

Australian Standard[®]

Cranes, hoists and winches—Safe use
Part 1: General requirements



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- Australian Chamber of Commerce and Industry
 - Australian Industry Group
 - Australian Institute for Non-Destructive Testing
 - Bureau of Steel Manufacturers of Australia
 - Construction and Mining Equipment Industry Group
 - Consult Australia
 - Crane Association of New Zealand
 - Crane Industry Council of Australia
 - Department of Commerce, WorkSafe Division (WA)
 - Department of Justice and Attorney General, Qld
 - Department of Labour New Zealand
 - Department of the Premier and Cabinet (South Australia)
 - Electricity Engineers Association (New Zealand)
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 - Engineers Australia
 - Horticulture New Zealand
 - Industry and Investment NSW
 - Institution of Professional Engineers New Zealand
 - Vehicle Loading Crane Interests
 - WorkCover New South Wales
 - WorkSafe Victoria
-

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Australian Standard[®]

Cranes, hoists and winches—Safe use

Part 1: General requirements

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee ME-005, Cranes, to supersede AS 2550.1—2002, *Cranes, hoists and winches—Safe use*, Part 1: *General*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to retain this Standard as an Australian Standard rather than develop it as an Australian/New Zealand Standard.

The objective of this Standard is to specify general requirements for the safe use of cranes, hoists and winches.

The objective of the AS 2550 series of Standards is to provide uniform requirements and guidance for the safe use of cranes, hoists and winches.

Major changes in this Edition include extensive revision of the inspection and maintenance requirements in Section 7, and the addition of a new Section 9 that specifies methods to monitor design duty and introduce the concept of design working period. Section 9 of this Standard is based on the concepts outlined in ISO 12482-1, *Cranes condition monitoring*, Part 1: *General*.

Published Standards in the series are the following:

AS

2550	Cranes, hoists and winches—Safe use
2550.1	Part 1: General requirements (this Standard)
2550.3	Part 3: Bridge, gantry, portal (including container cranes) jib and monorail cranes
2550.4	Part 4: Tower cranes
2550.5	Part 5: Mobile cranes
2550.6	Part 6: Guided storing and retrieving appliances
2550.7	Part 7: Builders' hoists and associated equipment
2550.9	Part 9: Vehicle hoists
2550.10	Part 10: Elevating work platforms
2550.11	Part 11: Vehicle loading cranes
2550.13	Part 13: Building maintenance units
2550.15	Part 15: Concrete placing equipment
2550.16	Part 16: Mast climbing work platforms
2550.19	Part 19: Telescopic handlers
2550.20	Part 20: Self-erecting tower cranes

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard Cranes, hoists and winches—Safe use

Part 1: General requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies general requirements for the safe use of cranes, hoists and winches.

NOTES:

- 1 Requirements applicable to particular types of cranes are specified in the specific parts of AS 2550.
- 2 Requirements that are common to two or more types of cranes are contained in this Standard; therefore, some requirements contained herein do not apply to all types of cranes.

1.2 APPLICATION

The requirements given in other parts of AS 2550 shall take precedence over the corresponding requirements of this Standard.

Where earthmoving equipment is to be used as a crane, the requirements in Appendix I shall apply.

Where this Standard uses the word ‘crane’ it shall be taken to mean ‘hoist’, ‘winch’ or components as defined in AS 2549.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

NOTE: A list of Australian Standards relevant to lifting gear is given in Appendix A.

AS

1318	Use of colour for the marking of physical hazards and the identification of certain equipment in industry
1418	Cranes, hoists and winches (all Parts)
2076	Wire-rope grips for non-lifting applications
2549	Cranes (including hoists and winches)—Glossary of terms
2550	Cranes, hoists and winches—Safe use (all Parts)
2759	Steel wire rope—Use, operation and maintenance
4991	Lifting devices

AS/NZS

1554	Structural steel welding
1554.4	Part 4: Welding of high strength quenched and tempered steels
1891	Industrial fall-arrest systems and devices
1891.1	Part 1: Harnesses and ancillary equipment
3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)

AS/NZS

ISO 31000 Risk management—Principles and guidelines

The National Standard for Licensing Persons Performing High Risk Work (2006)

Website: www.safeworkaustralia.gov.au

1.4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2549 and those below apply.

1.4.1 Competent person

A person who has acquired through training, qualification, experience or a combination of these, the knowledge and skill enabling that person to correctly perform the required task.

1.4.2 Crane standing

The ground surface, temporary support structure, grillage, track, parking, or similar support, on or from which the crane is supported during operation.

1.4.3 Demolition

The complete or partial dismantling of a building or structure by pre-planned and controlled methods or procedures.

1.4.4 Designed lifts

An extraordinary and temporary lifting operation requiring an assessment of the design of the crane, which may require a temporary re-classification or re-rating or a change in the intended use of the crane.

NOTE: The following are examples of designed lifts:

- (a) Some multiple crane lifts.
- (b) Lifts where the centre of gravity changes or is difficult to determine.
- (c) Lifts for hazardous materials.
- (d) Lifts where the load lifted exceeds the published rated capacity of the crane.

1.4.5 Electrical apparatus

Any electrical equipment, including overhead powerlines and cables, the conductors of which are live or can be made live.

1.4.6 Management

Reference to 'management' implies an activity not a line position.

1.4.7 Multiple crane lifts

A lifting operation employing more than one crane.

1.4.8 Multiple hoist lift

A lifting operation performed by two or more hoists, supported on a common structure.

1.4.9 Professional engineer

- 1 A person registered in a relevant area of practice on the National Professional Engineers Register.

or

- 2 Where applicable, a Member of a Scheme established under Professional Standards Legislation in the relevant jurisdiction.

or

- 3 A Chartered Professional Engineer (CPEng).
- or*
- 4 Other person providing satisfactory evidence to a responsible authority that they have the qualifications and experience to be competent to independently perform the required tasks.

1.4.10 Shall

Indicates that a statement is mandatory for compliance with the objectives and intent of this Standard.

1.4.11 Should

Indicates a recommendation.

NOTE: Neither following nor ignoring the recommendation results in non-compliance with the Standard.

1.4.12 Spotter (safety observer)

A person specifically assigned the duty of observing and warning against unsafe approach of the crane, its lifting attachments or its load, to electrical apparatus.

1.4.13 Synchronized motions

Two or more crane motions under the control of a single command output with bi-directional communication so that the behaviour of one motion causes identical behaviour of the others.

1.4.14 Tandem operation

An operating mode where the control of multiple cranes or crane components is from a common control station.

NOTE: Under tandem operation, crane motions may be synchronized or not synchronized.

1.4.15 Third-party inspection

An inspection carried out by an independent competent person, who is not involved in the maintenance of the crane.

NOTE: For the purpose of this definition, 'independent' means not employed by the same organization unless that organization uses a quality process that confirms independence.

1.5 INSTRUCTIONS

Instructions shall be prepared, maintained and made readily available to the appropriate personnel, to ensure the safe use of the crane. Such instructions shall include the manufacturer's instructions, recommendations and specifications where available or where any of these instructions, recommendations and specifications are not available from the manufacturer or are deemed inappropriate, they shall be drawn up by a competent person. All instructions shall be not less than those specified in this Standard.

1.6 LEGISLATED RESPONSIBILITY

The reader is referred to the applicable occupational health and safety legislation or work health and safety legislation for instruction on who is responsible for ensuring that items of plant are operated in a safe manner.

1.7 COMPETENCY OF PERSONNEL

All activities required to be carried out under this Standard shall be carried out by a competent person(s).

1.8 RISK ASSESSMENT

A risk assessment shall be undertaken by a competent person before carrying out the operation required to be undertaken by the crane. The risk assessment shall address the proposed operation rather than each individual lift. The assessment shall be in writing and shall take into account the following:

- (a) The task to be carried out.
- (b) The range of methods by which the task can be done.
- (c) The type of crane that will be required or that can be used.
- (d) The hazards involved and the associated risks.
- (e) The actual method and the other requisite plant and material.
- (f) Emergency and rescue procedures.

As a result of the risk assessment, the competent person shall formulate a safe work method procedure, which shall be monitored for ongoing effectiveness and modified whenever it is found to be deficient, when the task changes or when the associated risks change.

NOTE: Guidelines on hazard identification and risk assessment procedures are given in AS/NZS ISO 31000.

SECTION 2 PLANNING

2.1 GENERAL

The planning and application of crane requirements should commence as early as possible in the development of each project. Planning should include consultation with relevant stakeholders (e.g., the crane manufacturer, proprietor, supplier, operator, designer, importer and agent).

The suitability of the crane for the operation it is involved in should be assessed by a competent person when it is planned to change owner or alter the use of a crane.

NOTE: For cranes to be used on construction sites, the planning should include consultation with the principal contractor and building contractor.

2.2 PLANNING

The following planning activities shall be carried out by a competent person(s) in consultation with relevant stakeholders:

- (a) The selection and safe use of the crane.
- (b) The installation of the crane.
- (c) Ensuring that the supporting structure is capable of supporting the crane.
- (d) Appraising an existing crane for suitability for use.
- (e) Adequate competent personnel availability for all tasks.
- (f) Suitable equipment availability for the installation, maintenance, operation and dismantling of the crane.
- (g) Condition monitoring of the crane and associated equipment.
- (h) The maintenance, inspection and safe operation of the crane and associated equipment.
- (i) The preparation, availability and maintenance of instructions for the assembly, operation, maintenance and inspection of the crane.
- (j) Emergency procedures for the evacuation of personnel from the crane, if applicable.
- (k) Procedures to deal with reasonably foreseeable situations.
- (l) Procedures to deal with reasonably foreseeable emergencies.
- (m) Where cranes are required to operate in or near buildings or structures, consideration to be given to crane loadings and access at the project design stage.
- (n) Where cranes are required to operate in tandem, the following shall be considered:
 - (i) Operator controls.
 - (ii) Synchronization of crane controls.
 - (iii) Load handling attachment.

NOTE: The results and, where appropriate, the reasoning behind the decisions should be documented.

2.3 MATTERS TO BE CONSIDERED

At appropriate stages during planning, the following matters shall be considered, where applicable:

- (a) Establishment of a management plan.
 - (b) Selection of cranes.
 - (c) Lightning protection.
 - (d) Appropriate earthing for the conditions; for example, static electricity build-up due to electromagnetic radiation (EMR), wind.
 - (e) Site access and crane siting.
 - (f) Safety of personnel.
 - (g) Protection and safety of public.
 - (h) Proximity of above- and below-ground services (e.g., power, gas, water).
 - (i) Procedures for the setting up of the crane.
 - (j) Procedures for lifting operations.
 - (k) Procedures for the dismantling of the crane.
 - (l) Selection of the personnel.
 - (m) Communication system(s).
 - (n) Weather conditions (e.g., anticipated wind speeds, rainfall and temperature range).
 - (o) Ground conditions.
 - (p) Proximity of excavations.
 - (q) Selection of lifting gear considering the size, type and condition of slings appropriate for the load.
- NOTE: Appendix A lists Standards for components that are used in lifting system.
- (r) Personal protective equipment.
 - (s) Emergency procedures.
 - (t) The documentation of work procedures where the lifting operation is not of a routine type (e.g., multiple crane lifting).
 - (u) Consultation and coordination with other groups working in the area.
 - (v) Night operations.
 - (w) Parking/storage facilities.
 - (x) Marking on crane and ancillary equipment (e.g., rated capacity, safety signs).
 - (y) Access for servicing.
 - (z) Interface with structures, plant and vehicles.
 - (aa) Obtaining any approvals or licences from statutory authorities or other relevant parties.

S E C T I O N 3 S E L E C T I O N

Before selecting a crane for a particular application, all relevant information shall be obtained and all relevant operational criteria shall be determined, which shall include, as a minimum, the following:

- (a) The result of an appraisal of an existing crane, if applicable.
- (b) The maximum permitted forces on the supporting structure.
- (c) Power supply.
- (d) Rated capacity of the crane.
- (e) Classification of the crane taking into account the application, including—
 - (i) type of loads to be lifted;
 - (ii) mass of loads to be lifted;
 - (iii) speed of lifts; and
 - (iv) frequency of lifts.
- (f) The maximum load that will be imposed on the crane.
- (g) The maximum load moment that will be imposed on the crane.
- (h) The nature of the rigging or slinging to be used.
- (i) The position from which the load is to be lifted.
- (j) The position in which the load is to be placed.
- (k) The movement limitations of the crane and the load.
- (l) Other limitations of the crane.
- (m) Multiple crane lifting.
- (n) Working environment that includes hazardous gases, corrosive atmospheres and high ambient temperatures including full speed operation against in-service wind load.
- (o) Projected upgrades or applications of plant that are likely to impact on the crane.
- (p) The provision of a crane with a larger capacity to cater, where necessary, for changes in the site environment (for example, increases in lifted load mass due to manufacturing tolerances and rapid changes in weather conditions).
- (q) The access to conduct regular maintenance or repair on equipment.

SECTION 4 SITING

4.1 GENERAL

Consideration shall be given to the following factors:

- (a) Crane standing (see Clause 4.2).
- (b) Proximity hazards and visibility (see Clause 4.3).
- (c) Environmental factors, e.g., noise and noxious fumes (see Clause 4.4).
- (d) Clearances (see Clause 4.5).

4.2 CRANE STANDING

4.2.1 General

A competent person shall ensure that the loads imposed by the crane can be sustained by the ground or any other means of support.

The loads imposed by the crane whilst in service, out of service and during erection and dismantling shall be obtained from the crane manufacturer or a competent person. The loadings shall include the combined effects of the following:

- (a) Deadweight of the crane (including any counterweight, ballasting or foundation where appropriate).
- (b) Deadweight of the load(s) and any lifting attachment(s).
- (c) Dynamic forces caused by movements of the crane.
- (d) Wind loadings resulting from wind speeds up to the maximum permitted, taking into account the degree of the exposure of the site.

A competent person shall ensure that the ground or means of support is such that the crane can operate within the levels and other parameters specified by the manufacturer.

Loads shall not be imposed on any new concrete supporting structure until the structure has reached sufficient strength.

4.2.2 Wind load

All aspects of wind loading, both in and out of service, on the crane standing due to location, shall be taken into account, including the increased wind loads caused by funnelling effects between adjacent buildings or structures.

NOTE: Wind loads may be affected by a change in the physical features of a crane's location, such as the erection or demolition of a building.

4.2.3 Underground services

The site shall be checked for the presence of underground services, ducts and similar services. Where the check reveals the existence of underground services, precautions shall be taken to ensure the stability of the crane, crane standing and integrity of the services.

4.2.4 Stability of crane standing

Where a crane is required to work in the vicinity of an excavation or an embankment, the possibility of slip or collapse of the supporting surface shall be evaluated by a competent person. Where necessary, the excavation or embankment shall be reinforced.

4.3 PROXIMITY HAZARDS AND VISIBILITY

4.3.1 Proximity hazards

Consideration shall be given to the presence of proximity hazards including, but not limited to, the following:

- (a) Overhead powerlines (see Clause 6.20).
- (b) Nearby structures or other cranes.
- (c) Excavations.
- (d) Fixed hazards.
- (e) Personnel movement within the crane working area.
- (f) Mobile equipment and vehicular movement within the crane working area.
- (g) Public access areas including roadways, railways, rivers and aircraft flight paths.
- (h) The effects of electromagnetic radiation (EMR) (e.g., busbars, strobe lights, induction furnaces, welding) on radio, infra-red or electronic controls.
- (i) Temporary installations or those installed after the crane (e.g., tilt-up bracing).
- (j) The vicinity of airfields (applicable to operating high cranes).

4.3.2 Visibility

The crane should be sited in such a way that the crane operator has optimum visibility.

4.4 ENVIRONMENTAL RESTRICTIONS

Precautions should be taken against the effects of noise, exhaust gases, hydraulic fluids, lubricants, fuel, dust and other environmental pollutants emitted by the crane.

4.5 CLEARANCES

Where two or more cranes are to work within a site, or share the same airspace, procedures shall be established to prevent unplanned contact between parts of the cranes. Agreement shall be reached on adjoining sites.

Clearances as set out in the applicable Part of AS 1418 or AS 2550 shall be maintained.

SECTION 5 ERECTION, COMMISSIONING AND DISMANTLING

5.1 IDENTIFICATION OF CRANE COMPONENTS

Where there may be confusion as to their location or orientation, components of cranes subject to frequent erection and dismantling shall be clearly marked to prevent incorrect site assembly. Any component with a mass greater than 250 kg should be marked with its mass.

The materials of construction of the major components and special fasteners involved in site assembly should be recorded. This information should be marked on the components.

5.2 ERECTION, COMMISSIONING AND DISMANTLING INSTRUCTIONS

Instructions regarding erection, commissioning and dismantling shall be made available to all relevant personnel on site in a written procedure. The following shall apply:

- (a) Erection, commissioning and dismantling operations shall be supervised by a competent person.
- (b) Transport and stowing shall be in accordance with manufacturer's instructions.
- (c) The prescribed procedures for the assembly of components shall be followed in the correct sequence, using the correct equipment and tools.
- (d) Only parts and components meeting the manufacturer's performance and strength requirements shall be used.
- (e) Jointing pins shall be assembled so that they can be removed by a person standing on the outside of the assembly.

5.3 ELECTRICAL SUPPLY

Installation of the electrical supply shall be in accordance with AS/NZS 3000 and the applicable parts of AS 1418.

5.4 COMMISSIONING

5.4.1 General

Commissioning shall be carried out in accordance with the written procedure required by Clause 5.2.

5.4.2 Correct function of safety devices

Load moment systems, overload cut-outs or motion limit switches bypassed or disconnected during erection shall be reinstated and tested in accordance with the written procedure before the crane is put into operation.

5.5 SAFEGUARDING THE CRANE

Where there is a risk of adverse impact by mobile plant or vehicles, means shall be provided to protect the crane.

Where required, aircraft warning lights shall be fitted to the highest part of the crane, and the jib and boom sections shall be painted in high visibility colours in accordance with AS 1318.

SECTION 6 OPERATION

6.1 OPERATIONAL INSTRUCTIONS

6.1.1 General

Operating instructions shall be established in relation to the operation of the crane. Such instructions shall detail practices that shall be followed to help overcome hazards and potential risks identified in a risk assessment and shall be issued to all crane operators.

The instructions shall give directions on all applicable operating procedures, as detailed in this Standard, and any other identified directions.

6.1.2 Hazard identification

A hazard identification shall be performed.

NOTE: Guidance on risk management is given in AS/NZS ISO 31000.

6.1.3 Operating instructions

As a minimum, the operating instructions shall be the following:

- (a) Pre-operational inspections shall be carried out by the designated person at the beginning of each working shift in accordance with the pre-operational checklist.
- (b) Where pre-operational inspections reveal a safety malfunction or potential risk, the crane shall not be put in service until the risk has been assessed by a competent person and the appropriate action recorded and carried out.
- (c) All malfunctions and identified potential risks shall be reported and properly recorded for assessment by a competent person and acted upon as appropriate.
- (d) Cranes that are not in a safe condition shall be removed immediately from service and shall remain out of service until repaired.
- (e) The operational area shall be checked for hazards prior to and during each work shift.
- (f) For remotely operated cranes, the load shall be constantly in view of either the operator or a competent person who shall be able to relay the position of the load to the operator at all times.
- (g) Unnecessary operation of the crane motion limits shall be avoided.
- (h) Cranes shall be left in a safe condition. Before the operator leaves a cabin-operated crane, the crane shall be positioned at the designated parking place and all the crane motions disabled against unauthorized operation.
- (i) In the event of the operator becoming incapacitated through injury or illness and unable to continue crane-operating duties, the crane shall be stopped, the operator removed from the operational area and the fact reported to a responsible person.

An assessment shall be conducted by a competent person or persons to determine whether the injury or illness was caused by the crane; the crane shall not be returned to service until it has either been assessed as fit for service or made fit for service. All crane motions shall be disabled until the crane has been assessed as suitable for service and a replacement operator is available.

NOTE: It may be necessary to move the crane to an access point to allow the operator to leave the crane, or to execute the emergency evacuation procedures.

6.2 CRANE OPERATION MANAGEMENT

The following requirements apply to the operation of the crane:

- (a) The crane shall be operated within the rated capacity and design classification.
- (b) Only authorized competent personnel that have the necessary physical, health and other attributes to undertake the tasks assigned to them shall be involved in the operation, inspection and maintenance of the crane.
- (c) The crane shall be transported to site and erected in accordance with applicable instructions that have been drawn up in accordance with this Standard.
- (d) The crane shall not be put into operational service until it has been commissioned in accordance with the requirements of the applicable Part of AS 1418. The initial operation shall only take place after the sighting of an inspection and testing record signed by a competent person.

NOTES:

- 1 A manufacturer may specify additional commissioning requirements.
- 2 Appendix B provides notes and general guidance on this subject, together with a typical inspection and testing certificate format.

- (e) Lifting equipment including the hook block, lifting beams and attachments shall be appropriately marked in accordance with the applicable Australian Standard.
- (f) The power supply shall be compatible with the requirements of the crane.
- (g) Operators shall be fully trained and shall be certificated as required by the applicable regulatory authority, to ensure that they have achieved the required competencies in all aspects of the crane's operation and sufficient understanding of the operating instructions and emergency procedures.

NOTE: For a list of National Certificates of Competency, see Appendix C.

- (h) Instructions applicable to the operation of the crane shall be provided to operators; this may include manuals where applicable.
- (i) All guarding shall be in place.
- (j) Notices applicable to the various specified operating configurations of the crane shall be readily accessible to the operator at all times.
- (k) Access onto and egress from the crane shall only be at designated positions unless the crane is in a breakdown situation. A procedure shall be developed to allow safe access to the crane where the crane is at a location other than its designated service position.
- (l) A clear and defined pathway for the operators of cranes controlled by pendant or wireless control shall be provided and maintained.
- (m) Sufficient competent persons shall be available to assist the crane operator as required.
- (n) Procedures shall be established to deal with reasonably foreseeable emergency situations and all operators shall be fully trained in their application.
- (o) Inspections, maintenance and repairs shall be carried out in conformance with the requirements of Section 7 of this Standard.
- (p) Records shall be maintained and retained in accordance with Clause 7.5.
- (q) Appropriate personal protective equipment shall be provided and personnel shall be instructed in the use of such equipment.
- (r) Personnel shall not be under the effect of drugs, including alcohol, that adversely affect their performance.

- (s) Manufacturer's safety bulletins shall be implemented.
- (t) When out of service, external cranes shall be secured in accordance with Clause 6.6.

6.3 COMPLIANCE WITH INSTRUCTIONS

The crane shall be used in compliance with the instructions written in accordance with this Standard.

6.4 COMMUNICATION OF IRREGULARITIES

Details of any irregularities in the operation of the crane, including any abnormal noise or movement, and any incidents shall be communicated to the responsible person and recorded in the crane service record (logbook).

6.5 LEAVING THE CRANE UNATTENDED

A manually controlled or semi-automatically operated crane shall not be left unattended unless the following actions, where applicable, have been taken:

- (a) All payloads shall be removed from the hook or lifting device.
- (b) The hook shall be raised to a position where it is clear of obstructions or trafficable areas, or hooked back or otherwise appropriately secured.
- (c) All powered motions shall be disabled.

Means shall be provided and used to prevent unauthorized operation of the crane during the crane operator's absence.

NOTE: For details of methods to safeguard particular types of cranes, reference should be made to the operating instructions.

6.6 OUT OF SERVICE

When putting a crane into the out-of-service condition, it shall be isolated in accordance with Clause 6.5 and as follows:

- (a) Cranes shall be positioned at their assigned parking stations and stowed in their specific out-of-service configuration.
- (b) Power supply shall be locked off.
- (c) Where fitted, storm anchors shall be engaged.
- (d) The engine shall be stopped and fuel supplies shall be turned off, where applicable.
- (e) All doors and windows giving access to machinery or control cabins shall be locked to prevent unauthorized access.
- (f) Remote control equipment shall be isolated with locking key removed, where applicable.
- (g) Isolation and ignition keys shall be removed to prevent unauthorized operation.

6.7 HOUSEKEEPING

Housekeeping requirements are as follows:

- (a) Each crane shall be kept clean.
- (b) Loose objects shall not be left on any area of the crane from which they could fall (e.g., moving parts, access, areas subject to vibrations or mechanical shocks).

- (c) Grease and oil spills, debris and other materials that could cause a hazard shall be removed from the crane and associated walkways, stairways, platforms, ladders, working areas and access areas.
- (d) Hazardous substances (e.g., fuel) shall be stored safely.
NOTE: Regulations apply to the safe storage of hazardous substances.
- (e) Tools or other loose objects shall be stowed in receptacles specially provided for the purpose, or they shall be securely stowed.

6.8 CRANE ACCESS AND EGRESS

6.8.1 General

Access to and egress from a crane shall be by the means provided, such as the crane operator access, the inspection access and the maintenance access as defined in the applicable Part of AS 1418. The means of access/egress shall be properly designated.

Access to and egress from a crane shall be made only when the crane is stationary.

Where the crane is under the control of a crane operator, the crane operator shall be notified before any person gains access to or egress from the crane.

6.8.2 Emergency egress

A procedure for the emergency egress of personnel from a crane shall be established.

NOTE: Consideration should be given to the installation of a communications system for use during emergency egress.

6.8.3 Maintenance, commissioning, erection or dismantling

Access and egress shall be provided during maintenance, commissioning, erection or dismantling at heights.

6.9 PERSONS APPROACHING THE PROXIMITY OF A CRANE

Personnel should not approach a crane when it is operating or travelling as there is a danger that they may be struck by the crane or load, or trapped between fixed and moving parts of the crane (for example, between the slewing superstructure and the non-rotating structure of the crane).

Where personnel are required to enter a crane's operating area during normal operations, the operator shall be made aware of their presence (for example, establishing voice or visual contact).

Barricades or guarding shall be provided where necessary.

6.10 CRANE OPERATION

6.10.1 General

Crane operation shall be subject to the following conditions:

- (a) The rated capacity of the crane shall not be exceeded except for the express purpose of a test of the crane under the supervision of a competent person, or for a designed lift.
- (b) The crane operator shall be familiar with the location and operation of the main isolating switch.
- (c) The crane operator shall be familiar with the emergency procedures.
- (d) The crane operator shall be familiar with the location and operation of the firefighting equipment.

- (e) Sudden stops, jerks or other movements that could cause the load to swing unduly shall be avoided.
- (f) The hook or load shall not be moved when the hook or load is out of sight of the operator except when directed to do so by the competent person assisting the operator.
- (g) The hook or load shall be sufficiently raised to avoid collision with any object during horizontal movement.
- (h) Out of vertical hoisting shall not be undertaken.
- (i) Moving the load, lifting attachment or other object horizontally, other than when the load is freely suspended from the crane, shall be avoided.
- (j) Unnecessary engaging of the crane, or part of the crane, with end stops shall be avoided.
- (k) The signals or directions given by the authorized person shall be followed, unless a dangerous situation would be created by so doing in which case no movement shall be undertaken.
- (l) When loads have to be handled in the vicinity of persons—
 - (i) the crane operator shall be alert to the possibility of persons being trapped and injured by the movement of the crane or load and exercise due caution; and
 - (ii) where the person controlling the load, or others persons, could be trapped, the crane or load shall not be moved unless their safety is assured.
- (m) Slack rope shall be avoided when landing a load.
- (n) When out of service, the crane shall be positioned in its normal parking position.

When a crane is controlled by pendent or wireless control, the operator should have good visibility of the load, to ensure that safe handling takes place. Where this is not possible, a competent person shall be engaged to relay the position of the load to the operator at all times during the lift, and shall communicate with the operator to ensure safe operation. Provision shall be made for the security of the remote control transmitter against unauthorized use.

6.10.2 Hoisting of loads

The crane shall not handle any load greater than the rated capacity applicable to the configuration of crane and manner of loading or any load that may create an unsafe situation.

The load shall be raised a short distance to test the winching system before continuing to raise the load in the following situations:

- (a) For the first load of each working shift.
- (b) For the first load of each working shift that is greater than 50% of the rated capacity.

6.10.3 Use of motion limits

Unnecessary operation of motion limits shall be avoided unless such usage is to a functional limit where a final limit is fitted.

6.10.4 Interruption of electric power supply

If the crane is handling a load when the power supply is interrupted and the load is in a position likely to cause a hazard, where manual lowering capability is provided, the load should be lowered manually to a safe position (e.g., floor level).

6.11 LOAD SECURITY

Any load shall be adequately protected so that it cannot inadvertently fall when being lifted. To ensure loading security, the following shall apply:

- (a) The slings shall be suitable for the application.
- (b) All slings shall be used in accordance with manufacturers' instructions.
- (c) The slings shall be correctly attached to the load and to the crane hook.
- (d) Basket hitches shall not be used wherever persons may be located near a lifted load, unless the sling is positively restrained from sliding and the load is secured in the sling.
- (e) Where required, suitable protection shall be provided to prevent damage to the sling or load.

NOTE: A list of Australian Standards relevant to lifting gear is given in Appendix A.

6.12 CONTROL OF LOAD

Where a load is hoisted under the direction of a competent person other than the crane operator, that person shall direct the crane operator from the time the load is hoisted until it is placed in position. The competent person shall ensure that the load clears all obstructions and, where necessary, shall guide the load by an appropriate means, e.g., tag line (see Clause 6.13).

Where a load is being controlled by more than one competent person, only one person shall issue instructions to the crane operator and to the other competent person(s).

Before signalling the crane operator to raise a load, the competent person assisting the operator shall ensure that—

- (a) the slings are correctly applied to the load and to the crane hook (see Clause 6.11);
- (b) the slings shall be rigged to prevent sliding;
- (c) no part of the load is loose;
- (d) the load is free and ready for hoisting;
- (e) when hoisted, the load will not foul any object;
- (f) when hoisted, the load will not constitute a hazard to any personnel; and
- (g) the load placement area is ready to receive the load.

6.13 TAG LINES

When used, hand or tag lines shall be at least 16 mm in diameter and be made of non-conductive material. Tag lines shall be maintained clean and dry and shall be assessed before use. Lifting gear should not be used as tag lines. Taglines shall not be attached to the lifting gear.

6.14 COMMUNICATION

6.14.1 General

Where communication is required between the operator and other personnel, a reliable and efficient method of communication shall be established.

6.14.2 Hand signals

Hand signals should be as shown in Figure 6.14.

6.14.3 Bell, buzzer and whistle signals

Bell, buzzer and whistle signals used should be as shown in Figure 6.14.

The bell or buzzer shall be located in a position where it can be readily heard by the crane operator while at the control position.

If two or more cranes are operating in close proximity, the tones of each bell, buzzer or whistle employed for the cranes shall be clearly distinguishable.

6.14.4 Radio communication

Where radio communication is used, the transmitting frequencies of the radio equipment shall be selected to prevent interference to or from other radio equipment being used in the vicinity of the crane.

Communicated instructions shall specify the motion first followed by the action.

MOTION	HAND SIGNAL	WHISTLE, BELL OR BUZZER SIGNAL		MOTION	HAND SIGNAL	WHISTLE, BELL OR BUZZER SIGNAL
Hoisting raise		2 short • •		Hoisting lower		1 long —
Luffing boom up		3 short • • •		Luffing boom down		4 short • • • •
Slewing right		1 long, 2 short — • •		Slewing left		1 long, 1 short — •
Jib-trolley out: telescoping boom extend		1 long, 3 short — • • •		Jib-trolley in: telescoping boom retract		1 long, 4 short — • • • •
Travel and traverse		Not applicable		STOP		1 short •
CREEP SPEED: APPROPRIATE HAND SIGNAL FOR MOTION WITH HAND OPENING AND CLOSING						

FIGURE 6.14 SIGNALS

6.15 HANDLING LOADS OVER PUBLIC ACCESS AREAS AND ADJACENT BUILDINGS

The handling of loads over highways, railways, rivers, adjacent buildings or other places to which the public have access should be avoided. Where this is not possible, barricades shall be positioned and maintained a sufficient distance around the operating area beneath the crane to prevent people encroaching on that area. Alternatively, suitable overhead protection shall be provided during the operation.

6.16 NON-POSITIVE LIFTING ATTACHMENTS

Where loads are suspended by non-positive lifting attachments (e.g., magnetic, vacuum or friction lifting attachments), personnel should be excluded from all areas that could be affected by a falling load.

Where it is not possible to isolate personnel from the operation area of cranes fitted with non-positive lifting devices, operational procedures shall be developed to prohibit personnel working in the hazardous area; that is the area where personnel may be injured as a result of failure of the lifting attachment.

The non-positive lifting device shall be sized to provide an adequate design factor on its nominal rated capacity, taking into account the size, shape and mass of the lifted load.

6.17 INDICATING AND LIMITING DEVICES

Where indicating and limiting devices are provided, they shall not be switched off or made dysfunctional during crane operation, except for—

- (a) designed lifts in accordance with Clause 6.27; or
- (b) testing and commissioning; or
- (c) where the crane manufacturer has specified instructions for avoiding indicating and limiting devices for specific operations.

6.18 RIDING ON THE CRANE STRUCTURE

Except for inspection, maintenance, commissioning, erection or dismantling purposes, only those personnel correctly accommodated in the cabin or on the work platform shall be permitted on the crane when it is operating. Personnel shall only ride on the crane structure as necessary for inspection, maintenance, commissioning, erection or dismantling purposes. A written procedure for riding on the crane structure shall be provided.

6.19 SUSPENSION OF PERSONS BY CRANE

6.19.1 General

A person shall only be suspended from a crane hook when accommodated in a workbox designed for the purpose in accordance with AS 1418.17.

The use of the workbox shall be limited to those situations where it is necessary to elevate personnel to carry out work where it is not reasonably practicable to use scaffolding or equipment designed specifically to lift personnel.

6.19.2 Requirements for the crane used with a workbox

A crane used with a workbox shall—

- (a) be fitted with a safety hook or moused accessory;
- (b) be equipped with controls that return to the neutral position when released and this action causes the motion to stop;
- (c) be equipped with power lowering;
- (d) be equipped with a positive free fall lockout control so that inadvertent disengagement of the lockout is not possible;
- (e) be fitted with an upper limit motion limiting device;
- (f) be fitted with a down-limit motion limiting device, if the workbox is to be lowered below the crane supporting surface;
- (g) be such that at the maximum radius of the task to be performed, the crane has a minimum rated capacity of 1000 kg; and