



RISK ASSESSMENT

Pick & Carry Cranes



RISK ASSESSMENT

Pick & Carry Cranes

Risk Assessment

Contents

Revision

Cover	Apr17
Inside Cover	Apr17
Contents / Introduction	Apr17
Section 1 – General potential hazards and risk controls	Apr17
Section 2 – Operational potential hazards and risk controls	Apr17
Section 3 – Post operational potential hazards and risk controls	Apr17
Section 4 – Inspection and maintenance potential hazards and risk controls	Apr17
Appendix 1 – Working Environment (Site) Checklist	Apr17

As a manufacturer of plant in Australia, Terex Australia Pty. Ltd. is providing this information regarding hazard identification, risk assessment and recommendations on risk control measures to be taken:

The information provided in this document is sourced from the manuals provided by Terex Australia (the designer/manufacturer), attachment manufacturers, the experience of technical personnel from Terex and industry consultants.

Whilst the information in hazard identification, risk assessment and risk control measures is not exhaustive, Terex believes that the manual provides practical guidance for the safe operation of the crane, provided that the crane is used in accordance with the designers/manufacturer's recommendation for which the plant is designed and manufactured.

A generic assessment has been carried out for classes or types of plant that have similar functions and productive capacity and the procedures carried out for the class of plant do not result in any person being subject to a different risk than if the procedures were carried out for each individual item of plant. Any variations of individual models of plant from the generic hazards will be identified if required.

This report identifies all the pre-operational, operational and post-operational hazards and associated risk controls for all Terex Pick & Carry cranes in commercial service at the time of writing. In addition, hazards associated with attachments are also included together with the recommended risk controls.

This section lists the potential hazards and risk control precautions that should be observed when operating or maintaining Pick & Carry cranes.

The points raised here must be fully understood and observed to work safely. Read and understand the operation and maintenance manuals.

Further precautions may be necessary due to the attachments in use or the site conditions.

The user should continually re-evaluate the site conditions as the working environment has a major influence on the risk associated with the use of Pick & Carry cranes.



WARNING

DO NOT OPERATE OR WORK ON THE CRANE UNLESS YOU HAVE READ & UNDERSTOOD THE INSTRUCTIONS AND WARNINGS IN THE OPERATOR'S AND MAINTENANCE MANUALS. FAILURE TO FOLLOW INSTRUCTIONS AND WARNINGS COULD RESULT IN DAMAGE TO THE CRANE, INJURY OR DEATH.



RISK ASSESSMENT

1. GENERAL POTENTIAL HAZARDS & RISK CONTROLS



RISK ASSESSMENT

A. GENERAL HAZARDS

RISK CONTROLS & GENERAL PRECAUTIONS

- | | |
|--|--|
| A1. Unintended movement of plant due to clothing getting caught or tangled in control levers and mechanical parts. | A1. When driving or operating the machine, do not wear clothing with dangling parts, which might catch on control levers or mechanical parts. Wear appropriate personal protective equipment as necessary. |
| A2. Unintended movement of plant from operating wrong controls or errors in judgment. | A2. Do not operate the crane when you are excessively fatigued or unwell.

Read the Operators Manual & Risk Assessment (“this manual”) thoroughly, familiarizing yourself with all controls before you start operating the crane.

Follow instructions and warnings in this manual and on plates and stickers mounted on the machine. If there is something you do not understand, have it explained to you. If the manual is lost, or a warning label is illegible, replace it. |
| A3. Fire and emergency response. | A3. Carry a fire extinguisher and first aid kit in the crane. Learn how to use the fire extinguisher before an actual emergency situation arises. |
| A4. Fire from handling chemicals. | A4. Do not smoke or use fire near fuel, oil, antifreeze, batteries or other chemicals, which could ignite.

Extinguish all fires and potential sources of ignition when handling these flammable materials.

Before refueling the crane, switch off the engine and check that there are no fires or potential sources of ignition nearby.

After refueling securely fasten all fuel and oil caps and wipe off any spillage.

Refuel and change oil in a well-ventilated work area. |



**B. GENERAL HAZARDS-
WORKING PROCEDURES**

RISK CONTROLS & GENERAL PRECAUTIONS

B1. Unfamiliarity with site conditions or scope of work

B1. Plan for Pick & Carry crane operations as early as possible. Planning should involve inspection of the site, consultation with all persons involved in the work such as the principal contractor, crane hirer, energy suppliers, employer, dogman, spotter, site foreman and crane operator.

B2. Not observing instructions on warning labels could cause operation beyond limitation of plant.

B2. Observe all instructions on the warning labels. Ensure that all warning labels are clean and legible. If the warning labels are damaged or illegible replace them.

B3. Collision with people or objects in work area.

B3. Before starting work, check the work area for the presence of roads, overhead powerlines, nearby structures, other cranes, aerial hazards and other obstructions.

Isolate the work area by using witches hats, temporary barriers or fencing. People, vehicles, etc. should be prohibited from entering the isolated area. Consult the principal contractor, site supervisor, the other crane operators and everyone involved with the work and prepare a safety plan for the job.

Always be aware of your surroundings and the hazards while you work.



RISK ASSESSMENT

- | | |
|---|---|
| <p>B4. Collision with other plant and structures.</p> <ul style="list-style-type: none">a. During articulating or reversingb. From dirty windows and mirrorsc. From poor lighting.
d. From adverse weather conditions. | <p>B4. When operating a Pick & Carry crane, consider hazards such as overhead powerlines, nearby structures, other cranes, high obstructions and other mobile equipment within the crane working area.</p> <ul style="list-style-type: none">a. When you need to articulate or reverse in areas of restricted visibility, place a guide or use a spotter and follow their instructions.b. Keep the cab windows, mirrors, wipers and working lamps clean.
c. When working in areas with poor lighting switch on the lights. If required use additional illumination (mobile lighting can be hired from equipment hire places).
d. When visibility is bad due to fog, snow, rain, or other adverse weather conditions stop work and do not start again until conditions have improved. |
| <p>B5. Collision with people or other vehicles when working on public roads</p> | <p>B5. When working on public roads, position a guide and erect fences, witches hats, etc.</p> <p>Observe all the traffic rules and safety regulations and laws of the Country or State where the crane is being used.</p> |
| <p>B6. Collision with objects and people working in the work area.</p> | <p>B6. Discuss your requirements with the site supervisor. If you consider that the people and equipment in the area has to be removed before you operate the crane, discuss it with the site supervisor so the necessary arrangements can be made.</p> |
| <p>B7. Electrocution from live overhead conductors. If you are working close to power cables you can also receive a shock even if the crane does not physically contact the cables.</p> | <p>B7. Take the following precautions when working near power cables.</p> <ul style="list-style-type: none">a. Contact the managing company in advance and arrange for electricity to be switched off (if possible), or arrange for cables to be fitted with protective devices .b. Keep a safe distance between the machine and the power cables. Consult the electricity authorities on the location and voltage of cables on the site and the minimum isolation distance.
c. Use a spotter and follow their instructions. |



RISK ASSESSMENT

- | | |
|---|--|
| B8. Electromagnetic radiation from high-power electromagnetic emitters (used for radio, television, radar and mobile phones transmission) could be painful and have dangerous consequences. | B8. Take the following precautions when operating the crane near high-power electromagnetic wave emitters.
a. Contact the relevant authorities before starting work. Discuss the safety requirements and precautions to be taken with the authorities. Ensure that all the safety precautions are observed. |
| B9. Electrocution from lightning strikes. A crane with a long boom is prone to lightning strikes. | B9. If thunderstorms are approaching, lower the boom, turn off the crane and get out of the crane. Resume work when the thunderstorm ceases. |
| B10. Inadvertent movement from poor signaling. If the signaler does not signal appropriately with the sling handler and other workers there could be an accident. | B10. Work according to signals. Choose one person to be the signaler. Before starting the job the controller, the signaler, the sling handler and other workers should confer on signal procedures in order to work safely under the direction of the signaler. |
| B11. Collision between two cranes working together. | B11. Determine signals for joint operations in advance. If two or more cranes are working together on a site ensure that all parties involved discuss the work plan and clearly define the lines of communications. |



RISK ASSESSMENT

B12. The crane could tip over due to: B12.

- | | |
|---|---|
| <p>a. Strong windy conditions. Loads with large volumes or surface areas have larger wind forces acting on them. The wind forces and the loads from the suspended objects act on the crane and could cause the crane to tip over.</p> <p>b. Poor ground conditions.</p> <p>c. Rapid articulation.</p> | <p>a. Stop work in strong windy conditions. If the wind has a gust speed of 10m/s or more, retract the boom, turn off the crane and get out of the machine. Resume work when the gust speed is below 10m/s.</p> <p>b. Check that the ground conditions are stable and level over the entire intended path of travel. Do not operate the crane on unstable ground.</p> <p>c. Articulate the crane slowly and smoothly.</p> |
|---|---|



RISK ASSESSMENT

C. HAZARDS - PRE-OPERATION

RISK CONTROLS & PRE-OPERATIONAL PRECAUTIONS

- | | |
|--|--|
| C1. Inadvertent operation of plant due to poor housekeeping. | C1. Keep the area of the operator's cabin and seat clean and tidy. Do not leave parts, tools or other objects in the area of the operator's seat. These can cause unexpected accidents while you are working. |
| C2. Stress and tiredness from poor sitting position and posture. | C2. Adjust the operator's seat so that you can sit comfortably with good posture, and all control levers are within easy reach without having to lean or strain your body. Check that you can reach the foot pedals comfortably with your back resting against the back of the seat. |
| C3. Accidental operation of plant if operated by more than one operator. Passengers may collide with obstructions or be thrown off the machine, or they may cause a hazard by obstructing the operator's field of view | C3. Before and during work, nobody other than the operator should sit in the operator's seat or climb onto the crane. |



RISK ASSESSMENT

- | | |
|--|---|
| C4. Slips, trips and falls when getting on or off the plant. | C4. Take the following precautions when you get in and off the crane. <ul style="list-style-type: none">a. Check that all guards and covers on the machine are fastened correctly. Tighten any loose bolts or repair any damage.b. Wipe off any mud, oil or snow on the steps before you start work.c. Do not jump onto or off the machine.d. Do not hold onto the seat, control box, control levers or anything other than the hand-grips provided when you get on or off the machine.e. Do not get on and off the machine while it is moving. |
| C5. Dropping of load | C5. Check safety devices. Pick & Carry cranes are fitted with various safety devices which should be checked before starting work. |
| C6. Crane overload or tip over in adverse working configuration. | C6. Check the operation of the crane computer / Load Moment Indicator (“LMI”) according to the pre-operational check procedure described in the Operators Manual (this manual should be kept in the crane cabin). |
| C7. Failure of controls and/or mechanical parts of plant. | C7. Before operating the crane check the machine according to the pre-operational checking procedure detailed in this manual. Check the operation of the control levers while the crane is not carrying any load.

Allow the crane to warm up before carrying full load.

Ensure that the crane is serviced regularly in accordance with this manual. |



RISK ASSESSMENT

- | | |
|---|---|
| C8. Dropping of load | C8. Check all safety and warning devices. Pick & Carry cranes are fitted with various safety devices, which should be checked before starting work.

Carry out regular servicing of the crane in accordance with the recommendations in this manual. |
| C9. Falling objects (during erecting and dismantling activities) could damage property and present a risk of injury to workers and members of the public. | C9. Erect and maintain effective barricades around the mobile crane. Only allow persons who are directly involved Pick & Carry crane operations inside the area.

Schedule the erecting and dismantling of the crane to occur when the movement of other persons and mobile plant at the workplace is at a minimum. |



RISK ASSESSMENT

2. OPERATIONAL POTENTIAL HAZARDS & RISK CONTROLS



RISK ASSESSMENT

A. HAZARDS - STARTING THE ENGINE

RISK CONTROLS & GENERAL PRECAUTIONS

- | | |
|--|--|
| A1. Carbon monoxide poisoning from the exhaust fumes when the engine is running indoors. | A1. If the engine must be started indoors, open all doors and windows to ensure good ventilation. If necessary connect an additional pipe to the exhaust pipe and expel the exhaust gases to the outside. |
| A2. Fire from spills. | A2. Keep the engine and surroundings clean. Do not leave tools, rags, or anything else in the engine compartment.

After inspection and maintenance wipe off any spilled oil or fuel.

Check that flammable material is not scattered about or piled up near the engine. |
| A3. Accidental movement of the crane. | A3. Only start the engine when seated in the operator's seat. |
| A4. Operating the crane when it is being serviced or repaired. | A4. Always attach warning tags on control levers of the machine when it is being serviced or repaired. Isolate the machine where possible. |
| A5. Collision with people and objects | A5. Check for people and objects near the crane before you start the engine. Concentrate on the job and always be aware of people and equipment approaching the crane. Erect temporary barriers around the crane if necessary. |
| A6. Unintended movement of the crane on start up. | A6. Before starting the engine check that all levers, pedals and switches are in their neutral or OFF positions. |



RISK ASSESSMENT

B. HAZARDS WHEN OPERATING THE CRANE

RISK CONTROLS & GENERAL PRECAUTIONS

- | | | |
|---|-----|--|
| B1. Structural failure or tip over of the crane during operation. | B1. | <p>Do not exceed the lifting capacity of the crane. If unsure of the lifting capacity, always check the rated lifting capacity chart. Lifting capacity varies with the boom length and working radius.</p> <p>Always check that all safety devices and warning systems are functioning properly. Do not operate a crane if any of the safety devices or warning systems are faulty.</p> |
| B2. Collision from swinging load or reduced stability of the crane. | B2. | <p>Avoid sudden movement or violent operation of the crane. Operate the levers and pedals smoothly. Start, accelerate, decelerate, articulate and stop the crane smoothly and securely.</p> <p>When lifting long loads tie a guide rope to each end of the load. This will prevent the load from swinging whilst it is being lifted.</p> <p>Compound operations, such as combining winch hoisting or lowering, articulating, luffing and telescoping will be slower than the individual operations. When switching from compound to single operation, work the controls slowly and smoothly with no sudden change in speed or direction.</p> |
| B3. Crane damage and tip over from using counterweights that are not specified. | B3. | <p>Only use counterweights supplied by the manufacturer. Incorrect counterweights may subject the crane to unreasonable strain and damage it, or decrease the stability of the crane. For machines with variable counterweight (MAC25 all models, MAC25 SL all models, some AT-15 & AT-20 machines delivered to New Zealand), ensure the selection on the crane computer is correct before commencing lifting operations. Always refer to the correct load chart. Follow any warning provided in this manual or by the crane computer.</p> |



RISK ASSESSMENT

- | | |
|--|---|
| B4. Collision if operator is not concentrating on the job. | B4. Do not operate the crane if you are tired or cannot concentrate on the job.

Always be alert and watch that the boom or the suspended load does not collide with people or buildings and the load does not collide with the boom. |
| B5. Operating the crane by reaching in through the door or window. (The operator is not in full control of the crane and could cause the crane to collide with people, buildings and other objects). | B5. Only operate the crane while seated in the operator's seat. |
| B6. Dropping of the load from an unattended crane. | B6. Never leave a suspended load on an unattended crane. When leaving the crane, always lower the load to the ground, switch off the engine, lock the crane and take the keys with you. |
| B7. Dropping of load, damage or tip over of the crane due to overloading or unstable load. | B7. Carry out the following checks before lifting a load.

a. Check that the total weight of the load (including the weight of slings, hook and attachments) is below the rated capacity of the crane.
b. Check that the number of parts of line on the winch rope is a standard number according to the rated lifting capacity.
c. Check that the slings are properly positioned to lift the load above its center of gravity.
d. Check that the winch rope is hanging vertically.

When the load just leaves the ground pause until it stops swinging. Confirm that the load is stable before continuing to hoist. |



RISK ASSESSMENT

- | | |
|--|---|
| B8. Dropping of load from insecure slings or hook. | B8. To prevent the load from falling off or slipping out of the slings, pay attention to the following points when arranging the sling. <ul style="list-style-type: none">a. The slings or chains should be of the right capacity and in good condition.b. Arrange the slings so that they do not get tangled with each other.c. The hook is fitted with a retainer to prevent the slings from slipping out. Check that the hook is in good condition and the retainer is operating correctly.d. Place a protector (some soft material) to prevent the rope from damage where it comes into contact with the corner of the load, and elsewhere where the sling is prone to damage. |
| B9. Damage to the crane or reduced stability when working with a heavy load and long boom. | B9. When lifting a load the boom flexes and increases the working radius. This is more noticeable with a very heavy load or long boom. Allow an extra margin below the rated lifting capacity to compensate for the increased working radius. |
| B10. Overload due the increased flexure of the boom when the load is lifted suddenly. | B10. Lift the load off the ground carefully. Hoist the load vertically and pause briefly when the load is just off the ground to confirm the sling and that there is no overload. Then resume hoisting. |
| B11. Damage to crane or reduced stability if the load is lifted off the ground by luffing or extending the boom. | B11. Never lift the load off the ground by luffing or extending the boom. Wait until the load is just off the ground before luffing or extending the boom. |
| B12. Damage or injury caused by personnel under the load when articulating. | B12. Before moving the load sideways check that it is safe to do so. The path of the load or crane should be clear of people or obstructions. |



RISK ASSESSMENT

- | | | | |
|-----|---|------|---|
| B13 | Collision or dropping of load on people. | B13. | Do not move the suspended load above people's head. |
| B14 | Damage or injury caused by loss of stability due to operation on sloping ground | B14 | <p>Read and understand the Operators manual regarding operation on sloping ground. The rated capacity of the machine should be <u>reduced</u> when lifting on or traversing sloping / uneven / out of level terrain.</p> <p>Do not operate the machine on sloping ground outside the limits described in this manual and the machine load chart.</p> <p>Plan lifts carefully when operating on uneven terrain.</p> <p>Operators must be able to perform a manual calculation to reduce the safe working load of the machine if a lift plan is unavailable.</p> <p>Some Pick & Carry cranes may be fitted with crane computers which can perform a reduction in rated capacity. Refer to the operators manual to check if this function is available on the machine in use.</p> |



RISK ASSESSMENT

- | | | | |
|-----|--|------|---|
| B15 | Collision with obstacles from entanglement of wire rope during hoisting or articulating. | B15. | If the wire rope becomes entangled with an obstacle, carefully disentangle it without further hoisting or slewing. Place the load back on the ground and check that the wire rope is not damaged before resuming. |
| B16 | Overload and tip over of the crane by sudden raising or lowering of the boom. | B16 | Lower the load to the ground using the winch. Avoid sudden raising and lowering of the boom as it makes the crane prone to tipping over. |
| B17 | People falling from height. | B17 | Only lift people using a Terex approved man basket. A safety harness must be worn. Different states and countries have different safety regulations and laws. Always observe the laws of the state or country you are in. |
| B18 | Damage to the boom or tip over of the crane if the load is not lifted from a position above its center of gravity. | B18 | Never drag a load sideways, hoist it diagonally or drag it towards the crane. Luffing or hoisting to drag the load sideways or lift it diagonally subjects the crane to forces it was not designed for. These additional forces will damage the boom or cause the crane to tip over.

Follow the signaler and lift the load vertically. |



RISK ASSESSMENT

B19 Impact from falling objects during an earthquake.	B19 If there is an earthquake when the crane is operating, the vibrations feel greater and more alarming from the elevated position of the operator's seat. Stop work immediately and respond to ground deformation or falling objects as follows: a. Lower the load to a safe place. b. Articulate away from the danger of falling or toppling objects and then lower the boom. c. Stop the engine. d. To avoid being thrown out of the cab (by the vibrations caused by the earthquake) fix yourself in position with your hands and feet until the earthquake stops. If the door is open close it and secure it. To resume work after the earthquake has ceased and there is no likelihood of further tremors, thoroughly check the ground conditions. Look for damage to any part of the crane, check the operation of the crane computer and check hooks and slings for any abnormalities. Inspect the load for signs of movement of damage.
B20 Cabin noise when operating the crane. (An operator subjected to high noise levels over a prolonged period of time can become temporarily or permanently deaf)	B20 Refer to the Db ratings on the noise certificate in the Operator's Manual, and Occupational Health and Safety guidelines (for noise levels and the time an operator can be safely subjected to these noise levels without adversely affecting his or her health) in your state or country. If the noise levels and period of exposure are high, use appropriate hearing protection.



RISK ASSESSMENT

C. HAZARDS WHEN CONTROLLING BOOM DERRICKING AND LOWERING:

RISK CONTROLS & GENERAL PRECAUTIONS

- | | | | |
|----|--|----|---|
| C1 | Reduced stability and possible tip over during luffing the boom. (When luffing the boom, the working radius increases as the angle of the boom decreases thus increasing the risk of tip over) | C1 | When luffing the boom, ensure that the load will not cause the crane to tip over at the largest radius. Refer to the load chart in this manual. |
| C2 | Damage to hook from overhoisting. | C2 | <p>Terex Pick & Carry cranes compensate for the hook height below the boom head whilst telescoping in or out on boom 1 & 2. It is safe to two-block the hook block against the boom head with no load on hook for road travel. When lifting a load, care should be taken to prevent a load or hook block contacting the boom as damage may occur. The size of the lifting load must also be taken into account.</p> <p>All MAC25 and MAC25SL models only compensate hook height on boom 1 & 2, but not for boom 3. The overhoisting protection device (anti two-block switch) is functions to stop boom 3 extending if contacted by the hook block. It is safe to override the anti-two block for road travel only. When lifting a load, care should be taken to prevent a load or hook block contacting the boom as damage may occur. The size of the lifting load must also be taken into account.</p> <p>Do not operate the crane if the overhoisting protection device is malfunctioning.</p> |



RISK ASSESSMENT

D. HAZARDS WHEN OPERATING THE WINCH

RISK CONTROLS & GENERAL PRECAUTIONS

- | | | | |
|-----|--|-----|---|
| D1. | Dropping of excessive load | D1. | Choose a hook and winch rope parts of line suitable for the mass of the load from the rated lifting capacity table. |
| D2. | Dropping of excessive load or reduced stability. | D2. | When lifting a load, pause briefly after the load has just left the ground to check whether it is safe to continue. |
| D3. | Entanglement of wire rope on the winch drum. | D3. | When unwinding do not allow the hook to touch the ground. If the hook touches the ground, the wire rope on the winch drum can become tangled. |
| D4. | Collision with rotating load due to twisted wire rope. | D4. | If the wire rope gets twisted and causes the hook to rotate, untwist the rope before starting work. |



RISK ASSESSMENT

E. HAZARDS WHEN EXTENDING AND RETRACTING THE BOOM

RISK CONTROLS & GENERAL PRECAUTIONS

- | | | | |
|-----|---|-----|---|
| E1. | Abrupt stop from over-hoisted condition. | E1. | Lower the hook sufficiently before extending the boom. Monitor the position of the hook block relative to the head of the boom. Care should be taken to prevent a load or hook block contacting the boom. |
| E2. | Damage to the boom if used to push or pull objects (not applicable to DM type crane). | E2. | Do not use the boom to push or pull objects as the crane is not designed for this. Loads must be freely suspended to move them. |



RISK ASSESSMENT

F. HAZARDS WHEN ARTICULATING

RISK CONTROLS & GENERAL PRECAUTIONS

- | | |
|---|---|
| F1. Collision with people or objects when articulating. | F1. Check that the area is clear of obstructions before articulating. |
| F2. Damage to the boom and tip over of the crane from centrifugal forces caused by rapid articulation and stopping with a suspended load. | F2. Always be aware of the centrifugal forces when articulating. Articulating rapidly with a suspended load increases the working radius and could cause an overload that could tip over the crane. If the articulation is stopped abruptly, the inertia of the suspended load will cause it to swing uncontrollably and impose higher loads on the boom. Do not articulate rapidly or stop abruptly as this could lead to tip over and/or damage to the boom. This problem will get worse with longer boom lengths and higher boom angles. |



RISK ASSESSMENT

G. HAZARDS WHEN HANDLING THE JIB

RISK CONTROLS & GENERAL PRECAUTIONS

- | | | | |
|-----|---|-----|---|
| G1. | Jib breaking and falling off from overload. | G1. | When lifting an object, ensure that the load lifted is within the lifting capacity of the boom at the maximum working radius. |
| G2. | Injury due to manual handling while attaching jib | G2. | Follow instructions given in this manual for jib installation. Exercise caution while commanding crane movements. |



RISK ASSESSMENT

H. HAZARDS - SPECIAL TYPES OF CRANE OPERATIONS

RISK CONTROLS & GENERAL PRECAUTIONS

H1. Collision or dropping of the load when working with two cranes (tandem lifting).

- H1. When tandem lifting:
- a. Work with two cranes of the same type.
 - b. Select cranes with ample capacity for the job.
 - c. Create a lift plan prior to commencing work.
 - d. Do not exceed 75% of the rated capacity on either of the cranes at any time during the lift.
 - e. Reduce the rated capacity for articulation and sloping ground accordingly.
 - f. Appoint one signaler for the entire operation.
 - g. Ensure clear line of communication to all personnel.
 - h. Control cranes by single lever operations. Avoid compound lever operations.
 - i. Avoid rapid movements.

H2. Collision, entanglement and falling crane/load when operating on sites with reduced load visibility.

- H2. When operating a crane on sites with reduced load visibility:
- a. Choose a number of parts of line with ample capacity for the job.
 - b. Be particularly thorough in all aspects of signaling.
 - c. Proceed with extra caution in all crane operations.
 - d. If the number of parts of line on a wire rope is unsuitable for the boom length, the hook will not reach ground level and the wire rope will wind backwards onto the drum and get damaged.



3. POST-OPERATIONAL POTENTIAL HAZARDS AND RISK CONTROL

A. POST OPERATION HAZARDS**RISK CONTROLS & GENERAL PRECAUTIONS**

- | | |
|---|---|
| A1. Inadvertent or unauthorised operation of crane can cause accidents. | A1. Take the following precautions:
a. After finishing work, stow the crane and lock it.
b. Do not leave the crane in its working position – this can cause accidents. |
| A2. Collision from crane rolling down a slope. | A2. Take the following precautions:
a. Park the crane in a safe and level location. If there is no level location to park on, and the crane has to be parked on an incline, place chocks under the wheels to prevent the crane from moving.
b. Ensure that the parking brakes are engaged. |
| A3. Collision of parked crane with passing vehicles. | A3. Take the following precautions:
a. If possible park the crane off the road.
b. If the crane has to be parked on a road, park it in a safe and level location. Avoid parking around bends, just after the crest of a hill and where an approaching driver's vision is obscured.
c. Observe the safety regulations and laws of the state or country where the crane is being used. |
| A4. Mechanical failure of the crane. | A4. Ensure that the crane is maintained in accordance with the manufacturer's requirements. After operating the crane, check the crane for damage or signs of failure. Repair or replace damaged or worn parts. Replenish greases and oils as required. |
| A5. Damage from unauthorized use of the crane. | A5. When the machine is not being used, lock the doors and take the keys away. |



RISK ASSESSMENT

4. INSPECTION AND MAINTENANCE POTENTIAL HAZARDS AND RISK CONTROL

A. INSPECTION AND MAINTENANCE HAZARDS**RISK CONTROLS & GENERAL PRECAUTIONS**

- | | | | |
|-----|--|-----|---|
| A1. | Failure of controls or mechanical parts of the crane. | A1. | If there is a breakdown or malfunction of a control or crane component or part, repair or replace it immediately. Do not, under any circumstances, start a crane, which requires repairs. |
| A2. | Equipment malfunctions from incorrect tuning. | A2. | Always keep the crane in good state of repair and serviced regularly. Use authorized Terex dealers or service agents to keep the crane in top operating condition. Terex authorized dealers and service agents thoroughly understand the Terex cranes, and are trained and equipped to ensure that you get the best possible returns from your investment. |
| A3. | Collision from a run-away crane if not parked on level ground. | A3. | When inspecting and maintaining the crane, park on level ground and always engage the parking brakes. Also place chocks under the wheels for additional safety. |
| A4. | Inadvertent operation of the crane during inspection and maintenance. | A4. | Always place warning signs on the crane when it is being serviced or repaired. Whenever possible, stop the engine and remove the keys. Isolate the crane where possible. |
| A5. | Mechanical failure of the boom and/or jib after they have been repaired. | A5. | Use only authorized repairers to repair the boom or jib. Repairs of the boom or jib require specialized techniques and training. Authorized Terex repairers are trained in these techniques. |
| A6. | Burns from a hot radiator. | A6. | Observe caution when opening a radiator cap – the hot radiator coolant could spray out dangerously when the cap is removed from a hot radiator. If you have to take the radiator cap off, wait until the coolant has had time to cool. After the coolant temperature has reduced sufficiently, loosen the cap slowly and allow the pressure to dissipate before completely removing it. |

- | | |
|---|--|
| A7. Mechanical failure through corrosion from oils contaminated with water. | A7. When topping up or replacing fuel or hydraulic oil, take care to avoid the entry of water or other contaminants.

Ensure that the oils are changed regularly according to the instructions in the crane service schedule. |
| A8. Mechanical failure due to the use of incorrect oils, greases and filters. | A8. Use only genuine Terex approved oils, greases and filters. The use of products not approved by Terex could void warranty. Terex will not in any way, accept responsibility for resultant accidents or breakdowns caused by the use of unapproved parts and/or products. |
| A9. Environmental hazards from waste oil. | A9. Drain waste oil from the crane into a proper container designed for the purpose. Dispose the waste oil in accordance with the regulations of the state or country. Never allow waste oil or other contaminants to get into the storm water system, streams, rivers or wetlands. |
| A10. Injury or damage during cleaning. | A10. When washing the crane take the following precautions: <ul style="list-style-type: none">a. To prevent slipping wear slip-resistant boots.b. High-pressure steam can cut skin, and splash dirt into the eyes. Wear suitable personal protective equipment (such as goggles) when using high-pressure steam.c. Water sprayed on electrical equipment during washing can cause electrical shock or cause the equipment to fail. Ensure that all electrical equipment is protected from water over-spray and the electricity supply is fitted with a Residual Current Devices (RCD) to protect the operator from electrical shock. |
| A11. Falling from height. | A11. When working at heights take the following precautions: <ul style="list-style-type: none">a. Keep the working area neat and tidy (no tools scattered around).b. Wipe off any spilled oil or grease and walk carefully.c. When climbing and descending, use the handgrips and platforms provided. Always support yourself on at least three points at a time.d. Consider the use of additional safety devices such as fall arrest systems, lanyards, etc. if appropriate. |

- | | | | |
|------|--|------|---|
| A12. | Carrying out inspection and maintenance with the crane running. | A12. | Unless the task you are to perform requires the engine to be running, stop the engine before inspection and maintenance. If the task you are to perform requires the engine to be running, take care to prevent your body or clothes from getting caught in the moving parts. |
| A13. | Explosion of the gas released by the battery, or skin burns from contact with the battery fluid. | A13. | When servicing any part of the electrical system or when welding, remove the battery. |
| A14. | Burns from contact with hot engine parts. | A14. | Wait for the hot parts (engine, radiator, hydraulic equipment, pipes, exhaust system, etc.) to cool before commencing work on or near the hot parts. |
| A15. | Fire and explosion if naked flame is used for lighting or illumination. | A15. | Use an LED type lamp when inspecting the battery or fuel components. Do not use a lighter or other naked flame to light up the work area. |
| A16. | Fire from flammable vapours generated by heating the hydraulics. | A16. | Do not weld, solder or heat with a torch on or near hydraulic equipment or pipes. Heat applied on pressurized pipes or rubber hoses could cause them to rupture. Cover the pipes and hoses with fire-resistant materials before applying heat near or on them. |
| A17. | Crushing from dropping load or parts of plant due to broken wire ropes. | A17. | Use the winch rope for the crane. Check that the wire is not damaged before operating the crane. |



RISK ASSESSMENT

APPENDIX 1
WORKING ENVIRONMENT (SITE) CHECKLIST



WORKING ENVIRONMENT (SITE) CHECKLIST

Before commencing work at a site, it is recommended that the user should carry out a risk assessment for the worksite. This checklist is provided for guidance only. Due to the variety of working environmental conditions, this checklist is not exhaustive. If there are other hazards, please list them on a separate sheet, and decide on the risk control measures to be introduced.

Site Address:.....			
Site Conditions that May Increase Risk of Accident	Are the Risk Control Measures Adequate?		Improvements Required
	YES	NO	
1. Is the ground stable?			
2. Is the ground slope excessive?			
3. Is the weather too windy, wet or foggy, or near thunder clouds?			
4. Are there buried water mains, gas mains, electrical cables, undetonated explosives or any other objects?			
5. Is the working area controlled (from pedestrians and other traffic)?			
6. Is visibility of work area adequate?			
7. Are there overhead power lines or high-power electromagnetic wave emitters near working area?			
8. Are there falling stones, rubble or other objects?			
9. Is the working area too close to drops and road shoulders?			
10. Others?			

Site Assessed by:
(Name & Date)