

Course Name : Three years Diploma in Mining Engineering
Year : Second
Subject Title : **Mining Methods - Opencast Working**
Subject Code : **M201**

Teaching and Examination Scheme:

Teaching Scheme*			Examination Scheme					
L	T	P	Full Marks	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
2	1	0	100	80	20	26	40	3 Hrs.

*Duration of year is considered 28 weeks

After obtaining Diploma in Mining Engineering Diploma Engineer required to supervise operations involved in opencast mines, the number of opencast mines are increasing to enhance production rate and due to present policy of linking large opencast mines to the super thermal power plant. Thus Diploma engineer must have knowledge of unit operations involved. Type of machineries used their applicability and working, knowledge of explosive used and procedure for carrying out blasting operation in large opencast mines by deep hole blasting. All these are essential aspects are included in subject opencast mining in Third year of the programme.

COURSE OUTCOMES:

After undergoing the course of study the student shall be able to

1. Supervise operations involved in the opencast mining both coal and non-coal.
2. Supervise the operations of the equipment used in opencast mines.
3. Select suitable explosive for deep hole blasting in large opencast mines.
4. Supervise/carryout blasting operation to give the optimum results from the blast.

Take proper care of environmental aspects, which may get affected due to blasting and other opencast mining activity.

Unit	Content	Contact Hours	Marks
1.	INTRODUCTION TO OPENCAST MINING 1.1 Classification of Surface Mining methods, Factors affecting choice of opencast mining methods; Advantages and disadvantages of opencast mining 1.2 Stripping Ratio: Maximum allowable stripping ratio, Overall stripping ratio, Break even		

	<p>stripping ratio</p> <p>1.3 Benches parameters: Height, width, angle of slope, toe, crest, statutory provisions regarding height, width, angle of slope etc.</p>		
2.	<p>OPENING UP OF DEPOSIT</p> <p>2.1 Unit operations involved, site preparation, Box cut, Entry system in opencast mines</p> <p>2.2 Opencast mine layout, factor determining choices of layout, overburden excavation, Disposal of overburden, overcasting etc,</p> <p>2.3 Sample layouts for Lime Stone, Copper, Coal, Iron ore deposits, method of work, machines required, manpower, OMS etc.</p>		
3.	<p>OPENCAST MINING MACHINERY</p> <p>3.1 Classification of Excavating equipment, selection, choices of opencast mining machinery.</p> <p>3.2 Excavators shovel, Rope shovel, hydraulic shovel, application, advantages, disadvantages, comparison Rope shovel and hydraulic shovel, operating parameter, output of a shovel. Various attachments to shovel. Back hoe, operating parameter, application.</p> <p>3.3 Dragline, operating parameters, applicability, working, advantages, disadvantages, comparison with shovel.</p>		
	<p>3.4 Bucketwheel and Bucket chain excavators. Application, advantages & disadvantages, operation, working methods by Bucket wheel excavator, terrace cut, Dropping cut etc.</p> <p>3.5 Rippers. Scrappers, bulldozer etc.</p> <p>3.6 Surface miner its application, working. In pit crushing system</p> <p>3.7 Precautionary measures while use of HEMM.</p>		
4.	<p>OPENCAST EXPLOSIVES</p> <p>4.1 Explosives used in opencast mine, ANFO, slurry explosive, emulsion explosives, Heavy ANFO explosive, LOX, their properties, composition etc. Boosters.</p> <p>4.2 Initiation system, non-electric initiation system, Raydets, Nonel, Shock Tubes, electronic detonators, etc.</p> <p>4.3 Bulk explosive system, site mixed slurry, site mixed Emulsion, Bulk-loading system. Advantages, ANFO precautions while mixing,</p>		

	<p>handling and use, Conditions for using bulk explosives.</p>		
5.	<p>BLASTING PRACTICE IN OPENCAST MINES</p> <p>5.1 Bench blasting terminology, Blast hole geometry, hole depth, burden, spacing, sub grade drilling, bottom change, column charge, stemming height.. Factors to be considered while blast designing</p> <p>5.2 Simple numerical on blast design for the bench of surfaces mine</p> <p>5.3 Single and multiple rows blasting their comparison, Sequence of blasting in single & multiple row. Precautions while charging and firing of holes in deep hole blasting, deck charging, muffled blasting, control blasting techniques, secondary blasting/breaking in opencast mines.</p> <p>5.4 Transport of Explosives in bulk, precautions while drilling and blasting of deep holes.</p>		
6.	<p>ENVIRONMENTAL ASPECTS OF OPENCAST MINING</p> <p>6. Environmental aspects of opencast mining Fly rock, ground vibration, air blast their causes & prevention. Noise pollution, water pollution, Degradation of land, land reclamation.</p> <p>6.1 Salient features of environment protection Act, EMP and Environment impact assessment.</p> <p>6.2 Slope stability: Causes of un-stability, forms of failure preventive measures.</p>		

STRATEGY OF IMPLEMENTATION:

Conducting theory classes, practical, Industrial visits, seminars, group discussion, and assignment on different topics shall complete the curriculum.

REFERENCE BOOKS:

Author	Title	Publisher
G.K. Pradhan	Explosive and Blasting Techniques	Mintech publication Bhubaneshwar.
S.K. Das	Surface Mining Technology	Lovely Prakashan Dhanbad.
S.K. Das	Explosives and Blasting Techniques	Lovely Prakashan Dhanbad.
D.J. Deshmukh	Elements of Mining Technology Vol I	Central techno publication, Nagpur
G.B. Misra	Surface Mining	Oxford University Press, Calcutta