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18e

Requirements concerning instruction handbooks in European machinery standards

VFA
Verein zur
Förderung
der Arbeitssicherheit
in Europa

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KAN Report 18e

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Content

Content

The Commission for Occupational Health, Safety and Standardization (KAN) was founded in 1994 to assert German interests in OH & S matters, especially with regard to European standardization. KAN is composed of representatives of the social partners, the federal state and the Laender, the Hauptverband der gewerblichen Berufsgenossenschaften (HVBG, Federation of the statutory accident insurance Institutions of the industrial sector) and the German Standards Institute (DIN). One of KAN's tasks is to focus the public interests in the field of occupational health and safety and to exert influence on current and future standardization projects by delivering opinions on specific subjects.

KAN procures studies and expert opinions in order to analyse occupational health and safety aspects in standardization and to reveal deficiencies or erroneous developments in standardization work.

This study was based on the following task in hand:

"Requirements concerning instruction handbooks in product standards in support of the EC Machinery Directive" (modified in accordance with the supplementary proposal of the BGZ, Central office for health and safety at work of the statutory accident insurance institutions)

Introduction

Instruction handbooks drawn up by the manufacturer are documents which accompany the product. The obligation both to draw up instruction handbooks specific to machinery and to take account of specified basic requirements is laid down in the EC Machinery Directive and in national regulations based on this. Harmonised standards, which supplement the fundamental requirements of the EC Machinery Directive, contain further information as to what specific contents instruction handbooks must include in order to enable the user to operate machinery safely. The employer must convert the details given in the manufacturer's instruction handbook into user instructions, possibly including further aspects from the machine's working environment. The EC Work Equipment Use Directive states that instruction handbooks must be drawn up. In this respect, it is important what details relating to this are included in the section on "information for use" in European standards.

Objective

The objective is to prepare a KAN recommendation to standards makers to assist them in drafting the subclause on instruction handbooks in the section "information for use" in product standards.

Individual tasks

1. To indicate which basic documents contain information on drawing up and structuring instruction handbooks for product standards and how these can be assessed (especially Machinery Directive Annexe I, 1.7.4; DIN EN 292–2 (1995–06) Para. 5).

2. To analyse what aspects, in terms of content, type C standards makers on the one hand and the addressee of the standard, i.e. the manufacturer when drawing up the actual directions (for use) for his product, on the other must take into account.

3. To present selected examples of both successful and inadequate subclauses on instruction handbooks in the "information for use" section of European standards and draft standards (e.g. providing inadequate information for manufacturers, dealing with aspects relating to the health and safety of workers at work, especially those that concern the company's organisational obligation or the behaviour of employees at the workplace).

4. To draw up a guidance document which, with reference to existing rules and regulations, is intended to provide practical assistance for drafting the subclause on instruction handbooks in the "information for use" section of product standards.

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On December 9, 1997 KAN adopted the following summary of the study and recommendations.

Summary of KAN Study

"Requirements concerning instruction handbooks in product standards in support of the EC Machinery Directive"

Introduction

The study is intended to assist members of European standards bodies in the field of safety of machinery in the drafting of the "information for use/instruction handbook" section in product standards.

Based on the EC Machinery Directive, the term "technical documentation" is defined and distinguished from the instruction handbook which must be supplied with the machinery. The difference between the instruction handbook to be prepared by the manufacturer and the user instruction to be drafted by the employer is explained. The relevant stipulations of the EC Machinery Directive and the supporting sections of the generic European standards for drawing up instruction handbooks are quoted verbatim and further reference documents compiled. While all the necessary information is provided as far as content is concerned, the form, structure and drafting of information for use to be provided by the manufacturer is only dealt with in national and international guides; a relevant European standard, however, does not exist. Examples which can be considered successful as

well as those which are classified as inadequate are used to ascertain which aspects should be taken into account in European machinery safety standards and which developments that have emerged in standardisation practice must be counteracted.

Deficiencies concerning the formulation of the section on instruction handbooks

Based on examples, the following deficiencies have been established in machinery standards:

1. Manufacturer obligations are shifted to the user to compensate for safety deficiencies. This happens when hazards are not eliminated by means of design modifications, but are simply identified by information directed at the user.

2. Standards often give the impression of being conclusive. However, they cannot be more than just a recommendation. Based on the stipulations of the directive and, if applicable, on additional standards, the manufacturer must check and decide whether specific supplementary instructions are necessary for his product.

3. The standardisation mandate is exceeded if not only the manufacturer, but also the user is addressed on topics concerning use or certification. The reason for this could be resolution BTS 2 79/1993 which recommends that a special "informative annexe" on the „Code of safe practice" be attached to the standard if necessary.

Recommendations to KAN

1. The resolution of the CEN/BTS 2 79/1993 should be modified. The interest which obviously exists among standards makers, namely to address the user in the actual standard with stipulations aimed at both employer and employee, is not the task of a standard. And since the manufacturer is the sole addressee of the standard, this information would not reach its target group anyway.

2. The section "information for use/instruction handbooks" may only be directed at the manufacturer. Due to the stipulations in the EC Machinery Directive, there is no provision for instructions aimed at the user which would in this respect also conflict with directives under Article 118a.

3. The section on "information for use" of a type C standard should include a note which makes it clear that the information and instructions presented in these standards cannot be conclusive and complete. For the manufacturer's instructions on safe practice must also include those aspects which are not part of the standard:

e.g. general hazards according to DIN EN 292, specific technical solutions, supplementary safety equipment.

4. Measures described in the standard and intended for the user with regard to safe practice must be based on clear specifications concerning defined residual risks in the section "instruction handbooks". Appropriate substitute measures, procedures or operating methods for minimising risks should therefore be proposed by the standards body in the section "instruction handbooks".

5. General requests concerning the provision of personal protective equipment (PPE) or the setting up of first-aid or emergency stations without referring to existing residual risks are not considered useful information. Specific information on protecting against potential dangers, e.g. with regard to using PPE, is only useful if residual risks are defined. The employer's obligation to specify in detail individually adapted PPE or to provide special equipment results from relevant directives under Article 118a and does not need to be regulated in the standard.

6. Safety equipment to be provided to protect against other dangers according to point 1.5 of Annexe I to the EC Machinery Directive, which the standard imposes on the user, is not permitted if it serves to compensate for deficiencies in design.

7. Recurring inspections are not part of the Machinery Directive's area of application and cannot therefore by regulated in machinery standards. Machinery and plant requiring inspections and monitoring are subject to Article 118a of the EC Treaty. On the other hand, machinery standards need to specify what information manufacturers must provide on maintenance and inspection work.

8. The term "information for use" as a sectional heading should be replaced by a more suitable term. This term is also a generic term for all types of directions (for use), instruction handbooks, user manuals, operating instructions and technical instructions provided by the manufacturer. This causes irritation as the contents of the section on "information for use" in standards are not identical with the instruction handbooks to be drawn up by the manufacturer.

Line of argument for comments

A line of argument based on the German Consensus Statement against machinery standards containing instructions for the user is unsuitable as these standards are prepared under the mandate of the Machinery Directive based on Article 100a of the EC Treaty. The German Consensus Statement, however, only refers to areas

covered by Article 118a. The line of argument could, for example, be as follows:

1. Neither employer nor employees are the addressees of the standard and would not even be reached by it.

2. A specification in a standard aimed directly at the employee would undermine the employer's right to issue instructions to employees.

3. If a standard intervenes in the employer's legally regulated responsibility for occupational health and safety, legal consequences could be expected if a damaging event were to occur.

KAN's recommendations

Overall evaluation

The study provides a good working basis for assisting members of European standards bodies for machine safety in the drafting of the "information for use/instruction handbook" section in product standards. The compilation of all specifications relevant to C standardisation provides a quick overview of the documents which must be taken into account. Other guides are named in addition. Recommendations for standards makers as to which aspects should be taken into account in European machine safety standards from the point of view of German occupational health and safety are derived from negative and positive examples.

KAN has decided to publish the study as a KAN Report.

Recommendations to DIN (German Standards Institute)

KAN requests DIN to exert influence on CEN for the modification of the BTS 2 resolution 79/1993 with the following recommendations:

1. It is not the task of standardisation to address the user in the actual standard with stipulations aimed at both employer and employee. And since the manufacture

is the sole addressee of the standard, this information would not reach its target group anyway.

2. The section "information for use/ instruction handbook" may only be directed at the manufacturer. According to the EC Machinery Directive, there is no provision for instructions aimed at the user (Code of safe practice), which would in this respect also conflict with directives under Article 118a.

3. Information and instructions in product standards cannot be conclusive and complete. The following formulation should therefore be included in the section on "information for use" in type C standards:

"The following points describe by way of example the structure and contents of an instruction handbook to be drawn up by the manufacturer and should be supplemented or extended to take account of the specific machinery concerned."

4. In the section on "information for use/ instruction handbook", reference to residual risks may only be made if the specific types of hazards have already been mentioned in the section on "list of significant hazards" and dealt with in the section on "safety requirements and/or measures". Measures defined by the manufacture and aimed at the user with regard to safe practice must be based on clear specifications concerning defined residual risks specific to each individual product in the section on "instruction handbook". Appropriate substitute measures, procedures or operating methods for minimising residual risks should therefore be suggested by the standards body.

General requests concerning the provision of personal protective equipment (PPE) or the setting up of first-aid or emergency stations without referring to residual risks are not considered useful information. Specific information on protecting against potential dangers, e.g. with regard to using PPE, is only useful if residual risks are defined. The employer's obligation to specify in detail individually adapted PPE or to provide special equipment is the result of relevant directives under Article 118a and does not need to be regulated in the standard.

5. Safety equipment to be provided by the user to protect against other dangers according to No. 1.5 of Annexe I to the EC Machinery Directive, which the standard imposes on the user, is not permitted if it serves to compensate for deficiencies in design.

6. Recurring inspections are not part of the Machinery Directive's area of application and cannot therefore by regulated in machinery standards. Machinery and plant requiring inspections and monitoring are subject to Article 118a of the EC Treaty.

On the other hand, machinery standards are responsible for specifying what informa-

tion manufacturers must provide on maintenance and inspection work. In this context, recommendations given by the manufacturer can be considered for testing.

Recommendations to KAN

1. When commenting on machinery standards with instruction handbook, the KAN Secretariat is instructed to adopt the line of argument presented in the study (see result-oriented summary: Line of argument for comments).

2. The KAN Secretariat is instructed to examine information for use in European machinery standards processed at CENELEC in a further KAN Study, taking account of the results of this study.

3. The KAN Secretariat is instructed where possible to apply the results of the study to European standards which refer to other EC single market directives.

4. It is necessary to clarify whether a European standard (B standard) is useful with regard to the form, structure and the drafting of information for use. The KAN Secretariat is instructed to take account of this aspect in future investigations.

1 Introduction and current situation

Instruction handbooks are documents accompanying products. The obligation to draw up instruction handbooks for specific machinery is stipulated in the EC Machinery Directive and set out in its national transposition (1).

In the harmonised European standards supporting the essential requirements stipulated in Annex I of the EC Machinery Directive there is additional information on which content needs to be included in concrete terms in instruction handbooks in order to allow users to be able to operate machinery safely. The manufacturer's information in the instruction handbooks, which is sometimes extensive, and in particular manufacturer's information which is relevant to occupational health and safety, must be related by employers in occupational user instructions, if need be including additional aspects relating to the working environment of the machinery. The obligation to draw up user instructions is set out in the EC Use of (Work) Equipment Directive and its national transposition (2) along with subordinate statutory regulations. In this respect it is important which information pertaining hereto is contained in the "information for use" section in harmonised European standards.

The question is occasionally forwarded as to why a round-about route must be taken of first directing information and recommendations in the form of standards at manufacturers of products, who then in turn have to use this data to "painstakingly" put together instruction handbooks for the users of their products. Is it not simpler and more sensible to include in the standard from the outset what users may or may not do in operating machinery properly? And why is it still necessary given these requirements to also make statements pertaining to the operation of machinery in accident prevention regulations, which should actually be identical to the instructions provided by manufacturers?

A need for action has been perceived by the *Kommission Arbeitsschutz und Normung – KAN* (Commission for OH&S and Standardization) with respect to the "information for use" section contained in harmonised standards as a result of an unpublished study entitled *Normung im Bereich der Maschinensicherheit, Umsetzung der gegliederten CEN-Normungsstruktur (Typ-A-/B-/C-Normen) in der Praxis* ("Standardization in the field of machinery safety, application of the CEN standardization structure divided into type A-, B- and C-standards"). Herein the view is forwarded that the content of the sub-section entitled "instruction handbooks" in the "information for use" section of type C standards (product standards) first of all must conform to the requirements of the EC Machinery Directive, and secondly must not contradict the GDS (*Gemeinsamer Deutscher Standpunkt*/"German Consensus Statement") (3).

2 Objective of the Study and the Mode of Procedure

To resolve this apparent conflict in objectives, a study entitled *Anforderungen an Betriebsanleitungen in Produktnormen zur EG-Maschinenrichtlinie*. ("Requirements concerning instruction handbooks in product standards in support of the EC Machinery Directive ") has been initiated with the goal of drawing up a recommendation for standards makers. This is to depict which requirements must be conformed to in designing and drawing up the "information for use/ instruction handbook" section in type C standards pertaining to machinery safety in order to avoid contradicting the GDS.

In this study it shall therefore be shown which reference documents must contain information on the drawing up and designing of instruction handbooks for product standards and how these are to be assessed. Here it shall also be analysed which aspects of the content first of all type C standards makers and secondly manufacturers in their capacity as addressees of the standards must take into account in drawing up the actual usage instructions for their products.

The whole problem will in addition be illustrated by citing examples of sections on instruction handbooks in European standards which are considered to be successful and examples of those which are considered to be inadequate.

Finally, arguments will be forwarded for a guidance document providing a practical aid in drawing up sub-sections on instruction handbooks in the "information for use" section in product standards by referring to existing regulations in this field.

3 Instruction Handbooks and User Instructions – a Necessary Distinction

The terms "instruction handbooks" and "user instructions" have not been used in a uniform manner in laws, ordinances, accident prevention and other technical regulations in the past. In the field of machinery, however, a clear borderline has been drawn in terms of importance and use by two regulations: (1) the German Machinery Regulation (transposition of the EC Machinery Directive by the 9th regulation of the German Equipment Safety Act) and (2) the German Work Equipment Usage Ordinance AMBV (transposition of the EC Work Equipment Usage Directive by this AMBV under the Occupational Health and Safety Act.)

The obligation on the part of manufacturers to draft an **instruction handbook** to accompany products emanates from Annex I of the EC Machinery Directive. The need to have employers instruct users in how to use machinery and machinery systems, if need be by resorting to **user instructions**, is set out in *§ 6 Unterweisung* of the *Arbeitsmittelbenutzungsverordnung* (§ 6, "Instruction", of the German Work Equipment Usage Ordinance). It is stated herein that:

In instructing personnel in accordance with § 12 of the German Occupational Health and Safety Act, employers must take the measures required to make available proper information to employees and, if necessary, to provide user instructions for work equipment used in their work in understandable form and language. The information and the user instructions must at least contain information on the conditions for usage, foreseeable disruptions in operation and the experience which has been obtained thus far in the use of the work equipment.

User instructions in the loosest sense of the term are instructions issued by the employer on how to use technical work equipment with the goal of reducing any existing residual risks and the risks associated therewith, thus improving occupational health and safety. Employers' right to issue orders is reflected in instructions under § 6 of the German Work Equipment Usage Ordinance. Instructions are "mandatory regulations"; they are required to be in writing and are legally binding. They must stipulate the party they are intended for, the activity and the object (4). The term "user instruction" is nothing new. It has been used for some time in a uniform manner in accident prevention regulations. Accordingly, user instructions issued by employers are directed at insured persons, regulating behaviour in plants to avoid any danger of accidents and health hazards and serving as the basis for any training which may be required.

Instruction handbooks, in contrast, constitute information provided by the manufacturer on a product with regard to how to use it in a safe, proper manner in conformity with its intended purpose, with this information ranging to include required informa-

3 Instruction Handbooks and User Instructions – a Necessary Distinction

tion on how to dispose of the product. The word "instruction", however, only designates a recommendation. It is not legally binding in the sense of a statutory regulation, but still indicates to users a standard of diligence which they should adhere to for the purpose of avoiding negligence.

The special information on specific machinery contained in **instruction handbooks** is of considerable importance to employers in drafting **user instructions**, as this manufacturer's information must if relevant be made to harmonise with plant-related factors such as, for example, disruptive incidents, escape routes, rescue plans, fire-fighting regulations, alarm plans, disaster plans, the wearing of personal protective equipment and first aid instructions. The reason for this is that job safety depends equally on work processes, technical measures and the working environment. The obligation on the part of the employer to adhere to, review, evaluate and assess hazards, including those which do not only relate to the product itself, emanates from § 3 of the German Work Equipment Usage Ordinance.

"Notwithstanding their obligations under § 3, § 4 and § 5 of the (German) Occupational Health and Safety Act, employers must take the measures required to ensure that only that work equipment is selected and made available to employees which is suitable for the conditions prevailing at the workplace and for which the safety and health of employees is assured when it is used in conformity with its purpose. If it is not possible to guarantee safety and health of the employees to the full extent, employers shall take measures to keep hazards at a minimum. In taking precautions and measures, employers shall take into account hazards which are related to the use of the work equipment itself and which can be caused at the workplace through interaction of work equipment and substances or the working environment."

The statements contained in the "information for use/instruction handbooks" section of standards are supposed to aid manufacturers in drawing up their product-specific instruction handbooks. In this respect, they are particularly important for the health and safety of workers at work.

4.1 EC Machinery Directive

4.1.1 Instruction handbooks under Annex I of the Directive

Article 3 of the EC Machinery Directive stipulates that machinery and safety components must conform to the essential safety and health requirements listed in Annex I of the Directive. The essential requirements of Annex I itself are broken down into generic requirements in number 1 and special supplementary requirements for specific machinery in numbers 2 to 6. Number 1.7.5 of Annex I of the Directive contains the concrete requirement to draft an instruction handbook accompanying the product. In the instruction handbook required there, aspects to be addressed with certain classifications of machinery must in addition be supplemented with special features relating to machinery type in accordance with numbers 2, 3 and 4 of Annex I.

The essential requirements for instruction handbooks are quoted verbatim here:

1.7.5 Instructions

a) All **machinery** must be accompanied by instructions including at least the following:

- ☐ a repeat of the information with which the machinery is marked, except the serial number, (see 1.7.3 of Annex I), together with any appropriate additional information to facilitate maintenance (e.g. addresses of the importer, repairers, etc.),
- ☐ foreseen use of the machinery within the meaning of 1.1.2(c),
- ☐ workstation(s) likely to be occupied by operators,
- ☐ instructions for safe:
  - putting into service,
  - use,
  - handling, giving the mass of the machinery and its various parts where they are regularly to be transported separately,
  - installation
  - assembly, dismantling,
  - adjustment,
  - maintenance (servicing and repair),
  - where necessary, training instructions,
  - where necessary, the essential characteristics of tools which may be fitted to the machinery.

Where necessary, the instructions should draw attention to ways in which the machinery should not be used.

b) The instructions must be drawn up in one of the Community languages by the manufacturers or his authorized representative established in the Community. On being put into service, all machinery must be accompanied by a translation of the instructions into the language or languages of the country in which the machinery is to be used and by the instructions in the original language. This translation must be done either by the manufacturer or his authorized representative established in the Community or by the person introducing the machinery into the language area in question. By way of derogation from this requirement, the maintenance instructions for use by the specialized personnel employed by the manufacturer or his authorized representative established in the Community may be drawn up in only one of the Community languages understood by that personnel.

c) The instructions must contain the drawings and diagrams necessary for putting into service, maintenance, inspection, checking of correct operation and, where appropriate, repair of the machinery, and all useful instructions in particular with regard to safety.

d) Any literature describing the machinery must not contradict the instructions as regards safety aspects. The technical documentation describing the machinery must give information regarding the airborne noise emissions referred to in (f) and, in the case of hand-held and/or hand-guided machinery, information regarding vibration as referred to in 2.2.

e) Where necessary, the instructions must give the requirements relating to installation and assembly for reducing noise or vibration (e.g. use of dampers, type and mass of foundation block, etc.).

f) The instructions must give the following information concerning airborne noise emissions by the machinery, either the actual value or a value established on the basis of measurements made on identical machinery:

- ☐ equivalent continuous A-weighted sound pressure level at workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact must be indicated;
- ☐ peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 mPa);
- ☐ sound power level emitted by the machinery where the equivalent continuous A-weighted sound pressure level at workstations exceeds 85 dB(A).

In the case of very large machinery, instead of the sound power level, the equivalent continuous sound pressure levels at specified positions around the machinery may be indicated.

Where the harmonized standards are not applied, sound levels must be measured using the most appropriate method for the machinery.

The manufacturer must indicate the operating conditions of the machinery during measurement and what methods have been used for the measurement.

Where the workstation(s) are undefined or cannot be defined, sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1.60 metres from the floor or access platform. The position and value of the maximum sound pressure must be indicated.

g) If the manufacturer foresees that the machinery will be used in a potentially explosive atmosphere, the instructions must give all the necessary information.

h) In the case of machinery which may also be intended for use by non-professional operators, the wording and layout of the instructions for use, whilst respecting the other essential requirements mentioned above, must take into account the level of general education and acumen that can reasonably be expected from such operators."

Number 2.1 of Annex I requires that the following be taken into account by manufacturers in the instruction handbook with regard to food-processing machinery:

"In addition to the information required in Section 1, the instructions must indicate recommended products and methods for cleaning, disinfecting and rinsing (not only for easily accessible areas but also where areas to which access is impossible or inadvisable, such as piping, have to be cleaned in situ)."

Number 2.2. of Annex I requires that the following be additionally taken into account in the instruction handbook with regard to **hand-held or hand-guided machinery:**

"The instructions must give the following information concerning vibrations transmitted by hand-held and hand-guided machinery:

- ☐ The weighted root mean square acceleration value to which the arms are subjected, if it exceeds 2.5 m/s² as determined by the appropriate test code. Where the acceleration does not exceed 2.5 m/s², this must be mentioned.

If there is no applicable test code the manufacturer must indicate the measurement methods and conditions under which measurements were made."

Number 3.6.3 of Annex I requires that the following be additionally taken into account by manufacturers in drawing up instruction handbooks with regard to **machinery subject to special hazards as a result of its mobility:**

"Apart from the minimum requirements set out in 1.7.4, the instruction handbook must contain the following information:

(a) regarding the vibrations emitted by the machinery, either the actual value or a figure calculated from measurements performed on identical machinery:

- ☐ the weighted root mean square acceleration value to which the arms are subjected, if it exceeds 2.5 m/s²; should it not exceed 2.5 m/s², this must be mentioned;
- ☐ the weighted root mean square acceleration value to which the body (feet or posterior) is subjected, if it exceeds 0.5 m/s²; should it not exceed 0.5 m/s², this must be mentioned.

Where the harmonized standards are not applied, the vibration must be measured using the most appropriate method for the machinery concerned.

The manufacturer must indicate the operating conditions of the machinery during measurement and which methods were used for taking the measurements;

(b) in the case of machinery allowing several uses depending on the equipment used, manufacturers of basic machinery to which interchangeable equipment may be attached and manufacturers of the interchangeable equipment must provide the necessary information to enable the equipment to be fitted and used safely."

The following must additionally be taken into account by manufacturers in drafting instruction handbooks with regard to **machinery posing special hazards as a result of lifting processes** in accordance with number **4.4** of Annex I:

"Each lifting accessory or each commercially indivisible batch of lifting accessories must be accompanied with an instruction handbook setting out at least the following particulars:

- ☐ normal conditions of use,
- ☐ instructions for use, assembly and maintenance,
- ☐ the limits of use (particularly for the accessories which cannot comply with 4.1.2.6(e)).

In addition to section 1.7.4, the instruction handbook must include the following information:

(a) the technical characteristics of the machinery, and in particular:

- ☐ where appropriate, a copy of the load table described in section 4.3.3 (ii),
- ☐ the reactions at the supports or anchors and characteristics of the tracks,
- ☐ where appropriate, the definition and the means of installation of the ballast;

(b) the contents of the logbook, if the latter is not supplied with the machinery;

(c) advice for use, particularly to offset the lack of direct sight of the load by the operator;

(d) the necessary instructions for performing the tests before first putting into service machinery which is not assembled on the manufacturer's premises in the form in which it is to be used."

4.1.2 Documentation under Annex V or VI of the Directive

Under Article 8 of the EC Machinery Directive manufacturers or parties authorised by manufacturers which are domiciled in the Community must attest to their products' compliance with the stipulations of this Directive and issue an EC declaration of conformity in accordance with Annex II, letter A or letter C for each product manufactured in the meaning of Article 1, section 2 – with the exception of machinery as set out under Article 4, section 2.

Beyond this, manufacturers must compile **technical documentation** for machinery prior to distributing and applying the CE

sign to it in accordance with the procedure set out under Annex V (EC declaration of conformity) or Annex VI (EC CE type examination).

The comprehensive documentation (e.g. overall plan for the machine, composite drawings, parts lists, control circuit plans, computations, results of trials and instruction handbooks) which emanate individually from Annex V or VI of the Directive, need not have the EC declaration of conformity under Annex II attached to it. The documentation remains in the hands of the manufacturer; merely the instruction handbook has to accompany the product.

The term "technical documentation" used in Annexes V and VI of the EC Machinery Directive is interpreted in a varying manner by industry. Confusion therefore arises as a result. Under (5), for example, the following erroneous interpretations have become well-known:

Technical documentation =

= instruction handbook and lists of spare parts

= entire information accompanying products

= documents and records accompanying the product or the service

= service and sales documentation accompanying the product

= drawing up of all documents, checklists, etc., which relate to the product, which means, for example, including damage of all kinds or observation of the product performance

Chapter 4.1.1 and the above-stated substance matter allow the importance of the instruction handbook and the technical documentation to be illustrated in the following list (5):

- ☐ Without safety notes, no instruction handbook reflecting safety requirements!
- ☐ Without an instruction handbook, no technical documentation reflecting safety requirements!
- ☐ Without technical documentation, no EC declaration of conformity!
- ☐ Without an EC declaration of conformity, no CE mark!
- ☐ Without a CE mark, no „distribution" within the Single European Market!

The stipulations of Annexes V and VI pursuant to the EC Machinery Directive are used to derive which aspects of the technical documentation need to be additionally taken into account and which sub-aspects of these are to be assigned to the instruction handbook in accordance with Annex I of the Directive. Any possible confusion of the terms does not appear to be justified.

4.2 Section entitled "information for use/instruction handbook" in standards relating to machinery safety

Product standards (type C standards) serve to support the essential safety and health requirements of Annex I of the EC Machinery Directive. In the reasoning behind the Directive, it is stated that although the harmonised standards are meant to concretely support the essential requirements of Annex I, they must nevertheless remain **non-binding**. This also applies to the statements made in harmonised standards pursuant to the content of instruction handbooks in accordance with number 1.7.5 of Annex I of the Directive. Harmonised standards, the location of which has been published in the Official Journal, receive a high priority under Article 5, section 2 of the Directive, however, because it is assumed that when they are applied instruction handbooks drawn up on the basis of these standards will conform to requirements.

Content requirements relating to the drafting of instruction handbooks are contained in all CEN standards of the hierarchically structured European standards system (see Diagram 1):

1st level: type A standards

2nd level: type B standards

3rd level: type C standards

Type A and type B standards are generic, non-specific standards (see Diagram 2). Type A standards contain basic stipulations and terms which apply to all kinds of machinery and depict the basic elements of type B and C standards for standards makers.

The different levels of the European set of standards are defined as follows (6):

"Type A standards (basic safety standards): contain basic terms, guidelines for design and general aspects which may apply to all machinery, equipment and plant.

Type B standards (safety groups standard): deal with a safety aspect or a type of safety-related facility which may be used for a series of different machinery:

- The type B1 standards deal with certain safety aspects (e.g. safety distances, surface temperature and noise)
- The type B2 standards deal with safety-related facilities (e.g. two-hand switches, interlocking devices, contact mats and guards).

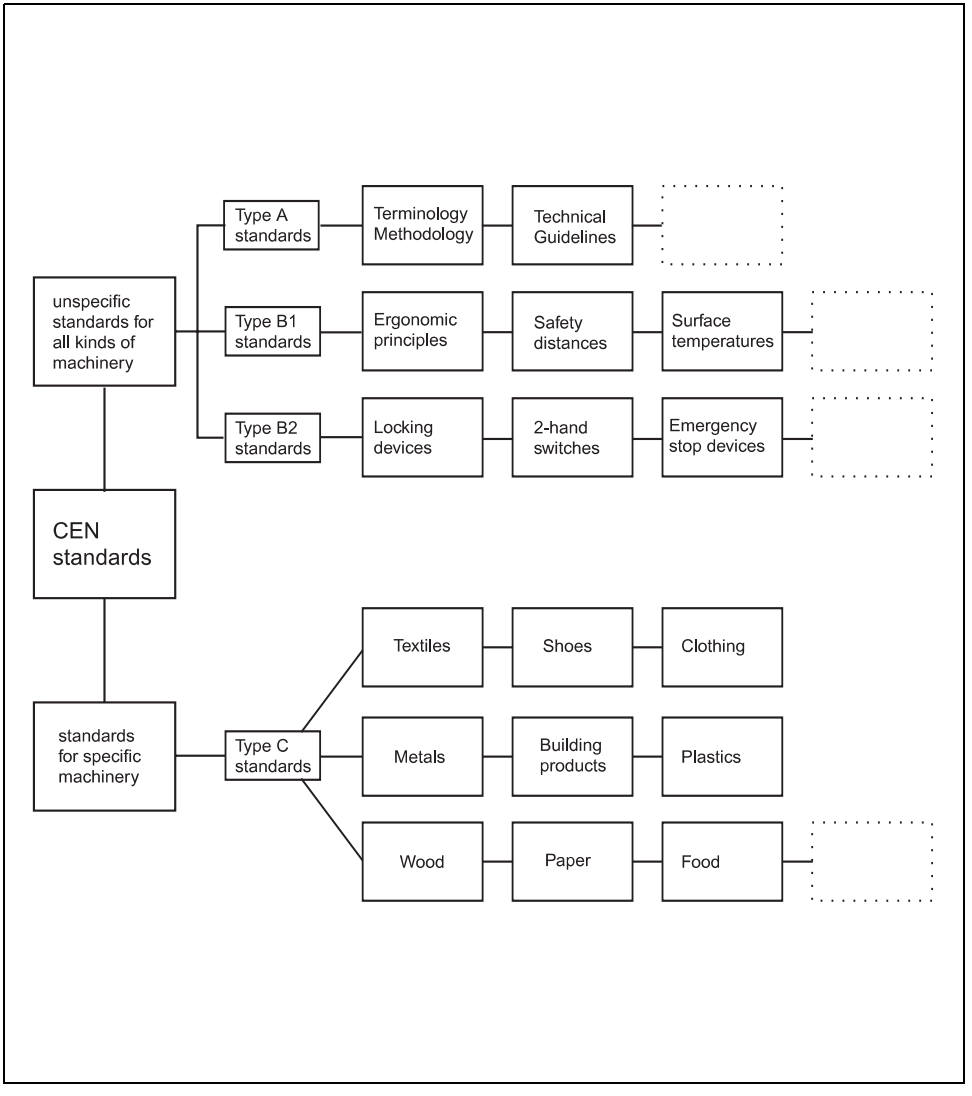
Type C standards (machinery safety standard): contain detailed safety requirements for a certain machine or machinery group.

NOTE: The term "machinery group" designates machinery which have similar features, the same function and have shown the same results and solutions in risk assessment."

Diagram 1: CEN standardization "Safety of Machinery" (Ref. (7))

CEN/TC Name		responsible DIN standards committee	June 1997 – Number of		
			standar-dization projects	EN	prEN
Type A and type B standards					
TC 114	Safety of machinery	NASG	42	21	14
TC 44x	Electrotechnical aspects	DKE	7	3	1
TC 122	Ergonomics	FNErg	21	10	5
TC 123	Laser and laser related equipment	NA FuO	5	4	1
TC 169	Light and lighting	FNL	1	–	1
TC 211	Acoustics	NALS	24	19	1
TC 231	Mechanical vibration and shock	NALS	25	12	9
AH 8	Integrated manufacturing systems	NAM	1	–	1
	subtotal A + B:		126	69	33
Type C standards					
TC 10	Passengers, goods and service lifts	NAM	17	2	7
TC 98	Lifting platforms	NAM	11	1	7
TC 142	Woodworking machines	NAM	35	7	20
TC 143	Machine tools	NWM	26	2	8
TC 144	Tractors & machinery for agriculture & forestry	NAM	55	18	17
TC 145	Rubber and plastics machines	NAM	16	5	9
TC 146	Packaging machines	NAM	7	1	3
TC 147	Cranes	NAM	25	–	2
TC 148	Continuous handling equipment and systems	NAM	6	–	5
TC 149	Rail-dependent storage & retrieval equipment	NAM	1	1	–
TC 150	Industrial trucks	NAM	19	1	17
TC 151	Construction equipment & building material machines	NAM	106	24	28
TC 153	Food processing machinery	NAM	41	1	21
TC 168	Chains, robes, webbing, slings and accessories	NRK	47	3	12
TC 182	Refrigerating systems	FNKä	5	–	5
TC 183	Waste management	NKT	2	–	1
TC 186	Industrial thermoprocessing	NAM	9	3	6
TC 188	Conveyor belts	FAKAU	34	5	19
TC 192	Fire service equipment	FNFW	6	–	2
TC 196	Machines for underground mines	NAM	11	–	8
TC 197	Pumps	NAM	5	–	4
TC 198	Printing and paper machinery	NAM	33	–	2
TC 200	Tannery machinery	NAM	5	–	2
TC 201	Leather and imitation leather goods and footwear manufacturing machinery	NAM	9	–	8
TC 202	Foundry machinery	NAM	5	1	4
TC 214	Textile machinery and allied machinery	Textil	9	1	7
TC 232	Compressors	NAM	3	2	1
TC 255	Hand-held, non-electric power tools	NAM	16	–	16
TC 270	Internal combustion engines	NAM	17	3	10
TC 271	Surface treatment equipment	NAM	14	–	7
TC 274	Aircraft ground support equipment	NL	14	–	9
TC 313	Industrial centrifuges	NAM	1	–	1
TC 322	Equipments for making and shaping of metals	NAM	14	–	–
AH 6	Industrial robots	NAM	1	1	–
	subtotal C:		625	82	268
	total type A, B and C standards:		751	151	301

Diagram 2: Hierarchical structure of the European standards



4.2.1 EN 414

EN 414 "Safety of machinery – Rules for the drafting and presentation of safety standards" (6) serves the purpose of providing guidelines for standards makers on how technical safety standards for machinery are to be designed. The EN 414 standard, which is currently being revised (draft of October 1996), contains a requirement in section 6.10 to the effect that each safety standard must contain "information for use" in which the targets for the instruction handbook are laid out:

EN 414

6.10 Clause "Information for use"

6.10.1 General

This clause is a **compulsory** element and shall be numbered. The standard shall refer to clause 5 of EN 292–2 and shall contain additional provisions for information for use for machines within the scope of the standard.

NOTE: As these safety standards are dealing with machinery design, this is the only clause which can impose on the designer requirements related to the use of the machine by indicating the information in order to be provided with the machine.

6.10.3 Accompanying documents (in particular: instruction handbook)

6.10.3.1 General

The instructions are a compulsory part of the machine, so each type C standard shall state that instruction handbooks shall be provided by the manufacturer. The type C standard shall refer to 5.5 of EN 292–2 and shall give specific information to be included in the handbook compiled from the results of the inquiry procedures in 5.2 to 5.8 of this standard.

NOTE: The instructions are normally the **only** means (immediately)* available to the user giving information on the use of the machine and the precautions necessary during use including maintenance interventions.

6.10.3.2 Noise

The requirements concerning noise declaration shall be dealt with by reference to 1.7.4f.) in Annex A of EN 292–2/A1 (requirements shall not be repeated).

NOTE: Further guidance on the drafting of noise clauses is given in EN 1746.

* Insertion by the author

6.10.3.3 Vibration

If applicable, the requirements concerning the vibration declaration shall be dealt with by reference to 2.2 and 3.6.3 in Annex A of EN 292–2/A1 (requirements shall not be repeated).

NOTE: Further guidance on drafting of vibration clauses is given in EN (WI 231 024).

4.2.2 EN 292

EN 292, "Safety of machinery; basic concepts, general principles for design" (8), which is identified as a type A standard (basic safety standard), is divided up into two parts:

- ☐ part 1: basic terminology, methodology
- ☐ part 2: technical principles and specifications

For type C (machinery safety standards) **standards makers** this general standard represents the basis for the description of product-specific hazards, the stipulation of appropriate safety measures and the disclosure of remaining, technically unavoidable residual risks to manufacturers in their capacity as users of this standard.

The **manufacturers** of a product must select and specify the respective safety measures with a view to adhering to the requirements of the stipulations in harmonized type C standards and – depending upon the current state of the standard – also take into account the state of the art. Moreover, in the instruction handbook, they must inform users on the purpose, safe usage and unavoidable residual risks in an unambiguous manner. Therefore, the clear statements made in section 5 of parts 1 and 2 of EN 292 are of crucial importance, in particular wherever pertinent machinery safety standards are lacking (see Diagram 1).

EN 292–1:

5 Strategy for selecting safety measures

Safety measures are a combination of measures incorporated at the **design** stage and those measures required to be implemented by the **user.**

The **designers** shall, in all circumstances, in the following order

- ☐ specify the limits of the machine,
- ☐ identify the hazards and assess the risks,
- ☐ remove the hazards or limit the risks as much as possible,
- ☐ design guards and/or safety devices (safeguards) against any remaining risks,
- ☐ inform and warn users about any residual risks,
- ☐ consider any necessary additional precautions.

NOTE: The strategy recommended in this clause is iterative: several successive applications of the procedure represented schematically in table 2, separated by experimental phases, are sometimes necessary to obtain a satisfactory result. In carrying out this process, it is necessary to take account of:

- safety of the machine
- ability of the machine to perform its function and to be set up, adjusted and maintained,
- manufacturing and operational cost of the machine,

in that order of preference.

Any measures which can be incorporated at the design stage are preferable to any which are implemented by the user (see table 2 hereafter).

The users' responsibilities regarding implementation of measures to minimize residual risks are not covered by this standard.

For the continued safe operation of the machine, it is important that the safety measures allow its easy use and do not hinder its intended use. Failure to do this could lead to safety measures being bypassed in order to achieve maximum utility of the machine.

EN 292–2:

5 Information for use

Information for use consists of communications links, such as texts, words, signs, signals, symbols or diagrams, used separately or in conjunction with each other, to convey information to the user. It is directed to professional and/or non-professional users.

The information for use is an integral part of the supply of a machine, as indicated in the definition of the design of a machine (see 3.11 in EN 292–1).

5.1 General requirements

5.1.1 Information for use shall clearly define the purpose for which the machine is intended and shall contain all directions required to ensure safe and correct use of the machine.

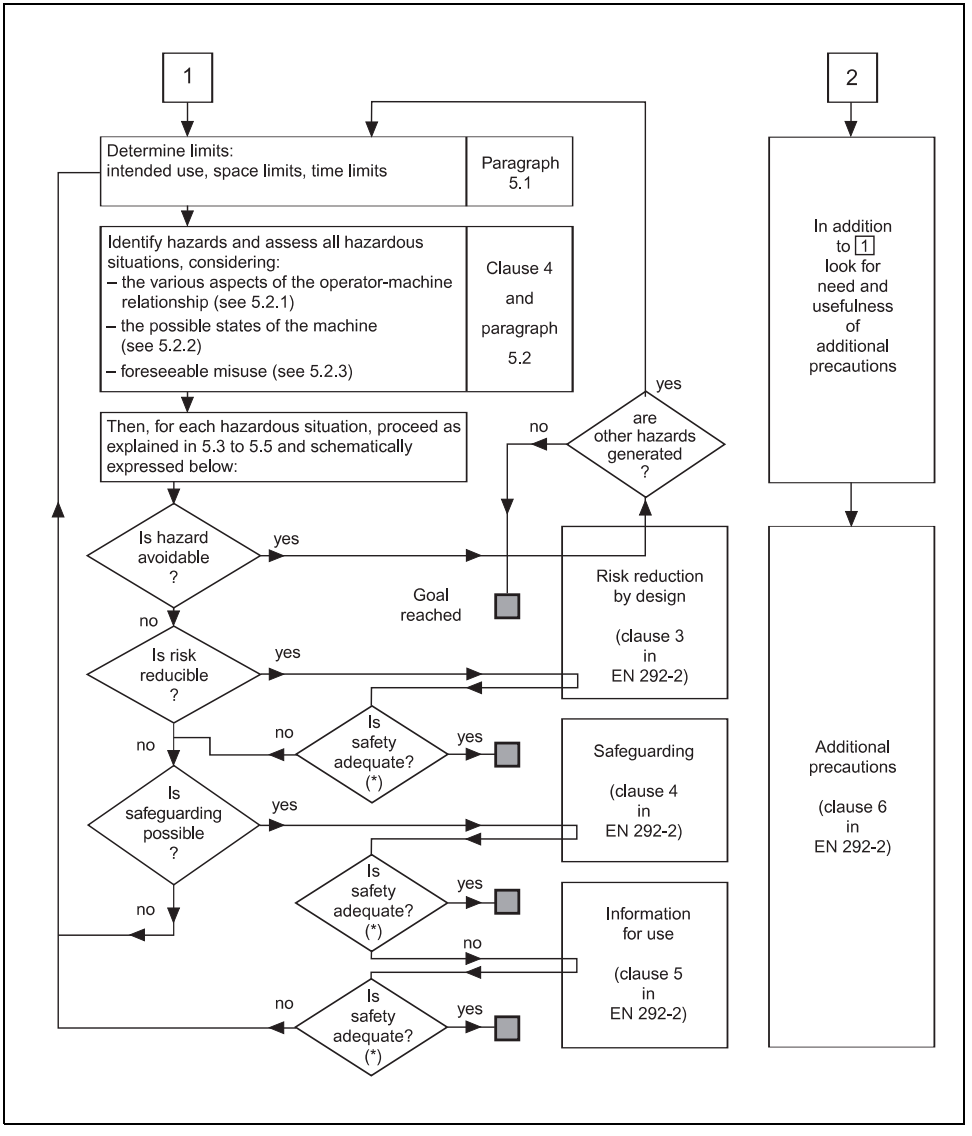
It shall inform and warn the users about residual risks, i.e. those which cannot be eliminated or sufficiently reduced by design and against which safeguarding is not – or not totally – effective (see 5.5 in EN 292–1).

It shall not exclude uses of the machine that can reasonably be expected from its designation and description and shall also provide adequate warning of inherent risk if the machine is used in ways other than described in the information (see 3.11 in EN 292–1).

5.1.2 Information for use shall not compensate for design deficiencies.

5.1.3 Information for use shall cover, separately or in combination, transport, commissioning (assembly, installation and adjustment), use (setting, teaching or process changeover, operation, cleaning, fault finding and maintenance of the machine), and, if necessary, de-commissioning, dismantling and disposal.

Table 1 Schematic representation of the strategy for selecting designed-in safety measures



(*) "Is saftey adequate?" means:
- **Has the required level of safety been reached?** (see clause 6 "Risk assessment")
- Is it certain that an **equivalent level of safety** cannot be obtained more easily?
- Is it certain that the measures taken:
  do not excessively reduce the ability of the machine to perform its function?
  do not generate new, unexpected hazards or problems?
- Are there solutions for all **operating conditions**, for all **procedures** (see 5.7.1)?
- Are the solutions compatible with each other?
- Are the operator's working conditions not jeopardized by those solutions?

Table 2 Relationship between the duties of the designer and of the user

<table>
<tr><td colspan="4">Safetey measures taken by the designer
(scope of this standard)</td></tr>
<tr><td rowspan="2">Risk reduction
by design
(Clause 3
in EN 292-2)</td><td rowspan="2">Safeguarding
(Clause 4 in EN 292-2)</td><td>Information for use
(Clause 5 in EN 292-2)</td><td rowspan="2">Additional
precautions
(Clause 6
in EN 292-2)</td></tr>
<tr><td>Training

Save working procedures

Supervision

Permit to work systems</td></tr>
<tr><td></td><td>Provision of
personal
protective
equipment</td><td></td><td></td></tr>
<tr><td></td><td colspan="2">Safety measures taken by the user

(not taken into account in this standard)</td><td></td></tr>
</table>

4.2.3 EN 292–1

In addition to the general statements made in section 5, "Strategy for the selection of safety standards", additional essential requirements pertaining to the design of machinery are presented in the following subclauses of this standard which may come from the **manufacturer** and which may be of importance to the **user**. For example, following the completion of the development stage any hazardous situations still emanating from the machinery which are not completely avoidable (normal operation, error function, emergency situation, incorrect usage) must be recorded as note items and it must be considered already as early as this stage what measures and codes of behaviour need to be created for the instruction handbook which is to be drawn up.

In particular, the following statements are made pursuant hereto:

5.1 Specification of the limits of the machine

The **design of a machine** (see 3.11) begins with the determination of limits:

- ☐ use limits:
  determination of the intended use of the machine (see 3.12), etc.,
- ☐ space limits:
  range of movement, space requirements for installation of the machine, "operator-machine" and "machine-power supply" interfaces, etc.,
- ☐ time limits:
  determination of the foreseeable "life limit" of the machine, taking into account its intended use, and/or of some of its components (tools, wear parts, electrical components, etc.).

5.2 Systematic assessment of hazardous situations (see 3.6)

Having identified the various hazards that may be generated by the machine (see clause 4), the designer shall attempt to foresee **all situations which might lead to these hazards causing injury or damage to health**. For this purpose, he shall take into account:

5.2.1 Human interaction with all phases of the "life" of the machine, as listed in 3.11 a).

5.2.2 Possible states of the machine:

a) The machine performs the intended function (the machine operates normally).

b) The machine does not perform the intended function (malfunction) due to a variety of reasons, including:

- ☐ variation of a property or of a dimension of the processed material or of the workpiece,
- ☐ failure of one (or more) of its component parts or services,
- ☐ external disturbances (e.g. shocks, vibration, electromagnetic fields),
- ☐ design error or deficiency (e.g. software errors),
- ☐ disturbance of its power supply,
- ☐ loss of control of the machine by the operator (especially for hand-held machines).

5.2.3 Foreseeable cases in which a misuse of the machine might occur

(see example at the end of 3.12).

5.3 Removal of the hazards or limitation of the risk

(risk reduction by design)

This objective may be met by completely removing or minimizing as far as possible, separately or simultaneously, each of the two factors which determine the risk (see 6.2).

All technical measures which make it possible to reach this objective contribute to risk reduction by design (see clause 3 in EN 292–2).

5.4 Safeguarding against hazards

which can not be avoided or sufficiently limited according to 5.3 (see clause 4 in EN 292–2).

5.5 Informing and warning users about residual risks

It is necessary to inform and warn users about residual risks, i.e. those against which risk reduction by design and safeguarding techniques is not – or not totally – effective (see clause 5 in EN 292–2); the instructions and warnings shall prescribe the procedures and operating modes intended to overcome the relevant hazards, indicate if a particular training is needed and if it is necessary to specify personal protective equipment (see 5.1.1 and 5.1.3 in EN 292–2).

5.6 Additional precautions

At this stage, the designer shall determine whether additional arrangements are necessary to deal with **emergency situations** (see 6.1 in EN 292–2) or **can improve safety as a secondary effect of their primary function** (see 6.2 in EN 292–2); e.g. ease of maintenance (maintainability) is also a safety factor.

5.7 Remarks

5.7.1 The designer should determine as completely as possible the different machine operating modes and the different intervention procedures for the operators. Appropriate safety measures can then be associated with each of these modes and procedures. This prevents operators from being induced to use hazardous operating modes and intervention techniques because of technical difficulties (see also 3.12).

5.7.2 If the safety measures taken by the designer, according to the approach described above, do not totally meet the essential safety requirements, this shall be compensated by safe working practices (training, safe working procedures, supervision, permit to work systems, etc.) which are the user's responsibility and, hence, out of the scope of this standard.

5.7.3 In the case of non-professional use, it shall be anticipated that prior training and/or instruction will not be given and the design of the machine (safety measures taken by the designer, including information) should take this into account (see 5.1.1 in EN 292–2).

4.2.4 EN 292–2

Which actual content must be included in the information for use/instruction handbooks to be drawn up by **manufacturers** in support of number 1.7.4 of Annex I of the EC Machinery Directive emanates from sections 5.2 to 5.5 of part 2 of EN 292. Here, especially section 5.5 is of fundamental importance:

5.2 Location and nature of information for use

…

5.3 Signals and warning devices

…

5.4 Markings, signs (pictograms), written warnings

…

5.5 Accompanying documents (in particular: instruction handbook)

5.5.1 Contents

The instruction handbook or other written instructions (e.g. on the packaging) should contain among others:

a) Information relating to transport, handling and storage of the machine

For example:

- ☐ storage conditions for the machine,
- ☐ dimensions, mass value(s), position of the centre(s) of gravity,
- ☐ indications for handling (e.g. drawings indicating application points for lifting equipment).

b) Information relating to commissioning of the machine

For example:

- ☐ fixing/anchoring and vibration dampening requirements,
- ☐ assembly and mounting conditions,
- ☐ space needed for use and maintenance,
- ☐ permissible environmental conditions (temperature, moisture, vibration, electromagnetic radiation, etc.)
- ☐ instructions for connecting the machine to power supply (particularly about protection against electrical overloading),

- ☐ advice about waste removal/disposal,
- ☐ if necessary, recommendations about prevention measures which have to be taken by the user (special safety devices, safety distances, safety signs and signals, etc.).

c) Information relating to the machine itself

For example:

- ☐ detailed description of the machine, its fittings, its guards and/or safety devices,
- ☐ comprehensive range of applications for which the machine is intended, including prohibited usages, if any, taking into account variations of the original machine if appropriate,
- ☐ diagrams (especially schematic representation of safety functions as defined in 3.13 in EN 292–1),
- ☐ data with reference to the measuring method about noise and vibration generated by the machine, about radiations, gases, vapours, dust emitted by it,
- ☐ data about electrical equipment (see 3.2 of EN 60 204–1),
- ☐ documents attesting that the machine complies with mandatory requirements.

d) Information relating to the use of the machine

For example:

- ☐ description of manual controls (actuators)
- ☐ instructions for setting and adjustment,
- ☐ modes and means for stopping (especially emergency stop),
- ☐ information about the risks which could not be eliminated by the safety measures taken by the designer
- ☐ information about particular risks which may be generated by certain applications, by the use of certain fittings, and about specific safeguards which are necessary for such applications,
- ☐ information about prohibited applications,
- ☐ instructions for fault identification and location, for repair, and for re-starting after an intervention,
- ☐ if necessary, instructions relating to personal protective equipment which is to be used and to training which is required.

e) Information for maintenance

For example:

- ☐ nature and frequency of inspections,
- ☐ instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence should be carried out exclusively by skilled persons (maintenance staff, specialists)*)
- ☐ instructions relating to maintenance actions (replacement of parts, etc.) the execution of which does not require specific skills and hence may be carried out by users (operators, etc.)*),
- ☐ drawings and diagrams enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks).

*) Maintenance instructions provided for skilled persons (second dash in e)) and maintenance instruction provided for unskilled persons (third dash in e)) should appear clearly separated from each other.

f) Information relating to de-commissioning, dismantling and, as far as safety is concerned, disposal

g) Information for emergency situations

For example:

- ☐ type of fire-fighting equipment to be used,
- ☐ warning about possible emission/leakage of harmful substance(s), and if possible indication of means to fight their effects.

5.5.2 Production of the instruction handbook

a) Type and size of print shall ensure the best possible legibility. Safety warnings and/or cautions should be emphasized by the use of colours, symbols and/or large print.

b) Information for use shall be given in the official language(s) of the country in which the machine is to used. If more than one language is to be used, each language should be readily distinguished from the other(s), and efforts should be made to keep the translated text and the relevant illustration together.

c) Whenever possible, text should be supported by illustrations. Illustrations should be supplemented with written details enabling, for instance, manual controls (actuators) to be located and identified; they should not be separated

from the accompanying text, and should follow sequential operations.

d) Consideration should be given to presenting information in **tabular** form where this will aid understanding. Tables should be adjacent to the relevant text.

e) The use of **colours** should be considered, particularly in relation to components requiring quick identification.

f) When information for use is lengthy, a table of **contents** and/or an index should be given.

5.5.3 Advice for drafting and editing information for use

a) **Relationship to model:** the information shall clearly relate to the specific model of machine.

b) **Communication principles:** when information for use is being prepared, the communications process "see – think – use" should be followed in order to achieve the maximum effect and should follow sequential operations.

The questions "how?" and "why?" should be anticipated and the answers provided.

c) Information for use shall be as simple and as brief as possible, and should be expressed in consistent terms and units with a clear explanation of unusual technical terms.

d) When it is foreseen that a machine will be put to non-professional use, the instructions should be written in a form that is readily understood by the non-professional users.

If personal protective equipment is required for the safe use of the machine, clear advice should be given and this information shall be prominently displayed at the point of sale, e.g. on the packaging as well as on the machine.

e) **Durability and availability of the documents**

Documents giving instructions for use should be produced in durable form (i.e. they should be able to survive frequent handling by the user). It may be useful to mark them "keep for future reference".

4.3 Resolution BTS 2 79/1993

The technical sector board CEN/BTS 2 (Mechanical Engineering) has addressed the issue of "information for use in C standards" and drafted the following resolution for C standard bodies.

„Resolution BTS 2 79/1993 (item III.1.9)

Subject: Safety of machinery – „Information for use" in C-standards (9)

BTS 2 acknowledges the concern expressed by some C-standards group over the extent to which the standard should give information covering the use of the machine. Subclause 6.10 of EN 414 gives guidance on the inclusion of „Information for use" in a standard. However TCs are aware of the potential conflict of requirements of the Machinery Directive (89/392/EEC, 91/368/EEC an 93/44/EEC) – in particular Annex I, 1.1.2 (b) and 1.7.4 (a) – made under Article 100a, and the Use of Equipment Directive (89/655/EEC), made under Article 118 A.

The current mandate between CEN/CENELEC and the CEC/EFTA is in support of the Machinery Directive and there is uncertainty about the advisability of including a large mount of information on use in a standard – particularly when this appears to be a significant proportion of the total added value.

BTS 2 instructs „C" type standards groups as follows:

1. TCs are reminded that they shall follow the principles laid down in clause 5 of EN 292–1 -Strategy for selecting safety measures – which give the overall basis for arriving at the safety requirements for a particular machine. In particular 5.5 gives the procedures for informing potential users about any residual risks that are left once the design and protective measures have been taken. This information shall deal with any precautions and preventive measures that should be taken by those persons who may be affected by the residual risks at all stages of the machines life: „The instructions and warnings shall prescribe the procedures and operating modes intended to overcome the relevant hazards, indicate if a particular training is needed and if it is necessary to specify personal protective equipment" (5.5 of EN 292–1).

2. Where the risk assessment clearly identifies that the predominant risks or a significant part of the risks remain after

the implementation of the design and protective measures they shall firstly consider if a „C" standard is still appropriate or required (5.5 of EN 414). If the answer is yes, they shall consider how the information is best put in the standard. For example, it may be that a enlarged section of a comprehensive standard as envisaged in EN 414, 6.10, is all that is required.

However, it is entirely acceptable, if the content justifies it, that a separate part of the standard be produced covering the „Information for the safety use of Widget machines". Reference shall be made to the separate part when detailing the scope of the parent standard – see Resolution BTS 2 89/1993. – Quality and contents of C-standards.

NOTE

Care should be taken with both the title and scope to avoid any confusion with a code of safe practice covering the use of the machine. Such a code of practice is outside of the current Mandates."

4.4 Structure and outline of instruction handbooks to be drawn up by manufacturers

In addition to content requirements, the information which is presented in number 1.7.4, "instruction handbook", of Annex I of the EC Machinery Directive provides, as stated in foregoing, statements of principle on the structure and outline of instruction handbooks to be drawn up by manufacturers. This outline schematic is specified by the supplementary information contained in the basic European standard EN 292.

The European standards committee for mechanical engineering CEN/TC 114, which is responsible in this case, has thus far not considered using any special standard as an aid in drafting instruction handbooks. National and international recommendations and guidelines pursuant hereto are available, however.

EN 292, but also the respectively subordinate type B and type C standards, address the scope of the national DIN 8418 standard pertaining to the drawing up of instruction handbooks, which was issued in 1974, in their "information for use/instruction handbooks" sections. This standard

has been available in a revised edition since 1988 as a pre-standard for "user's information; references for the presentation" (10). The purpose of this DIN V 8418, which as a result of pertinent requirements in European standardization requires national revision, is to provide recommendations on the design to those persons drawing up information for use for individual products and complete technical systems. The pre-standard is deemed to be a guideline and, in addition to design tips, contains a checklist of important aspects which could be of relevance to the content of information for use. It proceeds beyond the content of section 5 of EN 292–2, so supplementary suggestions could be taken from this for the outline and structure of instruction handbooks. The connection with the ISO/IEC Guide 37, "Instructions for use of products of consumer interest", is examined in more detail by way of comparison.

ISO/IEC Guide 37 (11) addresses the structure and formulation of instruction handbooks for products used by end-users. The principles and recommendations presented here can be used in addition to the specific requirements made of operating instructions which are contained in standards for products or product groups. The evaluation of the quality of operating instructions should take place in accordance with uniform criteria which are proposed in this Guide.

Another pertinent rule available to manufacturers is VDI Guideline 4500 Sheet 1, "Technical Documentation; information for use" (12), issued in 1995. It is primarily aimed at the producers of products and describes the state of the art for the planning, design, manufacture and application of technical documentation as a link between the product (manufacturer) and users. The "Technical Documentation" is distinguished according to

- ☐ manufacturers' internal company documentation and
- ☐ external company documentation for users.

VDI 4500 Guideline Sheet 1 deals especially with information for use as an accessory to the product and with written or visual information on the products. It has set the goal of supplementing the basic information in the different standards of EN 292–2, EN 60204 "Safety of machinery; electrical equipment of machines; part 1: general requirements", DIN V 8418 for technical products and DIN V 66055 for products relevant to consumers (13) and literature (14), as not all legally required, technically advisable and economically necessary information is contained here. It thus also takes into account those aspects which emanate from case law pursuant to contract law and product liability. The following focal points are addressed:

a) foundations
   - ☐ supra-company requirements
   - ☐ limits on the information for use content

b) basic design principles

c) target-group-related outline criteria

d) organisational prerequisites
   - ☐ internal requirements
   - ☐ external requirements
   - ☐ internal and external inspections
   - ☐ change and information services

e) user surfaces as part of the information for use

f) documentation technology

g) managerial aspects

h) compiling of information for use

i) examples of checklists to examine information for use

The brochure entitled *Sicherheitsgerechte Betriebsanleitungen* (Instruction Handbooks Conforming to Safety Requirements) (5), published by the *Verband Deutscher Maschinen- und Anlagenbau e.V.* (VDMA), which is already available in its 3rd revised and amended edition, should also be cited. It provides practical information and suggestions relating to the repercussions of more stringent product liability and the EC Machinery Directive for the drawing up of instruction handbooks. Experience gained in important sectors of mechanical engineering is presented in case examples.

Manufacturers of products can thus make use of the body of national and international experience in drafting instruction handbooks to conform to obligations set out in the EC Machinery Directive, but – with the exception of the cursory proposals on the creation, drawing up and editing of information for use in accordance with sections 5.5.2 and 5.5.3 of EN 292–2 – cannot make use of a harmonised European standard.

Whether in the view of manufacturers of machinery and technical machinery systems there is a need for harmonisation of the structure of instruction handbooks requires a separate study. In this context it should not be forgotten that at present there is a significant expense involved in terms of time and money merely by virtue of the main manufacturer having to rework the differently designed instruction handbooks of sub-suppliers into a uniformly structured instruction handbook for the end product. Harmonised European requirements may lead to financial savings being made by industry.

5 Assessment of the specific instruction handbook requirements contained in the reference documents

The minimum information which must be contained in manufacturers' instruction handbooks accompanying machinery is conclusively set out in the EC Machinery Directive. The type A standard EN 292, "Safety of machinery; basic concepts, general principles for design", specifies the requirements of the Machinery Directive and establishes guidelines according to which the content of the "information for use" section is to be drawn up in subordinate standards. Basic requirements on how standards in the area of machinery are themselves to be designed are set out in EN 414 "Safety of machinery – Rules for the drafting and presentation of safety standards". DIN EN 414 in addition stipulates that the "information for use/instruction handbook" section must be an **obligatory** element to be contained in **every** technical safety standard. This section is the **only** one in a standard in which from the perspective of the standards committee the topics which must be taken into account by manufacturers/designers in drawing up instruction handbooks are listed in a product-specific manner. In order to avoid repetition, reference is made to the general stipulations of section 5.5 in EN 292–2.

There is a consistent standardization approach with respect to the drawing up of the "information for use/instruction handbook" section in type C standards. From the perspective of the author, however, a supplementary, harmonised European standard relating to the drawing up of practise-oriented instruction handbooks could be useful. Along with the brochure entitled *"Sicherheitsgerechte Betriebsanleitungen"* ("Instruction Handbooks Conforming to Safety Requirements") (4), manufacturers in Germany can at present only make use of standards and guidelines presented in chapter 4.4 of this study in designing the content of instruction handbooks.

Conflicts which are occasionally addressed, which could arise from the content information in the standards section on "information for use" and the respective "user instructions" paragraphs in accident prevention regulations, are not likely to exist in product-specific standards which are designed in conformity with the above-stated basic safety standards EN 414 and EN 292. The reason for this is that the obligation of employers to draw up **user instructions specifically addressing workplace, work environment or work processes** expressly includes the requirement in accordance with chapter 3 of this study that the information and data contained in **product-specific instruction handbooks** which are supplied by the manufacturers must also be taken into account.

The contradiction relating to the scope of information which is supposed to be supplied in a standard pertaining to the **usage of machinery** mentioned in the first section of "Resolution BTS 2 79/1993" (see chapter 4.3 of this study) is difficult to under-

stand. It lacks any explanation of whether it relates to the previously described support for the "information for use" section in machinery safety standards in accordance with EN 414 and 292 or to regulations on the usage of the machinery itself.

This contradiction could be based on the following considerations: when drafting the section „Instruction handbook" in type C standards, standards makers involved with the area of the EC Machinery Directive aim at supporting the essential requirements of Annex I of the Directive. This also involves number 1.1.2 " Principles for safety integration" in connection with number 1.7.5 (a) of Annex I of the Directive "All machinery must be accompanied by instructions …" (on this see chapter 4.1.1 of this study).

The basic principles of number 1.1.2 which are relevant here state that:

…

b) In selecting the most appropriate methods, the manufacturer must apply the following principles, in the order given:

- ☐ eliminate or reduce risks as far as possible (inherently safe machinery design and construction
- ☐ take the necessary protection measures in relation to risks that cannot be eliminated,
- ☐ inform users of the residual risks due to any shortcomings of the protection measures adopted, indicate whether any particular training is required and specify any need to provide personal protection equipment.

c) When designing and constructing machinery, and when drafting the instructions, the manufacturer must envisage not only the normal use of the machinery but also uses which could reasonably be expected.

The machinery must be designed to prevent abnormal use if such use would engender a risk. In other cases the instructions must draw the user's attention to ways – which experience has shown might occur – in which the machinery should not be used.

…

e) When designing and constructing machinery, the manufacturer must take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.) …

The above-stated principles applying to the integration of safety are then used to derive the principle that the requirement to concretely set out stipulations required of the standards must also be expressed in the "instruction handbook" section of standards. The "instruction handbook" section should then, however, be concretely set out in the form of well-formulated instructions for users instead of providing information, suggestions and data to manufacturers so that they will be put in a position to support number 1.7.4. "instruction handbook" of Annex I of the Directive. If "setting out concretely" is understood to mean that the use of the machinery is to be regulated in the standard, a conflict is rightly seen to exist – just as described in the BTS–2 resolution mentioned above – between the EC Machinery Directive (1) and the EC Framework Directive (17) in connection with the EC Work Equipment Usage Directive (2). In this case an inadmissible overlapping would be present with respect to the competence of the directives under Article 100a including the harmonised standards in support of these directives and directives issued under 118a of the EC Treaty.

In order to escape from this apparent dilemma, the BTS–2 resolution proposes to the C standardization bodies that if need be a special separate section on "information for the safe use of machinery" (code of safe practise) should be created and, for example, appended to the standard as an informative annex, being fully aware of the fact that no mandate has been issued for this.

The "information on the safe use of machinery" contained in the recommended section must therefore be understood to be a direct instruction to users on the use of machinery. In this context, it must be kept in mind that the standard is aimed at manufacturers and not users. Instructions to users in a standard would be spurious. Under the EC Machinery Directive it is solely the manufacturer which is required to make available instructions on safe use to users.

For the sake of completeness, it should also be mentioned that the intended "information (instructions) for the safe use of machinery" cannot be conclusive. Consequently they could ultimately only reflect standard statements. Manufacturers will in any case have to include supplementary company and product-specific statements in their particular instruction handbook. Here contradictions between the views of the standards body and the information contained in the instruction handbook of the manufacturer apparently cannot be ruled out.

In chapter 4.4 the question was examined as to whether manufacturers need additional aid at the standardization level to comply with their comprehensive instruction obligations in the drawing up of practise-oriented instruction handbooks. In this respect it has been well established, as

5 Assessment of the specific instruction handbook requirements contained in the reference documents

experts are aware, that stipulations pursuant to the design in the drafting of instruction handbooks in EN 292–2 are kept very concise. National and international literature and guidelines which proceed beyond these stipulations are available to manufacturers, however. The question as to whether a European standard on the detailed drafting of instruction handbooks appears to be necessary or not, requires further consideration.

6 The "instruction handbook" section in select product standards

6.1 Purpose of the "information for use/ instruction handbook" section

The "information for use" section required in every safety standard under EN 414 must make reference to section 5 of EN 292–2 and contain additional product-specific information.

Section 6.10 of EN 414 states that the "information for use" section is the only section in a safety standard in which data, suggestions and information from the standards body relating to the use of the machinery by users can be provided to manufacturers/designers. Harmonised standards supporting the EC Machinery Directive do not provide any latitude for issuing instructions to third parties and would stand in contradiction to the regulatory area of the Directive under Article 118a of the EC Treaty and its national transposition and subordinate national regulations, e.g. accident prevention regulations.

In order for the manufacturer to be able to depict unambiguously the use of its machinery (e.g. information on possible operating conditions and foreseeable cases in which improper use of machinery can take place) in its instruction handbook for users, it makes sense and is helpful – and is in fact the task of the standards body – to compile the necessary aid in the form of recommendations in the "information for use" section of the respective product standard. These recommendations form the same preconditions for all manufacturers on the drawing up of instruction handbooks in order to guarantee safe handling of machinery and technical machinery systems to protect employees in the European economic area.

Manufacturers are the party that standards are aimed at. In their capacity as users of a type C standard, they must include the product-specific information contained therein, including general requirements set out in section 5 of EN 292–1/2, in their deliberations pursuant to the drawing up of their product-specific instruction handbooks.

The obligation of manufacturers to inform users thus includes **all** information in order for them to be able to create the prerequisites for the **intended use** of the machinery. In order to avoid **the unintended use of the machinery**, this therefore also includes information which may **not** be contained in the respective "list of hazards", "technical safety requirements" and "information for use" sections of the harmonised machinery safety standard as the result of a specific technical solution on the part of a company which deviates from the standard, but which is absolutely necessary for **safe operation**.

Ideas which the responsible standards committees have developed with regard to the drafting of the "information for use" section can be seen in the following excerpts from examples.

6.2 Examples of insufficient "instruction handbook" sections in European standards

Example 1

European draft standard
of CEN/TC 145:
prEN 12409:1996 „Rubber and plastics machines – thermoforming machines – safety requirements"

This document contains the technical safety requirements for the design and construction of hot-forming machinery for foils and plates of all types. A hot-forming machine can be composed of one or more sub-assemblies linked together. The following sub-assemblies are addressed in this document: foil-wrapping facility, plate feed, material feed, transport facility, heating, pre-heating, edge heating, forming station, follow-up processing station, stacking station, conveying station, residual foil wrapping facility and foil-cutting facility.

This document does not apply to sub-assemblies which are placed in front of or behind the heat-forming machinery if they have their own controller and/or are separate and/or have their own material feed.

Section 7, "Information for use", states (excerpts):

7.1 Minimum Marking on the Machine

…

Machines shall carry instructions in accordance with 5.4 of EN 292–2. The layout shall comply with this standard.

In addition warning signs shall be used if any of the following hazards exist:

a) hot zones, the temperature of which exceeds the values in EN 563, which can not be protected against accidental contact by appropriate protective devices; for example machine parts, hot plates or sheet material.

b) residual risks which cannot be protected, due to technical reasons, by means of fixed or movable guards.

…

7.2 Instruction manual

…

d) Instructions about the locations on the machine where ventilation systems shall be connected in order to avoid health hazardous gases, fumes or dusts being released.

e) Instructions about residual risks, if these cannot be excluded, despite protection measures taken.

…

h) Instructions about fire protection measures required within heating equipment. Instruction that, if flammable materials are to be processed, for example nitrocellulose, a suitable extinguishing system shall be installed.

The various safety suggestions contained in section 7.1 of this standard are correct.

The explanations pursuant to h) of section 7.2., however, are incomprehensible. These explanations lack the necessary clarity in demarcating responsibilities of the manufacturer and the user with respect to unintended use. The substance matter which is addressed should principally be the object of corresponding requirements in the "safety requirements and/or measures" section of this standard. Instead of this, section 5.2.5.4., among other things, contains the following entreaty: "If necessary, reference must be made in the instruction handbook to the availability of a suitable fire-fighting facility".

Under number 1.5.6 of Annex I of the EC Machinery Directive, fire hazards must be avoided – notwithstanding the highly flammable or non-flammable processing materials which are the subject. Only when the technical measures stipulated in the standard do not allow a sufficient reduction in the residual risk must users be informed of such residual risks in conformity with letter e). Under this condition, then, possible example solutions should be presented in the standard on how unavoidable residual risks could be confronted most effectively taking into account the various processing conditions and materials.

This important suggestion – in accordance with section 5.5 of EN 292–2 (see chapter 4.2.4 of this study) – is lacking in the standard. It is an element of the iterative process, which should be an integral part of the "list of hazards", "safety requirements and/or measures" and "information for use" sections, which are sensibly coordinated with one another. Users are of course responsible for the implementation of the measures to eliminate or reduce residual risks under tables 1 and 2 in chapter 4.2.2 of this study recommended in the standard.

Reading letter h) in section 7.2 as a whole creates the overall impression that suggestions made there to the effect that "a sui-

table **extinguishing system** shall be installed if flammable materials are to be processed" are meant to compensate for deficiencies in design, the reason being that extinguishing systems are part of the machine. It is not allowed for manufacturers' obligations to be shifted to users to compensate for technical deficits in safety (see number 5.1.2 in chapter 4.2.2 of this study). If the standard is revised and updated at a later point in time, the standardization section 7.2 under discussion here should receive clarification pursuant hereto in connection with the corresponding sections 4.5 "burning hazard" and 5.2.5 "preventionary measures" of this standard.

Letter d) in section 7.2 of this standard, on the other hand, stands in conformity with the requirements of number 1.5.13 of section I of the EC Machinery Directive. Accordingly, although hazards resulting from the emission of gases, dust, etc. must basically be avoided, the proper technical air-ventilation facilities in buildings can also be provided by users. Manufacturers must equip the machinery in such a manner so that the stated substances can be captured, and/or removed with a ventilation system, however.

Example 2

European draft standard
of CEN/TC 168:
prEN 12195:1997 „Load restraint assemblies – Safety;
Part 3: Lashing chains"

Lashing chains serve the purpose of defined strapping (lashing) loads on road vehicles. The route the standards body opted for to achieve this goal, including the information provided in the "information for use" section in order to guarantee "safe" transport, is presented below. To do this, those passages from the draft standard which would appear to be of importance here are quoted verbatim:

0 Introduction

…

The extent to which hazards are covered is indicated in the scope of this standard. In addition lashing chains for securing of loads on vehicles should comply as appropriate with EN 292 for hazards which are not covered by this Standard.

1 Scope

This Part of EN 12195 specifies safety requirements for round steel link chains of grade 8 or T, type T for multipurpose use and lashing combinations with chain for the safe surface transport of goods on vehicles, e.g. trucks and trailers

either on roads, on RO/RO-ships or by rail and/or combinations thereof.

…

7 Instructions for use

Instructions for use shall accompany each set of lashing chains or each lashing chain equipment and shall be in accordance with the relevant clauses of Annex B.

Annex B (normative)

Instructions for use and care of lashing chains

B.1 In selecting and specifying lashing chain equipment, consideration shall be given to the required lashing capacity, taking into account the mode of use and the nature of the load to be secured. The size, shape and weight of the load, together with the intended method of use, transport environment and the nature of the load will affect the correct selection.

Lashing chains with a pitch in between 3*d* and 6*d*, designed for timber transport only, are not allowed to be used in general service.

B.2 The selected lashing chains shall both be strong enough and of the correct length for the mode of use. Always follow good lashing practices: plan the fitting and removal operations before starting a journey. Remove lifting equipment before lashing the load. Keep in mind that during longer journeys parts of the load may have to be unloaded. Calculate the number of chain lashings according to prEN 12195–1.

B.3 Due to different behaviour and elongation under load conditions, different lashing systems (e.g. lashing chain, web lashing made of man made fibre) shall not be used to lash the same load. Consideration shall also be given to ancillary components and lashing devices in the lashing, which shall be compatible with the lashing chain.

B.4 Use the lashing chain in accordance with the supplier's instructions (this information will be formulated by the supplier).

B.5 Release of the lashing: Care shall be taken that the stability of the load is independent of the lashing chain and that the release of the lashing chain shall not cause the load to fall off the vehicle, thus endangering the personnel. If necessary, attach lifting equipment for further transport to the load before releasing the tensioning device in order to prevent accidental falling.

B.6 Before attempting unloading the lashing chains have to be released such that the load is unhampered.

6 The "instruction handbook" section in select product standards

B.7 During loading and unloading attention has to be paid to low overhead power lines.

B.8 Lashing chains shall be taken out of service or returned to the manufacturer for repair if they show any signs of damage. The following are considered to be signs of damage:

- ☐ for chains (to be rejected): superficial fissures, elongation exceeding 3 %, wear exceeding 10 % of the nominal diameter, visible deformations.
- ☐ for connecting components and tensioning devices: deformations, splits, pronounced signs of wear, signs of corrosion.

Repairs shall only be made under the responsibility of the manufacturer. Only lashing chains bearing identification tags shall be repaired. Following repair, the manufacturer shall guarantee that the original performance of the device is maintained.

B.9 Take care that the lashing chain is not damaged by sharp edges of the load on which it is used.

B.10 Lashing chains and any connecting components attached shall be the subject of frequent regular inspection, in addition to the initial thorough examination by a competent person: withdraw them from service in case of doubt.

B.11 Use only legibly marked and labelled lashing chains.

B.12 Lashing chains shall not be overloaded: Use only one hand to apply the maximum hand force of 50 daN. Do not use mechanical aid such as levers, bars etc. unless they are specially designed to be used with the tensioning device.

B.13 Lashing chains shall never be used when knotted, or connected with pin or screws.

B.14 Prevent damage to tags by keeping them away from the corners of the load and, if possible, from the load.

B.15 Protect the lashing chain and the edges of the load against abrasion and damage using protective sleeves and/or corner protectors.

B.16 Before unloading, if necessary, ice coatings shall be removed and attention shall be paid to the spillage of dangerous goods.

B.17 Information and warnings on residual risks, as described in 5.5 of EN 292–1:1991.

B.18 Particular information on the individual type of lashing chain or lashing chain equipment and its intended use."

It is unusual that, unlike the suggestions made in EN 414 mentioned above, there is no concrete information with reference to EN 292–2 in the section "information for use" which the manufacturer should pay attention to in the operating manual he draws up. This reference is even necessary if some requirements in EN 292–2 do not apply to lashing chains. Instead of this, manufacturers in their capacity as users of this standard are informed that the information for use to be compiled by them **shall** conform to the relevant statements made in Annex B (see sentence 1 in number 7).

The visible intention of the standards body with respect to this standardization project is to achieve a comprehensively **safe transport** of freight. To do this, first of all the specific hazards – which persons may be subjected to when dealing with the lashing chains – are identified and the corresponding technical safety requirements stipulated for lashing chains. Secondly codes of behaviour for handling lashing chains are conclusively regulated. These are contained in the **normative** Annex B with well-formulated instructions for users.

The scope is also based on a perspective on standards which asserts that standardization could also address those hazards which could be caused by lashing chains which are not sufficiently dimensioned in terms of technical safety in addition to those hazards which could arise through improper handling of the lashing chains.

There it is stated in sentence 1 that this standard stipulates requirements for lashing chains **to ensure the safe surface transport of goods on vehicles**. Here there is a failure to recognise that the standard can **not** make this claim.

The task of the standard is primarily to stipulate technical safety requirements for lashing chains **to secure** (strap) **goods on vehicles** and **not** stipulate requirements on the safe transport of goods. If necessary, information and suggestions are to be provided to manufacturers in the "information for use" section on which specific aspects of handling they must include in their instruction handbooks in order to ensure that users use the lashing chains properly as intended by the manufacturer taking into account foreseeable unintended use (e.g. using lashing chains as lifting slings or tying them in knots or tying lashing chains to bolts and screws).

As a whole, it is apparent that some instructions in Annex B go beyond the scope of the standard. For example, under EN 414 solely designers/manufacturers are obligated to provide information on unintended use, as only they can evaluate and assess possible hazards and risks in the use of lashing chains, and not suppliers, as indirectly emanates from (B.4). Suppliers will as a rule not be able to do this. In this respect, the existing instructions to users in (B.4) are also questionable with respect to the aptitude of the addressee. It should be

kept in mind that retailers and suppliers in this capacity are not the parties addressed by standards unless they claim to be such, in which case they would be subject to all the obligations of a manufacturer.

Aspects relating to unloading such as "attention must be paid to low overhead power lines" (B.7) or "if necessary, ice coatings shall be removed and attention shall be paid to the spillage of dangerous goods" (B.16), go beyond the scope of the standard and cannot be assigned to the actual handling with lashing chains, e.g. in connection with a foreseeable unintended use. Avoiding workplace-related hazards when loading and unloading is the sole responsibility of employers under § 3 of the German Work Equipment Usage Ordinance. Only employers can analyse and assess the additional risks mentioned above and issue appropriate instructions (user instructions) for their employees, and not the standards body or the manufacturers of lashing chains.

Notwithstanding the spurious instructions in standards addressing users, it is in addition apparent that manufacturers – if they **strictly adhere to the stipulations** of section 7 of this standard on the implementation of Annex B in their instruction handbooks – may controvert EN 292, the reason being that the instructions contained in Annex B may not be complete. This means: It is the sole responsibility of manufacturers to pass on the necessary information to users in the instruction handbook. Under the stipulations of section 5 of EN 292–2, "accompanying documents (in particular instruction handbooks)", manufacturers are required to describe the purpose and the safe use of lashing chains **in a comprehensive manner** in the instruction handbook. This principle reference is to be found in the introduction to the standard.

In the event of a conflict, manufacturers will therefore not be able to claim that they have exclusively followed the stipulations of the standard. It is therefore not advisable to create the impression that the "information and data" presented in the "information for use" section of a standard is conclusive, as is emphasised in sentence 1 of number 7.

Example 3

European Standard of CEN/TC 149: EN 528:1996 "Rail dependent storage and retrieval equipment; Safety"

This document applies to all kinds of equipment which is on rails within, and outside of, shelf aisles. The equipment includes jacking facilities and may contain side thrusts in order to load or retrieve stored units and/or long goods such as bar stock. The equipment can be controlled manually or completely automatically. The standard covers specific hazards which may arise during the setting up, commissioning, inspection, operation, main-

tenance and dismantling of equipment and facilities.

The "information for use" section contains the following:

10 Information for use

10.1 Instruction handbook

An instruction handbook shall be supplied by the manufacturer including at least the following information:

10.1.1 Operation and use

All necessary information for the safe operation and use of the machine and its associated equipment, including requirements and limitations of the specified load, in accordance with 10.3

10.1.2 Maintenance, repair and fault-finding

Information for safe maintenance, repair and fault-finding of the machine and its associated equipment, in accordance with 10.4.

10.2 Minimum markings

...

10.3 Conditions for the safe operation of equipment

In order to ensure the proper and safe operation of the machine and if necessary of special devices, the manufacturer shall state in the instruction handbook that the operating requirements stated therein shall be complied with by the user. At least the following operating requirements shall be included:

10.3.1 A storage and retrieval machine shall be used only for the purpose for which it was originally intended.

10.3.2 A storage and retrieval machine shall only be driven by suitable and reliable persons, of at least 18 years of age, who have been trained and expressly charged in writing with driving the machine by the user or his authorised representative. This minimum age requirement does not apply when the person is supervised during training.

10.3.3 The number of persons permitted to travel on the machine shall not exceed the maximum number specified by the

manufacturer on the identification plate. It is not permitted for unauthorised persons to travel on the machine.

10.3.4 An on-board **operator** shall, at least once per day, ascertain proper functioning of brakes, limit switches and warning devices. If any of these device is not functioning properly or in the event of either obviously hazardous defects the machine shall not be used until the defects are rectified.

If similar defects occur during operation, the operation shall be discontinued immediately. All faults shall be notified immediately and the nature of the fault recorded in a fault book or similar.

10.3.5 Before travelling down a racking aisle, the **operator** shall make certain that nobody is in the aisle and the aisle is free from obstacles.

10.3.6 It is not permitted for unauthorised persons to enter the racking aisle and its approach areas nor for persons to use it for access to other areas.

Entry to these zones shall be restricted to **specially authorised persons** who have been properly informed on and use measures provided for their safety.

Each person entering a machine operating area through an open door shall ensure that the main isolator remains disconnected by means of a personal locking device such as a padlock or an equivalent device.

10.3.7 Where work can take place in an area adjacent to a machine operating area, a **"permit to work system"** shall be used to control any access into the feed lanes. The "permit to work system" shall ensure the following:

a) Only persons **authorised by name in writing** to perform specific tasks are permitted to work in the area.

b) Authorization shall only be given to such **persons after they have been given the appropriate and relevant training**.

c) Such training shall ensure that **persons** understand the following:

- ☐ the nature of the hazards which can arise if the machine operating area beyond the picking face is entered.
- ☐ the precautions to be taken to avoid such hazards.
- ☐ the separate and additional procedures to be followed if it is necessary to enter the machine operating area.

10.3.8 Safety devices for the machine and the machine operating area shall not be rendered inoperable or misused.

10.3.9 The maximum permissible loading of the machine shall not be exceeded.

10.3.10 The load shall be arranged on the load handling device so that it is not possible for it to move about or to drop off during normal operation. Arrangement of the load shall ensure that no part of it extends beyond the extremities of the load profile.

10.3.11 Goods shall be stored in the racking in such a way that they do not project into the machine travel area.

10.3.12 On manually controlled machines the operator, when leaving the machine, shall prevent it being used without authorisation by removing the key from the key-operated switch.

10.3.13 In the case of fully automatic installations, only one key (or set of keys) shall be available for use.

10.3.14 In normal operation the operator shall only enter or leave the driving position when the machine is in the position provided for this purpose.

10.3.15 In case of emergency all personnel shall leave the machine immediately using the escape facilities provided.

10.3.16 Persons authorised to use the machine shall practice during initial training and periodically at least once a year including emergency procedures using the escape routes.

10.3.17 Faulty or improperly formed unit loads and defective load accessories shall not be handled.

10.3.18 Personnel shall leave the machine only where and when it is safe to do so.

10.3.19 No person is permitted on the load handling device unless it is specially designed and intended for that purpose.

10.3.20 The user shall ensure that all tests required are carried out at the specified intervals.

All faults and defects discovered shall be remedied within the specified time.

10.4 Maintenance, inspection and testing

In order to ensure proper and safe maintenance and to ensure inspection and testing of the machine and if necessary special devices, the manufacturer shall state in the instruction handbook that the information on maintenance, inspection

and testing contained therein shall be complied with by the user. Here applicable, the information shall include, but not be limited to, the following:

10.4.1 Maintenance

10.4.1.1 Maintenance work shall be carried out at regular intervals in accordance with the manufacturer’s documentation. Existing regulations and safety requirements shall be observed.

10.4.1.2 Maintenance shall be carried out safely and so as to ensure safe functioning of the machine between maintenance intervals.

10.4.1.3 Maintenance shall be carried out by suitable staff who are fully acquainted with the machine and warehouse equipment. This standard, the manufacturer’s instructions and valid general safety requirements shall be observed.

10.4.1.4 Maintenance records shall be kept.

10.4.1.5 Before maintenance work commences, the main isolator shall be switched off and locked (see 5.6.1 and 5.6.2). The key shall be kept in a safe place.

10.4.1.6 If for such work it is necessary to switch on the electric power to move the machine, appropriate measures shall be taken to avoid hazards to persons (see 5.8.5).

10.4.1.7 Work shall be carried out from safe positions. If it is not possible to perform work from such positions staff shall be protected by other temporary measures.

10.4.1.8 Defects or damage which are found during maintenance work shall be corrected immediately or reported for repair. In the event of an obvious hazard for the operator or the machine, the equipment shall be stopped immediately; the machine shall not be started again before the defect has been repaired.

10.4.1.9 In the case of two or more machines running on one rail, it shall be ensured that the staff performing the work are not exposed to any danger from the other machine(s) still in operation. Where possible the machine to be serviced shall be moved to a separate secure area. If the machine cannot be moved, procedures shall be implemented to protect the personnel working on this machine from the operating machine (see 5.8.5).

10.4.1.10 When any of the safety devices specified in 5.2.6, 5.3.3, 5.3.4, 5.4.1.2 and 5.4.3 c) has been acti-

vated, provision shall be made to ensure that the cause of the activation has been rectified and the safety device has been correctly reinstated before normal operation is resumed. These provisions (e.g. a safe system of work) shall be arranged so as to prevent unauthorised operation.

10.4.2 Periodic inspection and testing

10.4.2.1 Machines shall be inspected as to the **operational safety** in accordance with the instruction handbook but at least once a year. This periodic inspection shall be carried out by **persons authorised for this duty in accordance with national regulations.**

The periodic inspection shall include a visual inspection, a functional test at rated load and additional load (e.g. operator) of the condition of structural components and the machine, a verification of completeness and the correct functioning of all safety devices. The functioning of the overspeed governor shall be tested by manual triggering. This may be done with the safety gear uncoupled.

10.4.2.2 Machines shall also be inspected after major repairs (e.g. repairs on structural components by welding) and conversion work. The extent of testing required is determined by the extent of repair or conversion work to be done.

10.4.2.3 Written records shall be kept of the results of all inspections. These records shall contain the findings of the first and of the subsequent periodic inspections together with those of tests after major repair and conversion work and, if applicable, certificates of type approval and of testing done during manufacturing.

The records shall include the information in 9.3 except that the name and signature shall be of both the **authorised person** and the **responsible user of the equipment**.

10.4.2.4 The date of the next inspection shall be displayed in a clearly visible manner in the operator's position. In the case of a machine without an operator's position the inspection date must be displayed in a clearly visible place.

10.4.2.5 Safety components that are designed with a limited service life shall be examined by a **competent person** at the end of the period fixed by the manufacturer to determine the effects of wear and tear on the continued safe use of the machine. Depending on the result of this examination, the components shall be assessed for continued use, repair or replacement.

6 The "instruction handbook" section in select product standards

The "information for use" section mandatorily required in a safety standard under EN 414 is lacking in EN 528. What content should be contained in the "user instructions" sub-section emanates from EN 292–2 (see chapter 4.2.2 of this study). Contrary to these stipulations, the standards body has decided to include a normative section entitled "Information for use" in the standard. The information required under EN 292–2, e.g. on transport, installation and assembly along with information on the machinery itself (e.g. assessories), is lacking. Issues relating to installation are addressed in a separate section 8.

The following excerpts from section 10, "Information for use", therefore essentially contain statements on the topics of operation, maintenance and disruption.

The required reference to EN 292–2 is lacking in section 10.1 as a result of that stated above. It is stipulated in sections 10.1.1 "Operation and use" and 10.1.2 "Maintenance, repair and fault-finding" that all necessary information must be in accordance with sections 10.3, "Conditions for the safe operation of equipment", and 10.4, "Maintenance, inspection and testing". These sections, however, do not contain any information and data conforming with section 5.5.1 of EN 292–2 – rather, inadmissible instructions are issued to users. These are in part spurious and imprecise (e.g. 10.3.1, sentence 1 in 10.4.2.1), go beyond the scope of this standard (e.g. 10.3.7) or fall under the scope of the Directive under Article 118a of the EC Treaty or its national transposition and subsequent national regulations (e.g. 10.3.2, 10.3.4).

A host of terms for persons who can scarcely be distinguished from one another are used throughout the entire section 10 of this standard (operator, authorized persons, user or his authorized representative, persons authorized by name in writing, all personnel, persons authorized to use, personnel, staff, user, suitable staff, persons authorized for this duty in accordance with national regulations, responsible user of the equipment), which as a whole does not contribute to the clarity of these statements.

In part the instructions provided are completely inaccurate, such as, e.g., sentence 2 in 10.4.2.1: It is not the standards body, but rather manufacturers, who specify in their instruction handbooks which tests are to be conducted in detail on the storage-retrieval equipment designed by them and which knowledge inspectors should possess. Regardless of the specific manufacturers' requirements in the instruction handbook which are directed at users, more far-reaching inspection regulations may be contained in accident prevention regulations – as legally binding requirements for companies and operators of this storage-retrieval equipment – if this appears necessary from the

perspective of accident insurance institutions including more far-reaching considerations relating to the specific company. Pointing this out is not the task of this standard and does not provide any advantage for manufacturers in their capacity as the parties addressed by the standard.

The instruction contained in sentence 2 of number 10.4.1.3 completely fails to address the subject matter, as it is the task of the manufacturer to point out possible risks involved in the maintenance and if need be the required qualifications of those responsible for the maintenance. The information in the instruction handbook in and of itself should be sufficiently informative so that operators do not have to resort to "foreign" machinery safety standards with supplementary reference to additional standards which also apply in order to perform their maintenance work. This would be a skewed development. The reference contained in 10.4.1.3 to the fact that **this standard and valid general safety requirements shall be observed** is meaningless, reveals the inadequacy of the instruction handbook/maintenance handbook presented and, moreover, stands in contradiction to section 5.5.1 of EN 292–2.

"Periodic inspections" are called for in number 10.4.2. Such inspection obligations in standards under the EC Machinery Directive, which lie outside the visual and functional inspections (15, 22) of work equipment **only** allowed with regard to **first commissioning**, are not covered by the application area of the Directive – distribution and commissioning (23) – and as a consequence must be deemed to be restrictions on trade. The need to prepare standards in support of number 1.7.4 „Instruction handbooks" of Annex I of the EC Machinery Directive does thus not include periodic inspections. According to number 1.3.2 of Annex I the manufacturer must, however, state the type and intervals of inspection and maintenance work relevant to safety. These must be set out in concrete terms solely in product-specific standards.

Independently of the above-stated instruction obligations pursuant to maintenance, which may be set out concretely in standards, users and operators are obligated under article 4, section 2 of the Use of Work Equipment Directive (89/655/EEC) and § 4, section 4 of the German Work Equipment Usage Ordinance respectively to take the required precautions to ensure that the work equipment conforms to the required protective level throughout its entire usage life. In order to meet this obligation, employers integrate the pertinent data in the instruction handbook of the manufacturer in the operating maintenance measures which are to be carried out.

Periodic inspections of machinery or systems requiring inspection or monitoring are subject to the national regulations. These special operator obligations are con-

tained, e.g., in article 4a "Inspection of work equipment" of Directive 95/63/EC (21) (which has not yet been transposed into national legislation) pursuant to an amendment of Work Equipment Directive 89/655/EEC and in subordinate national regulations, e.g. in statutory regulations and accident prevention regulations. Periodic inspections as a regulatory subject in standards under "100a directives" are thus in the wrong place.

As a whole it should be kept in mind that the content and outline of the "information for use" section does not conform to the stipulations of EN 292–2. The VDI Guideline 2620 "Guidelines for the compilation of an instruction handbook for continuous transporters" (16) meets the requirements made of instruction handbooks much more effectively in this context by stipulating a respective outline with detailed information analogous to EN 292–2.

Example 4

European standard of CEN/TC 186: EN 746 "Industrial Thermoprocessing equipments"

The 746 series of standards consists of a total of 8 particular standards. General and generic regulations are contained in parts 1 to 3. Parts 4 to 8 are devoted to thermoprocessing equipments.

Part 1: Common safety requirements for industrial thermoprocessing equipment; EN 746–1: 1997"

Part 2: „Safety requirements for combustion and fuel handling systems; EN 746–2: 1997"

Part 3: „Safety requirements for the generation and use of atmospheres gases; EN 746–3: 1997"

Part 4: „Particular safety requirements for hot dip galvanising thermoprocessing equipment; prEN746–4: 1994"

Part 5: „Special safety requirements for salt bath thermoprocessing equipment; prEN 746–5: 1994"

Part 6: „Particular safety requirements for liquid phase treatment thermoprocessing equipment; prEN 746–6: 1994"

Part 7: „Special safety requirements for vacuum thermoprocessing equipment; prEN 746–7: 1994"

Part 8: „Particular safety requirements for quenching equipment; prEN 746–8: 1994"

In the standards of the 746 series, the „information for use" section is incorrectly used, contravening the above-mentioned stipulation in EN 292–2 to direct comprehensive instructions to users of the plant themselves. For this purpose general statements are first of all made in part 1, to

which subsequent parts' instruction handbooks together with their respective plant-specific amendments make reference. This will be clearly shown in the following citing part 1 in connection, e.g., with part 6.

EN 746–1

The document specifies common safety requirements for industrial thermoprocessing equipment (for example industrial furnaces and industrial heating equipment), which meets the definition for machinery given in EN 292–1. The document is applicable to industrial thermoprocessing equipment for use in fields such as metallurgical and metal working plant, glass making plant, ceramic manufacturing plant, cement, lime and gypsum manufacturing plant, chemical plant, waste incineration equipment, heated by gaseous, liquid, solid or mixed fuels or by electricity. The document is not applicable to blast furnaces, converters (in steel plants), boilers, welding machines or food processing equipment.

The comprehensive instructions for manufacturers and users in the "instruction handbook" section in this standard are of a multifarious nature:

6 Information for use

6.1 General

6.1.1 The information for use handbook shall make reference to the following:

- ☐ The foreseeable use for which the equipment has been designed;
- ☐ That the equipment has been designed for use by trained operators or supervisors.

The information for use handbook shall draw the user's attention to hazards that experience has shown can occur.

Additional specific requirements shall be given if the equipment is designed to operate in potentially explosive atmospheres.

6.1.2 The format and content of the information for use handbook shall comply with clause 5 of EN 292–2:1991.

6.2 Marking

...

6.3 Technical Data, Installation and Commissioning

Technical data, installation and commissioning instructions shall be provided

and shall contain at least the following information:

6.3.1 …

6.3.2 The flooring around the equipment shall be non-combustible (class of reaction 0);

NOTE:
See Annex F of prEN 1539:1955 for further information.

6.3.3 The accidental leakage of molten materials or dangerous liquids should be prevented or contained by tanks or collecting pits in case of emergency situations.

Means should be provided for the collection and removal of such discharges.

Storage and use of flammable materials in the vicinity of the equipment is prohibited.

6.3.4 …

6.3.5 During installation and demolition operations, technical means and individual protection shall be provided to ensure the safety of persons, property and the environment.

6.3.6 **The user** shall ascertain that the room or location intended to hold the equipment and the means required for construction and installation comply with the safety requirements of this part of this standard. **Adequate ventilation shall be provided**.

If necessary, the building containing the equipment or the equipment itself, if partially or completely located in the open air, shall be protected from atmospheric electrical discharges (i.e. lightning).

…

6.3.9 If shut-down resulting from a failure of electrical supply is dangerous, the **user** should provide in the equipment **either a preferential supply system or a stand-by supply system or install equipment with automatic start-up and operation**.

If appropriate, automatic admission of inert gas to the equipment should be adopted by the **user** in the event of a power failure to pressurise and/or purge the equipment.

6.3.10 If applicable the **manufacturer** and the **user** should **agree** on the date and conditions for the start-up and for the acceptance testing of the equipment in accordance with the stated **conditions for the use**. It is recommended that, prior to start-up, a test report should be drawn up countersigned by both parties.

An example of a suitable test report is given in Annex B.

Supervision of commissioning until hand-over of the equipment shall be the responsibility of the manufacturer in the absence of any other special documented agreement.

When delivery, commissioning and testing have been carried out and the user has accepted the equipment, responsibility passes to the user unless any other special agreements have been made.

6.4 Instruction Handbook (Operation)

The manufacturer shall supply an operating instructions manual covering the description of the equipment, the heating system and all auxiliary systems. These instructions accompanied by diagrams, drawings and leaflets when applicable, shall contain at least the following details:

- ☐ data plate information;
- ☐ type of equipment;
- ☐ heating and fuel, burner, electrical installations;
- ☐ air borne noise emission (see prEN 1547);
- ☐ safety and regulating devices;
- ☐ starting, operating and shut-down arrangements;
- ☐ when possible, action to be taken in the event of faults or irregularities and abnormal operation;
  NOTE: When it is not possible to include such information in the instruction handbook then such actions should be recorded in a special hazard prevention user instruction manual.
- ☐ use limitation;
- ☐ instructions for preventing hazardous conditions by suitable user training and control;
- ☐ details of necessary emergency escape routes;
- ☐ consideration of the effect of equipment failure and instructions to prevent it through appropriate maintenance, training, service life of components;
- ☐ personal protection requirements for special workstations, if applicable.

The manual shall include at least the following:

…

6.4.8 Information that the instruction handbook should be updated by the

user where modifications are made by the user after the original installation

6.4.9 …

6.4.10 Instruction that the equipment shall be started and stopped in accordance with the manufacturer's written instructions.

6.4.11 …

6.4.12 Instruction that the efficient operation of safety and control equipment shall be the responsibility of competent personnel, who shall be instructed to inform the supervisor of any hazards or faults which arise during the operation of the equipment.

…

6.4.15 Instruction that where it is not possible to avoid contact with hot elements, suitable protective clothing shall be used. This also applies where hot gases and vapours can exhaust, to hot workpieces during charging/discharging or where hot parts or fluids can be ejected (see also ISO 7243). Advice on medication to counter dehydration, etc. shall be given, if applicable. Troublesome and harmful draughts shall be avoided. The thermal stress and physiological effects of wearing specified protective clothing shall be considered.

6.4.16 …

6.4.17 Instruction that electromagnetic fields, marked as such, shall not be entered by persons having heart pace makers or metallic implants or who are wearing metallic rings, bracelets etc.

…

6.5 Instruction Handbook (Maintenance)

…

6.5.5 The safety, regulating and measuring devices shall be subject to periodic inspection and if necessary, adjusted, serviced or replaced to ensure their continued efficient operation and suitability for service. In particular the calibration of the devices and their efficiencies shall be checked by means of periodical test operations at frequencies detailed by the manufacturer. Such checks shall also be carried out after modifications or maintenance of the equipment. The results should be recorded.

6.5.6 A periodic inspection and maintenance programme, carried out at the frequency detailed by the manufacturer, shall be established to verify that the equipment continues to perform correctly for thermal, electrical and mechanical

performance conditions as well as for proper functioning of any components.

6.5.7 The periodic inspection and maintenance programmes shall be performed by competent and trained persons.

If, during one of these inspections, a faulty or ineffective safety device is discovered, then the equipment shall be made safe or be shut down until the proper functioning of the safety device has been restored or the safety device has been replaced or serviced (see also 6.5.4).

6.5.8 Essential maintenance operations carried out in hazardous areas such as

- ☐ working in gas-danger areas;
- ☐ working on or in gas pipes;
- ☐ welding in confined spaces;
- ☐ cleaning waste gas systems;
- ☐ working in access channels or confined spaces

shall be carried out by competent and trained persons who fully understand the risks involved. In such case a second person shall be present and they shall maintain close communication during the operation concerned.

Essential maintenance operations carried out in hazardous areas shall be authorised and performed in accordance with a PERMIT-TO-WORK Certificate. A typical PERMIT-TO-WORK certificate is shown in Annex C.

…

6.5.13 The maintenance of vent system and their detecting instruments (if applicable) shall be carried out together with periodic sampling of the working environment (if applicable). Adequate room air changes shall be provided.

The manufacturer shall specify any devices or instruments to be provided by the user which are considered necessary to detect and warn of hazardous environmental conditions.

NOTE: The user is responsible for operations which involve dismantling, the taking down of parts for major repairs or modifications, repairing the furnace walls, demolition and the complete removal of the equipment to ensure the safety of by-standers and the environment.

When major works are involved a supervisor should be responsible for coordinating the work of the persons carrying out the contract to ensure the safety of all personnel in the area. The work should be programmed if applicable.
…

6 The "instruction handbook" section in select product standards

Instructions for manufacturers and users are grouped according to their different weighting into the following:

- Civil-law contractual and usage conditions are recommended for the transfer of the plant from the manufacturer to the operator (e.g. 6.3.10),
- recommendations are issued to users which are solely the domain of manufacturers in their instruction handbook in accordance with their specific plant (e.g. 6.3.9),
- obligations are aimed at users which are spurious due to the principle that standards are addressed at manufacturers (e.g. 6.3.6, last paragraph in 6.5.8, note in 6.5.13),
- entreaties are issued to instruct personnel which are sufficiently regulated in the occupational health and safety directives issued under Article 118a of the EC Treaty and fall exclusively in the domain of the employer's right to issue regulations (e.g. 6.4.10 to 6.4.17),
- questionable information (see 6.4.8) is addressed by the standards body to manufacturers: "The instruction handbook should be updated by the user where modifications are made by the user after the original installation." No statements are made as to the nature of the changes (significant or insignificant). Here conflicts may be built-in – in accordance with article 8, section 6 of the EC Machinery Directive or § 3, section 4 of the Machinery Ordinance.

EN 746–6

This part of EN 746 gives the specific hazards that shall be provided by the manufacturer of equipment for **liquid phase treatment** whether it is used as an independent unit or an integrated part of a plant.

As a result of its importance in this study, the information for use provided in this standard is also rendered verbatim below:

7 Information for use

7.1 General

The manufacturer shall provide the user instructions which are full and comprehensive for installation, use, maintenance and dismantling of the equipment **in accordance with the requirements of** EN 746–1 and **this standard**.

The manufacturer shall remind the user that **the equipment has been designed for use by trained operators or supervisors in accordance with the following points**.

7.2 Specific information to be provided

...

7.2.2 Personal protective equipment (PPE)

A statement that the following equipment shall be worn when working with material melting, remelting and liquid phase maintaining the thermoprocessing equipment as follows:

a) Face Protection e.g. constructed of self-extinguishing material such as polycarbonate mounted on a suitable helmet in such a form that the face and skin are protected in accordance with EN 166;

b) Protective suits e.g. constructed of cotton with flame resistant chemical impregnation in accordance with EN 531;

c) Shirts e.g. constructed of cotton, they shall have long sleeves fastened by buttons or velcro in accordance with EN 531;

d) Protective gloves e.g. constructed of heat resistant material. They shall be easily removable from the hands in accordance with En 531;

e) Protective shoes e.g. constructed of leather with a friction/slip resistant sole in accordance with prEN 345 and prEN 346.

A statement that personal protective equipment shall be regularly cleaned.

7.2.3 Emergency items

A statement that the following items shall be available in or near the location:

a) Fire fighting equipment, e.g. protective clothing for fire fighters in accordance with EN 469;

b) Breathing apparatus, e.g. respiratory protective devices in accordance with EN 137;

c) Shower room(s);

d) First aid equipment.

7.2.4 Uncontrolled immersion or spillage

A statement that:

a) Only dry parts or pre-heated parts should be charged;

b) New or replaced linings should be properly dried. Guidance should be given on suitable means.

7.2.5 Charging combustible material

A statement that:

a) Combustible material should not be charged to molten material;

b) Provision of suitable fire fighting equipment should be installed, its location known and its operation understood and operators should be trained in its use;

a) Unauthorised persons should be prevented from entering the processing area.

7.2.6 Inadvertent contact between chemicals and use of operational chemicals

Process chemicals used in molten metal and glass process can, in combination, and when subject to the heat of the process give off toxic or unpleasant fume.

A statement that:

a) Ensure that the process chemicals used are compatible and where potential or foreseeable chemical reactions are known then precautions should be taken to separate the chemical concerned.

b) Adequate provision should be built into the instruction handbook to guide and warn them of the known dangers.

7.2.7 Concentration of explosive dusts

Guidance should be given on:

a) Preventative maintenance schedules to prevent accumulation of dusts;

b) Use of work permits and their contents.

7.2.8 Glare

A statement concerning the need to provide suitable protective equipment and the recommended type.

Goggles should be indicated in the information for use.

7.2.9 Starting/stopping procedures

Clear and precise instructions shall be stated for starting and stopping and failure.

7.2.10 Failure of cooling system

A statement that:

a) The location of emergency switches is identified;

b) The provision and location of auxiliary power supplies (if applicable) is detailed;

c) The means for leaving the equipment in a safe condition when emergencies are identified.

7.2.11 Maintenance of the equipment

A statement that:

a) During work (repair, maintenance) in the area of the bath above its normal

operating position, the bath shall be covered;

b) The user is advised to carry out checks as detailed by the manufacturer at the frequencies indicated (see table 2 for examples) and that records should be made of these checks.

7.2.12 Immersion of combustible material in the bath

A statement that unauthorised entry into the equipment or area shall be prevented.

7.2.13 Handling harmful materials

The need to handle harmful materials can cause injury by the handling method and also as a result of accidental spillage of the material.

A statement that:

a) Clear information is to be given in the information for use to the requirements for handling such material and its transportation and storage;

b) Make special reference to the requirements concerning the need for and the type of protective equipment to be worn and the special (if any) training arrangements that are necessary.

7.2.14 Oxygenation emergency

In the instruction handbook indicate that an oxygenation emergency station should be provided in the vicinity.

Require that warning panels are provided and controlled access areas are defined, together with instructions for entering those areas.

For example instruction shall be given forbidding entry into an area alone without being watched by a person outside capable of releasing alarms and of organizing aid immediately in case of accidents (see also EN 746–1 clause 6.5.8/Annex A PERMIT-TO-WORK certificate).

Portable CO dose indicators should be worn by the operators."

At the beginning of the "information for use" section of EN 746, part 1, **all** requirements (instructions) are referred to. Manufacturers are accordingly required to inform operators on the installation, operation, maintenance and dismantling of the plant.

6 The "instruction handbook" section in select product standards

In fact, this often involves **well-formulated instructions** which, however, also go beyond the above-stated substance matter (e.g. handling, transport, storage of „harmful" material in section 7.2.13). **These instructions no longer allow manufacturers any latitude in drafting their instruction handbook.** This applies in particular to the specific features of the **17 different types of plant** listed in Annex A (normative) of the standard from the areas of glass, ceramics, cement and metal.

In section 7.2.2, for example, compulsory information on the wearing of personal protective equipment is addressed without the question first being posed and answered as to **which** existing **residual risks** which cannot be removed with any other equipment **require which protective equipment** to counteract these risks. A certain quality cannot be conclusively determined by the standards body or the manufacturer, either, because the quality of personal protective equipment (PPE) requires a comprehensive assessment. This is the task of employers. They must undertake to obtain a holistic view of the workplace and select the respectively **suitable and individually required** personal protective equipment in conformity with § 5 "Assessment of work conditions" of the German Occupational Health and Safety Act (17) in connection with § 3 „Availability and usage" of the German Work Equipment Usage Ordinance (2) and, if need be, existing accident prevention regulations, including § 3 of the German PPE Usage Ordinance (18). Requiring work shirts which are not deemed to be protective equipment in a standard without any apparent need for such a measure makes little sense.

The note in the standard that personal protective equipment must be cleaned regularly as a rule has nothing to do with the safety of the plant and the protection of employees against residual risks and is therefore in the wrong place. This obligation on the part of employers is regulated in § 2, section 4 of the PPE Ordinance.

In a similar manner, section 7.2.3 is also incomprehensible and incomplete. Here equipment is required for emergency cases even though the standards body does not discuss possible emergency cases or specifically describe their risks to help manufacturers.

The equipment required in sections 7.2.8 and 7.2.14 does not bear any relationship to the intended operation of the plant. Where and under which circumstances residual risks are to be expected as a result of oxygen enrichment is not stated. Standards **must not contain any blanket requirements** for emergency stations.

The extent to which results of inspections are to be stored for the supervisory authorities under section 7.2.11 is not a concern of the standards body, either.

6.3 Examples of adequate „instruction handbook" sections in European standards

Example 5

European draft standard of CEN/TC 153:
prEN 12463:1996 "Food processing machinery – Filling machines and auxiliary machines – Safety and hygiene requirements"

This document applies to filling machinery which is used to fill, portion and twist off the feed flow for meat products and other food. Linked-up auxiliary machinery also serve to fill, portion, twist off, but also shape and hang up.

The „information for use" section in the above-stated standard targets manufacturers and avoids making well-formulated instructions for third parties.

Manufacturers of filling and auxiliary machinery are first of all instructed that the instruction handbook to be drafted by them is to be executed on the basis of section 5 of EN 292–2. Secondly, the standard states that additional product-specific information is necessary for intended operation and for the cleaning and maintenance work required. Special requirements are provided in the standard on safety and hygiene measures which are to be taken into account when operating food machinery. According to these requirements, manufacturers must consider whether they should perhaps offer in their documents training information for users of the machinery or whether they consider special training measures and follow-up training to be necessary.

The following "information for use" section can be viewed as exemplary in terms of its structure and diction.

7 Information for use

7.1 Instruction handbook

The operating instructions shall be in accordance with section 5 of

EN 292–2:1991, and additionally contain the following information:

7.1.1 Information relating to the use of the machine

- ☐ Information for installation and adjustment
- ☐ Information relating to adjustment elements

- ☐ Information relating to devices which stop the machine
- ☐ Information relating to hazards (e.g. in the infeed hopper, which can not be eliminated by the safety devices of the manufacturer)
- ☐ Information relating to specific hazards which can under certain circumstances of use or under certain circumstances of use of accessories occur
- ☐ Information relating to the use of interlocked step or interlocked ladder
- ☐ Information relating to the use of a two hand control at the hopper edge
- ☐ Information relating to the use of a hinged infeed hopper or hopper upper part
- ☐ Information relating to closing of the cover
- ☐ Information relating to the treatment of product running out of product casings on auxiliary machines

7.1.2 Information relating to cleaning and maintenance of the machine

- ☐ Information relating to the closing of the cover over external electrical components[1] if the machine is being cleaned with a water hose or a high pressure cleaning device.
- ☐ Information relating to the removal of cleaning agents and disinfectants as well as the removal of cleaning water from recessed areas.
- ☐ Information on the
  - Method of cleaning
  - Type of cleaning agents
  - Method of disinfection
  - type of disinfection agents
  - Types of rinsing agents.
- ☐ Information on the fitting and removal of the piston and the feeder
- ☐ Information on the nature and frequency of inspections and maintenance actions
- ☐ Information on the types of oils and/or greases to be used for lubrication
- ☐ Drawing and diagrams to enable service personnel to carry out these instructions

7.2 Training of operators

The information for use shall include informations on the necessary training, on the dangers which are incorporated with the use and cleaning of filling machines and auxiliary machines, and – if necessary – the recommendation, that operators should be instructed after the installation by a representative of the manufacturer or supplier of the machine.

[1] Author's note: The corresponding degree of protection IP should be demanded in section 5 of the standard.

Example 6

European standard of CEN/TC 202: EN 869 "Safety requirements for metal diecasting units", 1997

This document describes the foreseeable risks involved in the building, transport, commissioning, operation, maintenance, decommissioning, safety requirements and measures for metal pressure-casting machinery and ancillary facilities to be complied with by manufacturers which are an integrated part of the diecasting procedure.

Manufacturers/designers will learn about a targeted procedure with regard to the instruction handbook to be drawn up by them when they read the „instruction handbook" section quoted in the following. They will be instructed that they first of all have to take into account generic aspects resulting from section 5 of the basic standard EN 292–2 and secondly the requirements set out in the pertinent type C standard specific to pressure diecasting machinery. Furthermore, manufacturers are informed that they should allow special models of their machinery or special features deviating from the standard to be taken into account in the drafting of an instruction handbook which fulfils **all** instruction obligations.

The relationship created between section 7.3, letter d), third to the last paragraph, and section 5.9.1 (technical safety requirements) of this standard is very informative for the manufacturer. This involves the identification of special hazards with regard to lacking or dismantled protective facilities during the removal of the disturbance or the maintenance. Manufacturers must make special reference to this in their instruction handbook and if need be describe other effective substitute measures.

7 Information for use

7.1 General

The essential requirements for the instruction handbook are listed in clause 5 of EN 292–2:1991.

In addition to these requirements special consideration shall be given to the following points:

7.2 Minimum marking

...

7.3 Instruction handbook

The manufacturer shall provide an instruction handbook for each machine (see also clause 5 of EN 292–2:1991)[1], covering all auxiliary systems. In this manual, the characteristics and measures

[1] Author's note: Information in brackets can be despensed with.

specific to diecasting machines shall be designated. The following points describe examples of the structure and content of an instruction handbook and shall be completed or extended in consideration of the specific machine.

a) Machine declaration, especially,

- ☐ manufacturer, type of machine, year of manufacturing, serial number (if any) etc.;
- ☐ technical documents (circuit diagrams, parts list, data sheets, information/reference for spare parts etc.);
- ☐ for **intended** use with details to interfaces of additional/optional machines and equipment;
- ☐ for **non-intended** use (e.g. prohibition of specific materials for casting, forbidden use of specific auxiliary equipment);
- ☐ details about noise emission according to 1.7.4f.) of annex A of EN 292–2:1991, determined with prEN 1265, where necessary reference to use personal protection equipment, e.g. ear protection;
- ☐ description of auxiliary equipment/systems and tie into control of these (e.g. emergency stop, effect to the safety devices).

b) details about transport, setting up/installation, especially

- ☐ lifting instructions (e.g. transport rig, ring bolt);
- ☐ transportation weight;
- ☐ transport safety devices and removal of these before commissioning;
- ☐ plant layout/installation conditions (foundation plan, building requirements);
- ☐ reference to installation/assembly of the machine or single parts of the machine;
- ☐ reference to overturn protection and falls from high areas..

c) details about commissioning and de-commissioning, especially

- ☐ details about provision of energy (electric, hydraulic, pneumatic);
- ☐ details about fluid capabilities, specific fluids (e.g. low flammable high pressure fluids);
- ☐ details about fitting of special devices (e.g. tempering units);
- ☐ details about starting, operation and shut-down;

- ☐ details about inspection of safety devices before commissioning and prohibition ofunauthorized reconstruction and modification;
- ☐ reference for de-commissioning (e.g. disposal of high pressure fluids, emptying instructions).

d) operating instructions, in particular

- ☐ details about the availability safety devices;
- ☐ details about regular inspection of safety devices;
- ☐ details about characteristic hazards (e.g. electrical, hydraulic, special reference to setting up and re-commissioning after setting-up);
- ☐ references if processing such metals which generate gas, fume or dust hazardous to human health, reference to the user, that ventilation systems shall be available in that case and information how they could be connected to the machine;
- ☐ description of safety related control systems;
- ☐ operator
  - – references about the qualification level of operators
  - – introduction of the operator on how to operate the machine
  - – introduction to safety devices and the approach if an accident occurs;
- ☐ action in the event of faults or irregularities and abnormal operation;
- ☐ references for preventing hazardous conditions by instruction for the user, such as explosions caused by reaction between wet material and molten metal;
- ☐ references using devices to remove hot casting parts and reference to use personal protection equipment;
- ☐ references to residual risks like
  - – vibration
  - – radiation
  - – hot surfaces in the tool area and in the area of melting furnaces and feeding of material
  - – handling and storage of hot die parts in respect of surrounding conditions and protection of persons
  - – flying off of material parts;
- ☐ reference to particular hazards in case of access on special occasions (e.g. maintenance, trouble-shooting) shall be pointed out in the instruction handbook and on the machine by marking/symbols referring to the nature of hazard (see EN 61310–1). If

the protective devices are not available during this action the applicable measures shall be described in accordance with 5.9.1;

- ☐ references to hazards due to
  - – non-relieved pressures
  - – malfunction of programmable electronic systems
  - – temperature
  - – fire
  - – explosive atmospheres;
- ☐ references to manual handling in accordance with 5.8.

7.4 Maintenance manual ...

7 Evaluation of the specific instruction handbook requirements presented in product standards

The points noted in chapter 6 of this study are assessed and summarised in terms of their essential content in the following.

1. Facilities to be made available by users

Some safety notes in the "instruction handbook" section appear to suggest that it is not the avoidance of residual risks which is involved, but rather apparent flaws in design. This impression which arises is due to the lack of coordination between the "list of hazards", "safety requirements and/or measures" and "instruction handbook" sections.

Thus, for example, in example 1 of chapter 6.2the obligation of manufacturers to compensate for technical deficits in safety in standards is shifted to users. The current formulation of letter h) in section 7.2 of the draft prEN 12409 "Rubber and Plastic Machinery – Hot-Forming Machinery – Safety Requirements" forces users to subsequently introduce lacking fire-fighting systems to avoid the danger of fire on the basis of number 1.5.6 of Annex I of the EC Machinery Directive. Users at the same time are within the domain of article 8, section 6 of the EC Machinery Directive or § 3, section 4, subsection 2 of the Machinery Ordinance (linkage of machinery and parts of machinery) and must at least amend the accompanying instruction handbook of the manufacture and if need be the EC declaration of conformity.

A clear demarcation of responsibilities between manufacturers' and operators' obligations in a manner conforming with the Directive is lacking in the current draft standard.

2. Information and data cannot be conclusive

Information is frequently lacking in the "instruction handbook" section that manufacturers in their instruction handbooks are not only obligated to provide instructions taking into account hazards, safety requirements and the still-remaining, technically unavoidable residual risks addressed in the pertinent product standards, but that they must also address general hazards which are not treated in the special standard in their deliberations pursuant to the drawing up of instruction handbooks. This particularly applies when they have realised supplementary or technical solutions in addition to those which are described in the machinery standard.

In this respect, references such as those made in sentence 2 of section 7.3 of EN 869 (see example 6 in chapter 6.3 of this study) are advisable and contribute to safer handling of machinery. Information of this kind should be formulated in a comprehensive manner, however. An example of this is presented under number 3 of chapter 9.

7 Evaluation of the specific instruction handbook requirements presented in product standards

3. Extension of the mandate

This takes place, for example, when aberrations occur from the principle that standards must primarily address the requirements of design, manufacturing and processes to verify the stipulated technical safety requirements, but not topics relating to usage or certification.

Good examples of this are to be found in the prEN 12195 "Load-restraint assemblies – Safety; Part 3: Lashing chains", EN 528 "Storage-retrieval equipment; Safety" and EN 746, "Industrial thermoprocessing equipment" (examples 2, 3 and 4 in chapter 6.2 of this study). These standards go too far in their claim of providing support. Only manufacturers are addressed by the standard. Employers and employees are not affected by this standard.

The draft standard "Load-restraint assemblies" from example 2 in chapter 6.2 of this study, which is currently the subject of a national appeals procedure, attempts to regulate "safe transport of loads on vehicles" even if the standard can in principle only create the preconditions for lashing chains to be designed in such a manner as to conform to the respective stress requirements when lashing freight. The guarantee for safe transport cannot be completely borne by the standard. Safe transport depends first of all on lashing chains which are designed to be sufficiently safe, and secondly on the quality of the instruction handbook attached by manufacturers and based on the usage purpose, on the intended use of lashing chains by users and on the special features of each situation. The standard not only does not have any direct influence on the latter aspect – it has no mandate to do so, either.

The task of the standard must therefore in particular be limited to stipulating technical safety requirements for lashing chains to secure freights on vehicles (lashing) and providing sufficient information for manufacturers in the "information for use" section.

In example 3, "Shelf-Service Equipment", an excessive number of differently qualified groups of persons are furthermore identified. It would aid clarity if the standard stated which specific work manufacturers should only have performed by trained persons. The requirements pertaining to persons currently formulated in the standard are imprecise and cannot be used. It is not the task of the standard to require "persons authorised in writing and by name", "authorised persons" or "specially appointed persons". Here the position of employers as guarantors is affected. They are solely responsible for the organisation of work and occupational safety in their companies. Periodic inspections constitute barriers to trade from the perspective of the 100a directives. Inspection of machinery which is already located in companies is subject to the regulations of the individual states under article 118a of the EC Treaty.

A need to concretely set out requirements therefore emanates from the section on "information for use", however, for inspection and maintenance work performed in accordance with the requirements of Annex I of the EC Machinery Directive.

Finally, example 4, EN 746, "Thermoprocessing equipment", part 1 in connection with part 6, includes

- an entreaty to instruct personnel,
- blanket statements on making personal protective equipment available
- blanket requirements to establish first-aid and emergency stations and
- obligations to store the results of inspections for the supervisory authorities.

All these examples have in common that they note in the "instruction handbook" section that the instruction handbook must contain appropriate information and data in conformity with EN 292–2, but in fact contains well-formulated instructions for third parties in the subsequent discourse. Direct obligations are even directed at operators in example 4.

Of the total of 6 standards examined within the framework of this study, in the view of the author a distinction can be made between insufficiently and adequately drawn up sections on instruction handbooks (see chapters 6.2 and 6.3). Of the sections on instruction handbooks which are classified as insufficient, three are part of EN standards which have been approved by consultants at the CEN level (CEN consultant) on behalf of the standards organisation. To what extent issues relating to instructions for third parties in the "information for use" section have played a role or continue to play a role in the conclusive perusal of draft standards by the CEN consultants cannot be answered here.

In this context, however, it should be pointed out that standards are not subjected to any controls in the narrower sense of the word. The technical committees are, given the structure of the "New Approach", themselves responsible for controls on the content of standards, so the EC Commission does not become involved in any technical review of whether the mandated adapted standards actually support the essential requirements of the directive. It restricts itself, rather, to adhering to the mandate which has been issued. In this respect, it can basically not be excluded that a standard which is approved of by the CEN consultant may still have deficiencies.

8 Demarcation with the GDS ("Gemeinsamer Deutscher Standpunkt" – "German Consensus Statement")

Reasons to object to machinery safety standards with codes of behaviour for third parties cannot be found on the basis of the GDS (3, 19). Such an approach misses the mark from a formal standpoint as well as in terms of content:

a) From a formal standpoint, the design of instruction handbooks in product standards is not a topic of the area governed by Article 118a of the EC Treaty – rather, it is completely based on Article 100a.

Requirements pertaining to the drawing up and design of instruction handbooks are related to the properties of technical work equipment in the pertinent EC directives (in particular the EC Machinery Directive) under Article 100a of the EC Treaty. These properties are specified in standards in accordance with the New Approach to supporting the so-called "100a directives", and they are the object of inspections of technical work equipment by notified bodies in the harmonised area.

In contrast to this, both the GDS and the EU Memorandum (20), which in term of content takes the same position, refer to standardization in the scope of directives issued under Article 118a. The borderline between the standards to be accepted and the standards to be rejected in support of "118 directives" is drawn in both reference documents.

The scope of both documents, in particular therefore the GDS as well, is restricted to directives issued under Article 118a of the EC Treaty.

b) In terms of content, the GDS and the EU Memorandum relate to a sub-aspect of occupational health and safety with regard to the part which is regulated through directives issued under Article 118a. Directives issued under Article 118a, section 2 stipulate those minimum requirements on the basis of which under article 118a, section 3 the member states are able to claim discretionary latitude in the course of national transposition of such directives. The argumentation of the GDS and the EU Memorandum is based on this legal construction: The decisive argument against standards in the scope of directives issued under article 118a is that standards would restrict the latitude provided member states under the 118a directives, which allow these states to stipulate higher national levels of protection. This latitude and thus the argumentation based on it become a moot point if the prerequisite pursuant hereto, namely an EC directive with minimum requirements, is not in place.

The requirements of occupational health and safety, moreover, go beyond the sub-aspect of circumstances covered by 118a directives. In the part not covered by 118a directives as well, standards may interfere with the interests of institutions responsible for occupational health and safety. This case is to be assumed to exist if machinery safety standards, instead of

8 Demarcation with the GDS ("Gemeinsamer Deutscher Standpunkt" – "German Consensus Statement")

addressing manufacturers, address company regulations for employers/employees.

The argumentation against such a standard would in particular have to be supported by citing the following:

- ☐ neither employers nor employees are the parties the standard is aimed at and therefore are not affected by the stipulations of the standard,
- ☐ the employer's right to give instructions would be undermined by requirements aimed at employers in a standard,
- ☐ instructions aimed at employers and/or employees formulated in the standard may be inappropriate if manufacturers have not applied the standard or have only done so in part
- ☐ interference of the standard with statutorily regulated responsibility on the part of employers for occupational health and safety can be expected to lead to criminal and civil-law consequences in the event of damage occurring.

9 Results and Recommendations

The evaluation of the 6 examples of European standards and draft standards selected, with a distinction being made between insufficiently and adequately drafted sections on information for use/instruction handbooks is essentially influenced by

- codes of behaviour aimed at users, employers and employees (see chapter 6.2, examples 2 to 4) or
- a list of information and data directly addressed to manufacturers which is to be taken into account in drafting product-specific instruction handbooks (see chapter 6.3, examples 5 and 6).

Subordinate to this, other aspects stated below are also taken into account which could be of importance in interaction including

- the "information for use/instruction handbook" section in a standard,
- the instruction handbook of the manufacturer and
- the user instructions of the employer.

The drawing up of the "instruction handbook" section with a list of relevant product-specific information and data as the basis for manufacturers drawing up the instruction handbook is to be given priority over those instructions with conclusive, well-formulated instructions for users (see chapter 7).

The following results and recommendations are derived from this:

1. It should be attempted to make resolution BTS 2 79/1993 feel bound to the requirements of EN 414 in connection with EN 292 and include the intention of the EC Machinery Directive, because there is no reason why under certain conditions more far-reaching information should be made available in standards which manufacturers should also take into account in drawing up their instruction handbooks or maintenance handbooks. The apparent current interest of standards makers in deviating from this to directly address users in the standard with requirements for employers and employees is not the task of the standard and would not reach this group, anyway. In this respect, this skewed development should not be supported for obvious practical reasons alone – not to mention the legal misgivings mentioned in the foregoing (see chapters 4.3 and 5).

2. It should be attempted to make the "information for use/instruction handbook" section be aimed only at manufacturers. Latitudes for instructions aimed at users are not provided for as a result of stipulations in the EC Machinery Directive and would in this respect also contradict directives in the field of Article 118a of the EC Treaty.

3. It should be attempted to make the "information for use" of a type C standard include the following introductory sentence, from which emanates that the information and data presented in the standard cannot be conclusive and complete, the reason

being that the instructions of manufacturers pursuant to safe use must be amended to include those aspects which are not the subject of this standard.

The introductory sentence in the "instruction handbook" section could read:

"The following information and data describe example outlines and contents of an instruction handbook to be drafted by manufacturers. Aspects of those standards which are referred to in this standard must be taken into account. Beyond this, e.g. general risks according to EN 292, supplementary safety facilities or special models of the respective machinery must be taken into account."

4. Instructions of the manufacturer pertaining to safe use addressing users must be oriented towards clear requirements with defined residual risks in the "instruction handbook" section. Corresponding substitute measures, modes of procedure or operations to minimise these residual risks should therefore be proposed in the "instruction handbook" section.

5. Blanket requirements relating to the provision of personal protective equipment or the establishment of first aid or emergency stations do not constitute information which is of any use. Targeted data on preventing hazards only makes sense with regard to defined, pre-stipulated residual risks, e.g. with respect to the use of personal protective equipment. The obligation of employers to produce a detailed assignment of individually adapted personal protective equipment or making special facilities available emanates from the pertinent directives in the field of Article 118a of the EC Treaty or their respective national transposition including subordinate regulations and does not need to be regulated in the standard.

6. Safety facilities to prevent other hazards imposed on users in the standard and to be made available in accordance with number 1.5 of Annex I of the EC Machinery Directive are not allowed if they serve to compensate for design deficiencies (see, e.g., number 7.2, letter h) of example 1 in chapter 6.2).

7. Periodic inspections do not belong in the regulatory domain of machinery standards because such inspections do not fall under the application domain of the EC Machinery Directive. This only covers initial distribution and commissioning of machinery. Periodic inspections can thus not be regulated in subordinate machinery standards. Machinery and plant which require inspection and monitoring are subject to Article 118a of the EC Treaty and subordinate national regulations. The required maintenance and inspection work, however, needs to be concretely specified in machinery standards or instruction handbooks to be drawn up by manufacturers (see example 3 in chapter 6.2).

8. The term "information for use" used as a title for a section in the standard, which leads to confusion, should be replaced by a more suitable term. The above-stated term also represents a subsuming term for all kinds of usage instructions, instruction handbooks, user manuals, operating manuals and technical instructions of the manufacturer. This leads to confusion among experts and the public, the reason being that the content of the "information for use" section is not identical with that of the instruction handbook to be drafted by the manufacturer.

Finally, it is to be kept in mind that the instructions for third parties contained in the case examples presented here, e.g. how users, employers or employers should handle the product, are not due to lacking or insufficient requirements in the relevant reference documents, but result from the application of these requirements in practical standardization work. Standards in support of the EC Machinery Directive just like the essential requirements of the Directive itself are aimed at the manufacturers of products; there is no latitude for requirements to be addressed to third parties.

10 Summary

The reference documents required in drawing up the "information for use" section in machinery safety/product standards of the European Committee for Standardization (CEN) have been comprised in this study "Requirements concerning instruction handbooks in European machinery standards (type C standards) pursuant to the EC Machinery Directive" (see chapter 4). Numbers 1.1.2, "Principles of safety integration" and 1.7.5, "Instructions" of Annex I of the EC Machinery Directive and the supporting basic standards EN 414 and EN 292 parts 1 and 2 and the resolution of BTS 2 79/1993, "Safety of Machinery – Information for use in C standards", are understood to be reference documents in the narrower sense of the study.

In analysing this topic, it appeared to be helpful to quote the pertinent textual passages from the reference documentation verbatim in the study so that questions on the evaluation and assessment of the "information for use" section in standards can be argued solely on the basis of this study for the sake of simplicity.

The drawing up of an instruction handbook by the manufacturer as a document accompanying the product is required in the EC Machinery Directive. Essential requirements pertaining to the content and structure have already been set out in this. In the stated European standards the obligation is pronounced for standards makers to include a special "information for use" section in each machinery safety standard in support of the EC Machinery Directive and to accordingly structure this in a product-specific manner. This in particular includes an "instruction handbook" sentence (see chapters 4.1 and 4.2).

It is undisputed that the existing structural rules are inadequately applied in practise with regard to particular work items with reference to machinery (type C standards). Insufficient co-ordination or even contradictions between the "list of hazards", "safety requirements and/or measures" and "information for use" sections occasionally crop up. This leads to deficiencies in topics addressed in the section on information for use in product standards.

The content of the "information for use" section in a type C standard is dependent on the subject being subjected to regulation and of course on how the responsible standards body applies the requirements set out in EN 414 and EN 292. For this reason it is understandable that this substance matter is supported and depicted in a varying manner in the C type standards. This is not due to the lack of criteria or requirements, however, but rather the standards body itself. Latitude with respect to the design must definitely be provided for and depend upon equipment, machinery or types of plant. The stipulations of the EC Machinery Directive, however, and the EN 414, which here must be considered

in a supplementary manner, should certainly not fail to be taken into account.

As for the "information for use" section, it is also the case that the content of the standard – in accordance with the reasoning behind the EC Machinery Directive – ultimately only represents recommendations. Intended use including foreseeable unintended use can therefore only be stipulated by manufacturers in their instruction handbooks and not in a standard, the reason being that the instruction handbook accompanying the machinery which is drafted by manufacturers on the basis of the respective type C standard depends on the special design of the machinery, which may deviate from the standard, and on the technical safety know-how of the company on the product itself.

The requirement that an **instruction handbook** be drawn up **by the manufacturer** and the drawing up of **user instructions by the employer** emanate from two different legal sources. Conflicts do not arise in practical usage – if the existing responsibilities are respected and preserved in practical application (see chapters 3 and 5).

The apparent need of standards makers to include **"more far-reaching"** information in the "information for use" **section** on the topic "**usage of machinery**" than that which is required in EN 414 and EN 292 led to the recommendation of technical sector board BTS 2 of the European Committee for Standardization (CEN) to direct more far-reaching "information", i.e. codes of behaviour, at the users of machinery in a **separate** part of the standard under certain conditions, being aware that there is no mandate for such. This development should not become the rule (see chapters 4.3 and 5).

With regard to some of the standards which have been examined, it appears that the "information for use" section is incorrectly understood to be the right place to direct codes of behaviour which essentially fall under the domain of occupational health and safety protection directly at users. This would in no way violate the right of employers to give instructions – who can depart from apparent stipulations in a standard for tangible or general reasons – in the legal sense, but in practical terms this would in fact undermine this right. This is why codes of behaviour lead to confusion among parties applying the standard and shifts in competency between directives issued under Article 100a including the European standards in support of the essential health and safety requirements and directives issued under 118a of the EC Treaty (see chapters 6 and 7).

Several standards and draft standards have been subjected to perusal within the framework of this study with respect to their "information for use" sections. Some of them are presented in chapter 6. In evaluating the sections with information pur-

suant to the instruction handbook examined here, a distinction was made between adequately and insufficiently drafted sections (see chapters 6.2 and 6.3). The basis for this evaluation and assessment is the reference documents as stated in chapter 4, their assessment in chapter 5 and the targets depicted in chapter 6.1 of this study. A summarising assessment is provided in chapter 7.

Standards from the area of hand-tools driven by electric motors, which are used commercially and privately, have not been taken into account in this study. They are to be subjected to critical examination in another study pursuant hereto.

No argument against the development of machinery safety standards based on the GDS with instructions for users in the application area of directives under Article 100a of the EC Treaty can hold for both formal and content-related reasons. The reasons supporting the GDS are not needed because there are suitable counter-arguments depending on the particular circumstances, which can be taken from the above-stated reference documents (see chapter 4, 5 and 8).

In chapter 9, recommendations based on the findings of this study are forwarded to the *Kommission Arbeitsschutz und Normung* (Commission for OH&S and Standardization) which could be of help to standards makers in drawing up the "information for use/instruction handbook" section in machinery safety standards.

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