

AMMI-23 MINE PLANNING AND DESIGN

UNIT-1 INTRODUCTION

- 1.1 Stages/Phases of mine life; Preliminary evaluation of surface mining prospects;
- 1.2 Mine planning and its importance;
- 1.3 Mining revenues and costs, and their estimation;
- 1.4 Mine planning components, planning steps and planning inputs.

UNIT-2 ORE RESERVE ESTIMATION ORE ZONE AND BENCH/LEVEL COMPOSITING

- 2.1 Objectives and principles of ore reserve estimation; Estimation of grade at unknown point;
- 2.2 Methods of ore reserve estimation - vertical cross section method, horizontal cross section method and 3-D geological block method.
- 2.3 Stripping ratio Concept of stripping ratio; Types of stripping ratios and their significance; Choice between surface and underground mining.

UNIT-3 GEOMETRICAL CONSIDERATIONS BASIC BENCH GEOMETRY

- 3.1 Ore access; Pit slope geometry; Addition of haul road on pit plan; Pit layouts.
- 3.2 Pit Planning Development of economic block model;
- 3.3 Pit Cut-off grade and its estimation; Ultimate pit configuration and its determination – hand method, floating cone technique,
- 3.4 Lerchs-Grossmann algorithm, and computer assisted hand method.
- 3.5 Production planning Determination of optimum mine size and Taylor's mine life rule; Sequencing by nested pits;
- 3.6 Cash flow calculations; Mine and mill plant sizing,
- 3.7 Lanes algorithm for estimation of optimum mill cut of grade;
- 3.8 Introduction to production scheduling.

UNIT-4 ANALYSIS AND DESIGN OF HIGHWALL SLOPES AND WASTE DUMPS INFLUENCE OF PIT SLOPE ON MINE ECONOMICS

- 4.1 Highwall slope stability analysis and design methodology; Stability analysis and design methodology for waste dumps.
- 4.2 Design of haul roads Design of road cross section; Design of road width, curves and gradient; Haul road safety features and their design.
- 4.3 Design of drainage system in surface mines.
- 4.4 Selection of mining system vis-à-vis equipment system.
- 4.5 Closure of surface mines. Feasibility Report - Contents and preparation.

Reference Books:

1. . “Advanced Coal Mining” by B M Vorobjev and R T Deshmukh
2. “Introductory Mining Engineering” by Hartman