TECHNICAL
REPORT

**ISO/TR
14121-2**

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Safety of machinery — Risk assessment —

Part 2:
Practical guidance and examples of methods

Sécurité des machines — Appréciation du risque —

Partie 2: Lignes directrices pratiques et exemples de méthodes

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 14121-2 was prepared by Technical Committee ISO/TC 199, *Safety of machinery*.

ISO 14121 consists of the following parts, under the general title *Safety of machinery — Risk assessment*:

- *Part 1: Principles*

- *Part 2: Practical guidance and examples of methods* [Technical Report]

Introduction

This part of ISO 14121 has resulted from the effort to update ISO 14121 in order that it be consistent with ISO 12100-1:2003 and ISO 12100-2:2003.

The purpose of risk assessment is to identify hazards, and to estimate and evaluate risk so that it can be reduced. There are many methods and tools available for this purpose and several are described in this document. The method or tool chosen will largely be a matter of industry, company or personal preference. The choice of a specific method or tool is less important than the process itself. The benefits of risk assessment come from the discipline of the process rather than the precision of the results: as long as a systematic approach is taken to get from hazard identification to risk reduction, all the elements of risk are considered.

Adding protective measures to a design can increase costs and restrict the facility of use of the machine if added after a design has been finalized or the machinery itself has already been built. Changes to machinery are generally less expensive and more effective at the design stage, so it is advantageous to perform risk assessment during machinery design.

The risk assessment is performed once again when the design is finalized, when a prototype exists and after the machinery has been in use for a while.

Apart from at the design stage, during construction and during commissioning, risk assessment can also be performed during revision or modification of machinery or at any other time for the purpose of assessing existing machinery, e.g. in the case of mishaps or malfunctions.

The effectiveness of implemented protective measures will need to be verified before the carrying out of further iterations.

Safety of machinery — Risk assessment —

Part 2:
Practical guidance and examples of methods

1 Scope

This part of ISO 14121 gives practical guidance on the conducting of risk assessments for machinery in accordance with ISO 14121-1 and describes various methods and tools for each step in the process.

It also provides practical guidance on risk reduction (in accordance with ISO 12100) for machinery, giving additional guidance on the selection of appropriate protective measures for achieving safety.

The intended users of this part of ISO 14121 are those involved in the integration of safety into the design, installation or modification of machinery (e.g. designers, technicians, safety specialists).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14121-1:2007, *Safety of machinery — Risk assessment — Part 1: Principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14121-1 and the following apply.

3.1
supplier
entity (e.g. designer, manufacturer, contractor, installer, integrator) who provides equipment or services associated with the integrated manufacturing system (IMS) or a portion of the IMS or machines

NOTE 1 The user may also act in the capacity of a supplier to himself.

NOTE 2 Adapted from ISO 11161:2007, definition 3.24.

4 Preparation for risk assessment

4.1 General

The objectives, scope and deadlines for any risk assessment should be defined at the outset.

NOTE See the Introduction for suggested uses of risk assessment.