

Safety of woodworking machines — One side moulding machines with rotating tool —

Part 3: Numerical control (NC) boring machines and routing machines

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National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 53 and a back cover.

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**Safety of woodworking machines - One side moulding machines
with rotating tool - Part 3: Numerical control (NC) boring
machines and routing machines**

Sécurité des machines pour le travail du bois - Machines à
fraisier sur une face à outil rotatif - Partie 3: Perceuses et
défonceuses à commande numérique

Sicherheit von Holzbearbeitungsmaschinen -
Fräsmaschinen für einseitige Bearbeitung mit drehendem
Werkzeug - Teil 3: NC-Bohr- und Fräsmaschinen

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 142 "Woodworking machines - Safety", the Secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Organisations contributing to the preparation of the European Standard include the European Manufacturers Association "EUMABOIS".

Normative and informative annexes to this standard are listed in the contents list.

The European Standards produced by CEN/TC 142 are particular to woodworking machines and complement the relevant A and B Standards on the subject of general safety (see introduction of EN 292-1:1991 for a description of A, B and C standards).

Introduction

This standard has been prepared to be a harmonized standard to provide one means of conforming to the essential safety requirements of the Machinery Directive and associated EFTA Regulations.

This European Standard is a type C standard as defined in EN 292-1:1991.

The extent to which hazards are covered is indicated in the scope of this standard.

The requirements of this standard concern designers, manufacturers, suppliers and importers of NC boring machines and routing machines.

This standard also includes information to be provided by the manufacturer to the user.

Common requirements for tooling are given in EN 847-1:1997.

1 Scope

This European Standard sets out the requirements and/or measures to remove the hazards and limit the risk on NC boring machines and NC routing machines (as defined in 3.1) herein after referred to as "machines" designed to cut solid wood, chip board, fibreboard, plywood and also these materials where these are covered with plastic laminate or edgings.

This European Standard covers all the hazards relevant to this machine which are listed in clause 4. This European Standard does not cover the hazards related to Electromagnetic compatibility (EMC) as stated in the EMC directive 89/336 EEC dated 03.05.89.

This European Standard does not apply to NC, boring and routing machines with edge banding facilities.

This standard is primarily directed to machines which are manufactured after the date of issue of this standard.

2 Normative references

This European Standard incorporates by dated or undated references provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1	1991	<i>Safety of machinery - Basic concepts - General principles for design - Part 1: Basic terminology, methodology</i>
EN 292-2	1991	<i>Safety of machinery - Basic concepts - General principles for design - Part 2:</i>
EN 292-2/A1	1995	<i>Technical principles and specifications</i>
EN 294	1992	<i>Safety of machines - Safety distances to prevent danger zones being reached by the upper limbs</i>
EN 349	1993	<i>Safety of machines - Minimum distances to avoid crushing of parts of the human body</i>
EN 418	1992	<i>Safety of machines - Emergency stop equipment - Functional aspects - Principles for design</i>
EN 614-1	1995	<i>Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles</i>
EN 847-1	1997	<i>Tools for woodworking - Safety requirements - Part 1: Milling tools and circular saw blades</i>
prEN 847-2		<i>Tools for woodworking - Safety requirements - Part 2: Requirements for the shank of shank mounted milling tools</i>
EN 894-1	1997	<i>Safety of machinery - Ergonomics requirements for the design of display and control actuators - Part 1: General principles for human interactions with displays and control actuators</i>
EN 894-2	1997	<i>Safety of machinery - Ergonomics requirements for the design of display and control actuators - Part 2: Displays</i>
prEN 894-3		<i>Safety of machinery - Ergonomics requirements for the design of display and control actuators - Part 3: Control actuators</i>
EN 953	1997	<i>Safety of machinery - General requirements for the design and construction of guards (fixed, movable)</i>

EN 954-1	1996	<i>Safety of machinery - Safety related parts of control systems - Part 1: General principles for design</i>
EN 982	1996	<i>Safety requirements for fluid power systems and components - Hydraulics</i>
EN 983	1996	<i>Safety requirements for fluid power systems and components - Pneumatics</i>
prEN 1005-1		<i>Safety of machinery - Human physical performance - Part 1: Terms and definitions</i>
prEN 1005-2		<i>Safety of machinery - Human physical performance - Part 2: Manual handling of objects associated to machinery</i>
prEN 1005-3		<i>Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation</i>
EN 1037	1995	<i>Safety of machinery - Prevention of unexpected start up</i>
EN 1050	1996	<i>Safety of machinery - Principles for risk assessments</i>
EN 1088	1995	<i>Safety of machinery - Interlocking devices with and without guard locking - General principles and specifications for design</i>
EN 1760-1	1997	<i>Safety of machinery - Pressure sensitive protective devices - Part 1: General principles for the design and testing of pressure sensing mats and pressure sensing floors</i>
prEN 1760-3		<i>Safety of machinery - Pressure sensitive protective devices - Part 3: General principles for the design and testing of pressure sensing bumpers</i>
prEN 1837		<i>Safety of machinery - Integral lighting of machines</i>
EN 60204-1	1992	<i>Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 204-1:1992, modified)</i>
EN 60529	1991	<i>Degree of protection provided by enclosures (IP code) (IEC 529:1989)</i>
EN 60825-1	1994	<i>Safety of laser products - Part 1: Equipment classification requirements and user's guide (IEC 825-1:1993)</i>
EN 60947-4-1	1992	<i>Low voltage switch gear and control gear - Part 4: Contactors and motor starters - Section 1: Electromechanical contactors and motor starters (IEC 947-4-1:1990)</i>
EN 60947-5-1	1991	<i>Low voltage switch gear and control gear - Part 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices (IEC 947-5-1: 1990)</i>
EN 61496-1	1997	<i>Safety of machinery - Electrosensitive protective equipment - Part 1: General requirements and test (IEC 496-1:1997)</i>
EN ISO 3743-1	1995	<i>Acoustics - Determination of sound power levels of noise sources - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for hard wall test rooms (ISO 3743-1:1994)</i>
EN ISO 3743-2	1996	<i>Acoustics - Determination of sound power levels of noise sources - Engineering methods for small movable sources in reverberant fields - Part 2: Method for special reverberation test rooms (ISO 3743-2:1994)</i>

EN ISO 3744	1995	<i>Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)</i>
EN ISO 3746	1995	<i>Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:1995)</i>
EN ISO 4871	1997	<i>Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)</i>
EN ISO 9614-1	1995	<i>Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points (ISO 9614-1:1993)</i>
EN ISO 11201	1995	<i>Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)</i>
EN ISO 11202	1995	<i>Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Survey method (in situ) (ISO 11202:1995)</i>
EN ISO 11204	1995	<i>Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at the work station and at other specified positions - Method requiring environmental corrections (ISO 11204:1995)</i>
ISO 3745	1977	<i>Acoustics - Determination of sound power levels of noise sources - Precision methods for anechoic and semi-anechoic rooms</i>
ISO 7984	1988	<i>Woodworking machines - Technical classification of wood working machines and auxiliary machines for woodworking</i>
ISO/TR 11688-1	1995	<i>Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planing</i>
HD 21.1 S3	1997	<i>Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements</i>
HD 22.2 S3	1997	<i>Rubber insulated cables of rated voltages up to and including 450/750 V - Part 2: General requirements</i>

3 Definitions

In addition to the definitions given in EN 292-1:1991, EN 292-2:1991 and EN 418:1992 for the purpose of this standard the following definitions apply:

3.1 numerically controlled (NC) boring and routing machines

Integrated fed machines designed for the machining of workpieces by the use of milling and/or boring tools. These machines have at least two square axes programmable by the user (e.g. X, Y) for positioning and/or machining. The axes operate in accordance with a NC work programme.

The machine may have:

- additional units for sawing sanding, etc.;
- fixed or movable workpiece support;
- mechanical, pneumatic, hydraulic or vacuum workpiece clamping;
- automatic tool change facilities.

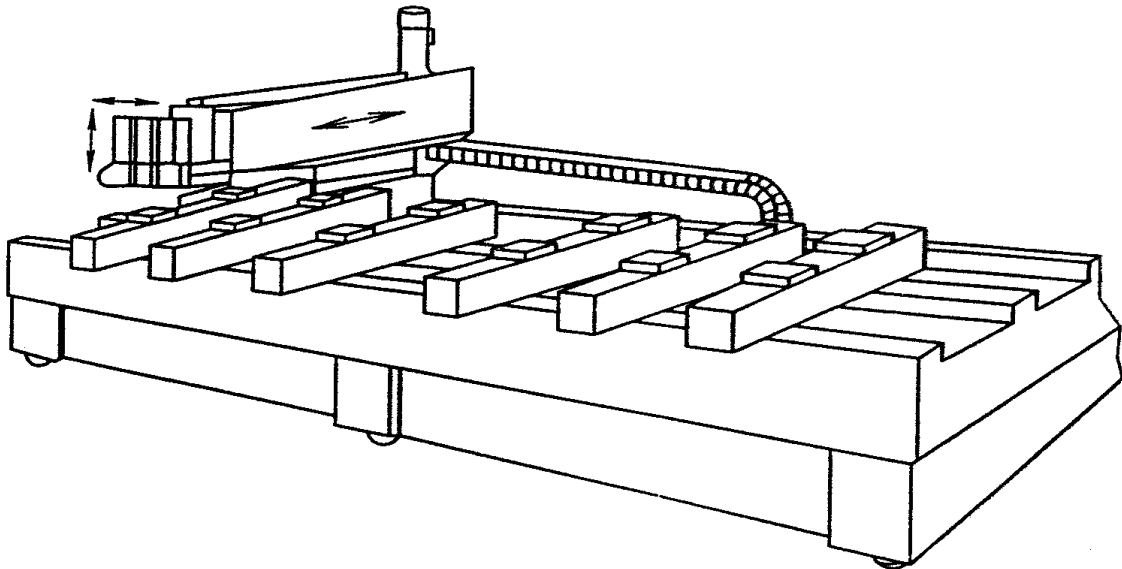


Figure 1: "C" frame machine (fixed table, moveable head)¹⁾

¹⁾ Safeguarding devices are not illustrated

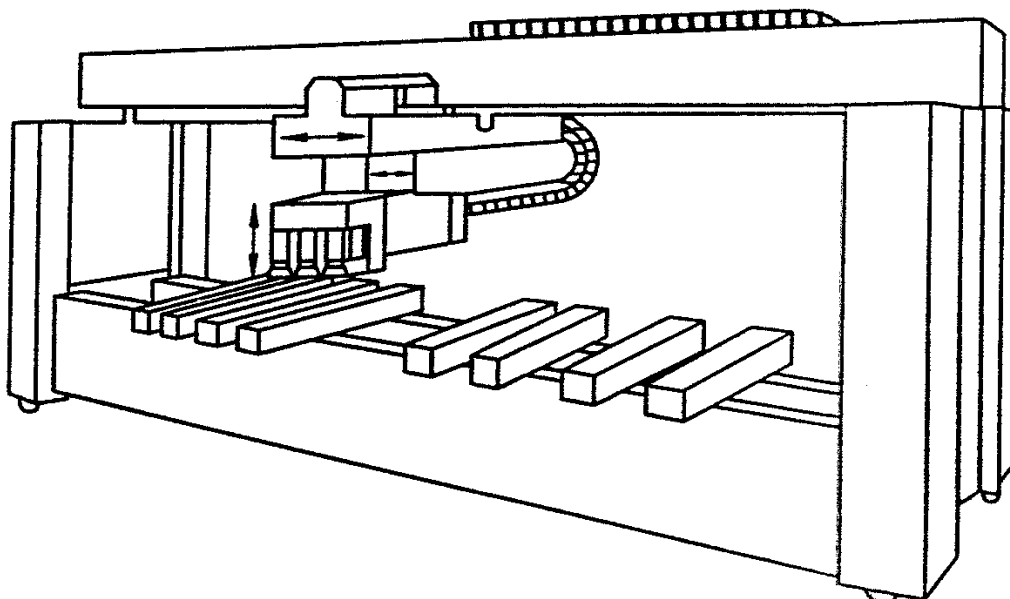


Figure 2: Portal frame machine¹⁾

¹⁾ Safeguarding devices are not illustrated

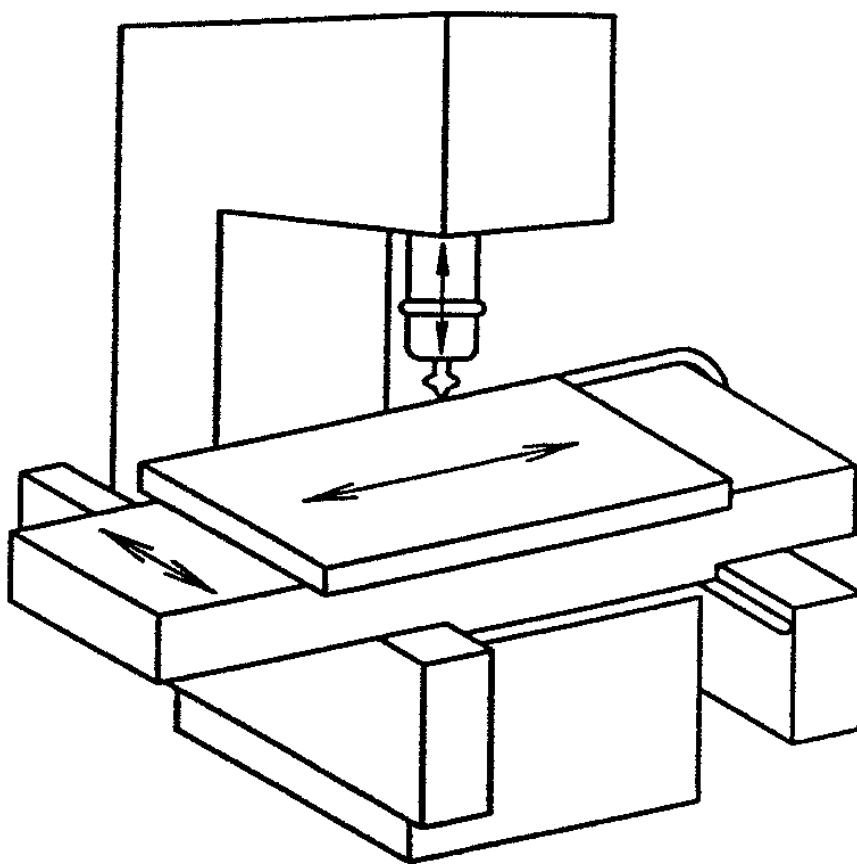


Figure 3: Overhead router (moving table)¹⁾

¹⁾ Safeguarding devices are not illustrated

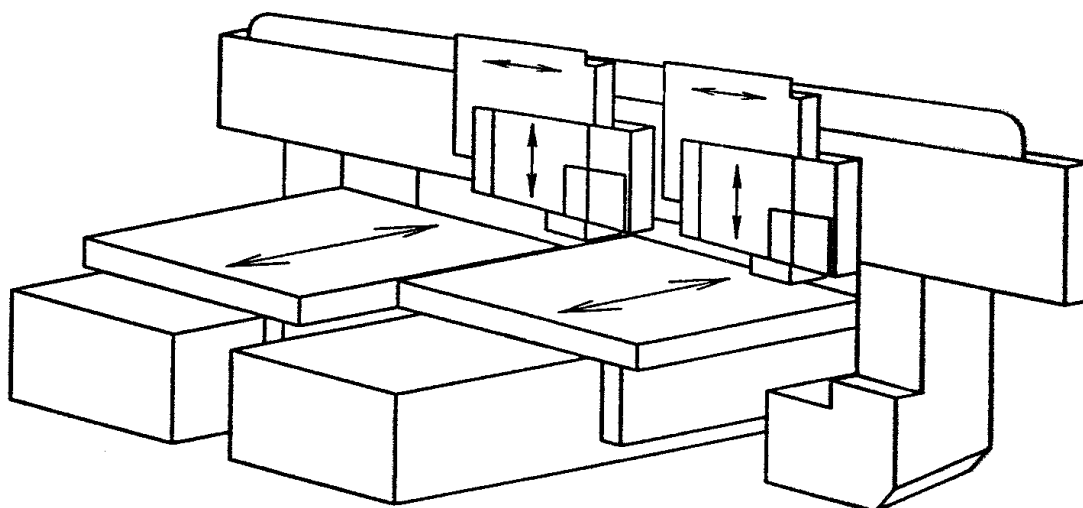


Figure 4: Overhead router (moving tables, fixed portal, moving heads)¹⁾

¹⁾ Safeguarding devices are not illustrated

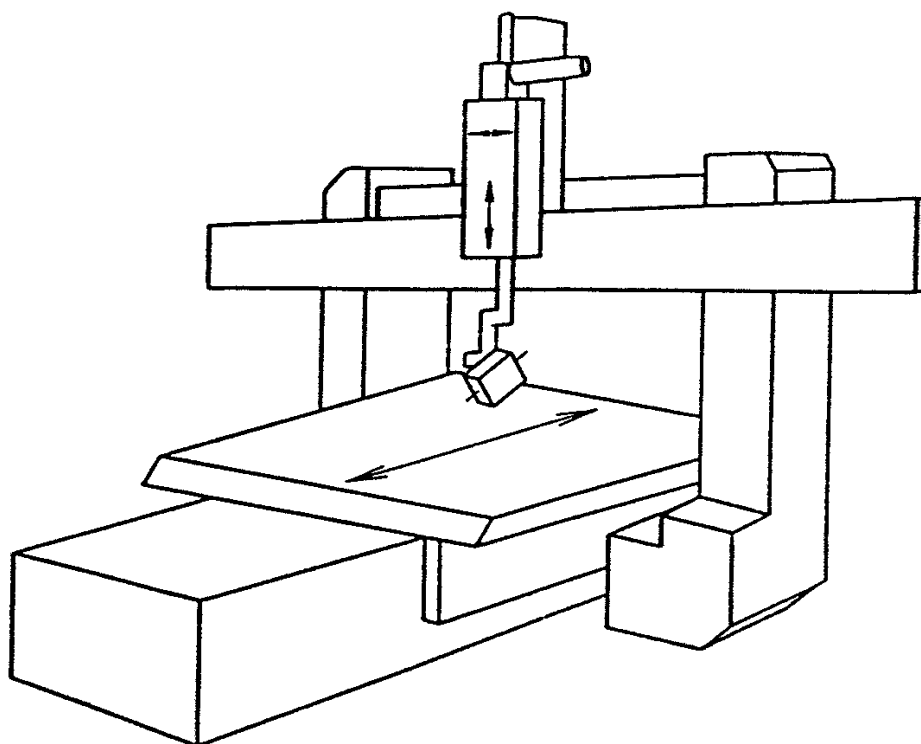


Figure 5: Machining centre (moving table, fixed portal, moving head)¹⁾

¹⁾ Safeguarding devices are not illustrated

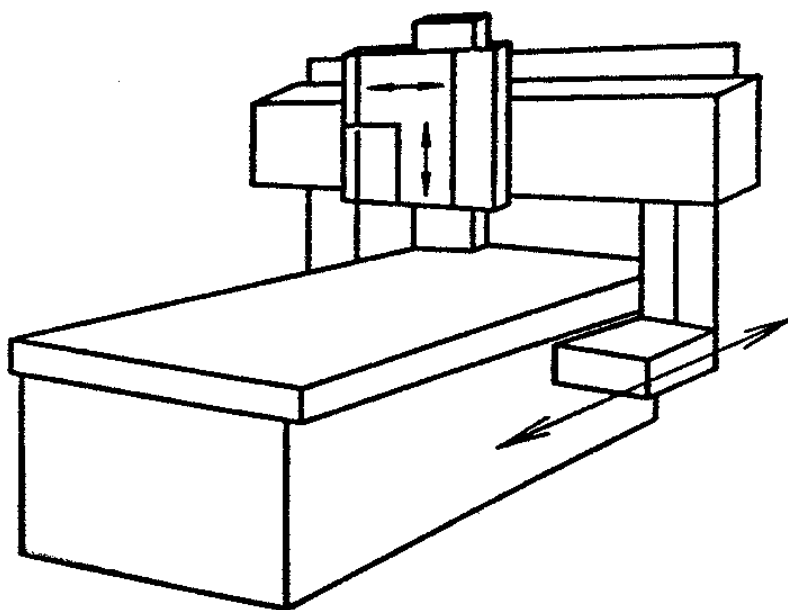


Figure 6: Overhead router (fixed table, moving portal, moving head)¹⁾

¹⁾ Safeguarding devices are not illustrated

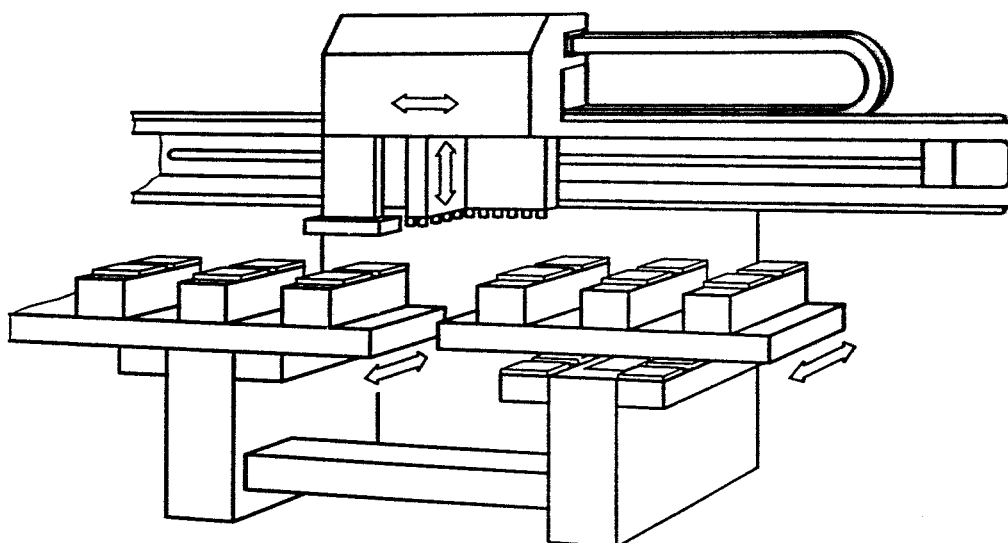


Figure 7: "C" frame boring machine (moving table, fixed portal, moving heads)¹⁾

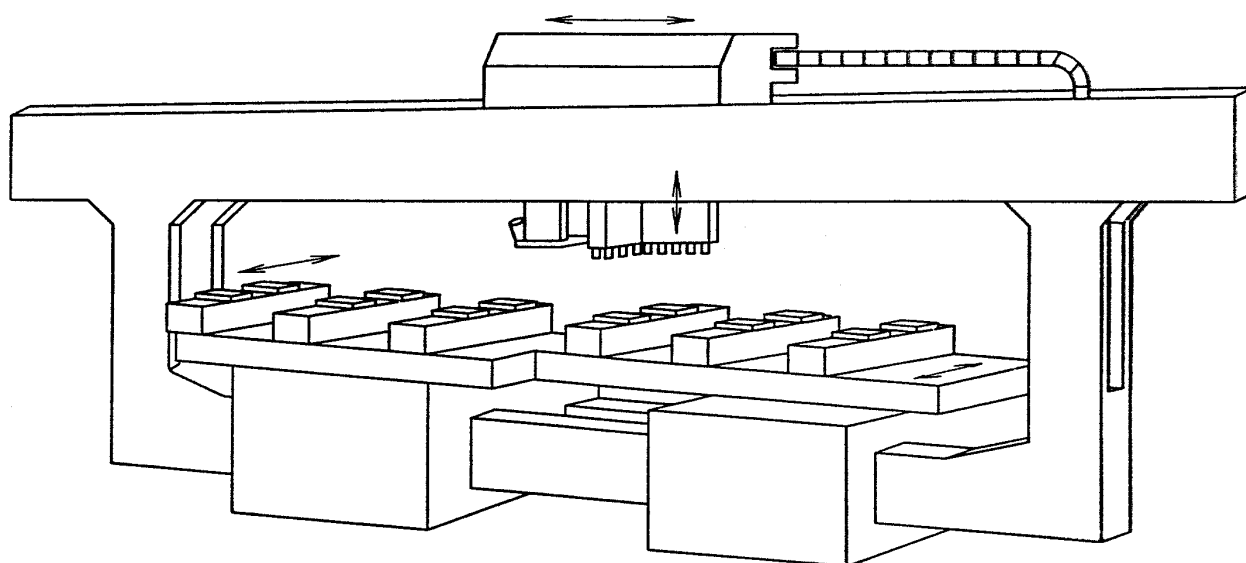


Figure 8: Portal frame boring machine (moving tables, fixed portal, moving heads)¹⁾

¹⁾ Safeguarding devices are not illustrated

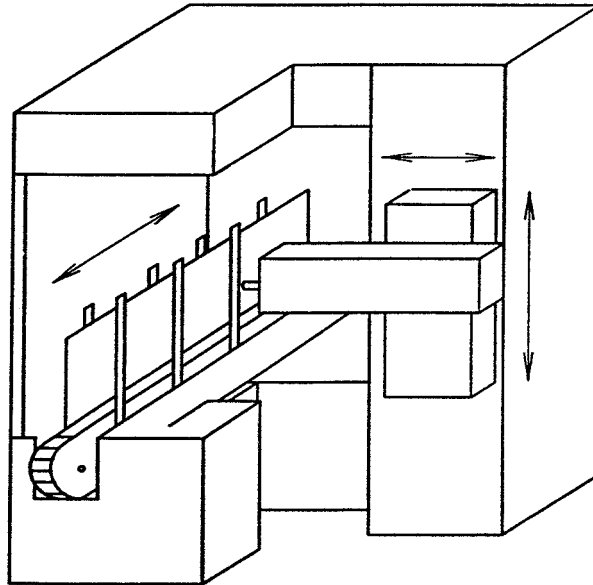


Figure 9: Vertical machine (moving support, fixed frame, moving heads)¹⁾

3.2 speed range

Rotational speed within which the tool spindle or tool is designed to operate.

3.3 ejection

Unexpected movement of the workpiece or parts of it or part of the tool from the machine during processing.

3.4 machine actuator

Power mechanism used to effect motion of the machine.

3.5 machining mode of operation

The automatic, programmed, sequential operation of the machine with the facility for manual or automatic loading/unloading of workpieces.

3.6 machine setting mode of operation

The setting, programming, fault finding, program verification, testing and manually controlled (under power) non-sequential operation of the machine.

3.7 confirmation

Statement, or other document where a manufacturer (supplier) declares either the compliance of the characteristics of a material or a product to a relevant standard or regulation.

3.8 numerical control (NC) computerized numerical control (CNC)

Automatic control of a process by a device that makes use of numerical data introduced while the process is in progress.

3.9 complete enclosure

Combination of fixed and moveable guards which when closed completely encloses the machine preventing access to it as well as stopping parts (e.g. dust and chips) from breaking through it.

3.10 partial enclosure

Combination of fixed and moveable guards which when closed encloses the defined machine danger area. It may or may not have apertures or a ceiling.

3.11 integrated feed

A feed mechanism for the workpiece support or tool which is integrated with the machine and where the workpiece support or machine element with incorporated tool are held and controlled mechanically during the machining operation.

3.12 operational stop

Control through which the machine can be brought to stop but where the energy supply to the machine actuators need not be cut off (e.g. cycle stop) when the machine or the dangerous parts of it, are stopped.

3.13 bumper

Safety device (see 3.23.5 of EN 292-1:1991) comprising:

- a) sensor(s) which generate(s) a signal when pressure is applied to part of its outer surface, where:
 - the cross section throughout the pressure sensitive area may be regular or irregular;
 - the sensor is intended to detect the hand, arm, head or body standing or lying on the protected area;
- b) a control unit, which responds to the signal from the sensor and generates output signal(s) to the control system of the machine.

4 List of hazards

This standard deals with all hazards listed and relevant to the machines defined in the scope:

- for significant hazards by defining safety requirements and/or measures or by reference to relevant type B standards;
- for hazards that are not significant e.g. general, minor or secondary hazards by reference to relevant type A standards especially to EN 292-1:1991 and EN 292-2:1991.

These hazards are listed in table 1 in accordance with annex A of EN 292-2:1991/A1:1995.