

Risk Identified: Battery Charging, Battery Repair, Battery Replacement, Battery Storage

HAZARD CATEGORY			
Safety	Damage/Financial	Health	Environment
Near Miss	Minor cost below 1000	Irritant	Environmental Near Miss
Minor-First Aid	Average cost btwn 1000 & 30000	Temporary Disabled/Discomfort	Minor Environmental Impact
WCL Non-Disabling/ No shift lost	Medium cost btwn 30000 & 80000	Illness leading to medical treatment (reversible)	Average Environmental Impact
WCL Disabling/ Shift lost or 14+ shifts lost	High cost btwn 80000 & 200000	Illness leading to disability (irreversible)	Major Impact
Fatality	Major cost over 200000	Fatal illness	Catastrophic occurrences

Post-risk Area Identification

QUESTION	ANSWER
What is the process?	Forklift/Reach Truck battery maintenance and repair
What materials are used?	Not Applicable
What by-products are used - solids?	Not Applicable
What by-products are used - liquids?	Isopropyl Alcohol for cleaning
What equipment/machinery are involved?	Block and Tackle and/or Forklift
Is waste controlled/cleaned up?	Yes, per waste procedure
What PPE is required?	Safety shoes, safety glasses

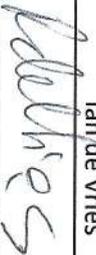
Activities

		SEVERITY					RISK MATRIX				
		1	2	3	4	5	1	2	3	4	5
SAFETY	1	LOW	LOW	LOW	MED	MED	LOW	LOW	LOW	MED	MED
	2	LOW	LOW	MED	MED	MED	LOW	LOW	MED	MED	HI
	3	LOW	MED	MED	HI	HI	LOW	MED	HI	HI	HI
	4	MED	MED	HI	HI	HI	MED	HI	HI	HI	CRIT
	5	MED	HI	HI	CRIT	CRIT	HI	HI	CRIT	CRIT	CRIT
HEALTH	1	1	2	3	4	5	1	2	3	4	5
	2	1	2	3	4	5	1	2	3	4	5
	3	1	2	3	4	5	1	2	3	4	5
	4	1	2	3	4	5	1	2	3	4	5
	5	1	2	3	4	5	1	2	3	4	5
ENVIRONMENT	1	1	2	3	4	5	1	2	3	4	5
	2	1	2	3	4	5	1	2	3	4	5
	3	1	2	3	4	5	1	2	3	4	5
	4	1	2	3	4	5	1	2	3	4	5
	5	1	2	3	4	5	1	2	3	4	5

SAFETY		HEALTH		ENVIRONMENT					
1-5 persons	6-11 persons	12-17 persons	18-35 persons	36 & more persons	1-5 persons	6-11 persons	12-17 persons	18-35 persons	36 & more persons
1 every second		Once a year		Twice a year		Four times a year		Monthly	
Rare		Uncommon		Occasional		Regular		Frequent	
1		2		3		4		5	
PROBABILITY		PROBABILITY		PROBABILITY		PROBABILITY		PROBABILITY	

Risk Assessments and Controlling Methods

Task/Activity	Hazard/Aspect Risk Identified	End effect: Potential incident, damage, health risk or environmental impact	Risk Rating: Uncontrolled			Existing Controls	Risk Rating: Controlled			Hierarchy of controls					
			HAZARD CATEGORY	SEVERITY	PROBABILITY		RISK RATING	SEVERITY	PROBABILITY	RISK RATING	ELIMINATED	SUBSTITUTED	ENGINEERING	ADMIN	PPE REQUIRED
Battery Repair	Touching live low voltage (<100V) battery terminal with wet bare hands	Mild electrical shock. Might minimally affect pace-makers.	Safety	2	1	LOW	*All Balancecell batteries < 100V	2	1	LOW	Yes	No	Yes	No	No
	Dropping conductive item (tools, bolts, wires) onto exposed cell terminals.	Sparks causing metal splatter and high intensity arc light	Health	3	5	HI	*Wear protective eyewear *Use insulated tools *Cover portion of battery not worked on *Battery cover needs to be removed first *Only qualified and trained personnel allowed to work on battery	2	2	LOW	No	No	Yes	Yes	Yes
	Dropping conductive item (tools, bolts, wires) onto exposed cell terminals.	Severe sparking, blow fuse, burn components.	Damage/Financial	2	5	HI	*Same as above	2	2	LOW	No	No	Yes	Yes	No
Battery storage	Stored for long duration (>month) at low charge state (<20% SOC)	Battery overdischarge, damaging cells internally.	Damage/Financial	4	2	MED	*SOC display visible to user *BEM visible low SOC indication *Partial reporting low SOC *Undervoltage cut-out by BEM and e-switch	4	1	MED	No	No	Yes	Yes	No

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Date:	2021/07/22	Signature:	
		Date:	2021/07/23

Task/Activity	Hazard/Aspect Risk Identified	End effect, Potential incident, damage, health risk or environmental impact	Risk Rating, Uncontrolled				Existing Controls	Risk Rating, Controlled				Hierarchy of controls				
			HAZARD CATEGORY	SEVERITY	PROBABILITY	RISK RATING		SEVERITY	PROBABILITY	RISK RATING	ELIMINATED	SUBSTITUTED	ENGINEERING	ADMIN	PPE REQUIRED	
Battery Charging	Over-charging	Cells can expand and damage battery box beyond repair.	Damage/Financial	4	3	HI	*Smart e-switch and BMS disconnection on overvoltage. *Approved Battery charger will prevent overvoltage.	4	1	MED	No	No	Yes	No	No	
	Over-charging	Cells can expand and vent gases through safety valves.	Health	1	3	LOW	*Same as above *Fitted lid to contain gases. *Non-flammable, non-hazardous gas	1	1	LOW	No	No	Yes	No	No	
	Reverse Polarity due to incorrect installation	Blow smart e-switch and BMS and damage charger.	Damage/Financial	2	2	LOW	*Keyed plugs on battery and charger. *Cables and connectors are colour-coded. *Battery or charger fuse should blow.	2	1	LOW	No	No	Yes	No	No	
	Driving away without disconnecting charger from fast charge point	Pulls charger off mounting causing permanent damage.	Damage/Financial	2	4	MED	*Immobiliser plug part of fast charge connection point	2	1	LOW	No	No	Yes	No	No	
	Poor electrical connection	Overheating of connectors / wires leading to fire.	Damage/Financial	2	5	HI	*Marking torqued bolts *Use dedicated contact washers *Load test check for hot spots using thermal camera *User to perform regular connection and hot spot checks	2	3	MED	No	No	Yes	Yes	No	
	Poor electrical connection	Overheating of connectors / wires leading to fire.	Safety	2	5	HI	*Same as above *Using approved fire retardent connectors *Over rate wire thickness	1	3	LOW	No	No	Yes	No	No	
Battery Change/Replace	Incorrect removing battery using lifting tackle	Battery can fall resulting in serious foot injury	Safety	4	4	HI	*Steel toe-capped safety shoe. *Use of certified lifting equipment. *Only trained operators to operate lifting equipment.	4	2	MED	No	No	No	Yes	Yes	
	Incorrect removing battery using lifting tackle	Battery can fall resulting in serious battery damage	Damage/Financial	4	4	HI	*Use of certified lifting equipment. *Only trained operators to operate lifting equipment. *Siftener rods keep cells in place even when inverted *Fully welded battery box *Tight cell packaging	3	2	MED	No	No	Yes	Yes	No	
	Damaged lifting tackle, hooks, straps	Battery can fall resulting in serious foot injury	Safety	4	2	MED	*Regular equipment inspection	4	1	MED	No	No	No	Yes	No	
	Damaged lifting tackle, hooks, straps	Battery can fall resulting in serious battery damage	Damage/Financial	4	2	MED	*Same as above	4	1	MED	No	No	No	Yes	No	

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