APPLICATIONS MANUAL
FOR THE REVISED NIOSH LIFTING EQUATION

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FOREWORD

This Manual was developed to provide users of the revised NIOSH lifting equation (1991 version) with methods for accurately applying the lifting equation to a variety of lifting tasks. All necessary terms, definitions, and data requirements for the revised equation are provided in Section 1. Procedures for analyzing single-task and multi-task lifting jobs are described in Section 2. A series of ten lifting tasks is included in Section 3 to illustrate application of the procedure. For each task, a brief **job description** is provided, followed by a **job analysis**, and a **hazard assessment**, including a completed worksheet. Suggestions for redesign of the task are also provided.

The rationale and supporting criteria for the development of the revised NIOSH lifting equation are described in a journal article, *Revised NIOSH Equation for the Design and Evaluation of Manual Lifting Tasks*, by T. Waters, V. Putz-Anderson, A. Garg, and L. Fine, *Ergonomics* 1993. [See Appendix I]. The revised equation reflects research findings published subsequent to the publication of the original NIOSH equation (1981) and includes consideration of additional components of lifting tasks such as asymmetrical lifting and quality of hand-container couplings as well as a larger range of work durations and lifting frequencies than did the 1981 equation. It must be noted that application of this equation is limited to those conditions for which it was designed. It does not, for example, address such task factors as one-handed lifting, lifting extremely hot or cold objects, or factors that may increase the risk of a slip or fall and other non-lifting components of job tasks. A complete list of work conditions which are ***not*** covered by the 1991 equation is presented in Section 1.2 on page 9 of this Manual. Finally, it should be recognized that all methods require validation. Appropriate studies for the validation of this equation must be conducted to determine how effective these procedures are in reducing the morbidity associated with manual materials handling.

The equation was designed to assist in the identification of ergonomic solutions for reducing the physical stresses associated with manual lifting. It is our hope that this Manual (1) will assist occupational safety and health practioners in evaluating lifting tasks and reducing the incidence of low back injuries in workers, and (2) also serve to stimulate further research and debate on the prevention of low back pain, one of the most costly occupational health problems facing our nation.

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