

Plant Identification: Electric Rough Terrain Articulated Boom

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| Model(s) | HA20 LE PRO | Safe Working Load (kg) | 350 | Maximum Platform Drive Height (m) | 18.8 | Maximum Working Height (m) | 20.8 |
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In accordance with the relevant Occupational Health and Safety Legislation for the region, this report serves as confirmation that each model type Haulotte product has undergone a risk assessment to the applicable market. The risk assessment investigates potential hazards associated with operation, maintenance, servicing, inspection, transportation and storage of the subject plant.

To assist, Haulotte provides Operators and Maintenance manuals for the product, which provides information regarding residual risks and correspondingly their control measures. Also, in accordance with the legislation, the information required to be supplied to the Purchaser, or User of the plant by the designer, manufacturer, supplier and importer can be found in the Manuals provided.

In addition to these manuals there may be industry safe use standards for the products that can be used to help with identifying potential hazards on the jobsite for ongoing servicing requirements (e.g. AS 2550.10).

Hazard Type Checklist

The table provides a summary of some potential hazards associated with the use of the plant. Haulotte evaluates each of these potential hazards during the risk assessment process in an effort to select specific control measures, (e.g. designs, guarding, warnings) that will reduce the likelihood that the operator, platform occupant(s), maintenance personnel or bystanders will be exposed to the hazard.

Many of these hazards can be identified in the SafeWork Australia Codes of Practice: Managing the Risks of Plant in the Workplace document, and AS/NZS 1418.10 Australian New Zealand Standard: Cranes, hoists and winches Part 10: Mobile elevating work platforms.

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| <p>Crushing, Entanglement, Cutting, Severing, Stabbing, Puncturing, Shearing, Friction, Impact, Trapping</p> | <p>entangled in moving parts, or objects in motion.</p> <ul style="list-style-type: none"> - Can anyone be crushed due to: <ul style="list-style-type: none"> o material falling from plant o uncontrolled motion or unexpected movement of plant o the plant tipping or rolling over o inadequate slowing or stopping devices of plant to control movement o support structure collapse o being thrown from or under the plant o coming in contact with moving parts of the plant during testing, inspection, operation, maintenance, cleaning or repair o being trapped between the plant and materials or fixed structures -Cutting, stabbing & puncturing due to: <ul style="list-style-type: none"> o contact with sharp or flying objects o coming in contact with moving parts of the plant during testing, inspection, operation, maintenance, cleaning or repair of the plant o parts of plant or worksite material disintegrating or falling o movement of plant o can anyone's body parts be sheared between moving parts or surfaces of the plant o can anyone be burnt due to contact with moving parts or surfaces of the plant o can anyone be struck by moving objects due to uncontrolled or unexpected movement of plant or work pieces (i.e. failure of the control system) |
| <p>Ergonomic, Tripping, Slipping, Falling</p> | <ul style="list-style-type: none"> - Can anyone be injured due to: <ul style="list-style-type: none"> o uneven or slippery work surfaces o poor housekeeping in the vicinity of or in the plant o obstacles being placed in the vicinity of the plant o due to repetitive body movements o constrained body posture or the need for excessive effort o design inefficiency causing mental or psychological stress o inadequate or poorly placed lighting of plant or workers IN THE WORKING AREA o lack of failsafe measures against human error or human behaviour o mismatch of plant with natural human limitations o unhealthy posture or excessive efforts o lack of personal fall protective equipment o inadequate design/positioning of controls |
| <p>High Pressure / High Temperature Fluids / Fire / Explosion</p> | <ul style="list-style-type: none"> - Can anyone come into contact with fluids under high pressure, due to plant failure or misuse - Can anyone come into contact with objects at high temperatures, or objects which can cause fire or burning - Can anyone suffer illness due to exposure to high or low temperatures - Can anyone be injured by explosion of gases, vapours, liquids, dusts or other substances triggered by the operation of the plant or material handled by the plant |
| <p>Suffocation</p> | <ul style="list-style-type: none"> - Can anyone be suffocated due to lack of oxygen, or atmospheric contamination |
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Hazard Control Measures

HAULOTTE has implemented necessary control measures to minimise potential hazards to the operator, platform occupants, maintenance personnel and any bystanders (eg:- spotters on the ground). The control measures listed below is a summary of potential hazards associated with the plant itself and the necessary control measures implemented, as well as any other additional control methods required.

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 1 | General OHS Hazards | Incident due to General Operation by a trained, or untrained, operator | <ul style="list-style-type: none"> • Comply with employer, job site and local council rules • Read, understand and follow the instructions in the operator's and safety manuals supplied with the machine • Use good safe work practices with a commonsense approach • Only have trained/certified operators, directed by informed and knowledgeable supervision, running the machine | <ul style="list-style-type: none"> • Address during company/site induction • Manuals provided in a storage black box location on platform • Quick Start reference guide provided describing critical operations |
| 2 | Worksite Hazards | Failure to conduct a jobsite risk assessment | <ul style="list-style-type: none"> • A complete jobsite specific risk assessment should be performed prior to using the plant. • To assist with this effort, operators and maintenance manual identifies some of the common residual risks for the plant. | <ul style="list-style-type: none"> • Every employer, user, and operator should review these residual risks and implement the necessary control measures to avoid them • Users and employers should also research other supplemental information regarding the safe use of the plant, to support this effort (i.e. AS2550.10) |
| 3 | Crushing, Entanglement, Trapping, Impact, Cutting, Severing, Stabbing, Puncturing | Incident due to General Operation | <ul style="list-style-type: none"> • ActiveShield installed in place. Observe ASB light to ensure the Activeshield device is in working order • Trapping and shearing points between moving parts which are within reach of persons on the work platform or standing adjacent to the plant at ground level are avoided by providing safe clearances or guarding, as applicable • When the work platform of a plant needs to be raised for routine servicing purposes, the hydraulic system allows the extending structure to be held in the required position | <ul style="list-style-type: none"> • Address during company/site induction • Operator(s) to be aware of clothes and materials hanging near moving parts • Tools and equipment may be kept in tool tray in basket |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 3 (cont.) | Crushing, Collision / Striking | Objects falling from platform | <ul style="list-style-type: none"> • Kick rails / toe board around the bottom perimeter of platform is installed to avoid objects from falling • Operator's manual warns personnel to keep clear of area beneath platform and to cordon off the area • Machine is affixed with warning labels for collision with power lines | <ul style="list-style-type: none"> • Tools and equipment to be kept in tool tray in basket. It may also be strapped down if required by site management. |
| | | Sudden or unintended movements | <ul style="list-style-type: none"> • Striking due to sudden platform movements when driving is restricted with speed limiting • Deadlock pedal interlock is provided to ensure against inadvertent operation by user • An enable switch must be pressed before machine operation | |
| | | Operating in an area where obstacles, other people and plant may be present | <ul style="list-style-type: none"> • Beacon and motion alarm alert others in the area that the unit is in use • Operator's manual contains instructions and guidelines for operating in these circumstances • Drive movement not provided at ground controls | <ul style="list-style-type: none"> • Site management must ensure platform and work area remains free of debris and clear from obstacles |
| | | Underneath platform when platform is being lowered | <ul style="list-style-type: none"> • Plant is clearly labeled with warning decals due to the potential crushing hazard associated with the type plants • Correct maintenance and operating procedures with safety instructions are provided in the Operator's manual | |
| | Crushing | Machine falling off truck during transport | <ul style="list-style-type: none"> • Provision is made for both lifting and tie down • Follow procedures within Operator's manual that is provided with the machine | <ul style="list-style-type: none"> • Use glazier kit attachment to secure machine during transportation |
| | | Lifting machine | <ul style="list-style-type: none"> • Designated lifting points are indicated by decals. • Correct lifting procedure is provided in the Operator's manual. | |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 3 (cont.) | Entanglement, friction, cutting | Failure of Engine components | <ul style="list-style-type: none"> • Engine components are enclosed under covers • Fan blades are covered • Warning decals are affixed. • Operators are not subjected to friction as there are no high speed exposed components • Guards provided is of a fixed permanent nature and can be removed with tools | <ul style="list-style-type: none"> • Maintenance to be carried out by qualified personnel • Slew movement provided at ground controls for emergency operation • Trained and competent ground personnel required to use ground controls |
| | Entanglement, shearing | Failure of engine components | <ul style="list-style-type: none"> • Crushing hazard decals are clearly displayed on the plant. • Warnings are placed in operator's manual to prevent entanglement. • Decals fitted to boom arms and linkages. | <ul style="list-style-type: none"> • JSA, Training and Supervision to be provided by site management. |
| | Friction | Mechanical Failure of Wheels | <ul style="list-style-type: none"> • Operators are not subjected by the plant to friction, as there are no high speed exposed components • Mechanical failure due to friction is reduced with self-lubricating bushes and wear pads • Locations of lubrication points are shown in the manual. Also a lubrication schedule is provided along with grease types to be used | |
| | Cutting, Stabbing, Puncturing | General Operation | <ul style="list-style-type: none"> • Controls and other contact surfaces have no sharp edges. • Controls are ergonomically designed. | <ul style="list-style-type: none"> • Bystanders must stay clear when plant is operational. |
| 4 | Ergonomic, Slip/Trip/Fall | Loss of braking while travelling | <ul style="list-style-type: none"> • Brakes on the plant automatically engage when the power to them has stopped or failed. • Brakes are capable of holding the plant on approved slopes. • The plant stopping distance at maximum speed meets the design requirements. • Control positions on the plant are located and designed to allow excellent visibility and to allow slow, deliberate movements to prevent contact with adjacent objects. • When the platform of the plant is elevated, the drive speed is reduced. Proportional drive is provided | |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 4 (cont.) | Ergonomic, Slip/Trip/Fall (cont.) | Loss of braking while travelling (cont.) | <ul style="list-style-type: none"> Operators are protected from falling from platform with a solid peripheral railing around the entire platform Harness attachment points are provided and labeled on the platform RED emergency buttons are positioned at all control stations Interlocks are designed in to prevent unintended movement | <ul style="list-style-type: none"> Site management to ensure occupants in platform wear a fall arrest harness, with lanyard Use a harness adjusted to your size that has been inspected by a competent person. |
| | | Poor visibility | <ul style="list-style-type: none"> ActiveLighting system installed to ensure adequate lighting during darker environments | |
| | | Unintended platform movement | <ul style="list-style-type: none"> Extending system is designed and constructed to prevent any inadvertent movements of the extending structure. | |
| 5 | High Pressure, High Temperature Fluids / Fire / Explosion | High Pressure fluid jets resulting puncturing the skin or eyes | <ul style="list-style-type: none"> Hydraulic hoses used have a bursting pressure well over working pressure Engine hood in place to isolate from high temperature fluid danger / fire Relief valves are used to prevent over pressurizing the hydraulic system Engine exhaust is directed away from the control positions and from all electrical wirings Guards are provided at control stations protecting the persons, or standing adjacent to the plant at ground level, against thermal and mechanical hazards High temperature components such as engine and pump are positioned out of arms reach and in enclosures Filling points for flammable fluids are positioned to minimise the risk of fire from spillage on hot parts | <ul style="list-style-type: none"> Fire extinguishers to be provided following job assessment. JSA, training and supervision must be provided by site management. |
| 6 | Suffocation | Inhalation of exhaust gases | <ul style="list-style-type: none"> Exhaust gas is directed away from the operator The size of the machine prevents operation in confined spaces, therefore exhaust gas inhalation is not considered to pose a problem. The design of the platform is that of open air | <ul style="list-style-type: none"> Use no emission / electric mode of operation to reduce fumes |

| HAZARD CONTROL MEASURES | | | | |
|-------------------------|-------------|--|---|--|
| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 7 | Electrical | Electric Shock due to working too close to power lines | <ul style="list-style-type: none"> Machine is clearly marked with electrical warning decals to reduce the risk Operator's manual states that the machine is not insulated Safe operating procedures and minimum approach distances are placed in the manual Decal - Minimum safety distance from the energized/power lines is fitted to the machine | <ul style="list-style-type: none"> JSA, training and supervision must be provided by site management to ensure safe working clearances from the electric field are assessed. Consider boom deflection in the assessment of the safe working distance. |
| | | Shock from electrical system | <ul style="list-style-type: none"> Machine is fitted with 240V outlets which have an earth leakage circuit breaker and wiring, as applicable Cables are insulated and secured to plant. These cables have protective rubber boots over connection points to prevent contact shorting during maintenance Inspection and maintenance procedures are placed in the operating manual | |
| | | Short circuit due to loose wire | <ul style="list-style-type: none"> Connectors used are either insulated crimp lugs, locking plastic plugs, or permanent type clamps Wiring is routed to prevent chaffing Plants are fitted with the control system which uses malfunction/error signals to assist in faultfinding Fault codes are explained in the operating manual | <ul style="list-style-type: none"> Conduct inspection as scheduled |
| | | Short circuit due to water bridging | <ul style="list-style-type: none"> Wiring looms of control boxes are covered with water resistant covers Electric components are tested for water damage Control cards for functions and flow control are encased in epoxy resin to prevent water damage Inspection and maintenance procedures are placed in the Operator's manual | |

| HAZARD CONTROL MEASURES | | | | |
|-------------------------|--------------------|--------------------------------------|--|---|
| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 7 (cont.) | Electrical (cont.) | Battery under/over charging | <ul style="list-style-type: none"> Battery is automatically charged while engine is running and, as it is only being trickle charged Safe charging procedures are placed in the operator's manual | <ul style="list-style-type: none"> As required, charge battery in a well ventilated area at a safe distance from any ignition source |
| 8 | Stability | Unauthorised use / access to machine | <ul style="list-style-type: none"> Plant is equipped with a key switch to prevent unauthorised use Additionally only one control station can be operated at any given time | |
| | | Overloading the platform | <ul style="list-style-type: none"> Maximum safe working load and number of people is clearly marked on the machine | <ul style="list-style-type: none"> Do not overload platform or carry material which increases wind surface area. |
| | | Excessive manual side force | <ul style="list-style-type: none"> Maximum allowable manual side force is marked on machine | |
| | | Tip Over | <ul style="list-style-type: none"> All machines have undergone detailed stability analysis. These calculations take into consideration the machines expected operating configuration, envelope, and approved operating conditions (i.e. slope) | |
| | | | <ul style="list-style-type: none"> Stability analysis takes into consideration a number of foreseeable forces including gravitational (based on rated capacity), dynamic, wind, and manual forces. | |
| | | | <ul style="list-style-type: none"> Stability analysis not only evaluates the plant's static condition, but also potential effects of dynamic conditions (i.e. braking, and depressions). | |
| | | | <ul style="list-style-type: none"> Stability analysis is verified by physically testing the static and dynamic stability of the design. | |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 8 (cont.) | Stability (cont.) | Side force slope | <ul style="list-style-type: none"> • Interlocks prevent plant operation on excessive slope • Tilt switch provides an audible and visual alarm when plant is put in an out of level condition • Machine is counterweighted to meet requirements • A permanent type specification plate is permanently attached to the plant which shows SWL, max slope, max side force and wind speed • Operator's manual states that the machine is not to be driven and the platform must not be elevated on sloping, uneven or soft ground. • Warning decals are placed on plant, and safe operating procedures are placed in the operator's manual | <ul style="list-style-type: none"> • Site management to ensure occupants in platform wear a fall arrest harness, with lanyard and follow local council regulations • Site management to ensure operators are trained in machine operation and plant is operated within specified limits |
| | | Travelling too fast | <ul style="list-style-type: none"> • Plant is equipped with a chassis inclination device, which sounds an alarm when the terrain slope is approaching the allowable limits. • Travel speed is limited when elevated. • Interlocks prevent plant operation on excessive slope. • Braking is designed to hold the plant on its maximum rated grade. • Plant is tested for dynamic stability in various conditions as per requirement. • Warning decals are placed on plant, and safe operation and transportation procedures are placed in the operator's manual. • A permanent type specification plate is stamped with design limits • Direction arrows (green/red) fitted to chassis and control position | <ul style="list-style-type: none"> • Site management to ensure occupants in platform wear a fall arrest harness, with lanyard and follow local council regulations • Operate machine in accordance with load, slope and wind limits |
| | | Driving too fast when elevated | <ul style="list-style-type: none"> • Control system limits the travel speed when elevated | |
| | | Check or relief valve failure | <ul style="list-style-type: none"> • An emergency overriding system is installed to allow emergency retrieval • Inspection and maintenance procedures are placed in the manuals | <ul style="list-style-type: none"> • Site management to ensure a ground crew member is trained in emergency retrieval of plant. |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 8 (cont.) | Stability (cont.) | Incorrect equipment adjustment | <ul style="list-style-type: none"> • Test points are provided for checking of pressure settings e.g. drive and lift relief • Adjustment points require tools to change • Correct adjusting procedures are placed in the manual • Hydraulic (and other) specifications are listed to enable adjustment | |
| 9 | Hydraulic | Unintended platform movement | <ul style="list-style-type: none"> • Deadman pedal is fitted and dual input is required by operator • When power to the controls stop or fails, this system automatically locks the work platforms movements, in any position | <ul style="list-style-type: none"> • Training and supervision must be provided by site management |
| | | Excessive pressure build-up | <ul style="list-style-type: none"> • Relief valves are used to prevent over pressurizing the hydraulic system. • Holding valves prevent unsafe descent in the advent of failure. • Correct pressures listed in the service manual • Hydraulic hoses used have a bursting pressure well in excess of the working pressure • Inspection and maintenance procedures are placed in the Operator's manual | |
| | | Overloading the structure and drive system. | <ul style="list-style-type: none"> • Pressure limiting devices are provided to protect the extending structure, and drive system, to prevent structural damage | <ul style="list-style-type: none"> • Do not overload platform |
| | | Mechanical Pump, motor, control valve or interlock failure | <ul style="list-style-type: none"> • In the advent of pump or motor failure, an emergency overriding system is installed on the machine • Holding valves on cylinders prevent inadvertent movement • Holding valves are installed to prevent decent due to hydraulic failure. • Inspection and maintenance procedures and daily inspection list are placed in the operator's manual | <ul style="list-style-type: none"> • Inspection, cleaning, maintenance and repair must be conducted when plant is stationary • Site management to ensure a ground crew member is trained in emergency retrieval of machine |

| HAZARD CONTROL MEASURES | | | | |
|-------------------------|-------------|--------------------------|--|--|
| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 10 | Structural | Failure of any structure | <ul style="list-style-type: none"> The machines have undergone detailed structural analysis These calculations take into consideration the machine's expected operating configuration, envelope, and approved conditions (i.e. slope) | <ul style="list-style-type: none"> Conduct 10 yearly major inspections to check for structural integrity of the machine |
| | | | <ul style="list-style-type: none"> Structural analysis takes into consideration a number of foreseeable forces including gravitational (based on rated capacity), dynamic, wind and manual forces | |
| | | | <ul style="list-style-type: none"> Structural analysis is verified by physically testing the structural soundness through both static and dynamic loading | |
| | | Fatigue | <ul style="list-style-type: none"> The machine has been cyclic tested beyond its rated design life cycle against fatigue Maintenance schedule including annual inspections provided in the manuals | |
| | | Wear and corrosion | <ul style="list-style-type: none"> Corrosive surfaces are painted, components subject to wear have provisions to minimize wear by using sacrificial components or lubrication e.g. wear pads, self-lubricating pins Lubrication points and a schedule for maintenance are provided in the manual | <ul style="list-style-type: none"> Conduct pre-operational inspections and periodic inspections as scheduled |
| | | General overload | <ul style="list-style-type: none"> A relief valve is used to prevent excessive loads being lifted by the platform Tools are required to alter pressure settings Test points are provided for checking of pressures Warning decals on machine show safe working loads Safe operating procedures are placed in manual | <ul style="list-style-type: none"> Do not overload the platform |
| | | Overloading Platform | <ul style="list-style-type: none"> The machine is equipped with a load-sensing system, which protects the plant and operator from reaching a point where the platform can be operated when the platform has been overloaded | <ul style="list-style-type: none"> Do not overload the platform at elevated heights |
| | | Tip Over | <ul style="list-style-type: none"> To help avoid overturning of the plant the structure for the plant is equipped with non-mechanical limiting devices (i.e. limit switches) to limit the operation | |

| HAZARD CONTROL MEASURES | | | | |
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| NUMBER | HAZARD TYPE | RISK | RISK CONTROL METHOD | ADDITIONAL CONTROL METHOD REQUIRED |
| 11 | Slip / Trip / Fall | General Operation | <ul style="list-style-type: none"> Operators are protected from falling from platform with a solid peripheral railing around the entire platform. Harness attachment points are provided on the platform. RED emergency stop buttons are positioned at controls stations. | <ul style="list-style-type: none"> Site management to ensure occupants in platform wear a fall arrest harness, with lanyard and energy absorber in accordance with governmental regulations. |
| | | Within the platform | <ul style="list-style-type: none"> Operators manual says to keep platform floor free of debris. Interlocks are in place to prevent inadvertent movements. An enable button must be pressed before operation. Solid handrail is provided to hold on to while operating the platform controls. | <ul style="list-style-type: none"> Site management to ensure occupants in platform wear a fall arrest harness, with lanyard and energy absorber in accordance with governmental regulations. |
| | Operator | Loss of Control | <ul style="list-style-type: none"> Controls are designed to operate with one hand and are either of joystick, toggle or button type. Non-assisted controls are minimized using electrical actuation. Where controls are mechanical in nature operating effort is reduced as far as practicable. Controls return to neutral upon release and movement will only occur when physically actuated. | <ul style="list-style-type: none"> Site management to ensure platform remains in clean, free of debris and safe condition. |
| | | Maintenance Error | <ul style="list-style-type: none"> Components which require regular maintenance such as filters are placed in an easily accessed area The machine features hinged compartments which house battery, motor, valve bank etc., away from the chassis for easy access | <ul style="list-style-type: none"> Only trained, qualified personnel must do maintenance work |
| | | Unclear Controls | <ul style="list-style-type: none"> Control box face plates use pictures for functions, and switches, which control 'direction', operate in that direction Machines are field tested for controllability and ease of use Handrails are provided around control station for support during motion Warning decals are used to warn of incorrect operating procedures | <ul style="list-style-type: none"> Replace control box faceplate label(s) if damaged |

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| | Noise | Neighborhood disturbances | <ul style="list-style-type: none"> • Engine and other hydraulic components have a shroud around them and are not considered to pose noise problems. | <ul style="list-style-type: none"> • Use no emission / electric mode of operation to reduce engine noise levels |
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Product Safety

The information provided in this document is only a small example of the activities which have been undertaken by Haulotte GROUP to ensure the safety of the plants.

These include:

- Performing computer simulation/modeling of product and internal design calculations.
- Independent design review by an independent engineer to local design requirements is completed in Australia.
- Cycle testing of components to ensure fatigue life is adequate for a 10 year life is completed.
- Extensive field testing of prototype units to ensure faults and hazards are identified.

Occupational Health & Safety Legislation

The below legislation has been used to produce this document.

ACT, NSW, QLD: Work Health and Safety Act 2011

NT: Work Health and Safety (National Uniform Legislation) Act 2011

SA, TAS: Work Health and Safety Act 2012

VIC: Occupational Health and Safety Act 2004

WA: Occupational Safety and Health Act 1984