



Hanel Lean Lift

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Introduction

Ensuring the safety of Renishaw's merchandise and personnel is the main goal of this investigation.

Applying a safe modification to existing equipment that Renishaw's insurance provider has determined is susceptible to fires caused by overheating motors.

The motors have no safety mechanisms, thus in the event of an overload, they would continue to operate without stopping, overheating the motor windings and perhaps starting a fire.

Objectives

- Research and and conform to industry safety regulations
- Find a suitable solution to the problem
- Source parts and design the solution
- Present design and solution to Senior Management
- Fit Modification to Lean Lift to ensure safety of employees and equipment
- Test Modification to Ensure safety of employees and equipment

FMEA Hanel Lean Lift									
System	Failure Mode	Failure Effect	Severity (1-10)	Potential Cause	Occurrence (1-10)	Control Measures	Detection (1-10)	RPN	Action Recommended
	How can it go wrong?	Impact to user/customer		What causes the failure?		What can be put in place to detect early?			
Modification	Motor Overheating	Impact to user/customer	9	Chain Jam	3	PPM Plan and Training	2	18	Implement PPM and Training. Implement Sensor modification
				Shelf Jam	7	Ensure guards are checked and not damaged on PPM	2	126	Implement PPM and Training. Implement Sensor modification
				Electrical Failure	3	Keeping electrical panel free of debris and testing equipment	5	15	Implement PPM and Training. Implement Sensor modification
				Faulty Sensor	3	PPM Plan and Conducting Heat gun test	2	18	Implement PPM and Training. Implement Sensor modification
				Incorrect Grease being used	7	PPM Plan and Training, use boiler grease	5	105	Implement PPM and Training. Implement new Grease
Use of Hanel Lean Lift	General Faults	Production Stop/ HSE	7	Operation of E-Stops	2	PPM Plan and Training. Operation of E-Stops	2	28	Implement PPM and Training
				Loose Guarding	3	PPM Plan and Training	2	42	Implement PPM and Training
				Screen Failure	3	Stock of Spare screen and backlights for H&S screen	2	18	Ensure stock system is up to date. Training to ensure people correctly book out stock.
				Light Guard Failure	7	Stock of Spare light guards. Training to align light guards	3	147	Ensure stock system is up to date. Training to ensure people correctly book out stock. Training on aligning light guards

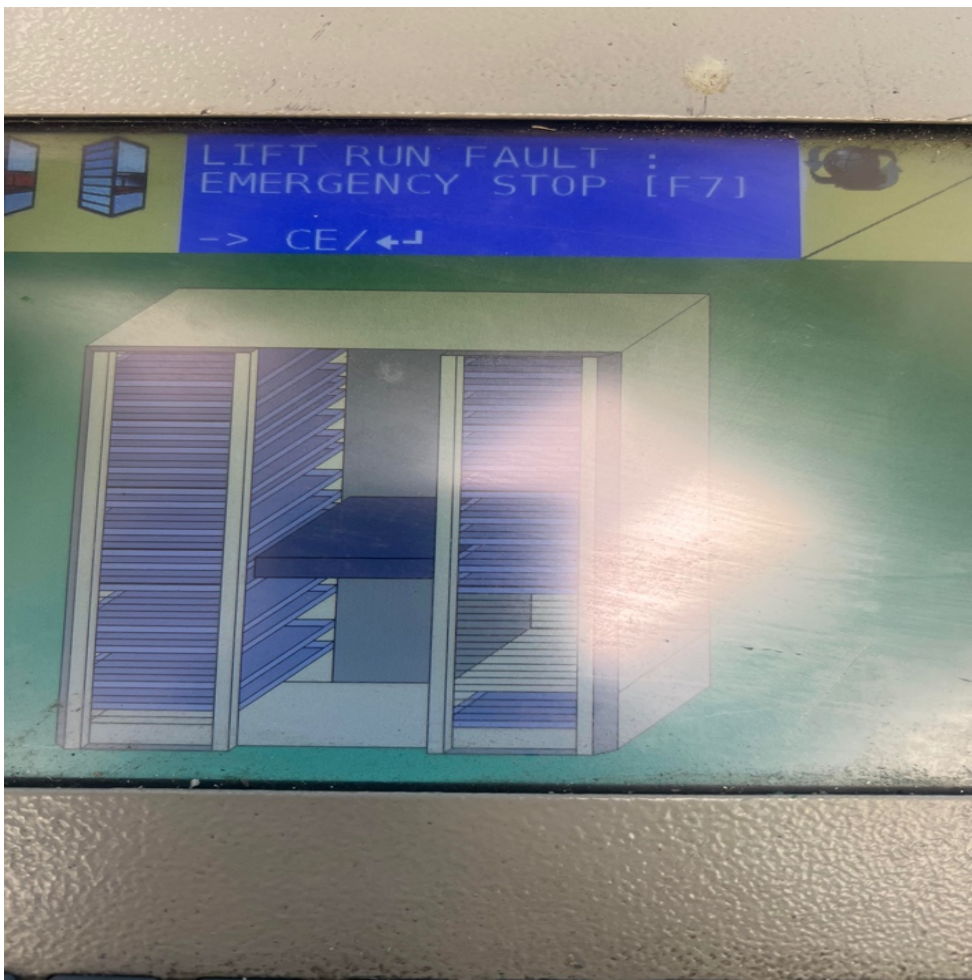
Failure Mode Effective Analysis (FMEA) showing Highest Risk Priority Number



Heat Gun Test. Heating Motor Sensor to 100°C



Calibrated Temperature Reader. Reading 100°C



Machine being triggered and going into Emergency Stop State

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Research

Researching Regulations like LOLER, PUWER, HASAWA and Fire Safety order 2005 has helped create a safe environment for the employees within Renishaw itself.

HSE statistics helped in seeing the bigger picture of overall safety on the machine. Not only is the Lean Lift a fire risk but other factors like encountering moving machinery were looked at.

During audits or inspections regulatory bodies may request access to these records which demonstrate adherence to LOLER. Creating and implementing a PPM schedule and booking this machine onto our system. They will adhere to the LOLER regulation.

PPMLEAN02 Renishaw PLC – Plant Maintenance		RENISHAW apply innovation™
<u>Hanel Lean Lift Planned Maintenance</u>		
Monthly. SSPM02	Duration: 1 Man 1 Hour	
1. Visually inspect all guarding around the machine. 2. Clear any accumulation of debris and clean as necessary. 3. Check operation of E-Stops. 4. Check operation of Light guard rails. 5. Check the operation and condition of the work light and replace if damaged. 6. Visually inspect all chains within the machine. 7. Visually inspect sprockets attached to the chains.		
Six Monthly. SSPM02	Duration: 1 Man 2 Hours	
1. Visually inspect all guarding around the machine. 2. Clear any accumulation of debris and clean as necessary. 3. Check operation of E-Stops. 4. Check operation of Light guard rails. 5. Check the operation and condition of the work light and replace if damaged. 6. Visually inspect all chains within the machine. 7. Visually inspect sprockets attached to the chains. 8. Grease the chains within the machine Rocol Sapphire Extreme. 9. Wipe down all sensors at the bottom of the machine. 10. Conduct a temperature test on the thermal sensor (130 degrees) using a heat gun.		
Yearly Monthly. SSPM02	Duration: 1 Man 3 Hours	
1. Visually inspect all guarding around the machine. 2. Clear any accumulation of debris and clean as necessary. 3. Check operation of E-Stops. 4. Check operation of Light guard rails. 5. Check the operation and condition of the work light and replace if damaged. 6. Visually inspect all chains within the machine. 7. Visually inspect sprockets attached to the chains. 8. Grease the chains within the machine using Rocol Sapphire Extreme. 9. Wipe down all sensors at the bottom of the machine. 10. Conduct a temperature test on the thermal sensor (130 degrees) using a heat gun. 11. Carry out a Vibration Scan on the Motor. 12. Home machine shelves and carry out reshuffle on lean lift.		
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Planned Preventative Maintenance (PPM) Schedule that was introduced

Conclusion

To evaluate the accuracy of the temperature sensor in measuring the motors overall temperature a heat gun test with a calibrated and accurate temperature probe was conducted.

The project was successful in the fact that a safe and working modification was implemented that ensures the safety of Renishaw’s employees and Renishaw itself.