RISK & HAZARD MANAGEMENT

JLG Machine Type	FS80 LiftPod	Safe Working Load (kg)	150	Max. Working Height (m)	4.33	Max. Platform Height (m)	2.37

INTRODUCTION/SCOPE

The aim of this report is to conduct an investigation into the hazards[1] and risks involved with the operation, maintenance, servicing, inspection, transportation and storage of the above plant[2]. Our aim is to ensure people at work (and any other personnel) are protected against health and safety risks associated with the use of the plant detailed within this report. Possible hazards and risks are to be assessed with respect to use of the plant and control measures incorporated to maximize safety. For each identified risk the probability and consequences of occurrence are assessed and the control measures implemented to reduce this risk as far as practicable[3]. The following procedure will be used:

1. Identifying Hazards - associated with the plant or 'systems of work'[4]

2. Risk and Hazard Likelihood - The probability of a hazard occurring, and the probable consequence associated with that hazard occurring.

3. Controls implemented to reduce Hazards & Risks - these include design and any other measures which are put in place to reduce risks and hazards as far as practicable.

TABLE 1 : RISK & HAZARD LIKELYHOOD

HAZARD	(A) Likelihood of Occurring	(B) Consequence of Occurring	RISK SCORE*
As listed in Table 2	(1) Rare (2) Very Low (3) Low (4) Moderate (5) High (6) Very High	(1) First Aid (2) Casualty (3) Hospitalisation (4) Disabled (5) Fatality (6) Numerous Fatalities	Risk Scores* are found by adding likelihood (A) & consequence (B) of Occurrence together. Risk Scores range from 2-12

* The higher the risk score the larger the requirement for the hazard to be addressed and guarded against. Please see Table 2 for identification of hazard types checklist.

[1] A hazard is anything with potential to cause injury, illness or harm when the plant is operated, maintained, serviced, repaired, inspected, transported and stored.
[2] Plant in this case is defined as a JLG model FS80 LiftPod elevating work platform.
[3] JLG considers that "reducing the risk as far as practicable" to be an undertaking of out duty of care in that we have addressed the potential to exposure to a risk during design and manufacture and have adhered to the required standards during this time. Any identified additional risks raised during this assessment have been addressed and eliminated for normal machine operation by trained personnel.
[4] Systems of work describe all operating/maintenance procedures and in general systems used by workers in servicing, inspecting, transportation and storage

TABLE 2 *HAZARD TYPE CHECKLIST	
A. CRUSHING. **ENTANGLEMENT.** **CUTTING.** **STABBING.** **PUNCTURING.** **SHEARING.** **FRICTION.** **STRIKING.**	-can anyone's hair, clothing, gloves, cleaning apparatus or any other materials become entangled in moving parts, or objects in motion. -crushing due to material falling from plant. -uncontrolled motion or unexpected movement of plant. -inadequate stopping devices of plant to control movement. -support structure collapse. -being thrown from or within plant. -cutting, stabbing & puncturing due to contact with sharp or flying objects. -parts of plant or worksite material disintegrating or falling. -movement of plant. -can anyone's body parts be sheared between moving parts or surfaces of the plant. -can anyone be burnt due to contact with moving parts or surfaces of the plant. -can anyone be struck by moving objects due to uncontrolled or unexpected movement of plant or workpieces.
B. ERGONOMIC. **SLIPPING.** **TRIPPING.** **FALLING .**	-can anyone be injured due to the design of seating or due to repetitive body movements. -constrained body posture or the need for excessive effort. -design inefficiency causing mental or psychological stress. -inadequate or poorly placed lighting of plant or workers. -lack of failsafe measures against human error. -mismatch of plant with natural human limitations.
C. HIGH PRESSURE FLUIDS. **HIGH TEMPERATURES.** **FIRE/EXPLOSION.**	-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 workpieces.
D. SUFFOCATION. **DROWNING.**	-can anyone be suffocated or drowned due to lack of oxygen, or atmospheric contamination.
E. ELECTRICAL.	-can anyone be injured by electric shock due to the plant coming into contact with live conductors. -plant being too close to high tension power lines. -overload of electrical circuits. -electrical wiring or switch shorting. -lack of insulation against water contact shorting. -magnetic interference from workplace corrupting electrical components.
F. STABILITY.	-can machine tip or roll over due to outriggers not extending. -outriggers failing mechanically, or retract unintentionally. -control valve or interlock failure. -set up on soft ground, unlevel or uneven ground, excessive slope. -driving on rough surfaces, over potholes, hitting fixed objects, excessive side loads e.g wind.
G. HYDRAULIC FAILURE.	-hydraulic system failure. -check valve or relief valve failure. -hose or cylinder failure - mechanical or fatigue.
H. STRUCTURAL FAILURE.	-boom or scissor arm failure due to fatigue, corrosion, or overloading. -pin, cable or linkage failure. -general overload- lifting excessive load, loading platform/ basket in an unintended way.
I.. MAINTENANCE.	-can anyone be injured while carrying out routine, preventative or corrective maintenance. -explosion due to welding spark etc. near charging battery -adjusting equipment for essential components faulty or seized. -guard removal.
J. TRANSPORT.	-can anyone be injured due to machine instability while transporting. -plant or objects falling from transport truck.
K. OCCUPATIONAL HAZARDS	-plant obstructing other plants at site. -unauthorised use by untrained personnel. -unintended use of duplicate controls while working. -hearing loss or communication interference due to excessive noise. -safety signs or decals removed. -energy supply failure (chemical, electrical or mechanical).

* Table 2 is based upon N.Z Chamber of Manufacture hazard identification guide, & specifications from the Elevating Work Platform Purchasing Specification and Operating Guide by the Electricity Association NSW - 1996, and pr EN280.

TABLE 3: FS80 LiftPod RISK ASSESSMENT AND CONTROL MEASURES

HAZARD NUMBER	HAZARD TYPE	LOCATION/SCENARIO	RISK SCORE	CONTROL MEASURES TO REDUCE RISK	NEW RISK SCORE
1	Crushing, collision/striking.	Operating unit in an area where obstacles, other people and plant may be present.	3+1	Section 1.3 of operator's manual contains instructions and guidelines for operating in these circumstances, under the heading "Crushing and Collisions".	1+1
2	Crushing, collision/striking.	Underneath platform when platform is being lowered.	3+1	Decal warning of this hazard. Section 1.3 of operator's manual (under the heading "Crushing and Collisions") says to warn personnel to keep clear of raised platform and to erect barricades if necessary. If an object is caught underneath the platform, the tension on the ropes is lost and the emergency brakes engage and the machine stops.	1+1
3	Crushing, striking.	Objects falling from platform.	3+2	Section 1.3 of operator's manual (under the heading "Crushing and Collisions") says to warn personnel to keep clear of area beneath platform and to erect barricades if necessary. Section 1.3 also says that appropriate protective gear is to be worn by ground personnel.	2+2
4	Entanglement, friction, cutting.	High-speed components.	3+2	All high-speed components with entanglement risk are enclosed. A shaft is slightly exposed but has a low risk of entanglement. Maintenance to be carried out by qualified personnel.	1+2
5	Crushing, striking.	Sudden or unintended movements.	3+1	Dead-man switch provided to prevent inadvertent movement. Emergency stop button in place to halt movement in the case of an emergency.	1+1
6	Cutting, stabbing, puncturing.	General operation.	2+2	Controls and other contact surfaces have no sharp edges.	1+1
7	Falling.	Falling from platform.	2+5	Top platform rail more than 950mm above the floor and a mid-rail is provided as per AS 1418.10. Gates have small openings, are self-closing and do not swing outwards.	1+3
8	Slipping, tripping.	Slipping or tripping within platform.	4+1	Anti-skid feature fitted to platform floor. Section 1.2 of operator's manual says to keep platform floor free of debris, mud, oil, grease and other slippery substances. Dead-man switch prevents inadvertent elevation movements. Solid handrail to hold on to while operating the platform controls. Holes in floor facilitate drainage.	2+1
9	Excessive effort.	General operation.	2+1	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.	1+1
10	Operating stress.	General operation.	2+1	Control panels use pictures for functions, and switches, which control direction operate in that direction. Plants are field tested for controllability and ease of use. Handrails are provided near control station for support during motion.	1+1
11	Lighting.	General operation.	3+1	Lighting requirements vary depending on the application and hence need to be accesses on a job-by job-basis. Manual says that visibility needs to be taken into account when moving the plant.	1+1
12	High Temp Components.	Burns from coming in to contact with components.	3+3	High temperature components are positioned within covers. Thermal cut-off incorporated into powerpack to prevent burning if plant overheats. Maintenance to be carried out by qualified personnel.	1+1
13	Suffocation.	Inhalation of gases.	-	No exhaust gases given off, as machine is electric.	-
14	Electrical.	Electric shock from machines electrical system.	2+3	System voltage is 28 V DC. Only electrical component is the powerpack and the electrical components are sealed in an enclosed case.	1+1
15	Electrical.	Loose wire shorts.	3+1	Connectors used are either insulated crimp lugs, locking plastic plugs, or permanent type clamps.	2+1

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16	Electrical.	Working too close to power lines.	4+6	Warning decals are placed on the machine. Operator's manual states that the machine is not insulated. Safe operating procedures and minimum approach distances are placed in the manual.	2+6
17	Electrical.	Electromagnetic interference.	1+1	Design is sufficient for normal use.	1+1
18	Electrical.	Water bridging.	3+1	All electrical components are encased in one plastic housing (the Power Pack) and this Power Pack is removable. Fast charger has been independently inspected for electrical safety.	1+1
19	Stability.	Overloading the platform.	4+5	Maximum safe working load and number of people is clearly marked on the machine and in the manual. Overload clutch limits lift up capability.	2+5
20	Stability.	Unit is exposed to high-wind levels.	4+5	Machine is designed for low wind use only and is marked accordingly with decals.	1+5
21	Stability.	Excessive manual side forces.	4+5	Maximum allowable manual side force marked on machine and indicated with decals on machine.	2+5
22	Stability.	Uneven, soft or sloping ground.	4+5	Manual says not to elevate the platform while on or near a sloping, uneven or soft ground. Decals instruct not to use the machine on sloping or uneven ground. Manual says to ensure that the ground conditions are adequate to support the load.	2+5
23	Stability.	Tyre puncture.	4+5	The FS80 LiftPod is fitted with solid castor wheels.	0
24	Stability.	Driving too fast when elevated.	4+5	Manual states not to move platform when elevated. Machine is not self-propelled.	0
25	Stability.	Machine driven into obstacle.	4+5	Machine is not self-propelled.	0
26	Stability.	Other dynamic effects.	3+5	Dynamic load factors included in calculations and test loads as per AS 1418.10. Manual says machine must not be used as a crane (which could produce swinging loads). AS 2550.10 prohibits the use of this type of plant for lifting and supporting loads in any manner for which they are not specifically rated. AS 2550.10 prohibits travelling with freely suspended loads.	1+5
27	Rope failure.	Ropes snap/break.	3+4	Manual details correct procedures to inspect ropes. Rope System maintains support if one rope fails. In the case of both ropes failing the plant is fitted with an emergency brake system.	1+1
28	Power Pack failure.	If the Power Pack breaks down.	3+5	Manual details correct procedures to take when Power Pack fails. Emergency manual descent crank installed in machine.	1+1
29	Structural failure.	Platform overload.	4+5	Design calculations independently reviewed to verify compliance to AS 1418.10. Overload tested at 1.25 x SWL as per AS 1418.10. Maximum safe working load is clearly marked on the machine and in the manual. Slip clutch system installed to limit overload for lifting up.	2+5
30	Structural failure.	Fatigue.	4+5	Testing and analysis carried out to ensure minimum design life is met. Maintenance schedule provided in the manuals. Maintenance to be carried out by qualified personnel.	1+5
31	Structural failure.	Wear and corrosion.	4+5	Corrosive surfaces are painted and components that are subject to wear have provisions to minimize wear by using sacrificial components or lubrication. Maintenance schedule provided in the manuals. Maintenance to be carried out by qualified personnel.	2+5
32	Excessive effort.	Disassembly/Assembly of machine.	3+3	Weight of each component designed so that one person may carry/disassemble/reassemble. Manual illustrates how machine is to be carried, whether it is assembled or disassembled.	2+2
33	Excessive effort.	Maintenance.	4+2	Removable cover allows easier access to other components. Correct maintenance procedures placed in the service manual.	3+2

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34	Entanglement, friction, cutting.	Maintenance.	4+4	Guarding provided is a fixed permanent nature and can only be removed with tools. Correct maintenance procedures placed in the service manual.	2+4
35	Crushing, collision.	Machine falling off truck during transport.	3+6	Correct transport procedures in manual.	1+6
36	Crushing.	Lifting machine incorrectly.	4+5	Correct lifting procedures in manual.	2+5
37	Noise.	General operation.	4+4	Machine is electrically powered and quiet. Where noise is considered excessive, level testing may be carried out to AS1055.2/AS1269.	2+4
38	Various	Decal removal.	4+6	Decals have permanent type marking & weatherproof backing. Recommended inspections require that decals be checked for readability and are in place. Safety warnings are in manual.	1+6
39	Various	Manual lost or illegible.	4+6	Weatherproof storage container to keep manual protected and with the machine. Replacement copies available on request.	1+6
40	Various	Lack of maintenance.	4+5	Schedule placed in manual. Maintenance is to be carried out in accordance with AS 2550.10.	1+5
41	Various	Use by unintended personnel.	4+4	Unit has removable drive system and power source.	1+4
42	Various	Machine malfunction due to static charge.	3+1	Control system and machine in general is not susceptible to static charge.	1+1
43	Explosion/Fire	Battery Storage	3+5	Decal states that charging is to be done only on the provided fast charger, to protect battery from rain and keep in temperatures of 0 – 40 degrees. Decal also states not to short circuit the battery, not to throw it in water or fire and not to dispose of in trash, as it can be recycled.	
44	Explosion/Fire	Battery charging	3+5	Decal states that charging is to be done only on the provided fast charger. The battery is NiMH type, not lead acid.	1+5