INTERNATIONAL STANDARD

ISO 13200

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1995-12-15

Cranes — Safety signs and hazard pictorials — General principles

Appareils de levage à charge suspendue — Signaux de sécurité et de danger — Principes généraux

Reference number
ISO 13200:1995(E)

Foreword

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

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

International Standard ISO 13200 was prepared by Technical Committee ISO/TC 96, *Cranes*, Subcommittee 6, *Mobile cranes*.

Annexes A to E of this International Standard are for information only.

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Introduction

ISO 13 200 was developed by TC 96/SC 6 to provide a truly International Standard for safety signs and hazard pictorials used on mobile cranes. Safety signs are used internationally to alert the equipment operator to hazards that may be encountered in the use and maintenance of the equipment. These hazards are typically created by functional components, where the hazards cannot be designed out or guarded. These hazards are often machine-dependent and are best by a specific safety sign rather than a general or generic approach.

The provisions of ISO 13 200 cover safety signs that satisfy legal requirements in the European Community, in the United States, and in other parts of the world. Two of the formats included in ISO 13 200 are consistent with prEN 5099-1 and EC Directive 89/392/EEC. The other two formats in ISO 13 200 are consistent with the USA national standard on safety signs (ANSI Z535.4) and meet the requirements of American products liability law.

A selection of hazard pictorials and guidelines for the development of new hazard pictorials are included in informative annexes. Additional hazard pictorials may be added to the annexes at a later date, and other pictorials may be developed and used as appropriate.

Cranes — Safety signs and hazard pictorials — General principles

1 Scope

This International Standard establishes general principles for the design and application of safety signs and hazard pictorials permanently affixed to cranes as defined in ISO 4306–1. This International Standard outlines safety sign objectives, describes the basic safety sign formats, specifies colours for safety signs, and provides guidance on developing the various panels that together constitute a safety sign.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4306–1:1990, *Cranes — Vocabulary — Part 1: General*

3 Objectives of safety signs

3.1 The objectives of a safety sign are to

— Alert persons to an existing or potential hazard

— Identify the hazard

— Describe the nature of the hazard

— Explain the consequences of potential injury from the hazard

— Instruct persons about how to avoid the hazard

3.2 In achieving these objectives, a safety sign should be distinctive on the equipment, should be in a clearly visible location, should be protected to the greatest extent practicable from damage and obliteration, and should have a reasonably long life expectancy.

3.3 Safety signs and hazard pictorials can be located on the machine or in operating service instruction manuals. Safety signs and hazard pictorials located on the machine shall be located near the location of the hazard or the control area to prevent the hazard.

3.4 Care shall be taken to prevent excessive need/use of safety signs and hazard pictorials on the machine, because overuse can reduce their effectiveness.

NOTE Experience has indicated that the effectiveness of safety signs and hazard pictorials is reduced when they begin to exceed approximately 7 in number.

3.5 Safety signs and hazard pictorials can be used in operator and service instruction manuals to highlight areas requiring special care. Their use in manuals is not subject to the recommendation in clause 3.4.

4 Formats for safety signs

4.1 A safety sign is composed of a border surrounding two or more rectangular panels that convey information about hazards associated with operation of a product.

4.2 There are four standard formats for safety signs:

— two–panel safety sign: signal panel, message panel (see 4.4);

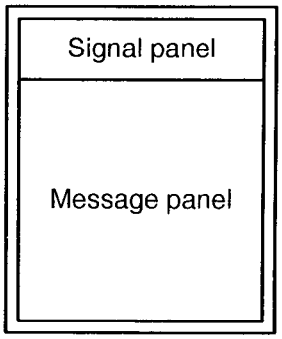
— three–panel safety sign: signal panel, pictorial panel, message panel (see 4.5);

— two–panel safety sign: pictorial panel, message panel (see 4.6);

— two–panel safety sign: two pictorial panels (see 4.7).

4.3 A vertical configuration is usually preferred, although a horizontal configuration is acceptable. Final choice of safety sign format and configuration should be determined by whichever alternative is judged to communicate most effectively, by the geographical and language areas where the product will be marketed, by legal requirements, and by the space available for the safety sign.

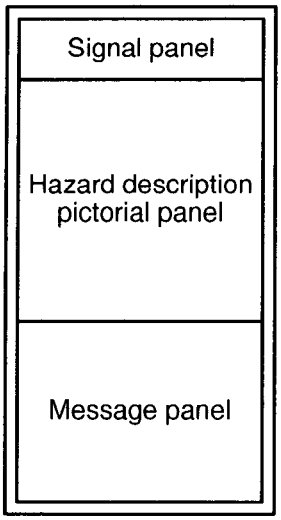
4.4 Two–panel safety signs: signal panel, message panel. See figure 1. The signal panel contains the safety alert symbol and one of the three signal words (CAUTION, WARNING, DANGER). The message panel contains a text message that describes the hazard, explains the consequences of exposure to the hazard, and instructs how to avoid the hazard.



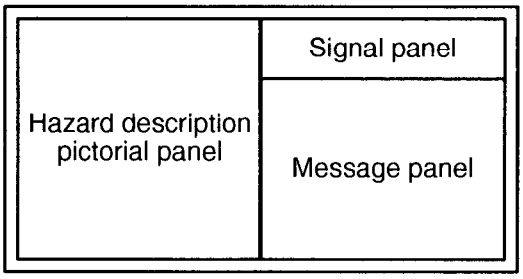
Vertical configuration

Figure 1 — Two–panel safety signs: signal panel, message panel

4.5 Three–panel safety signs: signal panel, pictorial panel, message panel. See figure 2. The signal panel contains the safety alert symbol and one of the three signal words. The pictorial panel contains a hazard description pictorial or, in some cases, a combined hazard description and hazard avoidance pictorial. The message panel contains a text message that describes the hazard, explains the consequences of exposure to the hazard, and instructs how to avoid the hazard.



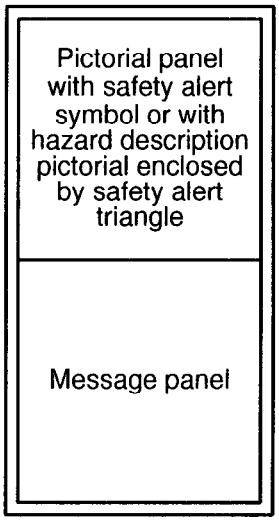
Vertical configuration



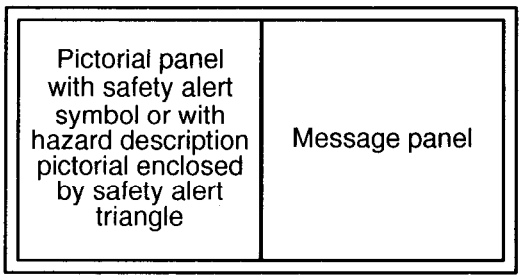
Horizontal configuration

Figure 2 — Three–panel safety signs: signal panel, pictorial panel, message panel

4.6 Two–panel safety signs: pictorial panel, message panel. See figure 3. The pictorial panel contains either a hazard description pictorial enclosed by the safety alert triangle or the safety alert symbol alone. The message panel contains a text message that describes the hazard, explains the consequences of exposure to the hazard, and instructs how to avoid the hazard.



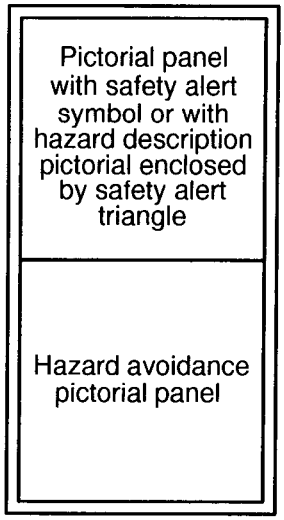
Vertical configuration



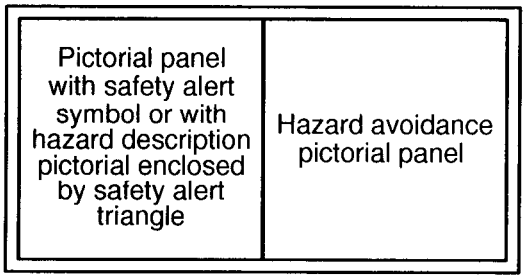
Horizontal configuration

Figure 3 — Two–panel safety signs: pictorial panel, message panel

4.7 Two-panel safety signs: two pictorial panels. See figure 4. The first pictorial panel is the hazard description pictorial panel and contains either a hazard description pictorial enclosed by the safety alert triangle or the safety alert symbol alone. The second pictorial panel is the hazard avoidance pictorial panel and contains a hazard avoidance pictorial.



Vertical configuration



Horizontal configuration

Figure 4 — Two-panel safety signs: two pictorial panels

4.8 Variations on these standard formats may be appropriate for some situations.

5 Signal panel

5.1 The signal panel of a safety sign contains the safety alert symbol and one of the three signal words.

5.2 The safety alert symbol for safety signs that contain one of the signal words shall be as shown in figure 5 and shall be used for safety signs that contain one of the three signal words.

Figure 5 — Safety alert symbol for safety signs that contain a signal word

5.3 Safety signs may be classified according to the relative seriousness of the hazard situation by use of the signal word.

5.3.1 There are three signal words: DANGER, WARNING, and CAUTION. The signal word alerts viewers to the existence and relative seriousness of a hazard.

5.3.2 The three signal words are reserved for personal injury hazards. Choice of the signal word is based upon an estimate of the likelihood of exposure to the hazard and of the probable consequences of exposure to the hazard.

— **DANGER.** The signal word DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

— **WARNING.** The signal word WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

— **CAUTION.** The signal word CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices associated with events that could lead to personal injury.

6 Pictorial panels

6.1 A pictorial panel of a safety sign contains a hazard description pictorial, a hazard avoidance pictorial, or the safety alert symbol alone.

6.2 There are two basic types of pictorials for use on safety signs: hazard description and hazard avoidance.

— **Hazard description pictorial.** A hazard description pictorial presents a visual description of the hazard and, in general, the consequences of not avoiding the hazard.

— **Hazard avoidance pictorial.** A hazard avoidance pictorial presents visual instructions on how the hazard should be avoided.

6.2.1 A well developed hazard description pictorial should clearly identify the hazard and portray the potential consequences of a failure to follow instructions. A well developed hazard avoidance pictorial should clearly identify the actions necessary to avoid interaction of persons with the hazard.

6.2.2 It is possible that both types of pictorial may be combined into a single pictorial, although this generally is quite difficult. Most often, a hazard description pictorial is used. A hazard avoidance pictorial may be used to supplement or to replace the text message.

6.2.3 In a few cases, a pictorial may address more than one hazard. In general, however, avoid addressing more than one hazard by a single pictorial unless the hazards are closely related.

6.3 On two-panel safety signs, the hazard description pictorial shall be enclosed by the safety alert triangle to identify the sign as a safety sign. The safety alert triangle is shown in figure 6.

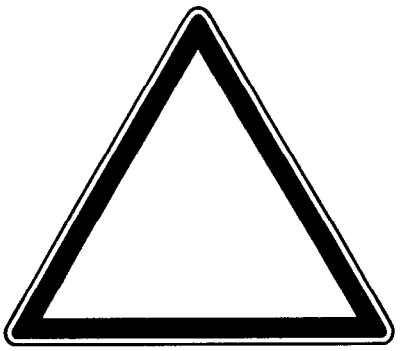


Figure 6 — Safety alert triangle

6.4 If no hazard description pictorial is used inside the safety alert triangle, an exclamation mark is placed within the triangle to create the outline safety alert symbol shown in figure 7.

Figure 7 — Outline safety alert symbol

7 Message panel

7.1 The message panel of a safety sign contains a text message that, either alone or in combination with a pictorial panel, describes the hazard, explains the potential consequences of exposure to the hazard, and instructs how to avoid the hazard.

7.2 If a hazard description pictorial adequately portrays the hazard and its potential consequences, one or both of these elements may be deleted from the message panel. If a hazard avoidance pictorial adequately portrays how to avoid the hazard, that element may be deleted from the message panel. If no pictorial is used, the message panel must convey all three elements. When possible, the message should be written in simple sentences not exceeding a few lines.

8 Languages, translations, and multi–language safety signs

8.1 Safety signs that contain a signal word or a text message should be in one of the languages of the country where the product is to be used. Safety signs without text obviously require no language translation. However, products that use no–text safety signs require both of the following:

— A special safety sign that instructs the operator to consult the operator's manual for an explanation of the safety signs applicable to that product.

— Appropriate text messages, corresponding to the no–text safety signs, printed in the operator's manual in the appropriate language.

8.2 Figure 8 shows, as an example, a four–language "Read operator's manual" safety sign in English, French, German, and Dutch. Other language combinations, or a single language, are also permitted, so long as the safety sign includes the language of the geographical area where the product is to be used.

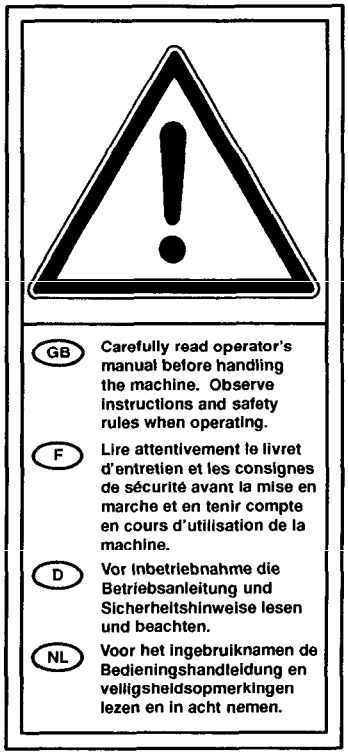


Figure 8 — Example of four–language "Read operator's manual" safety sign for use on products with no–text safety signs

8.3 Figure 9 shows the no–text "Read operator's manual" safety sign. This safety sign may be used as an alternative to a single or multiple language safety sign of the type shown in figure 8.

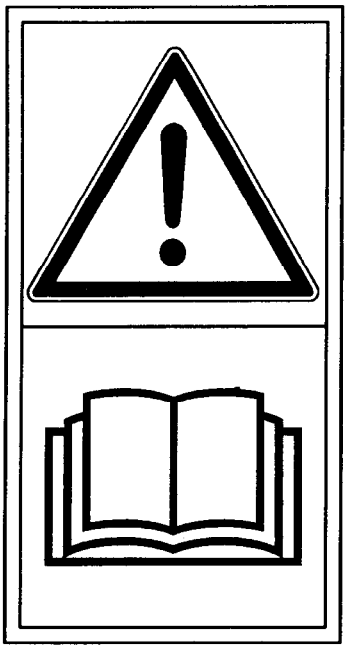


Figure 9 — No–text "Read operator's manual" safety sign for use on products with no–text safety signs

9 Colours of safety signs

9.1 Colours of signal panel

The colour of the signal panel depends on the selection of the signal word.

9.1.1 The signal panel of DANGER signs shall have a white signal word on a red background. The safety alert symbol shall have a red exclamation mark on a white background triangle (see figure 5).

9.1.2 The signal panel of WARNING signs shall have a black signal word on an orange background. The safety alert symbol shall have an orange exclamation mark on a black background triangle (see figure 5).

9.1.3 The signal panel of CAUTION signs shall have a black signal word on a yellow background. The safety alert symbol shall have a yellow exclamation mark on a black background triangle (see figure 5).

9.2 Colours of pictorial panel

The colours of the pictorial panels depend on whether the safety sign contains one of the three signal words.

9.2.1 Pictorial panels of safety signs that contain one of the three signal words shall have a black pictorial on a white background.

9.2.2 Pictorial panels of safety signs that contain the safety alert triangle or the outline safety alert symbol shall have a black pictorial on a yellow background.

9.2.3 Other colours (for example, red to indicate fire) may be used to emphasize specific aspects of the pictorial.

9.2.4 If prohibition of an activity is indicated by ✕ or ⊘ or the word **STOP** (see Annex D, clause D.9), the prohibition indicator shall be red.

9.3 Colours of message panel

The colours of the message panel depend on whether the safety sign contains one of the three signal words.

9.3.1 The message panel of safety signs that contain a signal word shall have white letters on a black background or black letters on a white background.

9.3.2 The message panel of safety signs that do not contain a signal word shall have black letters on a yellow background or black letters on a white background.

9.4 Colour of border

The colour of the border depends on the selection of the signal word and whether the safety sign contains the safety alert triangle.

9.4.1 The border of DANGER signs shall be red. If necessary to differentiate the safety sign from the colour of the surface on which it is affixed, an additional outside border of white may be used.

9.4.2 The border of WARNING signs shall be orange. If necessary to differentiate the safety sign from the colour of the surface on which it is affixed, an additional outside border of white or black may be used.

9.4.3 The border of CAUTION signs shall be yellow. If necessary to differentiate the safety sign from the colour of the surface on which it is affixed, an additional outside border of white or black may be used.

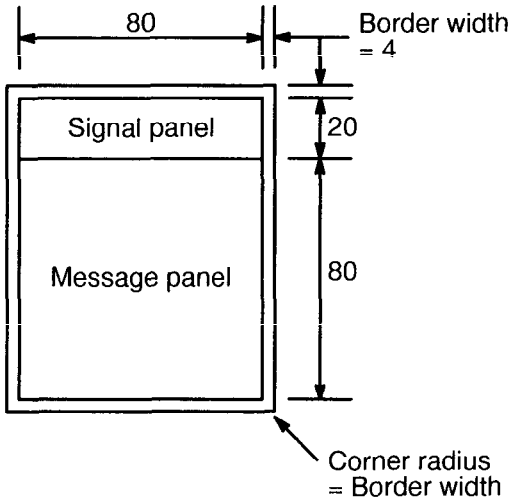
9.4.4 The border of safety signs that contain the safety alert triangle shall be yellow. If necessary to differentiate the safety sign from the colour of the surface on which it is affixed, an additional outside border of white or black may be used.

9.5 Colour of panel separation lines

Any panel separation lines shall be black.

10 Dimensions

Recommended dimensions in millimetres of safety signs are shown in figures 10 to 13. Smaller or larger sizes may be used as required. Proportions may be varied as necessary to provide a sufficiently large signal panel or to provide adequate space for the message panel to be set in a legible typesize.



Vertical configuration

Figure 10 — Recommended dimensions: two-panel format: signal panel, message panel

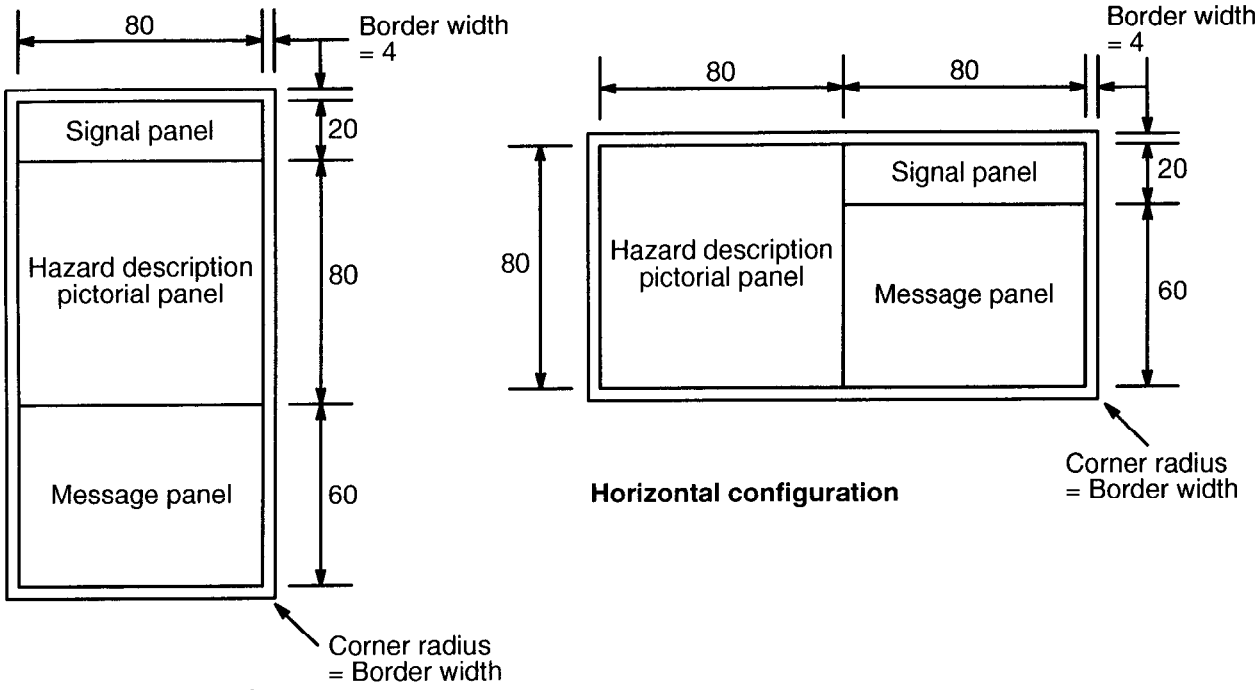


Figure 11 — Recommended dimensions: three–panel format: signal panel, pictorial panel, message panel

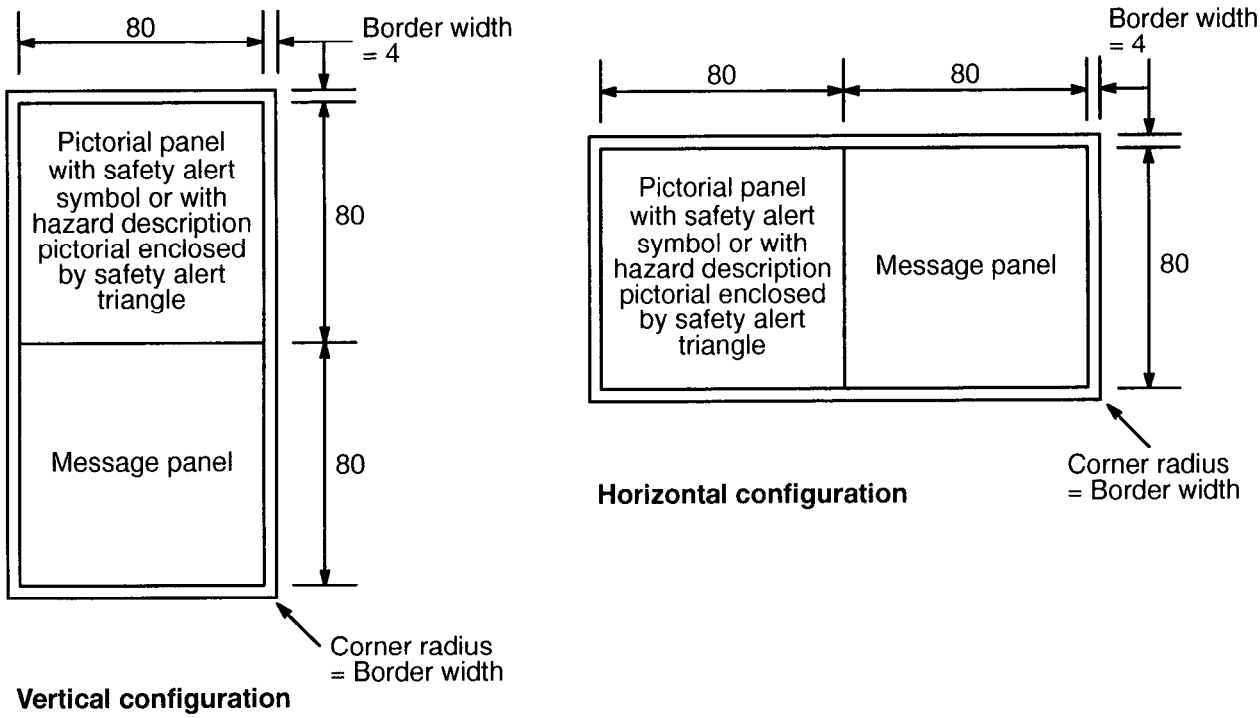


Figure 12 — Recommended dimensions: two–panel format: pictorial panel, message panel

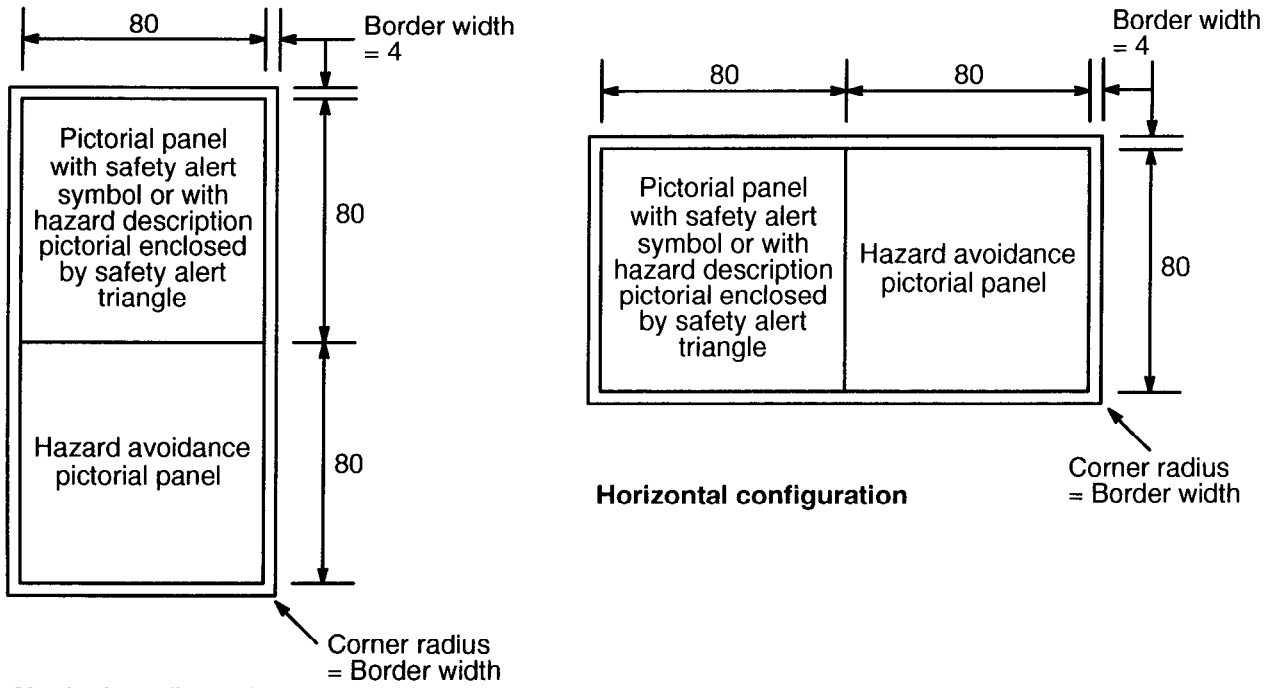


Figure 13 — Recommended dimensions: two–panel format: two pictorial panels

11 Hazard description pictorials

Annex A presents examples of hazard description pictorials intended for use on safety signs. Alternative hazard description pictorials may be used as appropriate, and additional hazard description pictorials may need to be developed.

12 Hazard avoidance pictorials

Annex B presents examples of hazard avoidance pictorials intended for use on safety signs. Alternative hazard avoidance pictorials may be used as appropriate, and additional hazard avoidance pictorials may need to be developed.

13 Examples of safety signs

13.1 Examples of safety signs with text

The signal word and text message appropriate to a hazard depend upon a combination of highly variable factors, including legal precedents. No detailed examples of safety signs with text are presented in this International Standard. Safety signs with text should be developed as necessary in conformance to the objectives and principles explained in preceding clauses of this International Standard.

13.2 Examples of safety signs without text

Annex C presents examples of no–text safety signs for a number of hazards. Additional safety signs may need to be developed for other hazards.

14 Principles and guidelines for graphical design of hazard pictorials

Annex D provides principles and guidelines for good graphical design of hazard pictorials as well as instructions for drawing the human figure and other pictorial elements. Good consistent visual design is important to conveying the meaning of both hazard description and hazard avoidance pictorials.

Annex A

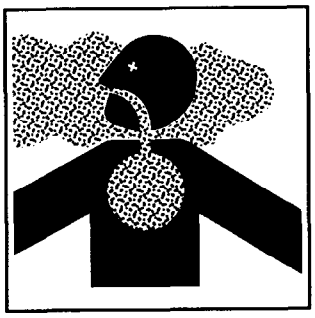
Hazard description pictorials
(informative)

A.1 Scope

This annex presents examples of hazard description pictorials intended for use on safety signs. Alternative hazard description pictorials may be used as appropriate, and additional hazard description pictorials may need to be developed.

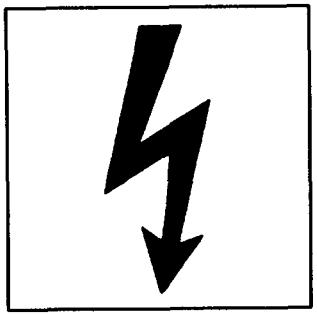
A.2 Chemical (ingestion/burn) hazards

A.2.1 Poisonous fumes or toxic gases — Asphyxiation

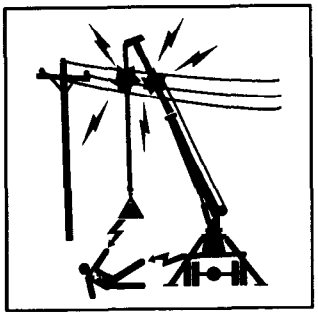


A.3 Electrical (shock/burn) hazards

A.3.1 Electrical shock/electrocution



A.3.2 Electrical shock/electrocution



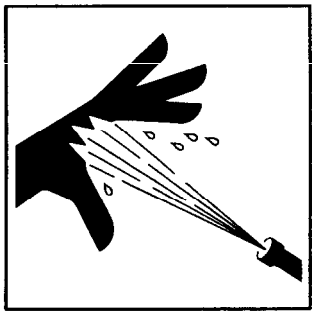
A.4 Falling hazards

A.4.1 Falling from high place

A.5 Fluid (injection, leak/spray) hazards

A.5.1 High pressure fluid — Injection into body

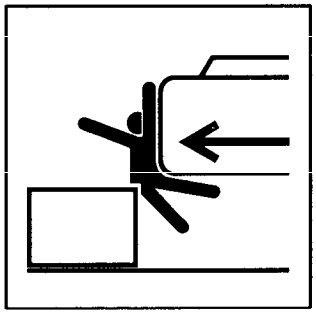
A.5.2 High pressure spray — Erosion of flesh



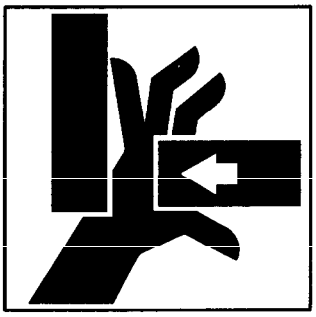
A.6 Mechanical — Crushing hazards

A.6.1 Crushing of whole body — Force applied from above

A.6.3 Crushing — Crane counterweight



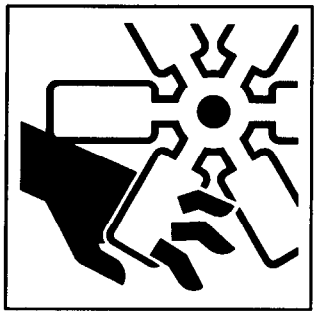
A.6.2 Crushing of fingers or hands — Force applied from side



A.7 Mechanical — Cutting hazards

A.7.1 Severing of fingers or hand — Impeller blade

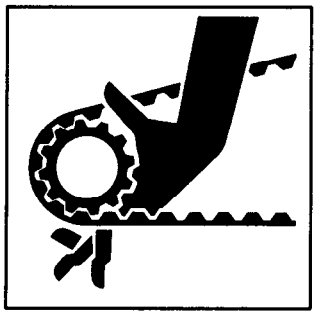
A.7.2 Severing of fingers or hand — Engine fan



A.8 Mechanical — Entanglement hazards

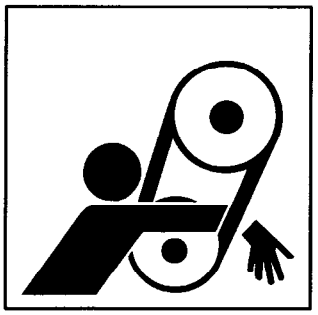
A.8.1 Arm entanglement in machinery

A.8.4 Hand and arm entanglement — Chain or toothed belt drive

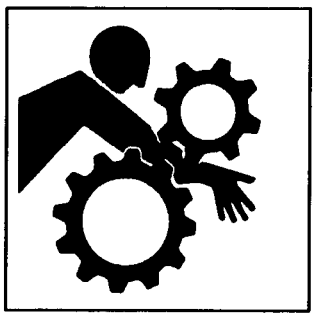


A.8.2 Leg entanglement in machinery

A.8.5 Hand and arm entanglement — Belt drive

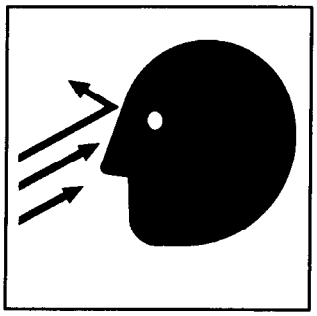


A.8.3 Arm entanglement — Rotating gears

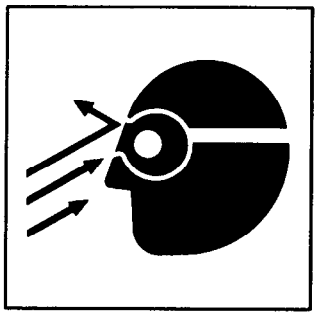


A.9 Mechanical — Thrown or flying object hazards

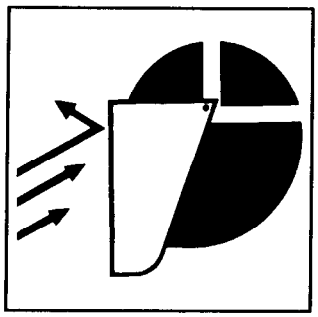
A.9.1 Thrown or flying objects — Face exposure



A.9.2 Thrown or flying objects — Eye protection required



A.9.3 Thrown or flying objects — Face protection required



A.10 Runover/backover/strike hazards

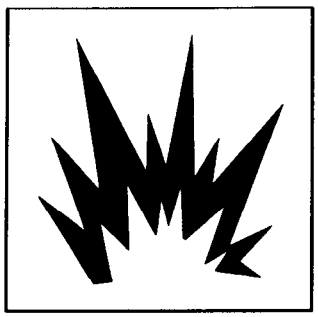
A.10.1 Runover/ backover — Mobile crane

A.11 Thermal (burn/contact) hazards

A.11.1 Hot surfaces — Burns to fingers or hands

A.12 Thermal (combustion/explosion) hazards

A.12.1 Explosion
(Use, for example, with starter fluid.)



Annex B

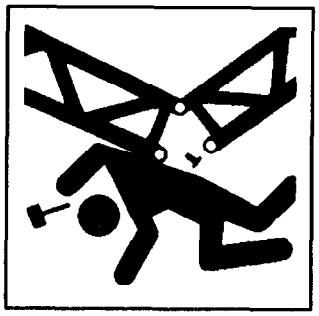
Hazard avoidance pictorials
(informative)

B.1 Scope

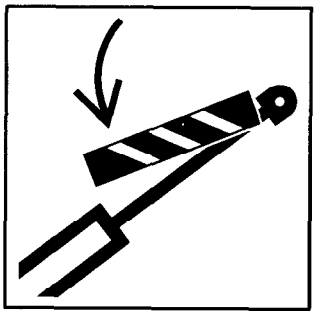
This annex presents examples of hazard avoidance pictorials intended for use on safety signs. Alternative hazard avoidance pictorials may be used as appropriate, and additional hazard avoidance pictorials may need to be developed.

B.2 Hazard avoidance pictorials

B.2.1 Stay clear when disassembling jib (boom).

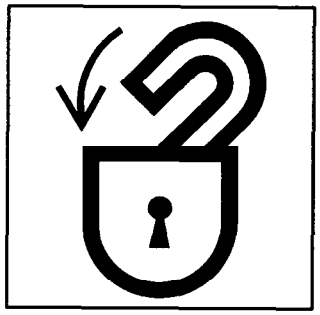


B.2.2 Secure lifting cylinder with locking device before getting in hazardous area.

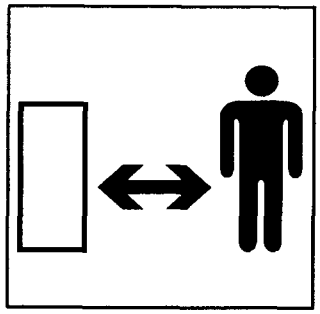


B.2.3 Attach support before getting in hazardous area.

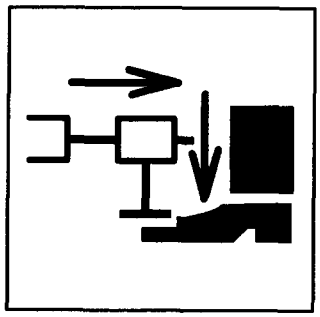
B.2.4 Insert safety lock before getting in hazardous area.



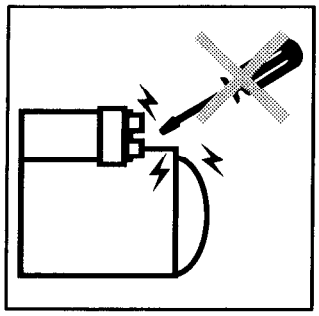
B.2.5 Stay a safe distance from the machine.



B.2.6 Stay clear of outriggers.

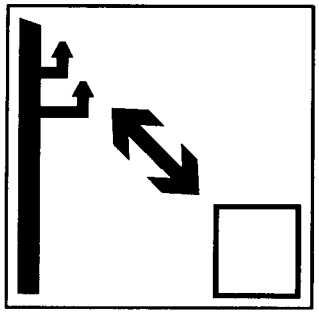


B.2.7 Start engine from operator's seat only.

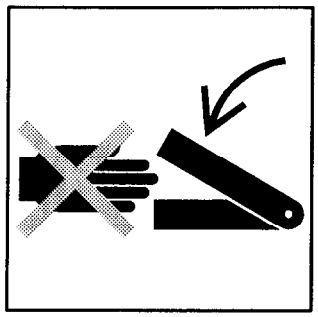


B.2.8 Riding on this machine is allowed only on a passenger seat and only if the driver's view is not hindered.

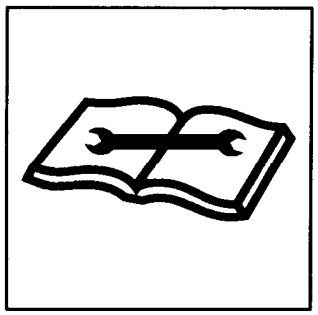
B.2.9 Keep sufficient distance away from electrical power lines.



B.2.10 Never reach into the crushing area as long as parts may move.



B.2.11 Consult technical manual for proper service procedures.



Annex C

Examples of safety signs without text
(informative)

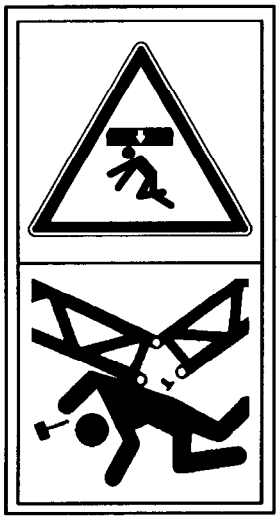
C.1 Scope

This annex presents examples of no–text safety signs for a number of hazards. These sample safety signs are shown in the vertical configuration two–panel format (no signal panel, two pictorial panels, no message panel). Additional safety signs may need to be developed for other hazards.

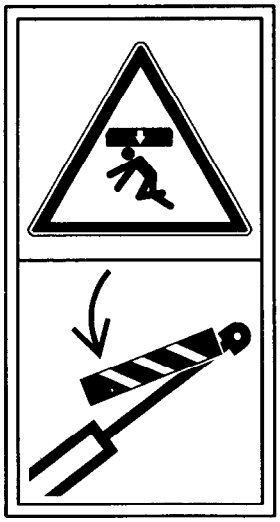
The text description for each safety sign provides a sample of explanatory text appropriate for inclusion in the operator's manual. This operator's manual text may be expanded or otherwise adapted as required for the specific use of the safety sign.

C.2 Examples of no–text safety signs

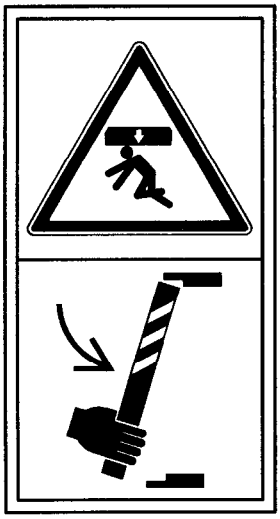
C.2.1 Stay clear when disassembling jib (boom).



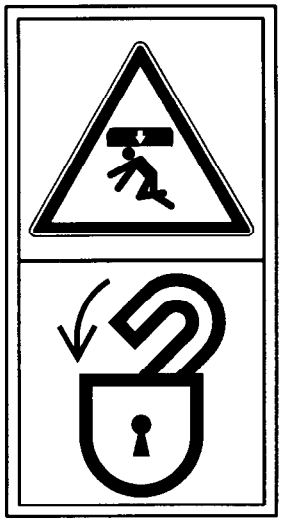
C.2.2 Secure lifting cylinder with locking device before getting in hazardous area.



C.2.3 Attach support before getting into hazardous area.

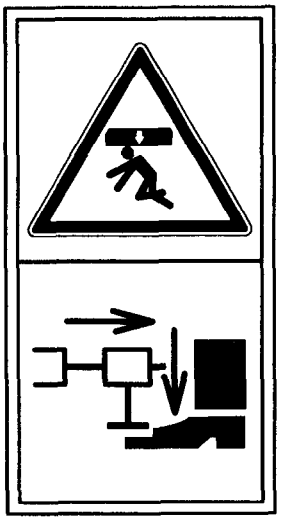


C.2.4 Insert safety lock before getting in hazardous area.

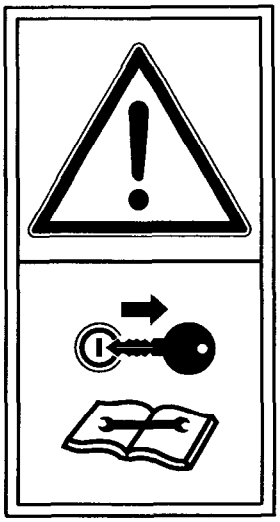


C.2.5 Stay a safe distance from the machine.

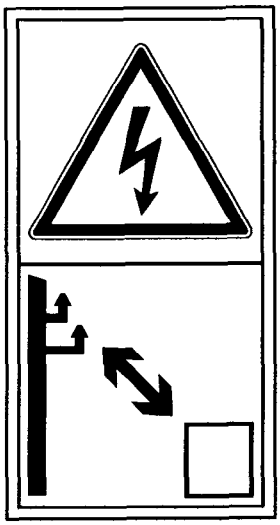
C.2.6 Stay clear of outriggers



C.2.7 Shut off engine and remove key before performing maintenance or repair work.

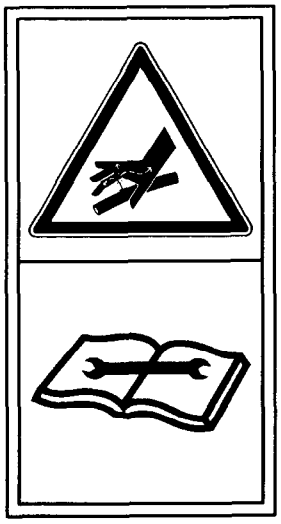


C.2.8 Keep sufficient distance away from electrical power lines.



C.2.9 Stay clear of hot surface.

C.2.10 Avoid fluid escaping under pressure. Consult technical manual for service procedures.



Annex D

Principles and guidelines for graphical design of hazard pictorials

(informative)

D.1 Scope

This annex provides principles and guidelines for good graphical design of hazard pictorials as well as instructions for drawing the human figure and other pictorial elements. Good consistent visual design is important to conveying the meaning of both hazard description and hazard avoidance pictorials.

D.2 Guidelines for creating pictorials

Although each safety sign and each safety sign pictorial shall be considered on its own terms, a number of general guidelines for good pictorial design may be articulated.

— Use representational pictorials rather than abstract symbols.

— Use a solid graphical representation of human body elements or the full human figure. An outline representation may be used when depicting a person whose presence is necessary to complete the pictorial but who is not directly involved with the hazard.

— When objects, faces, or the full human body are shown, use the view (generally front or side) that is most easily recognized.

— Use pictorials depicting dramatic action and showing the involvement of the human figure or body elements with the hazard.

— Use a simplified graphical representation of the machine elements that create the hazard. Use filled (solid) graphics of the hazardous machine elements unless these filled areas detract from easy recognition of the human figure. Use outline graphics of complete machines or of substantial portions of machines to locate hazardous areas or machine elements in context.

— Be specific in depicting hazards, especially when the nature or location of the hazard is not readily apparent. Be generic in depicting hazards and hazardous situations only when generality is possible and adequately communicates the necessary information.

— Use arrows where necessary to show actual or potential movement. In some cases, movement of a machine component is implicit in the pictorial graphics and arrows need not be added. Be consistent in selecting and using alternative arrow graphics to represent different types of movement or spatial relationships: falling or flying objects, direction of motion of machine components, direction of motion of entire machines, the exertion of pressure or force, and keeping a safe distance away from a hazard.

— Avoid using the prohibition symbols (diagonal cross, circle with diagonal slash) where the symbol would obscure identification of the prohibited action or where the meaning of the prohibition symbol is not explicitly clear.

— Do not use red to represent blood.

D.3 Human figure

D.3.1 Drawing basic human figure

The human figure is frequently the main component in the pictorial and shall be depicted in a simple but believable form. For the greatest long-range benefit, it should always be pictured consistently. Interpretation should be instantaneous and not require the viewer to study the pictorial to determine what part of the body is involved or in what way. The human figure presented here was designed to satisfy these specific requirements. Therefore, it should not be distorted or reproportioned, except as noted in D.3.5. Its purpose is to **alert persons** who see the safety sign and to **prevent accidents**, not to be an artistic presentation.

D.3.2 Human figure unit system

The standard pictorial figure is based on a grid system of uniform sized squares, or units. The full human figure is 12 units tall, 2 units wide at the trunk, and has a circular head 1,75 units in diameter. The precise unit measurements for drawing the figure are shown in figure D.1. The hands and feet end in semicircles.

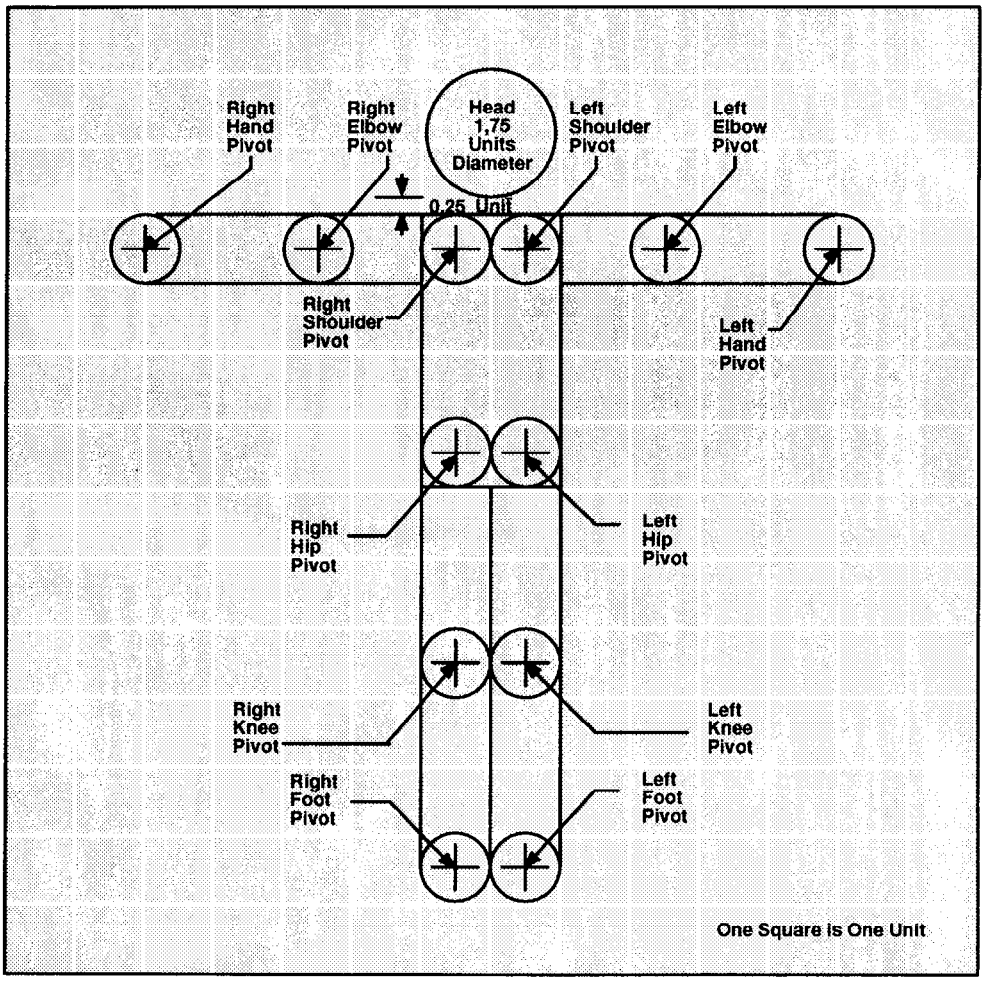


Figure D.1 — Human figure unit system

D.3.3 Human figure animation

By using pivot points on the figure, action or movement of the figure can be depicted. The unit proportions remain the same, except in situations where the overlapping of limbs causes a visual foreshortening of the limbs. When foreshortening occurs, it is compensated for by adding 0,5 unit to the limb. Figure D.2 shows the human figure in various positions. The position the figure will assume in the pictorial is usually determined by:

— The nature of the hazard

— The direction or orientation of the hazard

— Movements or positions resulting from involvement with the hazard

— The type of injury caused by the hazard

— Movements or positions involved in the operation of equipment

Figure D.2 — Drawing human figure

D.3.4 Bold representation versus outline drawing of human figure

This bold representation of the human form is more effective than a line drawing of the same human form in focusing the observer's attention on the person whose potentially hazardous situation is the subject of the pictorial. However, if more than one human figure appears in the pictorial, a person not directly exposed to the hazard may be a line drawing: for example, the driver of a machine in a runover hazard pictorial or a falling rider hazard pictorial. The line drawing of a human figure may be used:

— only for representing persons not directly at risk in the hazardous situation, **and**

— only when, by being combined with the bold human form, the combination results in a pictorial that is easier to understand and communicates better.

Figure D.3 shows a pictorial in which both the bold and line drawing human forms are used.

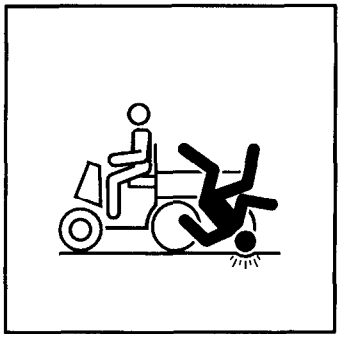


Figure D.3 — Example of pictorial using both bold and line drawing human forms

D.3.5 Stationary, free–standing human figure (viewed from front or rear)

The standard pictorial human figure is modified when the person is depicted in a stationary, free–standing position. The IEC symbol denoting "Heavy (obese) patient — For use on medical equipment" (symbol number 5391 from IEC 417:1973) is used as the pictorial human figure in hazard avoidance pictorials that communicate the idea of keeping a safe distance away from a hazard (see D.8.6) and in some hazard avoidance pictorials that communicate the idea of keeping away from a hazardous location (see D.9.2). Figure D.4 shows this stationary, free–standing human figure.

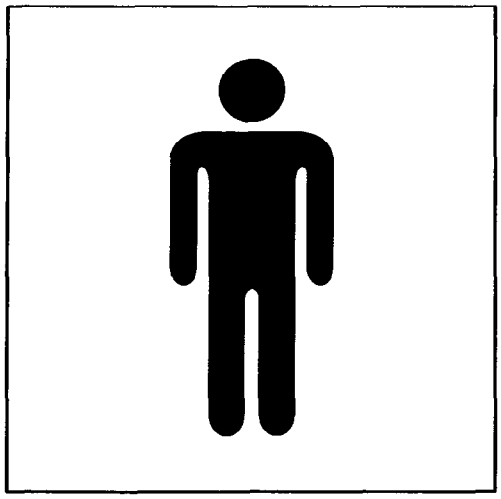


Figure D.4 — Stationary, free–standing human figure (viewed from front or rear)

D.3.6 Profile head

Whenever the head is involved with the hazard, the profile version is used facing either left or right. The profile head can also be used whenever the full figure or upper torso is to appear in profile to create an impression that the figure or torso itself is in the profile position. Figure D.5 gives examples of hazard pictorials that use the profile head.

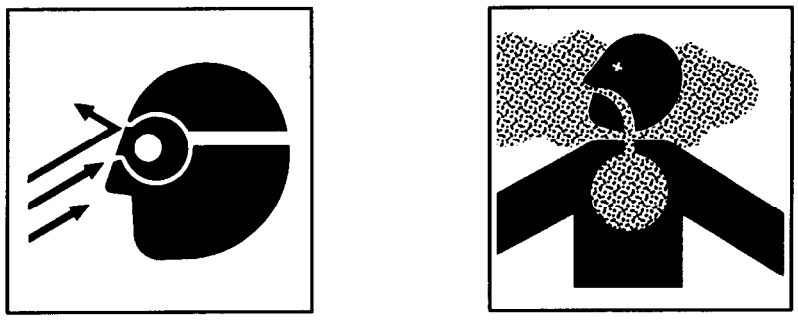


Figure D.5 — Examples of pictorials using profile head

D.4 Upper torso

Hazards that involve the arms, hands, or head may best be dramatized by using the upper torso rather than the full torso. In most cases the upper torso would appear in profile and the profile head would be used rather than the frontal or circular head. When depicted in a profile position, the upper torso can also be effective in conveying directional movement with the hazard. If hands are involved in the hazard, or if the depiction of hands would aid in visual dramatization, they should be added to the figure, as shown in D.5.2. Figure D.6 gives examples of hazard pictorials that use the upper torso.

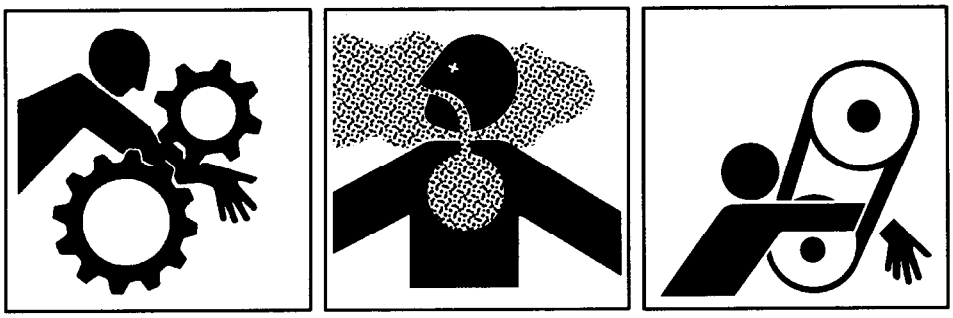


Figure D.6 — Examples of pictorials using upper torso

D.5 Hands

D.5.1 Drawing the human hand and fingers

The complexity of the human hand and the many possible finger movements, make hands one of the most difficult pictorial elements to work with. The design shown in figure D.7 was given careful attention to simplify shape and form for easy recognition. In the full palm view, the fingers and thumb do not move to other positions. In other full hand views, fingers may be spread.

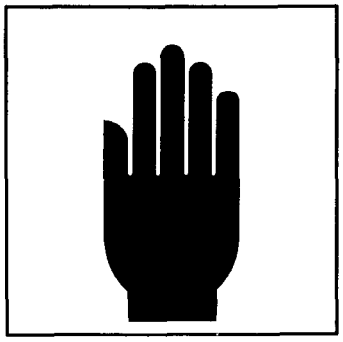


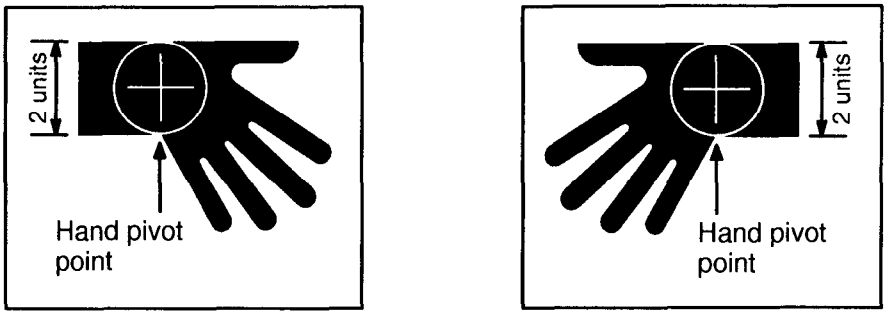
Figure D.7 — Full palm view hand

D.5.2 Adding hands to human figure.

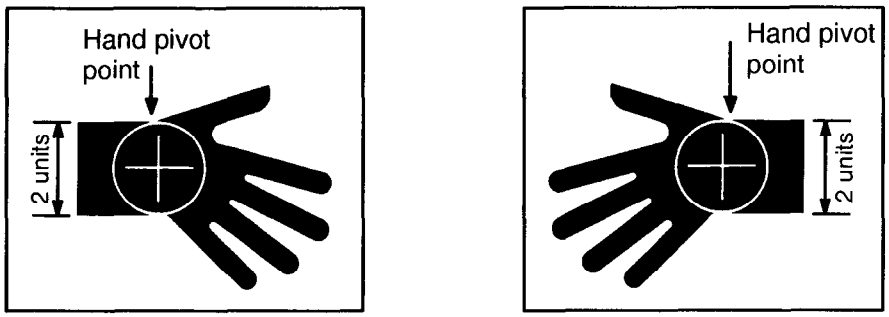
When hazards involve the hands or arms, hands are added to the figure to increase recognition value of the limb elements. Two basic hand positions are shown in figure D.8.

— Position A shows the thumb extended along the same axis as the arm.

— Position B shows the hand rotated several degrees around the hand pivot point.



Position A — Hand with thumb extended along arm axis



Position B — Hand rotated around hand pivot point

Figure D.8 — Adding hands to the human figure

Selection of Position A versus Position B should be based on which position is judged to best dramatize the involvement with the hazard. For design consistency, hands are added to both arms (when both arms are shown) even when only one arm is involved with the hazard. See Figure D.9 for examples of hazard pictorials where hands have been added to the human figure.

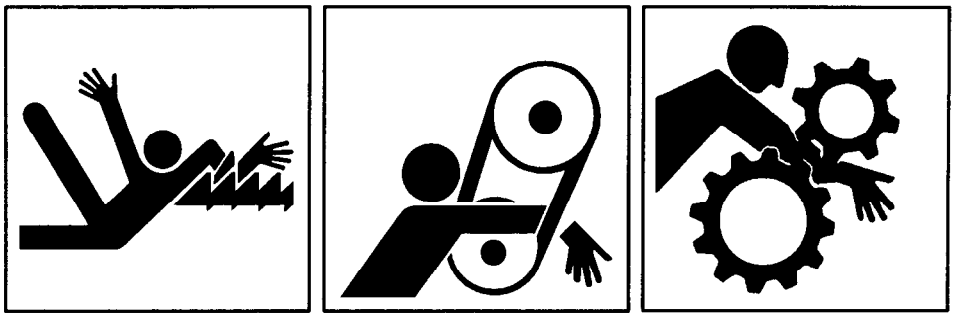


Figure D.9 — Examples of pictorials using human figure with hands

D.5.3 Hand Profiles

Hand profiles are best used to convey a feeling of depth, which can add realism, dramatization, and understandability to the pictorial. Although the hand is not actually drawn in perspective, the positioning of the fingers can create a three–dimensional impression.

Hand profiles are the most difficult elements of the human figure to design. The hand profiles shown in figure D.10 represent the design style to be used in pictorials to maintain visual consistency. Valuable time can be saved when creating hand profiles by taking existing pictorials and modifying or repositioning elements of the hand as necessary. Situations that require various finger movements can be depicted by selecting the hand closest to the desired position and modifying it. Note the finger treatment. The fingers are not tapered, although they may appear to be. Fingertips are created using a 0,25 circle. The profile view uses only three fingers plus the thumb.

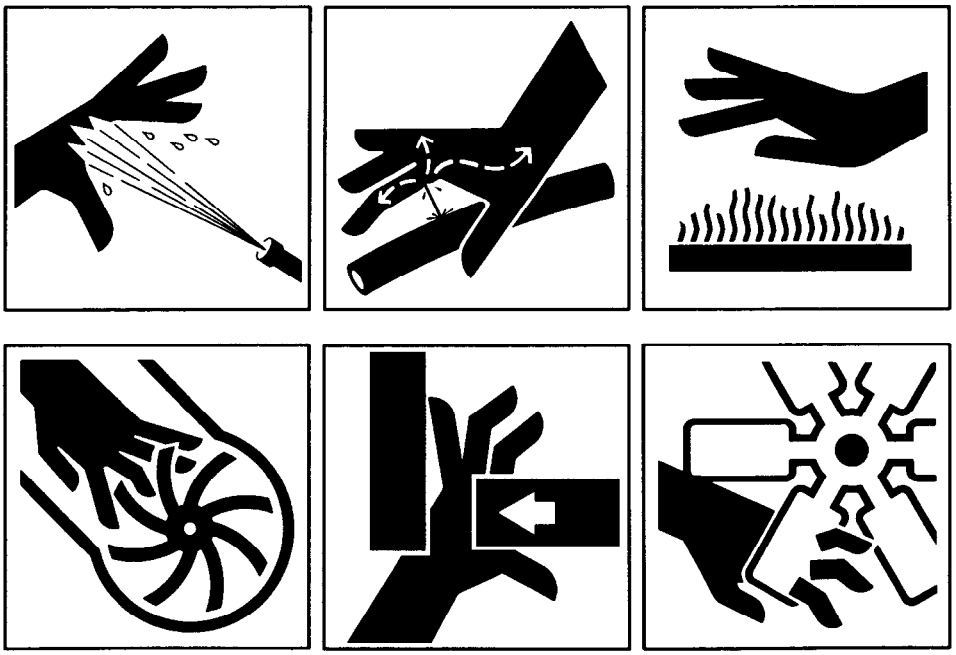


Figure D.10 — Examples of pictorials using hand profiles

D.6 Feet

D.6.1 Foot Development

When a pictorial illustrates just the lower leg or foot, the stylized shoe or boot (foot) shown in figure D.11 should be used. It can be used facing either left or right.

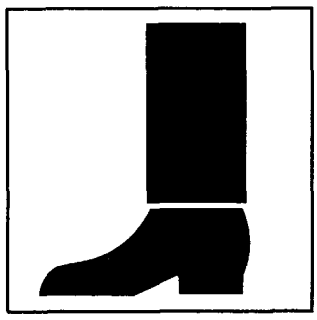


Figure D.11 — Foot development

D.6.2 Adding feet to the human figure

Some hazards which involve the feet or lower limbs are most effectively dramatized by using the full human figure; adding feet to the figure increases recognition value of the limb elements. For such pictorials, the feet shown in figure D.12 should be added to the foot pivot points. For design consistency, they should not be altered or distorted. Figure D.13 gives examples of hazard pictorials where feet have been added to the human figure.

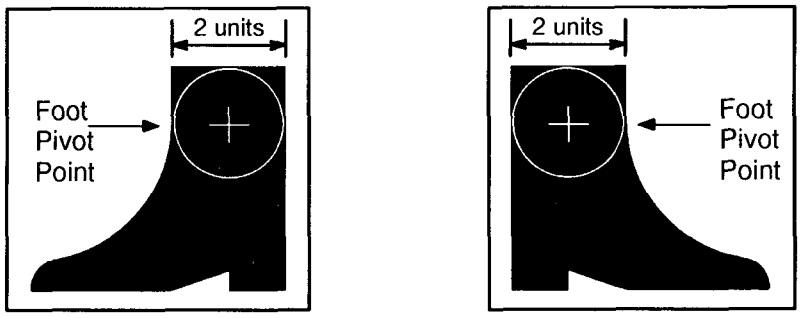


Figure D.12 — Adding feet to the human figure

Figure D.13 — Example of pictorial showing the human figure with feet

D.7 Representation of machines, equipment and components

D.7.1 In general, use outline representations for whole machines or substantial portions of machines. The reason is to avoid large filled (black) areas that may detract from recognition of the human figure relative to the machine or the hazard–creating component or equipment on the machine. This is especially true when the human figure is depicted in close proximity to the machine representation. Representations of individual components may be outline or filled, depending upon which alternative provides better visual recognition and graphical clarity. In general, filled areas result in the perception of greater mass and solidity; however, outlines of machines often encourage inclusion of enough graphical detail that the identity of actual components and the nature of the hazards they present may be discerned more easily. Smaller filled areas, or outlines using a wider line thickness, can assist in highlighting the hazard–creating component or equipment on a machine.

D.7.2 Figure D.14 gives examples of pictorials that use whole machines or major components of machines in their graphical description of hazards. Figure D.15 gives examples of pictorials that use individual hazard–creating machine components, not in the context of their machine location, in their graphical description of hazards.

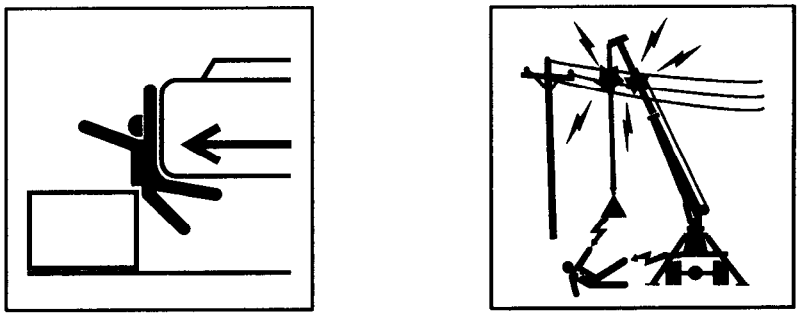


Figure D.14 — Examples of pictorials showing machines and hazard–creating major components

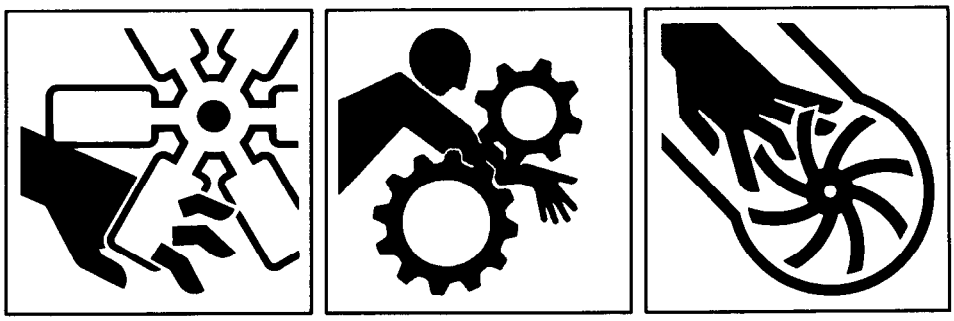


Figure D.15 — Examples of pictorials showing individual hazard–creating components

D.8 Arrows

D.8.1 Using arrows

To communicate basic safety sign information, pictorials shall use visual elements to represent a variety of things, conditions, and ideas. Important among these things, conditions and ideas are: flying or falling objects and their direction of motion, the direction of motion of machine components, the direction of motion of entire machines, the exertion of pressure or force, and the idea of keeping a safe distance away from a hazard. Five types of arrow design are used to denote these elements of pictorial communication.

D.8.2 Arrows representing falling or flying objects and their direction of motion

This arrow is generally used as a black arrow on a white background. It can be straight, angled or curved. The tail of the arrow should appear solid when a single object or a few objects are involved; the tail should be broken when a continuous barrage of objects or particles is involved. See figure D.16 for arrow dimensions. This arrow is normally sized in proportion to the size of the falling or flying object that it represents in a given pictorial. Figure D.17 gives examples of hazard pictorials that use this arrow to represent falling or flying objects and their direction of motion.

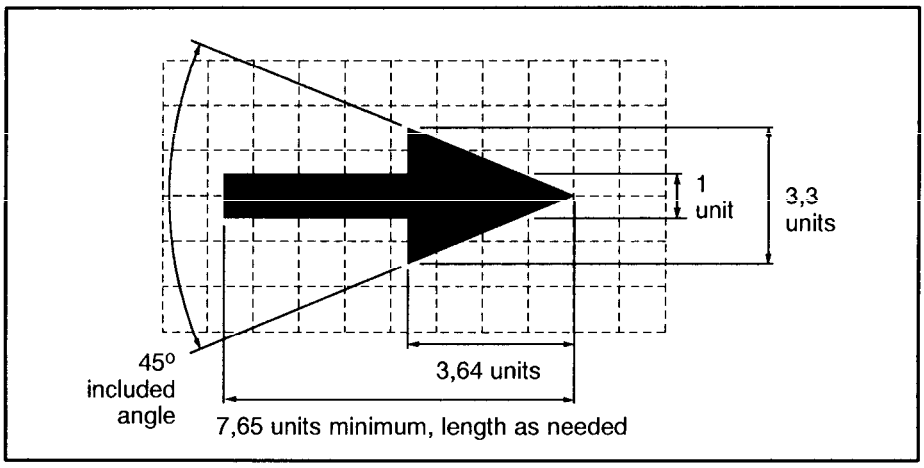


Figure D.16 — Arrow to represent falling or flying objects and their direction of motion

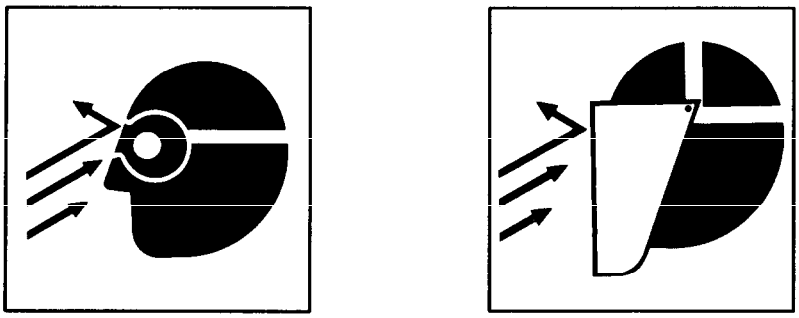


Figure D.17 — Examples of pictorials using arrows to represent falling or flying objects and their direction of motion

D.8.3 Arrows representing direction of motion of machine components

This arrow is generally used as a black arrow on a white background. It can be straight, angled or curved. See figure D.18 for arrow dimensions. This arrow is normally used at 100% of actual size shown in figure D.18, although it may be sized differently as appropriate to individual pictorials. This arrow conforms to the direction of movement arrow from ISO 4196, with a 60° included angle for the arrowhead. Figure D.19 gives an example of a hazard pictorial that uses this arrow to represent the direction of motion of machine components. Because relative line thickness is the only significant difference between the arrows in figure D.18 and figure D.20, situations may arise when the two arrows appear almost identical. When possible, however, use the arrow in figure D.18 to represent the direction of motion of machine components and the arrow in figure D.20 to represent the direction of motion of entire machines.

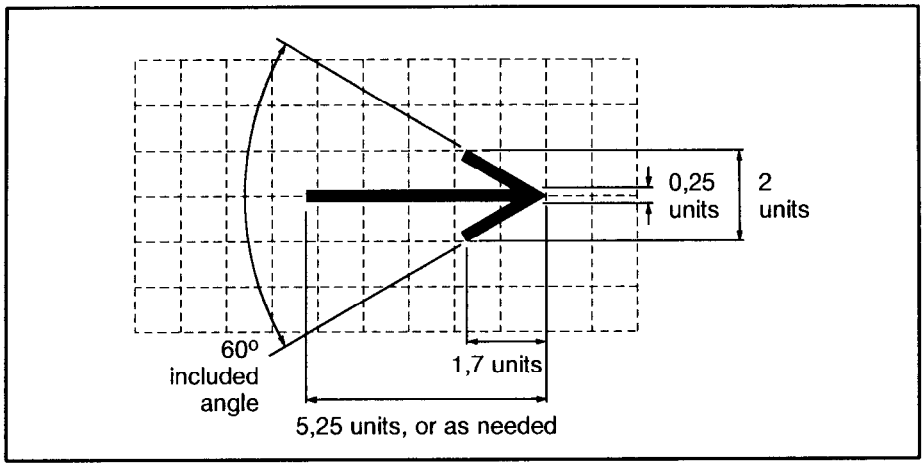


Figure D.18 — Arrow to represent direction of motion of machine components

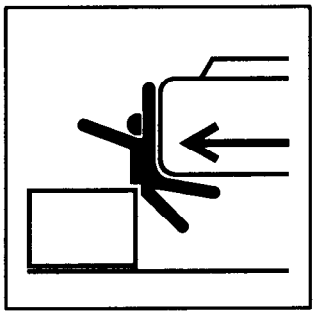


Figure D.19 — Example of pictorial using arrow to represent direction of motion of machine components

D.8.4 Arrows representing direction of motion of entire machines

This arrow is generally used as a black arrow on a white background. It can be straight, angled or curved. See figure D.20 for arrow dimensions. This arrow is normally used at 100% of actual size shown in figure D.20, although it may be sized differently as appropriate to individual pictorials. This arrow conforms to the direction of movement arrow from ISO 4196, with a 60° included angle for the arrowhead. Figure D.21 gives an example of a hazard pictorial that uses this arrow to represent the direction of motion of an entire machine. Because relative line thickness is the only significant difference between the arrow in figure D.18 and the arrow in figure D.20, situations may arise when the two arrows appear almost identical. When possible, however, use the arrow in figure D.18 to represent the direction of motion of machine components and the arrow in figure D.20 to represent the direction of motion of entire machines.

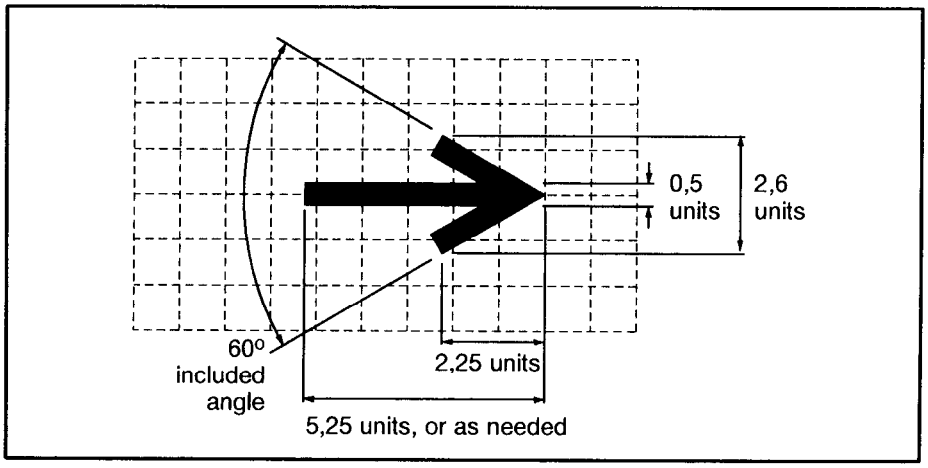


Figure D.20 — Arrow to represent direction of motion of entire machines

Figure D.21 — Example of pictorial using arrow to represent direction of motion of entire machines

D.8.5 Arrows representing exertion of pressure or force

This arrow is generally used as a white arrow in a black silhouette representing the source of the force or pressure. It may also appear as a black arrow on a white background when the specific source of the force or pressure is depicted. See figure D.22 for arrow dimensions. This arrow is normally used at 100% of actual size shown in figure D.22, although it may be sized differently as appropriate to individual pictorials. This arrow conforms to the force arrow from ISO 4196, with an 84° included angle for the arrowhead. Figure D.23 gives examples of hazard pictorials that use a pressure or force arrow.

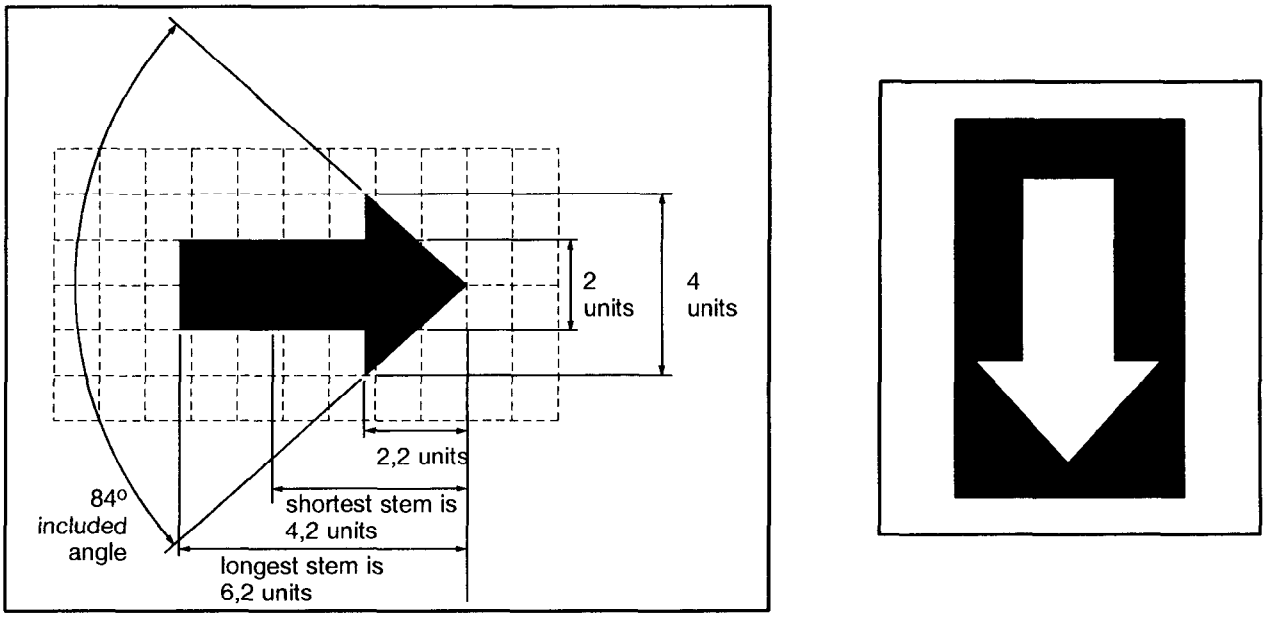


Figure D.22 — Arrow to represent exertion of pressure or force

Figure D.23 — Examples of pictorials using arrows to represent exertion of pressure or force

D.8.6 Arrows representing idea of keeping safe distance away from hazard

This arrow is generally used on hazard avoidance pictorials as a black arrow on a white background (for safety signs with text) or as a black arrow on a yellow background (for safety signs without text). See figure D.24 for arrow dimensions. This arrow is normally used at 60% of actual size shown in figure D.24, although it may be sized differently as appropriate to individual pictorials. This arrow conforms to the direction of movement arrow in ISO 4196 for public information symbols that direct persons, except that two arrows are combined tail–to–tail. Figure D.25 gives examples of pictorials that use this arrow to represent the idea of keeping a safe distance away from a hazard.

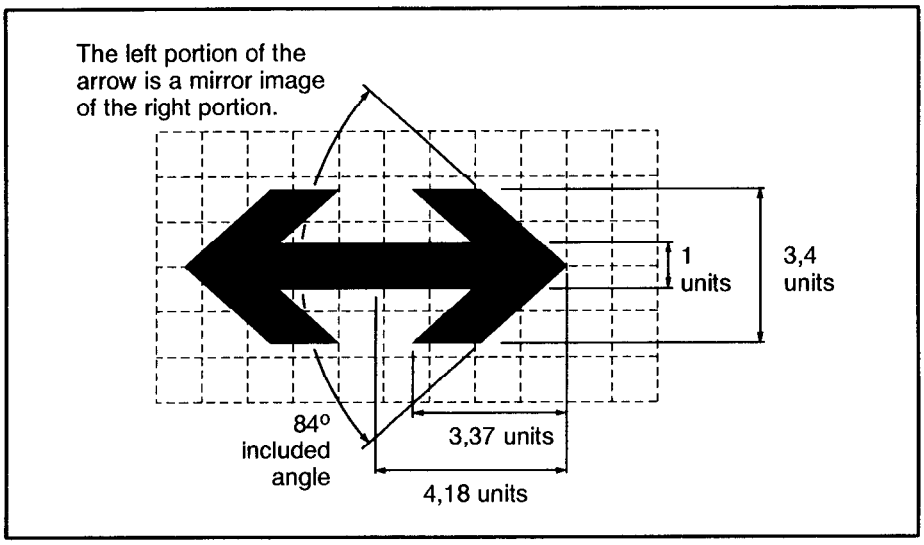


Figure D.24 — Arrow to represent idea of keeping safe distance away from hazard

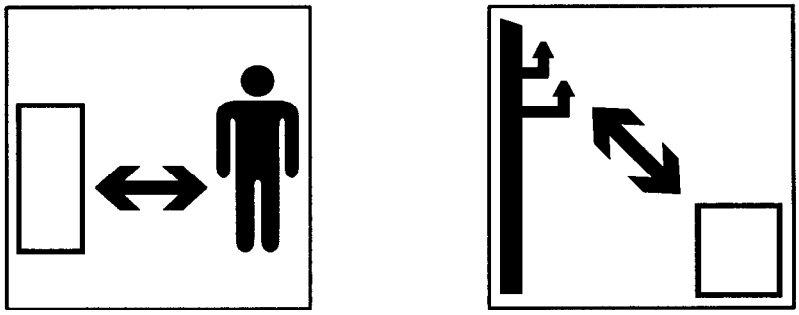


Figure D.25 — Examples of pictorials using arrows to represent idea of keeping safe distance away from hazard

D.9 Communicating idea of prohibited action or hazardous location

D.9.1 Hazard avoidance pictorials often communicate the idea that an action is prohibited or that a person's presence in a specified location may be hazardous. In general, use a red diagonal cross ✕ to communicate the idea of a hazardous location. Use either a red ✕ or a red circle with diagonal slash ⊘ to communicate the idea of a prohibited action; the red ✕ is generally preferred. These graphical elements are shown in figure D.26. Sizing of the ✕ and ⊘ depends on how they are used in a particular pictorial. It is important that they are sufficiently large as to be easily recognized, but care shall be taken to avoid obscuring any important portion of the pictorial.

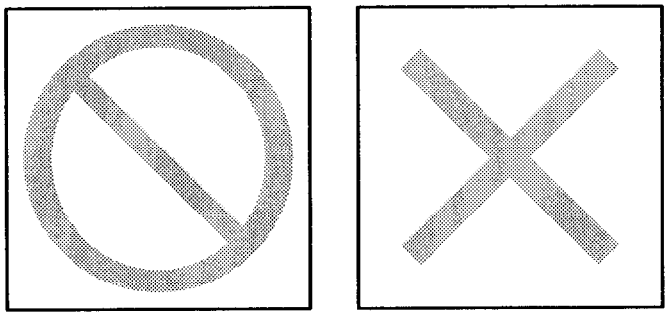


Figure D.26 — Red circle with diagonal slash and diagonal cross to communicate idea of prohibited action or hazardous location

D.9.2 A red diagonal cross is used to communicate the idea of prohibited action or hazardous location: a red ✕ may be placed across a human figure who is engaged in the prohibited action or who is present in a hazardous location; the red ✕ communicates the negative message that the depicted action is prohibited or that the indicated location may be hazardous and should be avoided. The arms of the diagonal cross are perpendicular to each other and at a 45° angle to the pictorial frame. Figure D.27 gives examples of hazard pictorials that use a red ✕ to communicate the idea of a prohibited action or a hazardous location.

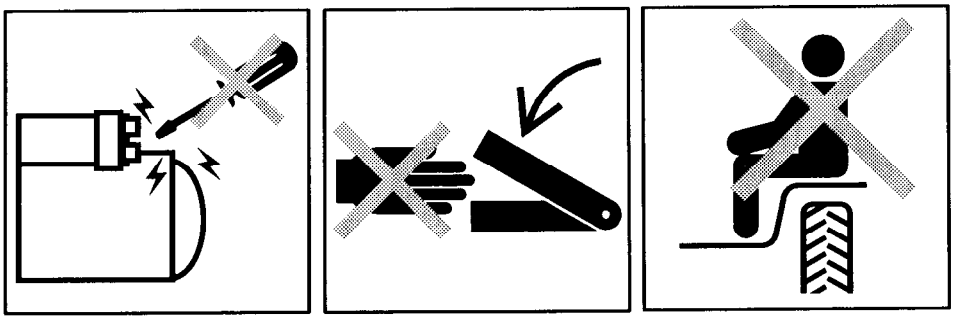


Figure D.27 — Examples of pictorials using red diagonal cross to communicate idea of prohibited action or hazardous location

D.9.3 A red circle with diagonal slash is used to communicate the idea of prohibited action: a red ⊘ may be placed across pictorial elements that depict the prohibited action; the ⊘ communicates the negative message that the depicted action is prohibited. The slash is always oriented from the upper left to the lower right of the circle; a 45° angle from the horizontal is standard, although this may be adjusted a few degrees more or less to avoid obscuring important pictorial information. Use ⊘ only when its pictorial meaning is clear.

Annex E

Bibliography
(informative)

[1] ISO 3461–1:1988, *General principles for the creation of graphical symbols — Part 1: Graphical symbols for use on equipment*

[2] ISO 3864:1984, *Safety colours and safety signs*

[3] ISO 4196:1984, *Graphical symbols — Use of arrows*

[4] ISO 7000:1989, *Graphical symbols for use on equipment — Index and synopsis*

[5] IEC 417:1973, *Graphical symbols for use on equipment — Index, survey and compilation of the single sheets*, and its supplements (IEC 417A:1974, IEC 417B:1975, IEC 417C:1977, IEC 417D:1978, IEC 417E:1980, IEC 417F:1982, IEC 417G:1985, IEC 417H:1987, IEC 417J:1990, IEC 417K:1991, IEC 417L:1993, IEC 417M:1994)

ICS 01.080.20; 53.020.20

Descriptors: handling equipment, lifting equipment, cranes (hoists), hazards, accident prevention, safety, signs, generalities.

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