVICES IN S.C.C. LTD

CHAIRMAN AND MANAGING DIRECTOR Shri
R.H.Khwaja, I.A.S.

Director (Planning & Projects) Shri
I.V.Dathathreyulu

Owner of Mines

Mines
1)Bellampalli Area 2) Mandamarri Area 3)Srirampur Area 4) Bhoopalpalli
Projects 5) Ramagundam-1 Area.
Corporate Departments
1)C.P & P, 2) Project Planning 3) Project Implementation & Monitoring 4)
Research & Development 5) Survey & Exploration 6) Quality Management
7)Safety 8)Forestry

Director (Operations) Shri P.
Vasudeva Rao

Owner of Mines

Mines
1) Kothagudem Area 2) Manuguru Area 3) Yellandu
Area 4) Ramagundam-II Area, 5) Ramagundam-III Area,
6) Ramagundam-IV Area
Corporate Departments
1)Civil 2) Purchase.

Chief GM(Safety) Shri Sashi
Kunoor

GM (Rescue & Safety) Shri
B.Chandru

Rescue Room
Rescue Rule 5

**Mines Rescue Station,
Kothagudem**
Rescue Rule 3(2), 7

**Rescue Room with Refresher
Training Facility (R.R.R.T.)**
Rescue Rule 5.1(b)

Superintendent Shri D. Baidya,

Manuguru
In charge Shri B.
Mohan
Rescue Rule 5,10of
1985

Yellandu
In charge Shri M. Veera
Reddy
Rescue Rule, 5, 10 of
1985

Bhoopal palli
In charge Shri Keerthi
Srinivas
Rescue Rule, 5,10of
1985

Instructor
Rescue Rule 3(2) & 8

Shri G.Prabhakar Rao
Addl.Mgr.

**Shri D. Ramana Reddy, Sr. Under
Manager**

Mandamarri
In charge Shri B.V.
Satyanarayana
Rescue Rule 5.1(b) (b), 8

Shri S.Ravinder, Overman
Rescue Rule 5.1(b) (b), 10

Ramagundam
In charge Shri B. Madhava
Rao
Rescue Rule 5.1(b) (b), 8

Shri Goli Rajender, Overman
Rescue Rule 5.1(b) (b), 10

5- Brigade Members
Rescue Rule 5.1 (b) (b)

4- Brigade Members
Rescue Rule 5.1 (b) (b)

4-Brigade Members
Rescue Rule 5.1(b) (b)

18 Brigade Members
Rescue Rule 3(2)

7 Brigade Members
Rescue Rule 5.1(b) (b)

10 Brigade Members
Rescue Rule 5.1(b) (b)