Plant Hazard Analysis & Risk Assessment

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Model: ATN Zebra 16 STAB

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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	Untrained operator, not following proper operating procedures. Distracted operator. Following a poor system of work. Operator working alone.	Crushing Impact Trauma	Set up Operation Maintenance	Operation instructions explained in operator's manual	C4 Extreme	Train operators on safe use of the plant. Operator training should include at least the following: • pre-operation inspections • safe operation of plant • regular maintenance tasks • understanding of plant operation • capabilities and limitations • emergency procedures Do not operate the plant unless proper training has been received. Ensure operator's manual is kept with the plant for reference. Do not operate the plant when distracted, ill, excessively fatigued, or under the influence of drugs or alcohol. Implement appropriate system of work based on manufacturer's recommendations (e.g. operating instructions shown in operator's manual).	B1 Low
1.2	Misuse Unauthorised use of plant	Crushing Impact Trauma	Operation	Operator's manual warns about not using the plant for other than its intended purpose.	C4 Extreme	Do not use the MEWP for any other purpose than its intended use as explained in the operator's manual. Do not operate the plant unless proper training has been received.	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	Overturning Crushing	Driving Operation	Maximum Rated Capacity (MRC) displayed on basket.	C4 Extreme	Learn and understand plant limitations. Consider weight of all workers, tools and equipment to be loaded into basket. Do not exceed work platform capacity. Regularly inspect the MEWP as per maintenance schedule to ensure integrity of structural members.	A2 Low
2.2	Excessive incline causing plant to overturn	Overturning	Driving Operation	Plant limitations given in Operator's Manual. Maximum incline of 5°. Electronic level system fitted to base frame, which emits a sound when the maximum chassis inclination has been exceeded. An incline indicator light, located on the upper electrical box, lights up as soon as the machine is in a dangerous situation.	C3 High	Do not drive the plant over ground slopes which exceeds its limitations. Conduct site risk assessment to determine suitability of job site before starting any work.	B2 Low
2.3	Driving uphill or downhill	Overturning	Driving	Chassis tilt alarm fitted to machine which warns operator when maximum chassis inclination has been reached.	C3 High	Train operator on safe use of the machine.	B2 Low

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2.4	Excessive wind force causing overturning.	Overturning	Operation	Follow maximum wind speed rating in operators manual (to 45 Km/h winds).	C3 High	Constantly monitor wind speed when operating in wind sensitive areas.	B2 Low
3	Plant at worksite						
3.1	Collision with - site infrastructure - other plant and/or pedestrians	Crushing Impact	Operation Driving			Beware of any obstructions around the work area; survey the area before moving the plant. Beware of other plant and persons around the work area, in particular when travelling around corners or blind spots.	B2 Low
3.2	Plant positioned near or driven over large depressions / obstacles.	Overturning Collapse	Operation Driving	The machine is fitted with a tilt sensor in the ground control station.	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
3.3	Exhaust fume build-up in poorly ventilated areas.	Asphyxiation	Operation	Some models installed secondary power unit – 240V.	C4 Extreme	Ensure there is enough ventilation at the job site whenever combustion engine is used to operate the plant. May require forced mechanical ventilation.	B1 Low
4	Operation						
4.1	Driving on steep ground	Overturning Crushing	Driving Set up	Follow maximum inclination limits set by manufacturer. Found in plant manual.	A5 High	Carry out job site risk assessment to determine suitability of the site before commencing any work.	A1 Low

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						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.	
4.2	Sudden change of direction when driving	Crushing Impact	Set up Driving			Take appropriate safety measures e.g. barricades to keep people away from plant's operating areas. Ensure all persons are clear of moving components before performing a movement.	A1 Low
4.3	Overturning	Crushing Falling Death	Set up Operation Emergency Maintenance Transport	Stability calculations supplied by manufacturer demonstrate plant stability when operated within rated capacity and environmental limitations. Plant stability tested	C5 Extreme	Do not exceed plant's rated capacity and environmental limitations. Pay attention to ground conditions when driving and setting up the plant. Know and understand plant's stability limits before operating the emergency system.	B1 Low
4.4	Load and moment-sensing system failure	Crushing	Operation	Operator's manual recommends pre-operation check of safety devices at the start of every shift.	C5 Extreme	Always perform pre-operation inspection. Do not operate a faulty plant.	A1 Low
4.5	Excessive work platform inclination	Falling	Operation	Electronic level system fitted to base frame, which emits a sound when the maximum	A5 High	Wear fall-arrest harness. Regularly check operation of tilt sensor.	A1 Low

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				chassis inclination has been exceeded.		Inhibit work platform movements which cause the work platform angle to exceed 5 degrees.	
4.6	Operator control	Woker falls from basket Overturning Impact	Operation	To carry out the elevation, rotation and translation movements, it is necessary to maintain the validation pedal activated.	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. When driving, check direction of travel against plant decals before operating controls. Wear safety harnesses and keep them fastened whenever operating the machine.	B2 Low
4.7	Uncontrolled movement of plant components	Crushing Impact Shearing	Set up Operation Maintenance Cleaning Troubleshoot	Prestart inspection as per manufacturers recommendation. Crush, shear hazard decals on machine.	C3 High	Isolate power to plant and remove the main switch key when performing maintenance and cleaning tasks. Tag out machine controls to prevent inadvertent use. Stay clear of components which may swing or drop unexpectedly. Maintenance personnel to secure platform by means of a crane or other similar equipment which would prevent the platform from falling from the raised position while maintenance is carried out. Maintenance to be carried out by a competent person.	B2 Low

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						Pay attention to crush and shear hazard decals to machine.	
4.8	Inadvertent operation of controls	Crushing Impact	Set up Operation Maintenance Emergency	Plant movement stops when validation pedal is released.	C5 Extreme	Always depress the emergency stop button whenever the plant is not being operated. Understand the risks associated with inadvertent operation and avoid placing yourself in compromising positions.	B2 Low
4.9	Lowering / Raising - work platform Moving parts	Crushing Impact Shearing Drawing Severing	Set up Operation Maintenance Troubleshoot	Decals indicating crush hazards affixed to plant.	C4 Extreme	Take appropriate safety measures e.g. barricades to keep people away from plant's operating areas. Ensure all persons are clear of moving components before performing a movement. Maintenance to be carried out by a competent person.	B2 Low
4.10	Entering/exiting the work platform (basket)	Falls	Operation	Use fold down step to help gain access.	C3 High	Ensure basket is horizontal and if necessary, adjust it by means of the special controls prior to moving from stowed position. Do not move between the basket and a structure outside the machine, machine stability could be jeopardised. Workers and equipment must enter and exit the basket only when it is at ground level. Always face inwards and maintain 3-points of contact when entering or exiting the basket.	B1 Low

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4.11	Manoeuvring the work platform near fixed structures	Crushing Shearing	Set up Operation	Work platform fitted with inner handrails to prevent crushing of fingers/hands by fixed structures.	C4 Extreme	Do not reach out or have body parts outside the work platform's rails while the work platform is moving. Beware of overhead obstructions during plant movement.	B1 Low
4.12	Unexpected work platform movement.	Impact Crushing Falling	Operation	Harness anchor points fitted to work platform.	B5 Extreme	Wear safety harness when in the work platform. Hold on to grab rails during platform movement.	B1 Low
4.13	Platform overload	Crushing Falling Impact	Operation	Plant limitation displayed on work platform and Operator's Manual. Platform overload detection fitted to machine which disables machine functions until overload condition is removed.	B5 Extreme	Do not overload the work platform.	B1 Low
4.14	Faulty/out of calibration load and moment indicator	Crushing Impact Overturning	Operation			Perform periodic testing and calibration of load and moment indicator as per manufacturer's recommendations and/or local authority requirements.	B1 Low
4.15	Falling objects	Falling objects Impact	Operation	Barricade work area under fall zone to create a no-go zone.	C3 High	Secure items such as tools and consumables which could fall from basket. Lay items flat and evenly across the floor of the basket.	B2 Low
4.16	Falling from basket	Fall Death	Operation	Drop gate. Lanyard attachment point.	C5 Extreme	Check that the sliding bar which protects the opening of the basket is closed and positioned correctly.	B2 Low

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						Safety harness to be worn at all times and secured to the designated hook in the basket. Do not drive at high speed when travelling on uneven ground.	
4.17	Raising boom	Crush between fixed structure and basket	Operation	Check surroundings prior to starting and continually throughout job.	C4 Extreme	Be aware of potential crush hazards in the direction of movement before moving the work platform. Hard hat may be required if working near overhead obstructions.	B2 Low
4.18	Removal/installation of work platform	Impact Musculoskeletal injury	Maintenance Transport		D3 High	2-person lift is required to lift the work platform in position. Use mechanical aids such as forklift or floor crane to support the basket.	A1 Low
4.19	Failure of basket to lower.	Falling	Emergency	Machine fitted with platform emergency lowering via ground controls. Emergency retrieval procedure included in operator's manual	C5 Extreme	Beware of the dangers of working at heights. Become familiar with emergency rescue procedures. Do not work alone.	B1 Low
4.20	Engine exhaust pipe	Burn	Operation	Exhaust pipe guarded.	C2 Medium	Do not touch exhaust pipe when hot.	A1 Low
4.21	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.	B1 Low

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						Perform plant maintenance as per manufacturer's maintenance schedule. Keep maintenance records / plant logbook up to date.	
4.22	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/off	Overturning Crushing	Transport	Use low speed / low engine RPM on slopes / ramps. Basket must always be on the lower side as compared to the slope.	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 counterweight towards the front of the tray or tow hitch on a trailer.	B2 Low
5.2	Loading and unloading – lifting on/off	Crush Impact	Transport Lifting	Transportation procedure included in Operator's Manual. Only use designated lifting points.	C5 Extreme	Follow appropriate lifting procedure.	B2 Low
5.3	Failure of lifting slings / chains used for lifting or tying down / tie down straps	Overturning 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

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6	Plant Failure						
6.1	Plant failure including: - malfunction of control devices - structural failure of machine components - failure of lift / tie down points	Crushing Impact	Operation	Follow routine maintenance inspections by qualified person as per manufacturers recommendation. Use designated tie down points. Prestart inspection as per manufacturers recommendation. Structural calculation supplied by manufacturer demonstrate suitability of structural members for the load combinations considered.	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 MEWP as per maintenance schedule to ensure integrity of structural members.	B2 Low
6.2	Emergency recovery controls failure	Health deterioration Death	Emergency		C4 Extreme	Regularly test emergency recovery system.	A1 Low
6.3	Failure of hydraulic components.	Crushing Overturning Burn Skin irritation Injection Impact	Set up Operation Maintenance Emergency	Counter-balance valves fitted to hydraulic cylinders. Counter-balance valve testing included in monthly inspection checklist.	C3 High	Check hydraulic hose condition during periodic maintenance. Report and “tag out of service” if identified. Regularly check operation of counter-balance valve.	A2 Low
6.4	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
6.5	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
6.6	Movement of engine cradle when servicing the engine	Crushing Impact	Maintenance	Always engage cradle locking pin when servicing the engine.	C3 High	Use jack supports where possible.	B1 Low

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7	Electrical						
7.1	Electronic component failure	Crushing	Operation	Electrical and electronic components comply with design safety categories stipulated in AS 1418.10-2011. Emergency stop buttons available at each control station.	A5 High	Become familiar with location of emergency stop buttons. Perform function tests, including operation of E-Stops at the start of every shift.	A1 Low
7.2	Overhead power lines	Electrocution	Set up Operation Transport Emergency	Operator's manual and decals show minimum safe distances when working near power lines.	C5 Extreme	Follow local authorities' regulations regarding safe distance from powerlines. Ensure overhead power is switched off or use a spotter if safe distances cannot be maintained. Be mindful of overhead power lines on roads when transporting the plant on a vehicle. Do not move, approach or come in contact with a plant that has contacted power lines until network power has been isolated.	A3 Medium
7.3	Lightning	Electrocution Shock	Set up Operation		A5 High	Do not use the plant during a thunderstorm.	A1 Low

RISK MATRIX							ACTION	HEIRACHY OF CONTROLS
		CONSEQUENCE					**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
		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