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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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# Contents

Page

Foreword .....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Preparation for risk assessment .....	1
4.1 General .....	1
4.2 Using the team approach for risk assessment .....	2
5 Risk assessment process .....	3
5.1 General .....	3
5.2 Determination of the limits of the machinery .....	3
5.3 Hazard identification .....	4
5.4 Risk estimation .....	6
6 Risk estimation tools .....	9
6.1 General .....	9
6.2 Risk matrix .....	9
6.3 Risk graph .....	12
6.4 Numerical scoring .....	14
6.5 Hybrid tool .....	15
7 Risk evaluation .....	19
8 Risk reduction .....	19
8.1 General .....	19
8.2 Inherently safe design .....	19
8.3 Safeguarding .....	20
8.4 Complementary protective/risk reduction measures .....	21
8.5 Information for use .....	21
8.6 Standard operating procedures .....	22
9 Risk assessment iteration .....	22
10 Documentation of risk assessment .....	22
Annex A (informative) Example application of the process of risk assessment and risk reduction .....	23
Bibliography .....	38

## 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.

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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*.

This second edition cancels and replaces the first edition (ISO/TR 14121-2:2007), which has been revised as follows:

- the examples previously given in Annex A, as well as the description of quantified risk estimation, have been deleted;
- the explanations of the methods or tools, taken from Annex A, are now presented in 5.3.5 for hazard identification and 5.4.4.1 for risk estimation;
- the terminology and criteria have been revised;

Consequently, the information is given more clearly and completely, and in line with ISO 12100. (ISO 14121-1 was withdrawn after having been replaced by ISO 12100:2010.)

## Introduction

The purpose of risk assessment is to identify hazards, and to estimate and evaluate risks so that they 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 and all the elements of risk are considered.

Adding protective/risk reduction measures to a design can increase costs and can 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.

It can be useful to review the risk assessment when the design has been finalised, when a prototype exists and after experience of the use of the machinery.

Apart from the risk assessment made at the design stage, during construction and commissioning, the principles and methods presented in this document can also be applied to existing machinery during revision or modification of machinery or at any time for the purpose of assessing existing machinery, for example, in the case of mishaps or malfunctions.