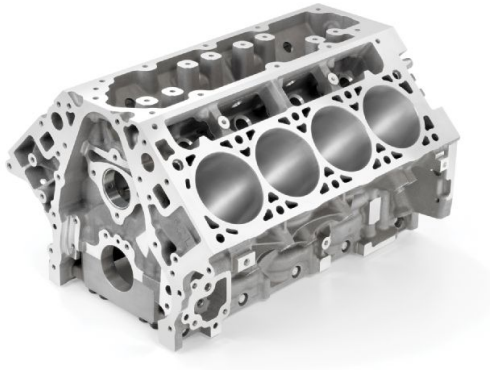
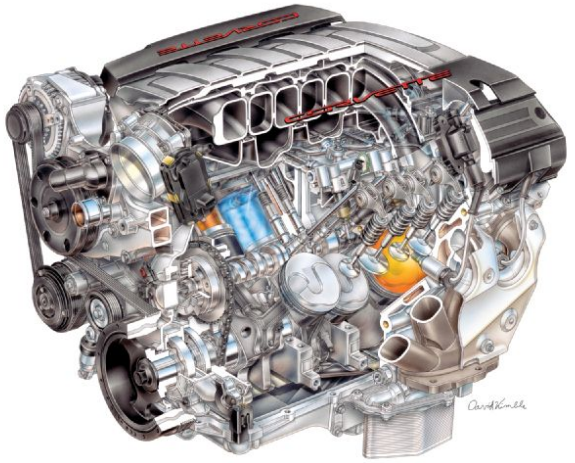
WORKING AT ST. CATHARINES

Area of Work: GEN V – Assembly

Eng. Supervisor: Dave Keir | Eng. Mentor: George Shing / Chris Bortolotto

By: Maharshi Patel

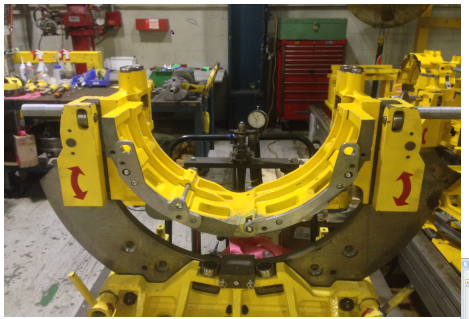




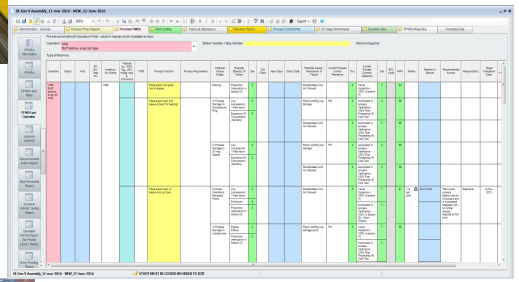
GENERAL MOTORS

PROJECTS UNDERTAKEN

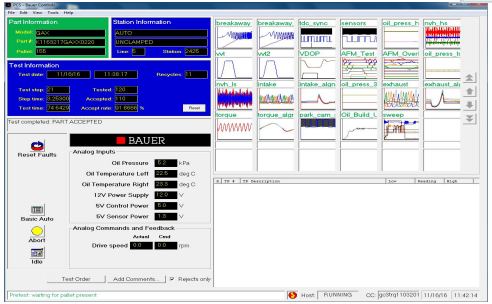
- Reducing Block Scrap – Transmission Dowel Thread Holes (OPEX)



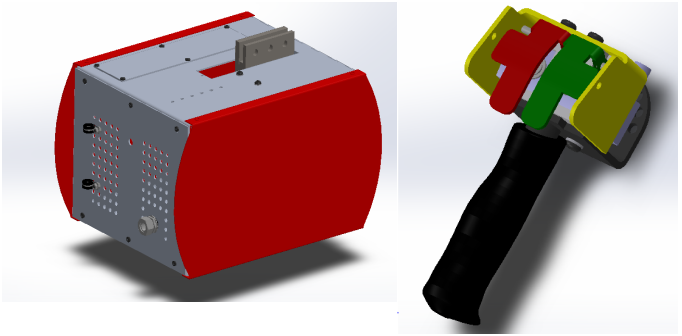
- Updated PFD and PFMEA for Gen-V Assembly



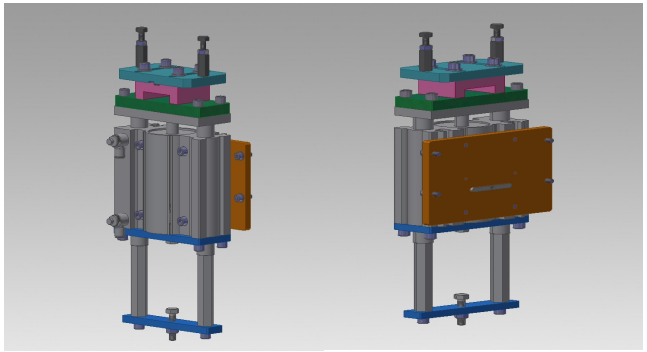
- Cold Test Support



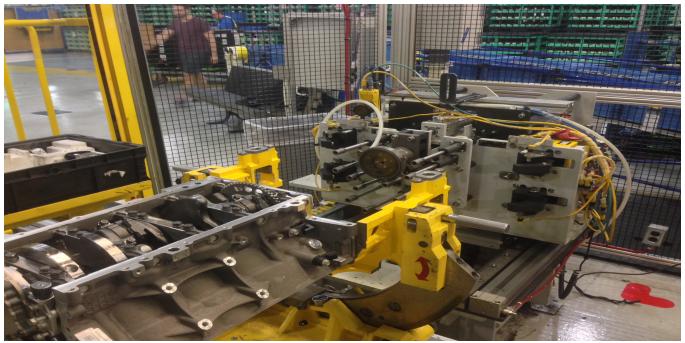
REDUCING BLOCK SCRAP – TRANS. THREAD BOLTS



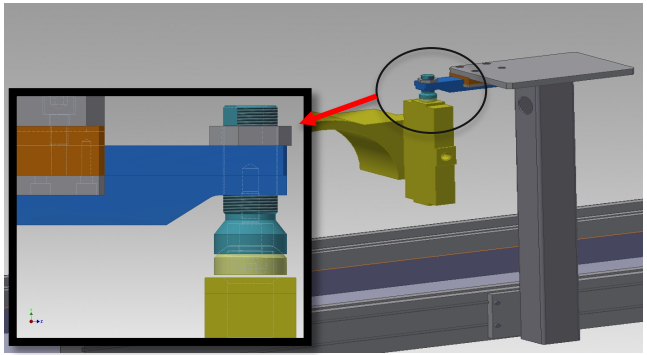
Servo Motor Hoist



Pallet Lift Assist



Pallet Adapter Unit



Adapter Arm

DECISION MATRIX

Engineering Decision Matrix

Solutions: →			Pallet Lift Unit		Servo Motor Hoist		Pallet Adapter Unit	
Criteria ↓	Weight	Weight (%)	Rating	%	Rating	%	Rating	%
Safety	10	21%	8	17%	9	19%	10	21%
Cost to Implement	9	19%	9	19%	6	13%	4	9%
Return on Investment	7	15%	7	15%	4	9%	3	6%
Performance	8	17%	5	11%	7	15%	8	17%
Complexity	6	13%	6	13%	4	9%	2	4%
Chances of Eliminating "Knack"	7	15%	4	9%	7	15%	7	15%
Total: →	47	100%	39	83%	37	79%	34	72%

1 -> Lowest Concern 10 -> Highest Concern

PFMEA (PROCESS FAILURE MODE AND EFFECTS ANALYSIS) – STATURE

OLD

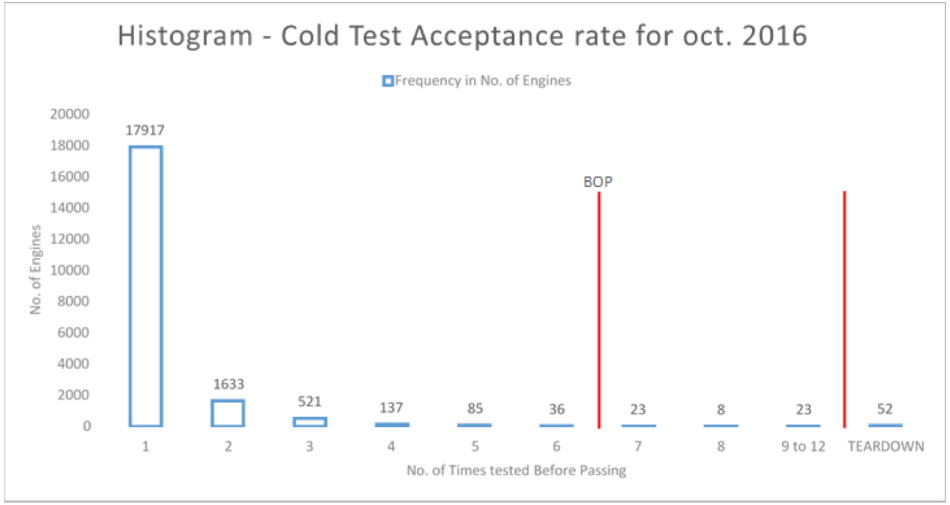
Severity Occurrence Detection

Remove timing chain tensioner pin and place to verification chute	Pin not removed	Production Interruption In Station (3)	3	Standardized work not followed		3	Visual Inspection - 100% In-station (7)	7	147	1 X per shift		E/P at a sub-sequent location - OP 1275 - Mechanical Plunger error proofing unit
		Vehicle Assembly Repair	7				Automated In process Verification - 100% In Station (3) - sensor in discard chute	7				

NEW

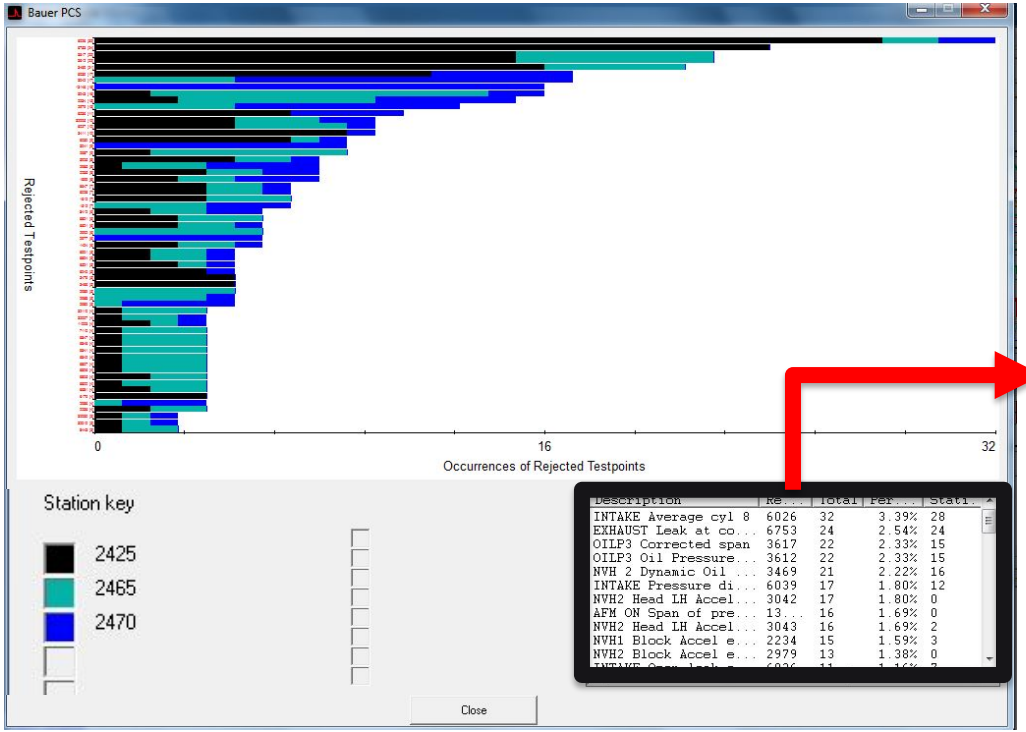
Error Proofing for the Gernade Pin	Rejecting Good Parts	Production Interruption In Station (Go into BYPASSmode)	3	Misalligned Mechanical Plunger		3	Cold Test / BYPASS 1275	2		18	
	Accepting Bad Parts	Production Interruption In Station (Go into BYPASS mode)	3	Misalligned Mechanical Plunger		3	Cold Test / BYPASS 1275	2		18	

COLD TEST ACCEPTANCE RATE



No. of Test Conducted before Passing	Frequency in No. of Engines	Percentage of Total	
1	17917	87.68%	
2	1633	7.99%	
3	521	2.55%	
		Total of First 3 Test	***98.22%***
4	137	0.67%	
5	85	0.42%	
6	36	0.18%	
	% Engines from 4-6 Tests	***1.26%***	
		% Engines from 1-6 Tests	***99.48%***
7	23	0.11%	
8	8	0.04%	
9 to 12	23	0.11%	
		% Engines from 7-12 Tests	***0.26%***
TEARDOWN	***52***	***0.25%***	
TOTAL ENGINES	**20435**		

COLD TEST SUPPORT

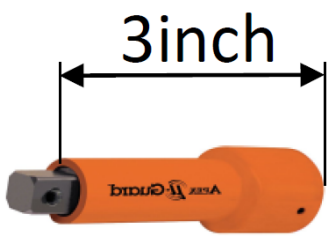


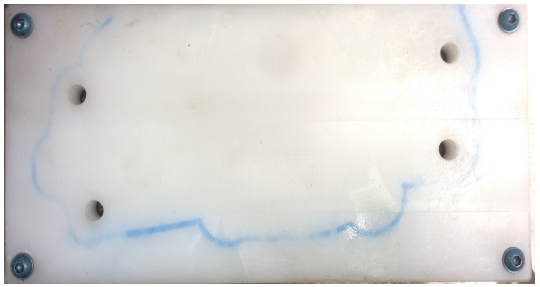
Description	Re...	Total	Per...	Stati.
INTAKE Average cyl 8	6026	32	3.39%	28
EXHAUST Leak at co...	6753	24	2.54%	24
OILP3 Corrected span	3617	22	2.33%	15
OILP3 Oil Pressure...	3612	22	2.33%	15
NVH 2 Dynamic Oil ...	3469	21	2.22%	16
INTAKE Pressure di...	6039	17	1.80%	12
NVH2 Head LH Accel...	3042	17	1.80%	0
AFM ON Span of pre...	13...	16	1.69%	0
NVH2 Head LH Accel...	3043	16	1.69%	2
NVH1 Block Accel e...	2234	15	1.59%	3
NVH2 Block Accel e...	2979	13	1.38%	0

TOP N Rejects – Data Analysis

OTHER WORK UNDERTAKEN

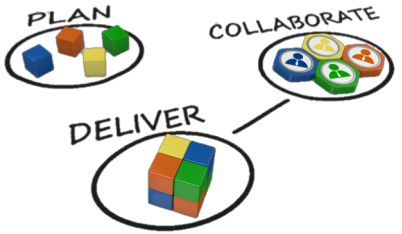
- PFMEA
  - TOP 5 RPN
  - Rework List
  - Risk Limiting Level 1
  - Annual-Internal PFMEA Audit
- Single Spindle Safety Initiative
- Oil Pump Rework Fixture
- Head Sub – OP80 Laser Key Check
  - 6.2L Rejects
- Turn Table Assist for Head Sub Load and Unload (OP10/120)
- Cold Test Support
  - Limit Changing



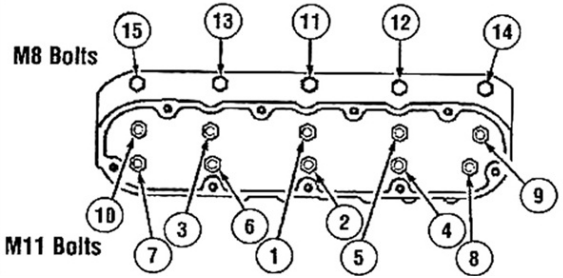


SKILLS OBTAINED

- Project Management



- Fastening/Assembly Techniq



- Engine Testing (Cold Test)