Lean Process Equipment Design and Implementation

Overview
In order to solve the Design Qualification Test (DQT) process improvement and the replacement of test equipment for drop down durability test for transducers manufactured at Philips Ultrasound, we modeled a DQT process by implementing lean principles. We also designed a pendulum that will replace the current drop down test that’s currently being used.

Objectives
Reduce the total duration of the Design Qualification Test (DQT) process by implementing lean principles as well as designing a replacement for the current drop down test.

Approach
• Gathered information about the tests included in the DQT process from the company’s reports given to us.
• Created two concept generation matrices (one for the DQT process and one for the drop down test replacement). Each matrix consisted of eight ideas contrasted with eight different criteria of evaluation.
• Visited sponsor in Reedsville, PA in order to discuss previous DQT process as well as drop down tests.
• A total of three CAD models iterations for the pendulum that replaced the drop down test were created and shown to sponsor for feedback.
• Detailed engineering drawings for each part of the CAD model were made and delivered to the sponsor.
• The pendulum was built by the Philips Ultrasound team and then delivered to us for assembly and validation.
• Validation was then performed with the help of the Physics Department here at Penn State and the use of an accelerometer in order to verify that the impact forces were similar.
• A DQT process model was created by categorizing each test by its location and need worker presence.
• Major percentage improvement of DQT was found by comparing new completion times with alternating of the longest test.

Outcomes
• Insourcing of Lens Impact test by implementation of pendulum.
• 50% labor reduction as a result of pendulum implementation.
• Variation of impact force during drop test was reduced by 18%.
• Design Qualification Testing total duration reduced 33%.