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ANSI Technical Report for Machine Tools –

Ergonomic Guidelines for Design, Installation, and Use

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Secretariat and Standards Developing Organization:

AMT-The Association For Manufacturing Technology
Technology Department
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Foreword

The ANSI B11 Accredited Standards Committee (ASC) for Machine Tool Safety formed a subcommittee consisting of professionals that are involved in manufacturing, safety, design and ergonomics to revise the 1993 technical report giving guidelines for the application of ergonomic principles to machine tools during the design, installation and use phases. The revised guideline is a significant change from the 1993 guideline. This guideline is intended to be a hands-on design reference to help reduce or eliminate work-related factors associated with musculoskeletal disorders (MSDs) and injuries associated with human error.

This guideline offers an ergonomic risk assessment flow chart and risk reduction hierarchy referencing ANSI B11.TR3. This guideline is not intended to provide specific decisions as to risk acceptability nor replace existing ergonomic risk assessment tools now used within existing ergonomic programs. The guideline does offer ergonomic design references for strength, forceful exertions, posture, control and display selection and design, environmental exposures such as temperature, vibration, noise and illumination. Three sample checklists are offered in Annex G to assist with prioritizing risk factors for continuous improvements during design, installation and use.

In addition, Lifting, Lowering, Pushing, Pulling and Carrying Tables are provided in Annex C. The data in these tables were developed by Liberty Mutual and have been in use since 1978 (Snook 1978; Snook and Ciriello 1991). The Liberty Mutual Tables in Annex C differ from all previously published versions of the "Snook" Tables; e.g., population percentage is provided rather than maximum acceptable weights and forces. These tables are easy to use and flexible but ergonomic training as discussed in clause 9 is recommended before utilizing them.

Metric units

While the body of this Technical Report conforms to the B11 ASC Metric Policy ('soft' metric units, followed by parenthetical 'hard' english units), space precludes conformance to this policy in some portions, e.g., many of the Annex tables.

Publication of this ANSI Technical Report has been approved by the Accredited Standards Developer – AMT- The Association For Manufacturing Technology. This document is registered as a Technical Report in the ANSI B11 series of publications according to the *Procedures for the Registration of ANSI Technical Reports*. This document is not an American National Standard and the material contained herein is informative, not normative in nature.

Suggestions for improvement of this technical report are welcomed. They should be sent to AMT, 7901 Westpark Dr., McLean, VA 22102-4206, Attention: Safety Director.

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Ergonomic Guidelines for the Design, Installation and Use of Machine Tools

1 Scope and Purpose

This document provides ergonomic design guidelines intended to improve quality, performance and safety by reducing fatigue and injury associated with manufacturing systems, including individual and integrated machine tools and auxiliary components. It is intended to be a resource that can be applied to:

a) Design or major modification, installation and use of machine tools and their auxiliary components;
b) Design of a manufacturing system supporting machine tools and auxiliary components;
c) Improve safety, quality and productivity, and reduce errors associated with a manufacturing system.

Integrating ergonomic concepts early in the design process should maximize the impact and cost effectiveness of ergonomic interventions during the design process. The goal of this document is to provide guidance on the practical application of ergonomic principles in order to avoid work-related injuries and musculoskeletal disorders (MSDs), increase productivity, and improve product quality.

This document is directed towards technicians, engineers, designers, and safety and health practitioners who deal with general ergonomic issues related to machine tools. It is not intended to replace in-depth analysis by qualified and experienced ergonomists.

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