

Functional FMEA

Function or Requirement	Potential Failure Modes	Potential Causes of Failure	Occurrence	End Effect on Product, User, Other Systems	Severity	Detection Method/ Current Controls	Detection	RPN	Actions Recommended to Reduce RPN	Action Item #	Test Plan #	
Transports Vehicle	Does not move	Motors do not produce enough power	1	LVE will not be able to complete the assigned task and will fail to provide educational value to the students	3	ICD	2	6	Power Calculation / ICD meetings	1	na	
		Does not read signal from controls	1		3	ICD	1	3	Open communication between chassis and controls teams / ICD meetings	2	na	
		Not enough traction from wheels	2		2	Chassis Team	1	4	Traction Calculation	3	na	
		Vehicle overheats	3		3	Chassis Team	1	9	Heat calculation / Provide source for chassis cooling	4	na	
		Improper voltage output from controls	2		3	ICD/Controls	2	12	Voltage Calculation / ICD meetings	5	na	
		Improperly programmed	3		1	Controls Team	2	6	Test the program periodically	6	na	
		Wires do not connect	1		2	ICD	2	4	ICD meetings	7	na	
		WOCCS is not properly integrated	2		2	Controls Team	1	4	Test the program periodically	8	na	
		WOCCS doesn't function as intended	3		3	None	1	9	Communicate with WOCCS team	9	na	
	Moves too fast	Too much power going to the motors	2	LVE will not be able to complete the assigned task and will fail to provide educational value to the students	2	ICD/Controls	1	4	Power Calculation / ICD meetings	10	10	
			Joystick sensitivity is too high		2	2	Controls Team	1	4	Test the program periodically	11	10
		Not enough power going to the motors	2		2	ICD/Controls	1	4	Power Calculation / ICD meetings	12	10	
			Joystick sensitivity is too low		2	2	Controls Team	1	4	Test the program periodically	13	10
		Does not move in intended direction	Motor speeds are not calibrated		3	3	Controls/Chassis	1	9	Incorporate user control	14	na
			Motos are not aligned		1	3	Chassis Team	1	3	Placement measurements	15	na
			Signals are crossed		2	1	Controls Team	1	2	Detailed electrical drawings	16	na
			Wheels will not skid on floor surface		2	2	Chassis Team	1	4	Traction Calculation / Account for use in field house	17	11
	Supports MSA	Cannot support MSA load	Structure is too weak	2	3	ICD	1	6	Load Calculation / ICD meetings	18	9	
Structure is unbalanced			2	2	ICD/Chassis	1	4	Account for location and weight of load from MSA / ICD meetings	19	9		
Connectors do not match			1	1	ICD	1	1	ICD Meetings	20	na		

Supports MSA	Does not provide power to the MSA	Battery is undersized	1	LVE will not be able to complete the assigned task and will fail to provide educational value to the students	3	ICD	2	6	Battery Calculation / ICD meetings	21	9
		Connectors do not match	1		1	ICD	1	1	ICD Meetings	22	na
Educates Students	Does not educate students	Does not incorporate design aspect	1	Students will not benefit from this exercise	3	MSA Team	1	3	Provide components to be drawn by students using CAD	23	28
		Does not require hands on machining	1		3	MSA Team	1	3	Provide components to be machined by students	24	27
		Tasks are too simple	2		2	MSA & Systems Teams	3	12	Student Survey	25	5
Carries Object	Cannot grasp object	Not enough grip strength in claw	2	MSA will not be able to complete the task	2	MSA Team	1	4	Account for the maximum possible load	26	9
		Claw is too small	1		2	MSA Team	1	2	Define object to be carried and design to maximum tolerances	27	na
	Cannot support object	Motors cannot power supporting the arm	2		2	ICD/MSA Team	2	8	Load Calculations / account for weight of arm as well as payload	28	9
		Not enough power going to the motors	2		2	MSA Team	1	4	Power Calculation / ICD meetings	29	9
		Mechanical structure of arm is too weak	2		2	MSA Team	1	4	Load Calculations / account for the maximum possible load	30	9