



Plant Hazard Analysis & Risk Assessment

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Model: Hoeflon C1e

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Person conducting assessment:

This Hazard Identification and Risk Assessment document is Model specific. It is based on the knowledge that all new machines of this model were/are produced to the same specification and design. It assumes all examples of this exact model currently in service to be as per the original specification, and to have been and continue to be operated and maintained in accordance with the Manufacturers requirements, and with all applicable statutory and regulatory requirements of an original example of the Model for which it was prepared. This Assessment must be reviewed by all stakeholders as required:

- Having regard to the manufacturers approved options
- Having regard to the general arrangement of miscellaneous equipment or facilities that may be provided on the plant according to the end users requirements or specification
- According to the particular circumstances under which the plant is used and maintained
- As new Hazards are identified and/or as risks are reassessed
- As existing risk control measures are revised or new risk control measures are introduced and implemented
- As and when work procedures are altered or revised
- Having regard to any unauthorised alterations or modifications made to the design or operation of the equipment

Monitor, in conjunction with the design verification process delivered by Engineering Design Innovation have made every attempt to identify all reasonably foreseeable operating circumstances in preparing this Assessment, however no guarantee as to the completeness of this Assessment is provided or implied.

It is the responsibility of Owners, Employers and Operators to identify all hazards associated with the use of this equipment specifically applicable to the task to be carried out and to where the equipment is to be used or located. They must assess the risk potential for each of the identified hazards and ensure that all reasonably practicable steps are taken to ensure those risks are effectively controlled.

- All operators must be trained and competent in the safe use of this particular piece of equipment, and hold appropriate qualifications as required by applicable regulatory requirements
- Operators of the equipment to which this Plant Risk Assessment refers must read and understand the Instructions for Use and Warnings contained within the Operators Manual prior to use
- All Daily Pre-Start Checks, Routine and Periodic Inspections, Maintenance and Repairs to this equipment must be carried out in accordance with the requirements of AS2550.10-2006

ID	Description of Hazard Potential		Activity	Risk control measures already implemented	Risk	Supplementary risk control measures	Risk score
	Origin	Consequence					
1	Operator Competency						
1.1	<p>Untrained operator, not following proper operating procedures.</p> <p>Distracted operator.</p> <p>Following a poor system of work.</p> <p>Operator working alone.</p>	Crushing Impact Trauma	Set up Operation Maintenance	Operation instructions explained in operator's manual	C4 Extreme	<p>Train operators on safe use of the plant.</p> <p>Operator training should include at least the following:</p> <ul style="list-style-type: none"> • pre-operation inspections • safe operation of plant • regular maintenance tasks • understanding of plant operation • capabilities and limitations • emergency procedures <p>Do not operate the plant unless proper training has been received.</p> <p>Ensure operator's manual is kept with the plant for reference.</p> <p>Do not operate the plant when distracted, ill, excessively fatigued, or under the influence of drugs or alcohol.</p> <p>Implement appropriate system of work based on manufacturer's recommendations (e.g. operating instructions shown in operator's manual).</p>	B1 Low
1.2	<p>Misuse</p> <p>Unauthorised use of plant</p>	Crushing Impact Trauma	Operation	Operator's manual warns about not using the plant for other than its intended purpose.	C4 Extreme	<p>Do not use the plant for any other purpose than its intended use as explained in the operator's manual.</p> <p>Do not operate the plant unless proper training has been received.</p>	B1 Low

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						Keys are not to remain in an unattended machine.	
2	Plant Limitations						
2.1	Plant overload causing - overturning - structural failure Malfunctioning rated capacity limiter	Roll over Crushing	Driving Operation	Rated capacity indicator present (stack lights).	C4 Extreme	Learn and understand plant limitations. Do not exceed load capacity (500kg). Regularly inspect the plant as per maintenance schedule to ensure integrity of structural members.	A2 Low
2.2	Excessive incline causing plant to overturn	Roll over	Driving Operation		C3 High	Do not drive the plant over ground slopes which exceeds its limitations. Drive with tracks expanded to give better balance. Conduct site risk assessment to determine suitability of job site before starting any work.	B2 Low
2.3	Excessive wind force causing overturning.	Roll over	Operation	Maximum allowable wind speed outlined in operator's manual.	C3 High	Add permissible wind speed to rated capacity chart. Do not operate the plant under excessive wind conditions. Know and understand plant limitations. Constantly monitor wind speed when operating in wind sensitive areas.	B2 Low
2.4	Carrying a load on side carrier.	Roll over Crushing	Driving Operation	Maximum side load displayed on rated capacity chart.	C4 Extreme	Side carrier removed.	A1 Low

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2.5	Drive acceleration	Crushing Being runover	Driving	The crane may only be moved by means of hold-to-run control. Levers must be activated continuously in order to drive.	C3 High	Do not drive at fast speeds. Be aware of other persons near and around the plant. Maintain visual contact with the direction of travel.	B2 Low
3	Plant at worksite						
3.1	Collision with - site infrastructure - other plant and/or pedestrians - overhead powerlines	Crushing Impact Electrocution	Set up Operation Driving Transport		C3 High	Beware of any obstructions around the work area; survey the area before moving the plant including powerlines. Beware of other plant and persons around the work area, in particular when travelling around corners or blind spots. Use spotter where required.	B2 Low
3.3	Load or parts of the crane entangled with fixed objects	Overturning Impact	Set up Operation		C5 Extreme	Plan lift beforehand, determine plant and load flight path before commencing a lift operation.	A2 Low
3.4	Plant positioned near or driven over large depressions / obstacles.	Roll over Collapse	Operation Driving		C4 Extreme	Always maintain a safe distance from ditches, trenches or pit walls while operating plant. Plan a route to safely bring the plant to the job site. Avoid driving over large obstacles or depressions. Assess the ground conditions before setting up the plant.	B2 Low
4	Operation						
4.1	Damaged control panel	Crushing Impact	Set up Operation		C5 Extreme	Regularly inspect control panel.	B1 Low

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4.2	Driving on steep ground	Overturning Crushing	Driving Set up	Follow maximum inclination limits set by manufacturer. Found in plant manual. Remote control permits operator to stand at a safe distance away from the plant.	A5 High	Carry out job site risk assessment to determine suitability of the site before commencing any work. Avoid driving on steep ground; find alternative routes whenever possible. Do not stand on the lower side of the plant while driving on steep ground. Never drive across steep ground, always drive with the tracks parallel to ground inclination.	A1 Low
4.3	Operator control	Roll over Impact	Operation	Model comes with remote control.	C5 Extreme	Operate the drive control levers gently in order to avoid abrupt and jerky movements. When driving, pay special attention to stability and the dimensions, especially the length, of the machine.	B2 Low
4.4	Ballast not fully extended	Crushing Overturning	Operation	Fault/error code is displayed when the ballast is not fully extended. Operator's manual instructs the operator to ensure the ballast is fully extended.	B5 Extreme	Ensure counterweight is fully extended.	A5 High
4.5	Uncontrolled movement of plant components	Crushing Impact Shearing	Set up Operation Maintenance Cleaning Troubleshoot	Prestart inspection as per manufacturers recommendation. All override valves should be returned, and lead seal installed.	C3 High	Follow manufacturer's instructions for attachment/removal of fly jib and other items of plant. Isolate power to plant and remove the main switch key when performing maintenance and cleaning tasks.	B2 Low

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						Install safety barriers around the working area to prevent unauthorised access. Maintain a safe distance from moving parts of the plant. Stay clear of components which may swing or drop unexpectedly. Maintenance to be carried out by a competent person. Pay attention to crush and shear hazard decals to machine.	
4.6	Inadvertent operation of controls	Crushing Impact	Set up Operation Maintenance Emergency	Remote control unit has guard above control levers for protection against inadvertent operation.	C5 Extreme	Do not leave the remote-control unit unattended during plant operation. Always depress the emergency stop button whenever the plant is not being operated. Always double check function selection in control panel before operating a function.	B2 Low
4.7	Falling suspended load	Impact Crushing	Operation	Crash hazard decal on plant	C3 High	Do not stand directly under material being lifted. Barricade work area under fall zone to create a no-go zone.	B2 Low
4.8	Lowering/raising boom, slewing, movement of hook block.	Crushing Impact	Set up Operation Maintenance Troubleshoot	Crush hazard decal present on boom.	C4 Extreme	Always maintain visual contact with moving parts of the plant a payload. Hard hat required especially with suspended loads. Ensure all persons are clear of moving components before performing a movement.	B2 Low

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						Maintenance to be carried out by a competent person.	
4.9	Faulty/out of order, or poorly maintained plant	Crushing Impact Trauma	Operation Emergency Maintenance	Operator's manual outlines plant maintenance schedule. Current maintenance inspections up to date as per manufacturers recommendation.	B4 High	Always perform pre-operation inspection before operating the plant. Implement 'tag out' procedure to isolate faulty/out of order plants. Do not use an 'out of order' plant. Record all faults in logbook. Perform plant maintenance as per manufacturer's maintenance schedule. Keep maintenance records / plant logbook up to date.	B1 Low
4.10	Plant modifications after completion of risk assessment.	Crushing Overturning	Operation Set up		C5 Extreme	Ensure modifications made to the plant are inspected, assessed, and approved by a competent person. Review hazard analysis and risk assessment after plant modifications.	B1 Low
5	Transport						
5.1	Loading and unloading – driving on	Roll over Crushing	Transport	Use remote controls always as they provide a safe operating distance for loading / unloading. Use low speed / low engine RPM on slopes / ramps.	C4 Extreme	Follow appropriate loading procedures including using weight rated ramps, have ramps at a low inclination, all person clear from the loading zone and placing the heavy end towards the front of the tray or tow hitch on a trailer.	B2 Low
5.2	Loading and unloading – lifting on	Crush Impact	Transport Lifting	Lifting procedure included in Operator's Manual.	C5 Extreme	Follow appropriate lifting procedure. Remove counterweight from the plant before lifting and transporting.	B2 Low

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5.3	Failure of lifting slings / chains used for lifting or tying down / tie down straps	Roll over Crushing	Transport Lifting	Plant is fitted with designated lifting and tied down points.	C5 Extreme	Use tie-down points provided on the plant to secure it for transportation. Ensure lifting slings and tie down straps are in good condition. Ensure lifting slings have a SWL suited to the load.	B2 Low
5.4	Unmarked lifting and tiedown points	Crushing	Transport Lifting	Lifting and tie-down points are provided.	B5 Extreme	Mark lifting and tie-down points on plant for correct identification.	B2 Low
6	Plant Failure						
6.1	Plant failure including: - malfunction of control devices - structural failure of machine components	Crushing Impact	Storage Operation Setup	Follow routine maintenance inspections by qualified person as per manufacturers recommendation. Prestart inspection as per manufacturers recommendation.	B5 Extreme	Carry out pre-operational function tests of safety related functions at the start of every shift. Beware of risks associated with inadvertent operation of the machine, avoid compromising machine positions. Familiarise with location of emergency stop buttons. Regularly inspect the plant as per maintenance schedule to ensure integrity of structural members.	B2 Low
6.2	Remote control failure	Crushing Impact Uncontrolled movement		Remote control system intrinsically safe, all functions stop if a failure occurs. Cable available with plant to connect remote control to electric cabinet in the event of remote-control failure.	A4 High	Ensure remote control battery is fully charged before the start of a job. Test operation of emergency stop buttons at the start of every job.	A1 Low
6.3	Power Failure Burst hydraulic hose	Crushing Overturning Burn	Set up Operation Maintenance	Holding valves present on all hydraulic cylinders	A3 Medium	Check hydraulic hose condition during periodic maintenance.	A2 Low

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		Skin irritation				Report and “tag out of service” if identified.	
6.4	Excessive hydraulic oil pressure.	Impact Crushing	Set up Operation	Plant fitted with pressure relief valve.	C3 High	Check pressure settings during preventative maintenance.	A1 Low
6.5	Emergency Stop not available	Crushing Impact Trauma	Emergency Maintenance		C4 Extreme	Install emergency stop.	A1 Low
6.6	Inadequate maintenance procedures	Crushing Impact	Maintenance	Maintenance procedures included in Operator’s Manual.	B4 High	Allow only qualified service personnel to perform maintenance tasks.	B1 Low
7	Electrical						
7.1	Damaged power cables, components.	Electrocution Shock Fire	Set up Operation Maintenance Troubleshoot Emergency	RCD fitted to 240V circuit. Fuse protection on electrical circuits	C1 Low	Ensure plant and extension cord are electrically tested and tagged as per AS 3760. Do not operate/use equipment with an expired test tag. Ensure inline RCD is used when charging the batteries. Visually inspect the plant and extension lead before resetting the thermal fuse and RCD.	B1 Low
7.2	Earthing fault	Electrocution Shock Fire	Set up Operation Maintenance	Plant fitted with thermal fuse and residual current device (RCD).	C4 Extreme	Use appropriate means to supply power to the plant. That is, use extension leads with neutral, live and earth wire and pin. Ensure the plant’s appliance inlet is regularly tested and tagged as per AS 3760. Do not operate a plant with an expired electrical safety tag.	A2 Low

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						Visually inspect the plant and extension lead before turning the power ON.	
7.3	Power extension lead overheating.	Electrocution Shock Fire	Set up Operation Maintenance Troubleshoot Emergency		C4 Extreme	Use appropriate means to supply power to the plant. That is, only use extension leads rated to plant requirements. Ensure the plant's appliance inlet is regularly tested and tagged as per AS 3760. Do not operate a plant with an expired electrical safety tag.	A3 Medium
7.4	Contact with live conductors under plant cover	Shock Electrocution	Emergency Maintenance		C5 Extreme	Do not touch terminals/wires inside the electric cabinet. Keep electric cabinet closed and locked at all times.	A2 Low
7.5	Power failure (flat battery)	Crushing Being runover	Operation Emergency		C4 Extreme	Prepare emergency procedure for power failure.	C1 Low
7.6	Battery charging	Burn Fire Explosion	Maintenance		C5 Extreme	Charge in an area with good ventilation, away from ignition sources.	A3 Medium
7.7	Battery handling	Burn Fire Explosion	Maintenance	Isolate power by turning off factory isolator.	C5 Extreme	When handling the battery, wear protective clothing and eyewear. Avoid contact with clothes or skin; if electrolyte gets on your skin or clothes, flush it with a large quantity of water. In case of contact with eyes, flush with a lot of water for at least 15 minutes and seek medical assistance immediately.	3B Low

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						<p>Do not touch the battery terminals or cables with tools that may cause spark emissions.</p> <p>In order to avoid spark emissions, always disconnect the (-) cable first and connect it last.</p> <p>Use appropriate lifting techniques, perform 2 person lifting technique for heavy or awkward to reach parts.</p>	
7.8	Charging the batteries whilst operating the plant	Electrocution Fire	Set up Operation Maintenance Troubleshoot Emergency		4D Extreme	<p>Charging of batteries and operation of the plant can be done simultaneously.</p> <p>Ensure the extension cord is coiled up before operating the plant.</p> <p>Use an RCD inline with the extension cord.</p>	A1 Low
7.9	Contact with overhead power lines.	Electrocution	Set up Operation Transport Emergency	Warning decal on machine.	C5 Extreme	<p>Maintain safe distance from powerlines.</p> <p>Ensure overhead power is switched off or use a spotter if safe distances cannot be maintained.</p> <p>Be mindful of overhead power lines on roads when transporting the plant on a vehicle.</p> <p>Do not move, approach or come in contact with a plant that has contacted power lines until network power has been isolated.</p>	A3 Medium
7.10	Lightning	Electrocution Shock	Set up Operation		A5 High	Do not use the plant during a thunderstorm.	A1 Low

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8	Crane Components						
8.1	Suspended load / hook block swinging due to wind or movement of the plant.	Crushing Impact	Operation	Crush hazard decals on plant	C4 Extreme	Use tag line to control suspended load movement. Keep plant operating area clear of obstructions. Install safety barriers around the working area to prevent unauthorised access.	B1 Low
8.2	Anti-2-block: Rubbing on wire rope. Disengaging from wire rope.	Cushing Impact	Operation	Operator's manual states contact surfaces to be dry and clean.	D3 High	Re-design anti-2-block. Regularly inspect wire rope for signs of wear/damage.	A2 Low
8.3	Wire rope failure	Crushing	Set up Operation Maintenance		C5 Extreme	Always perform pre-operation inspection before operating the plant. Keep maintenance records / plant log book up to date. Replace wire rope at service intervals recommended by the manufacturer.	B2 Low
8.4	Rigging equipment failure. - Using chains and slings not rated for lifting. - Incorrect load rating of shackles, hooks and lifting slings.	Crushing Impact	Operation Maintenance		C5 Extreme	Plan lift beforehand, ensure rigging equipment is in good condition and have rated capacities suitable for the load being lifted. Ensure rigging equipment is inspected, regularly maintained and tagged with inspection dates. Do not use rigging equipment with out of-date tags. Do not use ropes for lifting operations.	A2 Low

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8.5	Plant component movement	Crushing Impact Shearing Drawing Severing	Set up Operation Maintenance	Plant fitted with guards to cover engine and slewing mechanism. Crush and impact hazard decals fitted to the plant.	C3 High	Install safety barriers around the working area to prevent unauthorised access. Maintain a safe distance from moving parts of the plant.	A2 Low
8.6	Winch, wire rope, sheaves, hook block, winch head	Drawing-in Severing Crushing	Set up Operation Maintenance		C4 Extreme	Add pinch point safety decal throughout wire rope path, including winch. Do not wear loose cloth, ties while operating or standing near the plant. Wear appropriate PPE. The use of gloves is mandatory when running the lifting cable.	A2 low
8.7	Incorrect feeding of wire rope.	Crushing	Set up Operation		B4 High	Ensure wire rope is fed following markers on the plant. Add wire rope routing diagram to the plant for all different attachment configurations. The use of gloves is mandatory when running the lifting cable.	B1 Low
8.8	Faulty/out of calibration load moment indicator	Crushing Impact Overturning	Operation		B5 Extreme	Perform periodic testing and calibration of load moment indicator as per manufacturer's recommendations and/or local authority requirements.	B1 Low
8.9	Wire rope incorrect winding (birds nest)	Crushing Impact	Operation		B5 Extreme	Avoid hoisting with slack on the wire rope. Ensure hook weight is installed. Do not stand or place limbs under a raised load.	A2 Low

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8.10	Effect of boom deflection under load.	Electrocution Shock Fire Impact	Operation Maintenance	Caution given in operator's manual about large boom deflections under load.	C4 Extreme	Observe boom movement when releasing the load to ensure there is a safe distance from electric power lines. Follow local authority safe distance guidelines when working near overhead power lines. Slowly lower load to avoid boom whiplash. Maintain a safe distance from the boom and load until the load is completely released.	A3 Medium
8.11	Pick-and-carry.	Overturning Crushing	Driving Operation		A5 High	Do not perform pick-and-carry operations on ground gradient greater than 1%. Maintain the load close to the ground and as close as practicably possible to the plant. Plan travel route prior to moving the plant. Keep bystanders a safe distance away from the plant.	B1 Low
8.12	Pushing/pulling ballast	Musculoskeletal disorder	Set up Maintenance		C3 High	Regularly service ballast slide to ensure smooth operation. Use sound ergonomic techniques to avoid back injuries.	A3 Medium
8.13	Uncontrolled movement of ballast.	Crushing Impact	Set up Maintenance		B3 Medium	Ensure plant is in level ground before releasing ballast locking mechanism.	A2 Low
8.14	Installing/uninstalling fly jib and other attachments.	Crushing Impact Shearing	Assembly Set up	General warnings in operator's manual recommend the use of	D2 High	Wear appropriate protective gear such as gloves and eye protection.	A2 Low

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				gloves when feeding the winch cable		Avoid lifting heavy plant components. Seek help if items are too heavy.	

RISK MATRIX							ACTION	HEIRACHY OF CONTROLS
		CONSEQUENCE						
		1. Insignificant	2. Minor	3. Moderate	4. Major	5. Catastrophic		
LIKELIHOOD	E. Almost Certain Is expected to occur immediately or within a short timeframe	HIGH	HIGH	EXTREME	EXTREME	EXTREME	EXTREME – Do not proceed, until further control measures are implemented to lower the risk. Senior management attention required. HIGH – Review and introduce additional controls to lower level of risk. Needs senior management attention. MEDIUM – Monitor and maintain supervision and controls. Specify management responsibility. LOW – Monitor and manage by routine procedures and monitoring.	1. Elimination – controlling the hazard at the source 2. Substitution – e.g. replacing one substance or activity with a less hazardous one 3. Isolation – e.g. use of barriers to shield or isolate the hazard, enclosures for noisy machinery, installing guards on machinery 4. Engineering – e.g. design and install equipment to counteract the hazard 5. Administration – policies and procedures for safe work practices 6. Personal Protective Equipment – e.g. respirators, ear plugs, face masks, safety glasses, safety shoes
	D. Likely Will probably occur in most circumstances	MEDIUM	HIGH	HIGH	EXTREME	EXTREME		
	C. Possible Could happen and has occurred here or elsewhere	LOW	MEDIUM	HIGH	EXTREME	EXTREME		
	B. Unlikely Unlikely to occur	LOW	LOW	MEDIUM	HIGH	EXTREME		
	A. Rare Not expected to occur	LOW	LOW	MEDIUM	HIGH	HIGH		

CONSEQUENCE DESCRIPTORS			
SEVERITY	SAFETY	ENVIRONMENT	BUSINESS
5. Catastrophic	Potential for incident resulting in serious damage and/or fatality	The aspect is legally or contract regulated and has the potential for a disastrous long term impact resulting in prosecution.	Loss > \$1M
4. Major	Potential for incident resulting in serious damage and/or permanent disabling illness or injury	The aspect is legally or contract regulated and has the potential for a serious long term impact resulting in prosecution.	Loss of service provision

3. Moderate	Potential for incident resulting in significant damage and/or temporary disabling illness or injury	Significant environmental aspect with short term impact resulting in improvement notice.	Loss \$100K - \$1M
2. Minor	Potential for incident resulting in moderate damage and/or requiring medical treatment.	The aspect is legally or contract regulated and has the potential for a moderate reversible short term impact resulting in an improvement notice.	Prolonged reduction in service provision or productivity
1. Insignificant	Potential for incident resulting in minor damage and/or injury requiring first aid treatment	The aspect is not legally or contract regulated and has the potential for a minor negligible impact.	Loss \$10K - \$100K