

Risk Assessment & Control

Table 1: All Engine & Battery-Operated Scissors Lift

Table 2: All Engine & Battery-Operated Boom Lift

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Approved by Mitch Ely



STATEMENT

This report is from Hunan Sinoboom Intelligent Equipment Co., Ltd. (Herein after referred to as Sinoboom) who is the equipment manufacturer. It aims to identify hazards and assess risks involved with the operation, maintenance, service, inspection, and storage of Sinoboom equipment.

Possible hazards and risks are to be assessed with respect to use of the plant and control measures incorporated to maximize safety. Operators of the equipment to which this Plant Risk Assessment & Control refers must read and understand the instructions for use and warnings contained within the operation manual prior to use. Table 1: All Engine & Battery-Operated Scissors Lift and Table 2: All Engine & Battery-Operated Boom Lift. Sinoboom has made every attempt to identify all reasonably foreseeable operating circumstance in preparing this assessment, however no guarantee as to the completeness of this Assessment is provided or implied.

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WARNING

***All operator must be trained and competent in the safe use of all Sinoboom equipment, and hold appropriate qualifications as required by applicable regulatory requirement**

***It is the responsibility of owners, employers and the operator to identify all hazards associated with the use of equipment listed as above 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 of potential for each of the identified hazards and ensure that all reasonably practicable steps are taken to ensure those risks are effectively controlled**

Table 1: All Engine & Battery-Operated Scissors Lift

SN	Hazard Type	Hazard Description	Control Measures by Manufacturer	Remark(s)
A	GENERAL			
1	Crushing	Operating in a high movement area or in an enclosed environment. Potential crush & collision during lifting or traveling.	The machine has a motion alarm and a flashlight, emitting audible and visual warning. Select to low drive speed if available. Have a spotter/guide when traffic is high with people & machinery movement.	
2	Entanglement	Loosened wiring and hoses. Rotating parts (motor, engine flywheel and fan). Loose clothing & accessories.	All wires and hoses are safe and fixed at specific locations, and the charger cable is shortest. No rotating parts is exposed outside the machine. Flywheels and fans of both motor and engine are enclosed in their own compartments, and thus are accessible only with special tools and repaired only by qualified personnel. In addition, warning signs are posted on the machine. Always wear proper & just fit clothing, no accessories like bangle, chain, bracelet, vendetta, scarf etc. Operator to ensure all loose items are secure before operation, perform walk around inspection	
3	Cutting	Sharp edges, rusty area,	All contact surfaces are free of any sharp edges. All handrail edges are smooth and painted well against rusting. Do not slide any part of own body against the machine, practice hold, release & hold of hand when moving about in/around platform.	
4	Puncturing.	Protruding bolt/screw/pins.	Any protrusion in platform should face outside (away from people standing inside). Any protrusion below platform should face inside to avoid injury to people nearby.	
5	Shearing	Between scissor arms	Guards are provided in accordance with plant code requirements for guarding. Guarding provided is a fixed permanent nature and can only be removed with tools. Follow maintenance procedures in the service manual, always use the maintenance bar provided. Ensure no one near machine when operating, always horn before start lowering.	
6	Friction	Mechanical faults, Platform rising/lowering not smooth	Friction-caused mechanical faults are reduced greatly with lubrication. Greasing points at cylinders' ends. All other pins come with self-lubricating bushings. The maintenance manual specifies the lubrication schedule and grease type for reference. Always ensure sliding wear pad areas are always free of debris & clean to reduce friction.	
7	Striking	Sudden or unintended movements. Extension platform extended & lowering/driving.	Enable switch provided to prevent inadvertent movement, no movement will work without first activating the enable switch. Practice safe operation by retracting extension platform first before lowering/driving	
B	ERGONOMIC			
8	Tripping	Tripping on the platform	Operational Manual stipulated "keep the platform floor free of obstacles". Hold the handrail when moving in the platform.	
9	Falling	General operations. Falling when entering/exiting platform.	Platform comes with safety rail to prevent operator fall off. Safety lanyard anchor points provided for all operators. Platform door is swing inward type & self-locking type, as specified by AS1418.10. For more, refer to Operational Manual "Falling Hazard". Always practice 3 points contact. Always Enter head on & exit back down to avoid falling.	
10	Slipping	Slipping on the platform, slip on lubricant, water or wet material like cloth.	Platform floor is of checkered pattern type to reduce slippage. Always clear all spilt liquid in platform & surrounding area. Always wear non-slip safety shoe.	

C EQUIPMENT SYSTEM				
11	High Pressure Fluid	High pressure fluid can cut or penetrate skin.	System is designed with relief valve & pressure-reducing valve just suffice for operation. All hydraulic component & hoses compliance with the system working pressure, with its bursting pressure away higher than latter. Refer to Maintenance Manual for proper adjustment & repair. Do not operate machine to detect leakage, do not use hand to check for leakage.	
12	High Temperature	Heat can burn or scald body skin.	Do not open radiator cap when it is hot. Do not check engine when it is hot. Always wear PPE like gloves & goggles/face shield.	
13	Fire/Explosion	During operating or charging the equipment. Combustible material not subjected to heat. During refueling & spill of fuel.	Maintenance Manual specifies the related warning: in open-flame or potential explosion environment, it is forbidden to use or charge the machine. Do not touch any battery terminal with tools that may generate sparks. Store & remove all combustible material from machine immediately. E.g. cloth/paper with stain lubricant, fuel, & dry debris which can catch fire easily. Especially area near engine/motor. No open flame or smoking during refueling, always clean up spill fuel asap.	
14	Exhaust Gas	Working in a closed environment, Engine exhaust gas during operation.	In a concealed environment, don't start or operate any machine with diesel engine. Engine powered units are for outdoor use only, do not operate indoor.	
15	Gas Emitted During Charging	Inhalation of exhaust gas	Only charge battery in a well-ventilated area, do not work in the same area where machine is charging.	
E ELECTRICAL				
16	Overload Electrical Circuit	System overload & caused fire.	Power supply circuit has a minimum of 250A fuse and control circuit has a minimum of 10A Circuit breaker. Besides, on the main positive circuit has main power-off/isolator switch.	
17	AC Electric Shock	Electrocution hazard.	For standard equipment, the system voltage is below 24V DC. For off-road equipment with diesel engine, the system voltage is below 14V DC. For off-road electric equipment, the system voltage is below 48V DC. 220V charger has power protection function by limiting the charging and emitting warning signal. Outside the platform handrail, the mains port has such functions as short circuit + overload + leakage protection (RCBO), at 230V of voltage, 16A of current and 5-10 In of electromagnetic tripping (C curve) (Selection of protective element is dependent on the corresponding areas.)	
18	Near High Tension Power Line	Components may fail due to strong electromagnetic interference. Electrocution hazard, serious injury or death.	The vehicle is of non-insulated design and marked with non-insulated signs. CAN BUS is of shielded twisted pair for data interaction. Always practice minimum approach distance, always find out power line voltage before operating. Refer to operational manual.	

F STABILITY			
19	Uneven/Slope Ground	It is possible that the machine tip over	Nameplate and Operation Manual clearly specify the allowable inclination. Above the inclination, the vehicle cannot be used. With a level sensor, the machine can give out warning signal if tilted beyond the inclination, limiting some functions. Tests have been done on pits/slopes that meet or exceed the standards.
20	Outriggers/Axle Not Deploy	With outriggers/axles not deployed, exceeding allowable height may tip over the vehicle.	Platform height is limited with outriggers unfolded, which is set in the program. Manuals stipulate the precautions for outriggers/axles not deployed.
21	Drive: Pothole, Hitting Object	The vehicle may tip over in pothole or obstacles.	Our products are designed and tested according to AS/ANSI/CE standards, approving that they don't tip over in pothole or obstacles specified in standards. - design and test. Always practice worksite inspection before operation, mark out all pothole/object that are not able to be removed.
22	Safe Workload, Side Load	Higher than the safe working load: side load may cause the vehicle to tip over.	Our products are designed and tested according to AS/ANSI/CE standards, approving that they don't tip over at the specified workload and side load. -- design and test. There are safety workload and side load requirements on the safety signs. Manuals also list the safety workload and side load requirements.
23	Wind Rating Indoor/Outdoor	Above the specified wind speed, the vehicle may tip over.	Safety signs stated max allowable wind speeds for indoor and outdoor products. Manuals also specifies the maximum allowable wind speed, as well as the applicable indoor/outdoor models. Always ensure unit is for indoor or outdoor application.
24	Over-speeding	Above allowable traveling speed, the vehicle may roll over.	Traveling speed has been limited in the control system. Do not adjust travel speed higher than spec. Always be aware of travel ground & surrounding condition.
G HYDRAULIC FAILURE			
25	Hose Failure	High pressure fluid can cut or penetrate skin.	Hoses must be in compliance with the system working pressure, with its bursting pressure way higher than latter. Besides, at the friction parts of hoses are mounted sheathes for protection. There is an overflowing valve to limit the system pressure. Always de-pressurize the system before maintenance, refer to Maintenance Manual.
26	Cylinder Failure	Cylinder piston rod is bent. Unit self-lowered uncontrol, tip over.	Main seals are of reputable manufacturer to ensure the sealing quality. The anti-bending stability coefficient of cylinders is relatively high. Ensure the theoretical stability of cylinders are satisfied. Check & test unit prior operation, do not use unit if abnormality detected in any cylinders
27	Hydraulic Component Failure	The work platform lowers by itself. Unit become inoperable at critical position.	Component used are of reputable manufacturer to ensure safety & quality. Filters are design into system to keep off foreign materials. Descending valve has manual control function for emergency lowering operation.
H STRUCTURAL FAILURE			
28	Scissors Arm Fatigue/Corrosion	Fatigue break and corrosion fracture. Scissors arm failure will cause platform to collapse from height.	CAE is adopted for calculation and analysis to ensure fatigue safety coefficient - design and calculation. Surfaces in touch with corrosive materials are painted well, with maintenance intervals shown in manuals. Visual inspection prior operation, rectify fault before used.
29	Pin, Bushing, Linkages	Platform collapse or breakdown in critical position.	CAE is adopted for calculation and analysis to ensure fatigue safety coefficient - design and calculation. Manuals specify the periodic maintenance and inspection.

30	Overloading	Collapse or tilt over due to overloading.	Safety sign shows the max. rated load, and so do manuals. No overloading.	
I	MAINTENANCE			
31	Scissor Arms, Extension Platform	Erratic movement, breakdown in critical position.	Check & ensure periodically maintenance are perform & machine works normally prior start work Maintenance Manual stipulates component & inspection/maintenance interval.	
32	Battery Short Pos & Neg Terminal	Potentially fire & explosion, system totally not functioning at critical position.	Check unit prior operation for proper cleanliness, battery terminals are tight, rubber covered properly, no foreign object that can cause short circuit, no spilled battery water or other fluid.	
33	Pressurized Hydraulic System	High pressure fluid can cut or penetrate skin. Erratic movement, breakdown in critical position.	Periodically check all relief pressure setting, regularly change filters & hydraulic oil as specified in Maintenance manual. Replace hoses when the outer layer is worn out even it does not leak to prevent sudden burst of hose due to its strength is compromised.	
34	Battery Fluid Acid	Corrosion on component & burn the skin.	Standard maintenance-free battery, less chance of handling of acid or leaks or spilt its electrolyte. Always wear rubber glove & goggles when handling battery acid/electrolyte.	
J	TRANSPORT			
35	On Trailer-Tie down Points	Machine roll off trailer during transport.	Tie-down points are provided in the machine. Ensure proper tie down method is done & with sufficient capacity of tie down material.	
36	Hoisting- Lifting Point	Machine tilt off balance & fall while hoisting.	Ensure hoisting material are proper length, capacity suffice & latch to specific hoisting points	
37	Loading/ Unloading	Machine slip & fall at ramp	Ensure ramp is not wet, drive at low-speed high torque. Have spotter if from platform cannot see the ramp clearly.	
K	OCCUPATIONAL HAZZARD			
38	Unauthorized Use	General operations. Accident resulting in injury/fatality & damaged to property & machine.	Only one controller can be used at one time. Ground controller are recessed to prevent against accidental operation. Detachable key switch to prevent unauthorized operation. Only allow trained operator to use the machine.	
39	Emergency Lowering	Platform not able to lower at critical height.	Emergency lowering procedure is on the chassis. Always check emergency lowering prior start of work, ensure people nearby know how to perform emergency lowering. Refer Operation Manual.	
40	Safety Sign & Label	Decal Removed / Wrong decal(s) Wrong operation resulting in accident.	Warning signs are permanent, waterproof and conspicuous. The nameplate specifications are stamped, and permanently valid. All safety warning signs are illustrated in Operation Manual. Ensure all sign & label are readable & in proper location, replace immediately prior work start.	

Table 2: All Engine & Battery-Operated Boom Lift

SN	Hazard Type	Hazard Description	Control Measures by Manufacturer	Remark(s)
A GENERAL				
1	Crushing	Operating in a high movement area or in an enclosed environment. Potential crush & collision during lifting or traveling.	The machine has a motion alarm and a flashlight, emitting audible and visual warning Select to low drive speed if available. Have a spotter/guide when traffic is high with people & machinery movement.	
2	Entanglement	Loosened wiring and hoses. Rotating parts (motor, engine flywheel and fan). Loose clothing & accessories.	All wires and hoses are safe and fixed at specific locations, and the charger cable is shortest. No rotating parts is exposed outside the machine. Flywheels and fans of both motor and engine are enclosed in their own compartments, and thus are accessible only with special tools and repaired only by qualified personnel. In addition, warning signs are posted on the machine. Always wear proper & just fit clothing, no accessories like bangle, chain, bracelet, vendetta, scarf etc. Operator to ensure all loose items are secure before operation, perform walk around inspection	
3	Cutting	Sharp edges, rusty area,	All contact surfaces are free of any sharp edges. All handrail edges are smooth and painted well against rusting. Do not slide any part of own body against the machine, practice hold, release & hold of hand when moving about in/around platform.	
4	Puncturing.	Protruding bolt/screw/pins.	Any protrusion in platform should face outside (away from people standing inside). Any protrusion below platform should face inside to avoid injury to people nearby.	
5	Shearing	Boom lowering between turret & boom mechanism.	Guards are provided in accordance with plant code requirements for guarding. Guarding provided is a fixed permanent nature and can only be removed with tools. Follow maintenance procedures in the service manual. Ensure no one near machine when operating, always horn before start lowering.	
6	Friction	Mechanical faults, Platform rising/lowering not smooth	Friction-caused mechanical faults are reduced greatly with lubrication. Greasing points at cylinders' ends. All other pins come with self-lubricating bushings. The maintenance manual specifies the lubrication schedule and grease type for reference. Always ensure sliding wear pad areas are always free of debris & clean to reduce friction.	
7	Striking	Sudden or unintended movements. Extension platform extended & lowering/driving.	Enable switch provided to prevent inadvertent movement, no movement will work without first activating the enable switch. Practice safe operation by retracting extension platform first before lowering/driving	
B ERGONOMIC				
8	Tripping	Tripping on the platform	Operational Manual stipulated "keep the platform floor free of obstacles". Hold the handrail when moving in the platform.	
9	Falling	General operations. Falling when entering/exiting platform.	Platform comes with safety rail to prevent operator fall off. Safety lanyard anchor points provided for all operators. Platform door is swing inward type & self-locking type, as specified by AS1418.10. For more, refer to Operational Manual "Falling Hazard". Always practice 3 points contact. Always Enter head on & exit back down to avoid falling.	
10	Slipping	Slipping on the platform, slip on lubricant, water or wet material like cloth.	Platform floor is of expanded metal mesh pattern type to reduce slippage. Always clear all spilt liquid in platform & surrounding area. Always wear non-slip safety shoe.	

C EQUIPMENT SYSTEM			
11	High Pressure Fluid	High pressure fluid can cut or penetrate skin.	System is designed with relief valve & pressure-reducing valve just suffice for operation. All hydraulic component & hoses compliance with the system working pressure, with its bursting pressure away higher than latter. Refer to Maintenance Manual for proper adjustment & repair. Do not operate machine to detect leakage, do not use hand to check for leakage.
12	High Temperature	Heat can burn or scald body skin.	Do not open radiator cap when it is hot. Do not check engine when it is hot. Always wear PPE like gloves & goggles/face shield.
13	Fire/Explosion	During operating or charging the equipment. Combustible material not subjected to heat. During refueling & spill of fuel.	Maintenance Manual specifies the related warning: in open-flame or potential explosion environment, it is forbidden to use or charge the machine. Do not touch any battery terminal with tools that may generate sparks. Store & remove all combustibile material from machine immediately. E.g. cloth/paper with stain lubricant, fuel, & dry debris which can catch fire easily. Especially area near engine/motor. No open flame or smoking during refueling, always clean up spill fuel asap.
14	Exhaust Gas	Working in a closed environment, Engine exhaust gas during operation.	In a concealed environment, don't start or operate any machine with diesel engine. Engine powered units are for outdoor use only, do not operate indoor.
15	Gas Emitted During Charging	Inhalation of exhaust gas	Only charge battery in a well-ventilated area, do not work in the same area where machine is charging.
E ELECTRICAL			
16	Overload Electrical Circuit	System overload & caused fire.	Engine startup circuit has a 350A fuse and control circuit has 5A/10A/15A circuit breaker. Besides, on the main positive circuit has main power-off/isolator switch.
17	AC Electric Shock	Electrocution hazard.	For the equipment with diesel engine, the system voltage is 14V DC. For electric equipment, the system voltage is below 48V or 80V DC. 220V charger has power protection function by limiting the charging and emitting warning signal. Outside the platform handrail, the mains port has such functions as short circuit + overload + leakage protection (RCBO), at 230V of voltage, 16A of current and 5-10 In of electromagnetic tripping (C curve) (Selection of protective element is dependent on the corresponding areas.)
18	Near High Tension Power Line	Components may fail due to strong electromagnetic interference; personal casualty may occur at touching points.	The vehicle is of non-insulated design and marked with non-insulated signs. CAN BUS is of shielded twisted pair for data interaction. Always practice minimum approach distance, always find out power line voltage before operating. Refer to operational manual.
F STABILITY			
19	Uneven/Slope Ground	It is possible that the machine tip over. Air-filled tire if punctured with slope, the machine may tip over.	Nameplate and Operation Manual clearly specify the allowable inclination. Level sensor activate a warning signal if tilted beyond the inclination, limiting some functions. Tests have been done on pits/slopes that meet or exceed the standards. Solid tires or foam-filled tires don't have such risk.

20	Outriggers/Axle Not Deploy	With outriggers/axles not deployed, exceeding allowable height may tip over the unit.	With outriggers not extended out, the boom extending length and lifting angle will be limited. Working conditions limit the outriggers retracting. If an outrigger retracts back in work, corresponding actions will be limited.	
21	Drive: Pothole, Hitting Object	The vehicle may tip over in pothole or obstacles.	Our products are designed and tested according to AS/ANSI/CE standards, approving that they don't tip over in pothole or obstacles specified in standards. - design and test. Always practice worksite inspection before operation, mark out all pothole/object that are not able to be removed.	
22	Safe Workload, Side Load	Unit can tip over if exceeded the SWL or exceed the side load.	Our products are designed and tested according to AS/ANSI/CE standards, approving that they don't tip over at the specified workload and side load. - design and test. There is safety workload and side load specification safety signs. Manuals also list the safety requirements. With load sensor, overload will activate a warning signal & alarm, limiting some functions.	
23	Wind Rating Indoor/Outdoor	Above the specified wind speed, the vehicle may tip over.	Nameplate stated max allowable wind speed for indoor and outdoor products. Manuals also specifies the maximum allowable wind speed, as well as the applicable indoor/outdoor models. Always ensure unit is for indoor or outdoor application.	
24	Over-speeding	Above allowable traveling speed, the vehicle may roll over.	Traveling speed has been limited in the control system. Do not adjust travel speed higher than spec. Always be aware of travel ground & surrounding condition.	
G	HYDRAULIC FAILURE			
25	Hose Failure	High pressure fluid can cut or penetrate skin.	Hoses must be in compliance with the system working pressure, with its bursting pressure way higher than latter. Besides, at the friction parts of hoses are mounted sheathes for protection. There is an overflowing valve to limit the system pressure. Always de-pressurize the system before maintenance, refer to Maintenance Manual.	
26	Cylinder Failure	Cylinder piston rod is bent. Unit self-lowered uncontrol, tip over.	Main seals are of reputable manufacturer to ensure the sealing quality. Anti-bending stability coefficient of boom telescoping cylinder is higher than 1 and that of other cylinders is higher than 2, ensuring the theoretical stability of cylinders is satisfied. For maintenance and inspection, refer to Maintenance Manual.	
27	Hydraulic Component Failure	The work platform lowers by itself. Unit become inoperable at critical position.	Component used are of reputable manufacturer to ensure safety & quality. Filters are design into system to keep off foreign materials. Descending valve has manual control function for emergency lowering operation.	
H	STRUCTURAL FAILURE			
28	Boom Fatigue/Corrosion	Fatigue break and corrosion fracture. Boom failure will cause platform to collapse from height.	CAE is adopted for calculation and analysis to ensure fatigue safety coefficient - design and calculation. Anti-corrosion design & construction done according to relevant standards, such as electrophoresis, galvanizing, epoxy zinc-rich primer, intermediate coating & finishing coating.	
29	Pin, Bushing, Linkages	Platform collapse or breakdown in critical position.	CAE is adopted for calculation and analysis to ensure fatigue safety coefficient - design and calculation. Manuals specify the periodic maintenance and inspection.	
30	Overloading	Structural damage, collapse or tip over	Nameplate, safety sign shows max. rated load, also in manuals. Load sensor cutoff functions.	

I MAINTENANCE			
31	Boom	Operators are impacted or clamped by the boom during maintenance and inspection.	Warning signs on the boom say that no one is allowed to stand under the boom, which is also specified in both operational and maintenance manuals. Boom luffing cylinder has a balance valve to prevent the boom from lowering caused by hose leakage.
32	Battery Short Pos & Neg Terminal	Potentially fire & explosion, system totally not functioning at critical position.	Check unit prior operation for proper cleanliness, battery terminals are tight, rubber covered properly, no foreign object that can cause short circuit, no spilled battery water or other fluid.
33	Pressurized Hydraulic System	High pressure fluid can cut or penetrate skin. Erratic movement, breakdown in critical position.	Periodically check all relief pressure setting, regularly change filters & hydraulic oil as specified in Maintenance manual. Replace hoses when the outer layer is worn out even it does not leak to prevent sudden burst of hose due to its strength is compromised.
34	Battery Fluid Acid	Corrosion on component & burn the skin.	Standard maintenance-free battery, less chance of handling of acid or leaks or spilt its electrolyte. Always wear rubber glove & goggles when handling battery acid/electrolyte.
J TRANSPORT			
35	On Trailer-Tie down Points	Machine roll off trailer during transport.	Tie-down points are provided in the machine. Ensure proper tie down method is done & with sufficient capacity of tie down material.
36	Hoisting- Lifting Point	Machine tilt off balance & fall while hoisting.	Ensure hoisting material are proper length, capacity suffice & latch to specific hoisting points
37	Loading/ Unloading	Machine slip & fall at ramp	Ensure ramp is not wet, drive at low-speed high torque. Have spotter if from platform cannot see the ramp clearly.
K OCCUPATIONAL HAZZARD			
38	Unauthorized Use	General operations. Accident resulting in injury/fatality & damaged to property & machine.	Only one controller can be used at one time. Ground controller are recessed to prevent against accidental operation. Detachable key switch to prevent unauthorized operation. Only allow trained operator to use the machine.
39	Emergency Lowering	Platform not able to lower at critical height.	Emergency lowering procedure is on the chassis. Always check emergency lowering prior start of work, ensure people nearby know how to perform emergency lowering. Refer Operation Manual.
40	Safety Sign & Label	Decal Removed / Wrong decal(s) Wrong operation resulting in accident.	Warning signs are permanent, waterproof and conspicuous. The nameplate specifications are stamped, and permanently valid. All safety warning signs are illustrated in Operation Manual. Ensure all sign & label are readable & in proper location, replace immediately prior work start.