

### FAILURE MODE AND EFFECTS ANALYSIS

Item: Mechanical Mesquite Bean Harvester Responsibility: SDI1 T9 Ripple Effect  
 Model: 1 Prepared by: SDI1 T9 Ripple Effect  
 Core Team: SDI1 T9 Ripple Effect

FMEA number: \_\_\_\_\_  
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Process Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Process Controls	D e t e c t	R P N	Recommended Action(s)	Responsibility and Target Completion Date	Action Results				
											Actions Taken	S e v	O c c u r	D e t e c t	R P N
Extender Pole	Snaps/Breaks	Hook Assembly falls and potential serious injury.	7	Pole held horizontally (90 degrees from vertical).	5	Warning Label not to exceed certain angle from vertical when holding.	1	35	Make sure the extender pole doesn't bend and it is secured on tight to work.	10/31/21	Consider disregarding the pole altogether.	2	1	1	2
Shaft Collar	Comes Loose	Offset mass slips	8	Shaft collar is not adequately fastened	2	Ensure collar is tightened before each use	2	32	Document procedure for checking collars in the user manual	10/31/21	Tighten shaft collar.	2	1	2	4
Offset Mass	Offset Mass Breaks from Screw	Rotational speed is too high	8	Screw cannot handle forces/stresses	1	Control the rotation speed of the offset mass and ensure key is adequately tightened.	2	16	Ensure adequate design of offset mass and key	10/31/21	Just ensure that the screw is sufficiently tightened.	5	1	2	10
Pole	Pole Bends (plastic deformation)	Reduced performance for future use (fatigue).	7	Hollow walls to thin and/or material strength isn't sufficient	2	Hold device upright	3	42	Establish a maximum angle	10/31/21	There is no longer a pole to bend*.				0
Motor	Comes loose	Hook Assembly disassembles (comes apart). Motor falls to ground.	9	Loose bolts. Loose fit.	1	Make sure bolts are tightened before use.	3	27	Ensure the motor mounts are capable of holding the motor in place	10/31/21	Ensure that the upper motor mount is tightened sufficiently to the lower motor mount.	6	1	2	12
Shaft	Bends or Breaks	May cause additional stress/force on pillow blocks.	8	Bent shaft. Offset alignment.	2	Get alignment of shaft correct.	3	48	Make sure coupling is secured.	10/31/21	Replace shaft.	5	2	3	30
Hook - Pole interface	Breaks	User will be unable to hold the pole	7	Heavy vibrations cause the interface to snap	6	Provide a strong hook-pole interface	3	126	Weld hook to pole. Remove pole from the design	10/31/21	Consider disregarding the pole altogether.	2	1	1	2
Wires	Come undone	Motor or speed controller stop working	4	Heavy vibrations cause the wires to untangle	7	Create a sturdy knot and use electrical tape if necessary. Use electrical tubing to organize wires.	3	84	Solder exposed wires and cover with electrical tape.	10/31/21	Implement long wires that don't have an end connection to the main hook structure.	4	5	3	60
Speed Controller	Comes Loose	Wires disconnect, lose connection, jump in voltage	5	Vibrations transmitted through pole and onto mount/speed controller	8	Grip the speed controller case tightly in the clamp	3	120	Separate controller from pole	10/31/21	Speed controller will be connected by wires, at a distance from the main hook assembly.	2	1	1	2