Effects of Welding on Health I
Effects of Welding on Health

A literature survey and evaluation to establish the state-of-the-art and to point the directions for future research to understand and improve the occupational health of welding personnel

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Prepared for:
SAFETY AND HEALTH COMMITTEE
AMERICAN WELDING SOCIETY
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Preface

This literature review has been prepared for the Safety and Health Committee of the American Welding Society to provide an assessment of current knowledge of the effects of welding on health, as well as to aid in the formulation of a research program in this area, as part of an ongoing program sponsored by the Committee. Previous work has included studies of fumes and gases, radiation, and noise generated during various forms of arc welding. Conclusions based on this review and recommendations for further research are presented in the introductory portions of the report. Appendix A of this report reviews AWS sponsored studies and others in order to clarify the occupational exposures that are summarized in Chapter 1. Chapters 2 and 3 contain information related to the effects of exposure to byproducts of welding operations on humans and on laboratory animals. Chapter 4 covers studies of the mutagenicity of welding fume condensate.
Introduction

According to census figures (Ref. 1), there were an estimated 572,000 welders and cutters in 1970. Sosnin (Ref. 2) has estimated that today there are close to one million individuals whose occupation requires a substantial amount of welding; this latter estimate includes pipe-fitters and mechanics who view welding only as one of the tools of their trade. Therefore, the health and safety of this large occupational group is an important concern.

Welders are not a homogeneous group. They work under a variety of conditions: outdoors, indoors in open as well as confined spaces, underwater, and above ground on construction sites. They also utilize a large number of welding and cutting processes. However, many of these have in common the production of fumes, gases, radiation, and other potentially harmful agents. The review that follows attempts to assess the effects of these agents on the health of welders.

The discussion concentrates on health effects due directly to the welding process. It does not attempt to treat safety problems, nor does it cover in any detail the accompanying hazards that, although often found in the welding environment, are not created directly by the welding process.

Occupational health depends upon the conditions and exposures received in the workers' environment. In Chapter 1 of this report, the physical and chemical agents to which welders may be exposed and the conditions of their generation are summarized; details are provided in Appendix A. In Chapter 2, the effects of this exposure on welders and others in the environment are reviewed. Since welders are exposed to a number of factors simultaneously, the chapter is subdivided by organ system, not by agent. Effects on the respiratory system, skin, eyes, and internal organs are considered. Chapter 3 presents the results of studies in experimental animals; the review concludes with a discussion of special studies of the mutagenicity of welding fumes.