

# Design of Surface Mine Haul Road

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## Abstract

This Bureau for design of surface mine haul road covers such aspects of haul road design as road alignment (both vertical and horizontal), construction materials, cross slope, and drainage provisions. Traffic control and design of proper lane widths to promote safe vehicle movement are included, as are suggested criteria for road and vehicle maintenance and for runaway vehicle safety provisions. The aim of this publication is to provide those involved with the surface mine haul road design with a complete detail of recommended practices that, if implemented, will promote safer, more efficient haulage routes.

**Keywords:** cross-section, switchbacks, manoeuvring, haulage way, berms

## I. INTRODUCTION

During the past 30 years, surface mine haulage equipment has developed from trucks capable of moving 20 tons of material to vehicles that transport as much as 350 tons. Unfortunately, the design of roads this equipment must traverse has not advanced at the same rate. In many areas, road-building technology appropriate to vehicles of three decades past is still being practiced today. As a result, numerous unnecessary haulage road accidents occur every year. A number of these mishaps can be attributed to operator error. However, far too many are caused by road conditions that are beyond the vehicle's ability to negotiate safely. With this history of haulage related problems in mind, the Bureau of Mines undertook a project to produce a design manual that would ultimately guide surface mine road planners toward safer, more efficient haulage systems. Design guidelines for each weight category, including velocity stopping distance curves, vertical curve controls, haulage way widths, curve widening, and spacing of runaway devices, drainage provision, are presented in this report.

## II. FOUR BASIC LAYERS OF HAUL ROAD

- Sub-grade
- Sub-base
- Base course
- Surface course



Fig. 1: Typical haul road cross-section

# Mine Road Design Manual

**Helena Wilhelmina Glen**



## **Mine Road Design Manual:**

Surface Mine Haulage Road Design Manual Norris Brooks, United States. Mine Safety and Health Administration, 1999  
Information Circular ,1977      *Surface Haulage* ,1997      **Design of Surface Mine Haulage Roads** Walter W. Kaufman, James C. Ault, 1978 This Bureau of Mines manual for design of surface mine haulage roads covers such aspects of haulage road design as road alignment both vertical and horizontal construction materials cross slope and drainage provisions Traffic control and design of proper lane widths to promote safe vehicle movement are included as are suggested criteria for road and vehicle maintenance and for runaway vehicle safety provisions The aim of this publication is to provide those involved with surface mine haulage road design with a complete manual of recommended practices that if implemented will promote safer more efficient haulage routes      *Comparative shortwall and room-and-pillar mining costs* Larry E. Green, Eugene R. Palowitch, 1977      **Mining Haul Roads** Roger Thompson, Rodrigo Peroni, Alex Visser, 2019-01-15 Mining haul roads are a critical component of surface mining infrastructure and the performance of these roads has a direct impact on operational efficiency costs and safety A significant proportion of a mine's cost is associated with material haulage and well designed and managed roads contribute directly to reductions in cycle times fuel burn tyre costs and overall cost per tonne hauled and critically underpin a safe transport system The first comprehensive treatise on mining haul road design construction operation and management Mining Haul Roads Theory and Practice presents an authoritative compendium of worldwide experience and state of the art practices developed and applied over the last 25 years by the three authors over three continents and many of the world's leading surface mining operations In this book the authors Introduce the four design components of an integrated design methodology for mining haul roads geometric including drainage structural functional and maintenance management Illustrate how mine planning constraints inform road design requirements Develop the analytical framework for each of the design components from their theoretical basis and using typical mine site applications illustrate how site specific design guidelines are developed together with their practical implementation Summarise the key road safety and geometric design considerations specific to mining haul roads Specify the mechanistic structural design approach unique to ultra heavy wheel loading associated with OTR mine trucks Describe the selection application and management of the road wearing course material together with its rehabilitation including the use of palliatives Develop road and operating cost models for estimating total road user costs based on road rolling resistance measurement and modelling techniques Illustrate the approach of costing a mining road construction project based on the design methodologies previously introduced List and describe future trends in mine haulage system development how mining haul road design will evolve to meet these new system challenges and how the increasing availability of data is used to manage road performance and ultimately provide 24x7 trafficability Mining Haul Roads Theory and Practice is a complete practical reference for mining operations contractors and mine planners alike as well as civil engineering practitioners and

consulting engineers It will also be invaluable in other fields of transportation infrastructure provision and for those seeking to learn and apply the state of the art in mining haul roads This book is the most definitive treatise on mining haul roads ever written There has never been a text that addresses the many facets of mining haul roads on such a scope From the Foreword by Jim Humphrey Professional Engineer Autonomous haulage systems developer and Distinguished Member of the Society of Mining Metallurgy and Exploration

**Guidelines for Mine Haul Road Design** Dwayne David Tannant, Bruce Regensburg, 2001 *Proceedings, 1983 Symposium on Surface Mining--Hydrology, Sedimentology and Reclamation, November 28-December 2, 1983* Donald Hubert Graves, 1983

**Design of Surface Mine Haulage Roads** Walter W. Kaufman, James C. Ault, 1977 This Bureau of Mines manual for design of surface mine haulage roads covers such aspects of haulage road design as road alignment both vertical and horizontal construction materials cross slope and drainage provisions Traffic control and design of proper lane widths to promote safe vehicle movement are included as are suggested criteria for road and vehicle maintenance and for runaway vehicle safety provisions The aim of this publication is to provide those involved with surface mine haulage road design with a complete manual of recommended practices that if implemented will promote safer more efficient haulage routes

User's Manual for Premining Planning of Eastern Surface Coal Mining: SURFACE MINE ENGINEERING: Exploration ,1980 **Proceedings** ,1983 *Manual of geometric design standards for Canadian roads and streets* Canadian Good Roads Association, 1963 Public Works ,1960 **Energy Research Abstracts** ,1977 Semiannual with semiannual and annual indexes References to all scientific and technical literature coming from DOE its laboratories energy centers and contractors Includes all works deriving from DOE other related government sponsored information and foreign nonnuclear information Arranged under 39 categories e g Biomedical sciences basic studies Biomedical sciences applied studies Health and safety and Fusion energy Entry gives bibliographical information and abstract Corporate author subject report number indexes

*A Treatise on Mine-surveying* Bennett Hooper Brough, 1916

**Journal of the South African Institute of Mining and Metallurgy** South African Institute of Mining and Metallurgy, 2000

**Development of Warrants for the Use and Location of Truck Escape Ramps. Volume II - Appendices** Ronald W. Eck, 1980 **Surface Mining 1996** Helena Wilhelmina Glen, 1996 **Government Reports Announcements & Index** ,1990 *Transportation Research Record* ,1999

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The book is crafted in an easy-to-understand language and is complemented by engaging illustrations. It is highly recommended for anyone seeking to gain a comprehensive understanding of Mine Road Design Manual.

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