

OVERVIEW OF LIFE SUPPORT ESCAPE BREATHING APPARATUS TECHNOLOGY

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ABSTRACT

This paper provides an overview of life support technology available today that is designed to meet the requirements of emergency escape following a mine disaster. The basic kinds of escape breathing apparatus are described, and U.S. and foreign experience with this technology is examined.

INTRODUCTION

When a mine disaster occurs, the basic survival technique for a miner is to escape from the mine. Following a mine fire or explosion, the atmosphere inside a mine may become oxygen deficient or filled with toxic gases. Under these circumstances, escape is impossible unless a miner is equipped with a self-contained breathing apparatus.

The purpose of this paper is to review the respirator technology available today to meet the requirements of emergency escape following a mine disaster.

This paper is organized into three sections. The first section defines the self-contained self-rescuer (SCSR). The next section describes the basic kinds of SCSR technology. Both U.S. and foreign experience with SCSR technology are examined in the third section.

DEFINITION OF SCSR

Federal regulations (30 CFR 75.1714) require that every person who goes into an underground coal mine in the United States be supplied with an SCSR. An SCSR is an emergency breathing apparatus designed for the purpose of mine escape. It must be capable of providing at least a 60-min supply of oxygen (O₂). Only SCSR's approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) meet the provisions of these regulations.

Other nations, including the Federal Republic of Germany and the U.S.S.R., have developed self-contained breathing apparatus designed for mine escape. Although some of these apparatus are not approved for use in the United States because they do not satisfy performance or duration requirements contained in Federal regulations for testing and certification of respirators (30 CFR 11), all of these devices will be referred to as SCSR's.