

Plant Hazard Analysis & Risk Assessment

Model: Rayco RG80

Date: 03/03/2026



Person conducting / reviewing assessment: S. Parlevliet

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

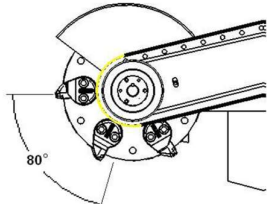
Monitor has made every attempt to identify all reasonably foreseeable operating circumstances in preparing this Assessment, however no guarantee as to the completeness of this Assessment is provided or implied. It is the responsibility of Owners, Employers and Operators to identify all hazards associated 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 manufacturer's requirements.

| 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> | <p>Entanglement (amputation/death)</p> <p>Laceration / cuts / bruises / fractures</p> <p>Serious injury or death</p> | <p>Set up</p> <p>Operation</p> <p>Maintenance</p> | <p>Operation instructions explained in operator's manual</p> | <p>C4 Extreme</p> | <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> | <p>B1 Low</p> |
| 1.2 | <p>Misuse</p> <p>Unauthorised use of plant</p> | <p>Entanglement (amputation/death)</p> <p>Laceration / cuts / bruises / fractures</p> | <p>Operation</p> | <p>Operator's manual warns about not using the plant for other than its intended purpose.</p> | <p>C4 Extreme</p> | <p>Do not use the plant for any other purpose than its intended use as explained in the operator's manual.</p> | <p>C4 Extreme</p> |

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| | Origin | Consequence | | | | | |
| | | Serious injury or death | | | | Do not operate the plant unless proper training has been received. Keys are not to remain in an unattended machine. | |
| 2 | Plant Limitations | | | | | | |
| 2.1 | Slope operation | Roll over | Driving Operation | Operator's manual recommends that you operate the machine once you consider the following criteria: <ul style="list-style-type: none"> • configuration • machine maintenance • operating speed of the machine • conditions of the terrain • fluid levels, and • tyre inflation pressures. | C3 High | Avoid any conditions that can lead to tipping the machine. Avoid driving on ground too soft to support the machine's weight. Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes. If the machine has to be stopped on an incline, make sure that the machine is pointing either up or down the slope. Also chock both wheels at the downhill end. | B2 Low |
| 3 | Operation | | | | | | |
| 3.1 | Damaged machine controls | Crushing Impact | Set up Operation | | C2 Medium | Regularly inspect machine controls. | A1 Rare |
| 3.2 | Moving chipper into position | Overturning Crushing | Driving Set up | Follow Operator's manual recommendations (as listed above). Machine is fitted with dual wheels to provide increased stability and traction. | C4 Extreme | 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. | B2 Low |

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| | Origin | Consequence | | | | | |
| | | | | Machine fitted with 2 speed self-propel drive and an integrated creep mode. | | Be aware of performance features of the equipment in operation and the effects on machine stability. Do not stand on the lower side of the plant while driving on steep ground. | |
| 3.3 | Set up | Struck by flying debris | Operation | Operator's manual states when in use, flying debris could be thrown past guards and injure bystanders if they are in these areas. | D3 High | Ensure only operators are within work area - ensure the exclusion zone is in place and operational. NEVER stand or allow anyone else to be directly in front of machine. | B2 Low |
| 3.4 | Prestart inspection | Laceration / cuts / bruises / fractures | Operation | Prestart inspection as per manufacturers recommendation. Grinder fitted with - Emergency stop button | | Ensure any fitted safety devices or equipment are in good condition and functional during Pre-start check. | A1 Low |
| 3.5 | Uncontrolled movement of plant components | Entanglement (amputation/death) Laceration / cuts / bruises / fractures Serious injury or death Muscular stress / Musculoskeletal Disorder | Set up Operation Maintenance Cleaning Troubleshoot | Prestart inspection as per manufacturers recommendation. | C3 High | Isolate power to machine and remove the main switch key when performing maintenance and cleaning tasks. Implement 'tag out' procedure to isolate faulty/out of order plants. Maintenance to be carried out by a competent person. Pay attention to hazard decals to machine. | B2 Low |
| 3.6 | Operator safety | Entanglement (amputation/death) Laceration / cuts / | Set up Operation Maintenance | Ensure operator: | D4 Extreme | May require dust mask dependant on type of timber being chipped. | B2 Low |

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| | Origin | Consequence | | | | | |
| | | bruises / fractures Serious injury or death | Cleaning Troubleshoot | <ul style="list-style-type: none"> - Has no loose clothing or jewellery, hair tied back - Has snug fitting PPE with no cuffs or strings - Has clothing tucked in where applicable. - Is provided with correct rated hearing protection. - Safety footwear | | Machine fitted with a swing out controls. | |
| 3.7 | Grinder operation | Entanglement (amputation/death) Laceration / cuts / bruises / fractures Serious injury or death Muscular stress / Musculoskeletal Disorder | Operation | <p>Operator's manual recommends only a portion of the cutting wheel with the 80° area shown in the following image should engage the stump. never undercut the stump or use the bottom of the cutting wheel for cutting purposes.</p>  | D4 Extreme | <p>Ensure material to be chipped is clear of metal, stones, plastic, fauna, pests, diseases, rope or other contamination.</p> <p>Ensure that only an approximate 50 mm is ground at a time.</p> <p>Use smooth, comfortable speeds while operating.</p> <p>When it is desired to cut smaller roots, it may be more effective to do so before, rather than after, cutting the stump.</p> <p>Should the chip buildup become excessive when cutting, shut off the cutting wheel, wait for the cutting wheel to stop rotation, retract the machine from the stump and clear the chips to one side.</p> | B3 Medium |

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| | | | | <p>Machine is self-propelled, making it easier to traverse up and down hills, trailer ramps, mounded landscaping, etc.</p> <p>Machine comes standard with remote control.</p> | | <p>On larger stumps, when cutting from one side, eventually a tyre may tend to roll into the hole. If the hole is deep enough, severe damage to the operator station may occur. This may be prevented by moving the machine to another side of the stump to continue removal, or by filling the hole with chips before continuing.</p> | |
| 3.8 | Cutting wheel | <p>Struck by flying debris</p> <p>Entanglement (amputation/death)</p> <p>Laceration / cuts / bruises / fractures -</p> <p>Serious injury or death</p> <p>Vibration</p> <p>Aggressive grabbing causing stump grinder to hop</p> | Operation | <p>Ensure the cutting wheel only has the recommended number of teeth installed.</p> <p>The use of oversize teeth will induce extreme impact energies into the machine's structure.</p> <p>Use of wrong teeth can set up vibrations that will harm machine's structure.</p> <p>Rotation does not stop instantly. Stand at the controls and watch the cutting wheel until it comes to a complete stop before doing anything else.</p> | D4 Extreme | <p>Clear away debris regularly.</p> <p>If chipper begins to vibrate or shake violently, stop work immediately and stop machine.</p> <p>Always stop machine, wait for moving parts to stop and lock out power before removing any cutting teeth.</p> <p>Ensure that the carbide tip can remove a clear "kerf" from the stump without the body of the tooth ever contacting the stump. This concept reduces drag, which maximizes the use of the machine's horsepower. This also reduces wear on the tooth body and on the attachment hardware.</p> | B2 Low |
| 3.9 | Faulty/out of order, or poorly maintained plant | <p>Entanglement (amputation/death)</p> <p>Laceration / cuts /</p> | <p>Operation</p> <p>Emergency</p> <p>Maintenance</p> | Operator's manual outlines plant maintenance schedule. | B4 High | Always perform pre-operation inspection before operating the plant. | B1 Low |

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| | Origin | Consequence | | | | | |
| | | bruises / fractures Serious injury or death Muscular stress / Musculoskeletal Disorder | | Current maintenance inspections up to date as per manufacturers recommendation. | | 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. | |
| 3.10 | Refuelling | Explosion Fire | | | B4 High | When refuelling: • Keep away from ignition sources • Do not smoke • Avoid spilling fuel over hot engine. | A2 Low |
| 3.11 | Engine exhaust pipe | Burn | Operation | Exhaust pipe guarded by exhaust shield. "Hot surface" decal in place. | C2 Medium | Do not touch exhaust pipe when hot. | A1 Low |
| 3.12 | 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 |
| 4 | Transport / Handling | | | | | | |
| 4.1 | Loading and unloading – driving on/off | Roll over Crushing | Transport | Make sure that the entire width of the tyres will be on the ramps before driving on the ramps. | C4 Extreme | Follow appropriate loading procedures including using weight rated ramps, have ramps at a low inclination, all person clear from | B2 Low |

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| | Origin | Consequence | | | | | |
| | | | | Use low speed / low engine RPM on slopes / ramps. | | the loading zone and placing the heavy end towards the front of the tray or tow hitch on a trailer. | |
| 4.2 | Failure of chains used for tying down / tie down straps | Roll over Crushing | Transport | Plant is fitted with designated tie down points. | C5 Extreme | Use tie-down points provided on the plant to secure it for transportation. | B2 Low |
| 4.3 | Transporting machine | Overturning Impact | Transport | | C3 High | Ensure machine is in transportation (locked) mode before departing. Clear machine of loose woodchip material before departing. | A2 Low |
| 4.4 | Incorrect replacement tyre fitted | Crushing Overturning Impacting | Operation | Maintain correct tyre inflation pressures as per manufacturers recommendation. | B4 High | Ensure replacement tyres match the plant manufacturer specifications. | A1 Low |
| 4.5 | Flat tyre | Overturning Crushing Impact | Operation | Prestart inspection as per manufacturers recommendation. | C4 Extreme | Regularly check condition of pneumatic tyres. Avoid driving over sharp obstacles or debris. | B1 Low |
| 5 | Plant Failure | | | | | | |
| 5.1 | Power Failure Burst hydraulic hose | Crushing Overturning Burn Skin irritation | Set up Operation Maintenance | | A3 Medium | Check hydraulic hose condition during periodic maintenance. Report and “tag out of service” if identified. | A2 Low |
| 5.2 | Excessive hydraulic oil pressure. | Impact Crushing | Set up Operation | | C3 High | Check pressure settings during preventative maintenance. | A1 Low |
| 5.3 | Inadequate maintenance procedures | Crushing Impact | Maintenance | Maintenance procedures included in Operator’s Manual. | C3 High | Allow only qualified service personnel to perform maintenance tasks. | A2 Low |

| RISK MATRIX | | | | | | ACTION | HEIRACHY OF CONTROLS | |
|-------------------|--|---------------------|-------------|----------------|-------------|--------------------|--|--|
| | | CONSEQUENCE | | | | | <p>EXTREME – Do not proceed, until further control measures are implemented to lower the risk. Senior management attention required.</p> <p>HIGH – Review and introduce additional controls to lower level of risk. Needs senior management attention.</p> <p>MEDIUM – Monitor and maintain supervision and controls. Specify management responsibility.</p> <p>LOW – Monitor and manage by routine procedures and monitoring.</p> | <ol style="list-style-type: none"> 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 |
| | | 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 | | |
| | 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 |