

AMMI-8 ROCK MECHANICS

UNIT-1 INTRODUCTION

- 1.1 Concepts and historical developments and design in rock excavation,
- 1.2 Factors affecting rock fragmentation, mechanism of rock breakage and fractures.
- 1.3 Rock Fragmentation: Method of rock fragmentation
- 1.4 Explosive action, cutting, ripping and impacts.

UNIT-2 MECHANICAL PROPERTIES OF ROCKS

- 2.1 Application 'of compression, tensile and multi- axial strength, index test and abrasivity, anisotropy, elasticity, porosity, lamination, bedding joints in rock fragmentation process.
- 2.2 Principles of Rock Cutting Technology: Drilling and its various types i.e., rotary, percussive; rotary - percussive mechanism of rock percussion,
- 2.3 Theory of single tool rock cutting, crack initiation and propagation, breakage pattern.

UNIT-3 ROCK CUTTING PRICKS

- 3.1 Discs and rolls cutter. Water jet cutting.
- 3.2 Method of assessing drill ability and cut ability of rock.

UNIT-4 PRINCIPLES OF EXCAVATION MACHINES:

- 4.1 Road headers, TBMs' coalface cutters loaders,
- 4.2 Bucket Wheel Excavators, draglines and Continuous Miners both surface and underground.

UNIT-5 ROCK' CUTTING TOOLS

- 5.1 Cutting tool material - different type's relative application and their choice, tool shape and size, specific energy consumption, tool wear, drill bit types.
- 5.2 Rock Excavation Engineering (Open Elective)

UNIT-6 EFFECT OF OPERATIONAL PARAMETERS ON TOOL PERFORMANCE AND REPLACEMENT OF CUTTING TOOLS OF EXCAVATING MACHINES.

- 6.1 Course Outcome: The student will be in a position to appreciate the engineering properties of rock mass and its response to design of excavation,
- 6.2 Selection of right type of equipment for excavation, to avoid breakdowns and to improve the efficiency and machine performance.

Reference Books:

1. SME mining engineering hand book, Hartman, Society for Mining, Metallurgy and Exploration.
2. Introductory mining Engineering, Hartman, John Wiley International, 1976.