

**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 practitioners 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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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
LIST of FIGURES	viii
LIST of TABLES	ix
INTRODUCTION	1
1. THE REVISED LIFTING EQUATION	4
1.1 Definition of Terms	4
1.1.1 Recommended Weight Limit (RWL) ...	4
1.1.2. Lifting Index (LI)	4
1.1.2. Terminology and Data Definitions ...	5
1.2. Lifting Task Limitations	9
1.3. The Equation and Its Function	12
1.3.1. Horizontal Component	14
1.3.2. Vertical Component	17
1.3.3. Distance Component	18
1.3.4. Asymmetry Component	19
1.3.5. Frequency Component	22
1.3.6. Coupling Component	28
1.4. The Lifting Index (LI)	33
1.4.1. Using the RWL and LI to Guide Ergonomic Design	33
1.4.2. Rationale and Limitations for LI	34
1.4.3. Job-Related Intervention Strategy	34
2. PROCEDURES FOR ANALYZING LIFTING JOBS	36
2.1. Options	36
2.1.1. Rationale for Determining Significant Control	36
2.1.2. Rationale for Multi-task Analysis Procedure	37
2.2. Collect Data (Step 1)	40
2.3. Single-Task Assessment (Step 2)	43
2.4. Multi-Task Procedure	43

2.4.1. Compute the FIRWL for Each Task . . .	44
2.4.2. Compute the STRWL for Each Task . . .	44
2.4.3. Compute the FILI for Each Task	44
2.4.4. Compute the STLI for Each Task	45
2.4.5. Compute the CLI for the Job	45
3. EXAMPLE PROBLEMS	48
3.1. How to Use the Example Problems	48
3.2. Jobs Performed a Few Times Per Shift	53
3.2.1. Loading Punch Press Stock, Example 1	53
3.2.2. Loading Supply Rolls, Example 2	59
3.2.3. Loading Bags Into A Hopper, Example 3	65
3.3. Single Task, Performed Repetitively	69
3.3.1. Package Inspection, Example 4	69
3.3.2. Dish-Washing Machine Unloading, Example 5	73
3.3.3. Product Packaging I, Example 6	79
3.4. Repetitive Multi-Task, Short-Duration	84
3.4.1. Depalletizing Operation, Example 7 . . .	84
3.4.2. Handling Cans of Liquid, Example 8 . .	91
3.5. Repetitive Multi-Task, Long-Duration (> 2 hrs)	99
3.5.1. Product Packaging II, Example 9	99
3.5.2. Warehouse Order Filling, Example 10	105
GLOSSARY	113
REFERENCES	118
APPENDIX I	121

LIST of FIGURES

Figure 1	Graphic Representation of Hand Location	7
Figure 2	Graphic Representation of Asymmetry Angle (A)	8
Figure 3	Single Task Job Analysis Worksheet	41
Figure 4	Multi-Task Job Analysis Worksheet	42
Figure 5	Loading Punch Press Stock, Example 1	54
Figure 6	Job Analysis Worksheet, Example 1	56
Figure 7	Modified Job Analysis Worksheet, Example 1 . .	58
Figure 8	Loading Supply Rolls, Example 2	60
Figure 9	Job Analysis Worksheet, Example 2	61
Figure 10	Modified Job Analysis Worksheet, Example 2 . . .	64
Figure 11	Loading Bags Into Hopper, Example 3	66
Figure 12	Job Analysis Worksheet, Example 3	68
Figure 13	Package Inspection, Example 4	70
Figure 14	Job Analysis Worksheet, Example 4	71
Figure 15	Dish-Washing Machine Unloading, Example 5 . .	74
Figure 16	Job Analysis Worksheet, Example 5	75
Figure 17	Modified Job Analysis Worksheet, Example 5 . .	78
Figure 18	Packaging I, Example 6	80
Figure 19	Job Analysis Worksheet, Example 6	81
Figure 20	Modified Job Analysis Worksheet, Example 6 . . .	83
Figure 21	Depalletizing Operation, Example 7	85
Figure 22	Job Analysis Worksheet, Example 7	87
Figure 23	Handling Cans of Liquid, Example 8	92
Figure 24	Job Analysis Worksheet, Example 8	96
Figure 25	Product Packaging II, Example 9	100
Figure 26	Job Analysis Worksheet, Example 9	101
Figure 27	Warehouse Order Filling, Example 10	106
Figure 28	Job Analysis Worksheet, Example 10	108

LIST of TABLES

Table 1	Horizontal Multiplier	16
Table 2	Vertical Multiplier	18
Table 3	Distance Multiplier	20
Table 4	Asymmetric Multiplier	22
Table 5	Frequency Multiplier Table (FM)	26
Table 6	Hand-to-Container Coupling Classification	29
Table 7	Coupling Multiplier	31
Table 1	Horizontal Multiplier Table (HM)	51
Table 2	Vertical Multiplier Table (VM)	51
Table 3	Distance Multiplier Table (DM)	51
Table 4	Asymmetric Multiplier Table (AM)	51
Table 5	Frequency Multiplier Table (FM)	51
Table 7	Coupling Multiplier Table (CM)	51
Table 8	General Design/Redesign Suggestions	52

