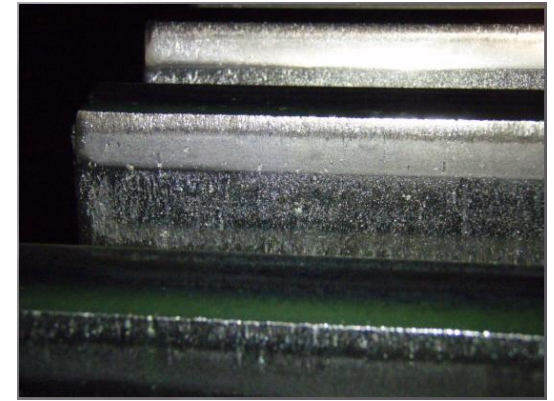
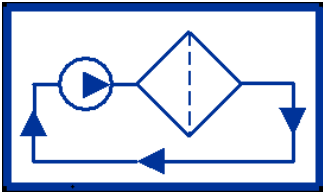


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Context



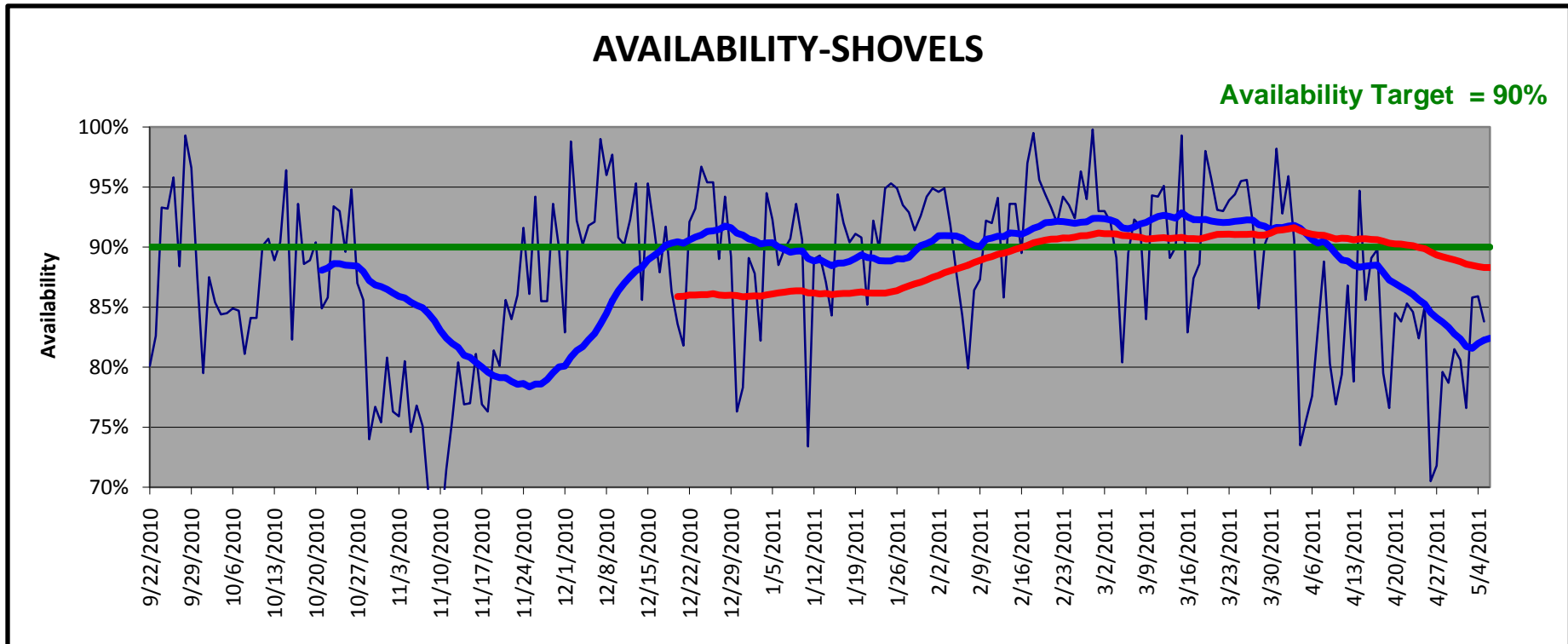
- Failed Crowd Gear Cases (ES51 x2)
- Better predictability of failure through better sample ports
- Interaction with gear case – Flow detection and PLC Tie-in
- Increased expected gear box life (2.1x if cleanliness targets are met)
- Excellent results on ES55 Test Unit

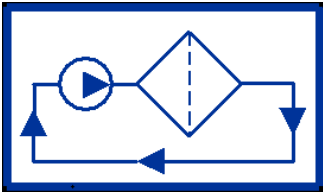


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Business Case

The electric shovels have a lower than desired availability and productivity due to mechanical failures on the major components within the shovel.

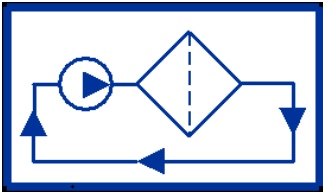




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Problem Statement

The shovel gear cases have multiple failure events that could be prevented through enhanced filtration. If proper sample ports and filtration were installed, issues can be better identified and predicted and downtime minimized.

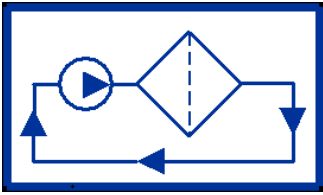


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Objective Statement

All of the electric shovels will be outfitted with a kidney loop filtration system on the crowd gear case that continuously filters the oil to achieve a target cleanliness of ISO 23/18/15 and extend gear box life. The filtration system will also have adequate sample ports to gather proper oil samples for better predictive maintenance.

This project will be completed by 10/15/11



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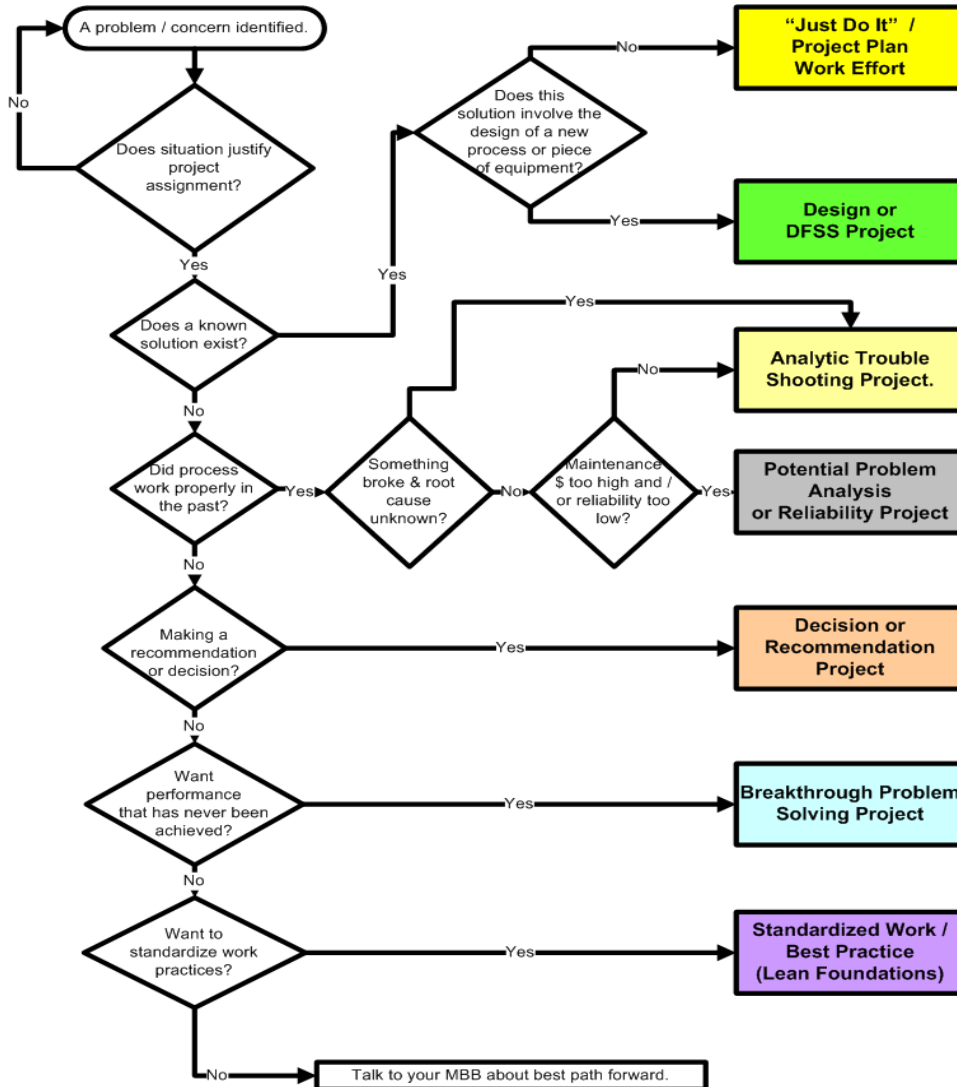
Project Method:
Just Do It

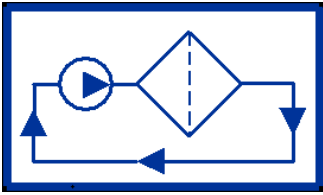
Problem Identified:
51 Crowd Case Failure (2x) & Poor failure prediction through Oil Analysis.

Known Solution Already Exists:

Test filtration system already in place for ~1yr with great results

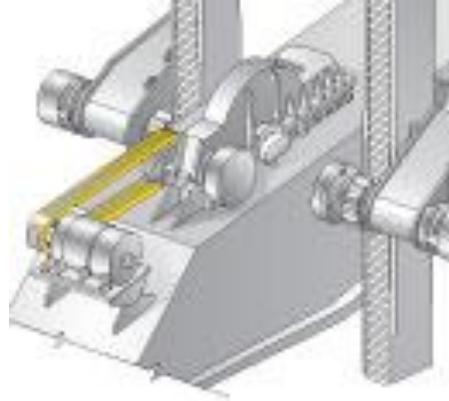
Bottom line:
Roll out solution to remaining electric shovels





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Project Progress



Experimental system on the 55 Shovel

Excellent Results:

Particle count reduced to 23/18/15 from 29/28/20 =

Approximately 64 times cleaner

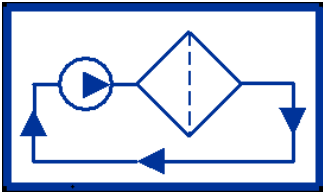
Approximately 2.1 times increase in life expectancy

Total system roll out to all shovels costs ~ \$42,000

The estimated cost reduction of this project is approximately

\$129,730 per year

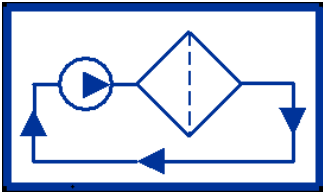




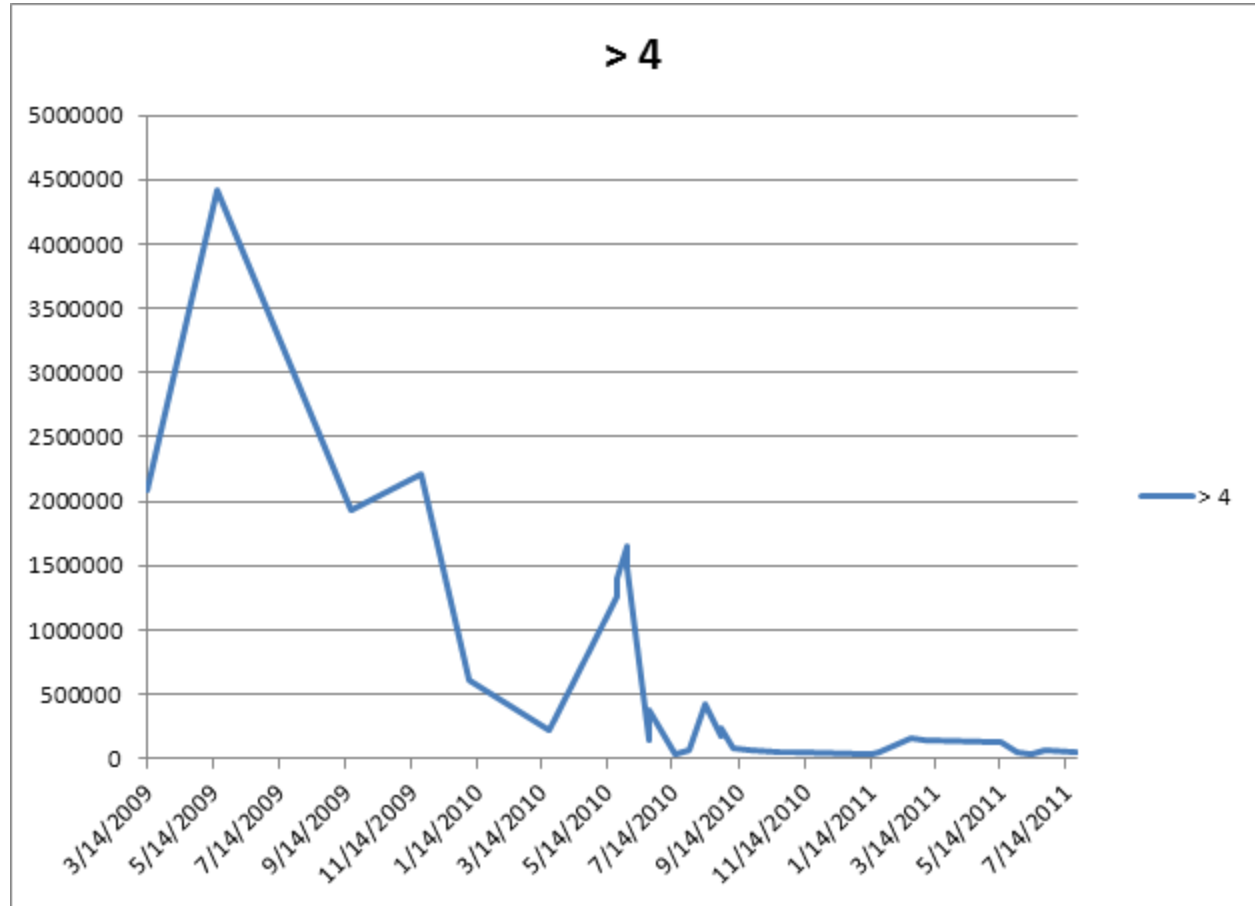
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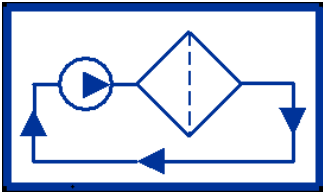
ISO RAW DATA

Date	> 4	> 6	> 14	> 21	> 38	> 70
7/24/2011	49835	3089	126	78	52	13
6/25/2011	73889	8773	340	154	77	33
6/12/2011	41352	5102	467	238	79	48
5/29/2011	57083	1185	125	100	58	42
5/15/2011	126446	16528	617	307	142	94
3/5/2011	151616	21627	689	367	184	46
2/20/2011	161762	14949	977	429	286	238
1/22/2011	44449	2464	332	119	68	34
1/14/2011	43829	6279	105	74	39	13
11/5/2010	47582	3172	434	214	128	86
10/22/2010	45118	1829	227	92	43	11
9/25/2010	69926	28623	596	204	74	25
9/9/2010	85342	19742	1152	507	232	85
8/28/2010	180661	9834	785	439	185	69
8/28/2010	230947	25392	611	478	292	53
8/13/2010	423697	61514	3857	2030	1421	609
7/29/2010	72854	4594	676	321	183	69
7/16/2010	42983	2910	354	129	103	52
6/22/2010	138170	3302	104	89	74	30
6/22/2010	236987	27455	214	120	80	53
6/22/2010	374958	7580	339	212	169	42
6/1/2010	1658670	87976	12441	9775	5332	2666
6/1/2010	1483370	54551	7252	5361	3153	1577
5/24/2010	1265930	139707	3784	1499	857	214
5/24/2010	1407330	711418	2023	1424	899	375
3/22/2010	227833	6831	961	635	334	167
1/7/2010	608854	46521	1604	1167	583	146
11/23/2009	2217670	832485	3922	1144	490	163
9/18/2009	1925630	905441	8855	2767	1107	369
5/17/2009	4421690	1294380	6164	1156	770	578
3/14/2009	2087330	571333	3333	889	444	222

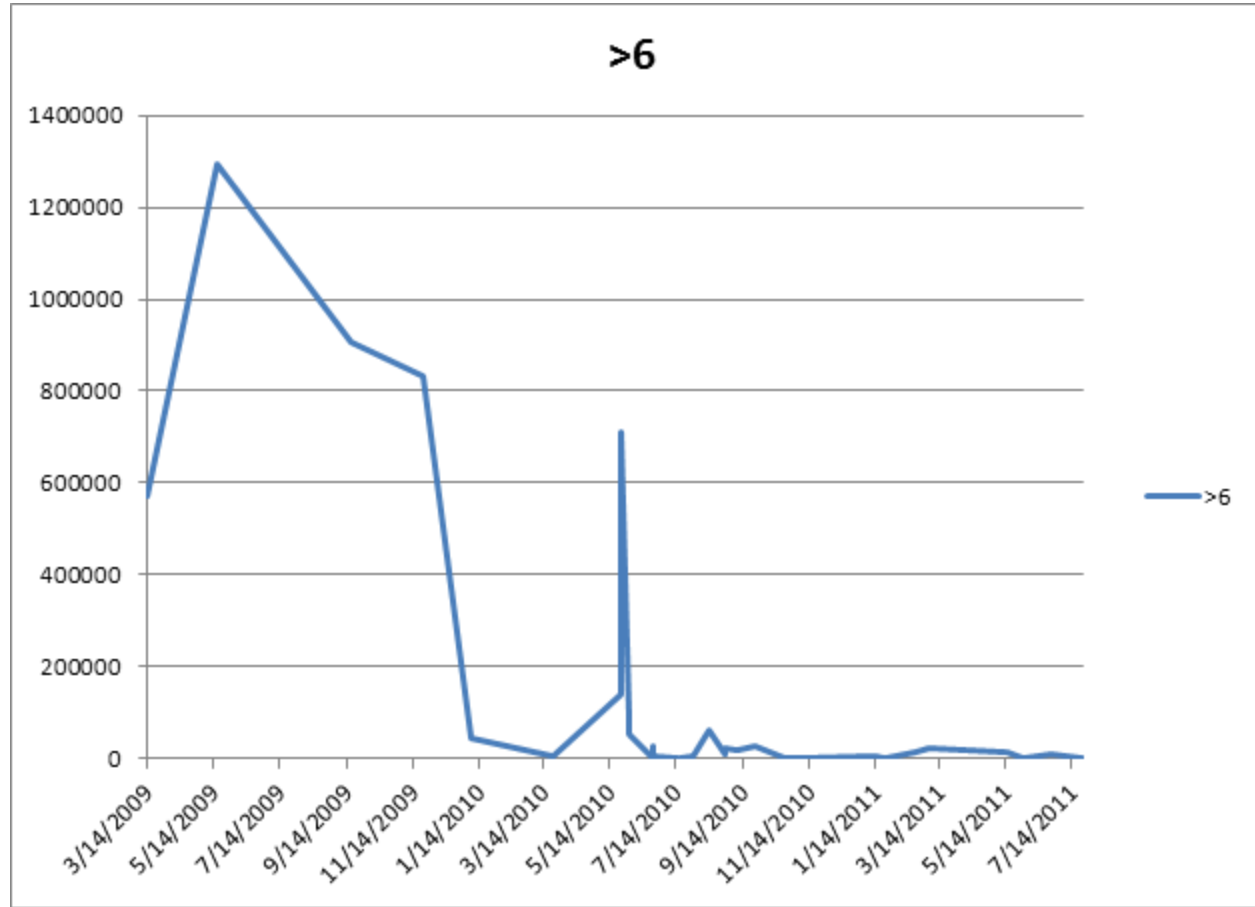


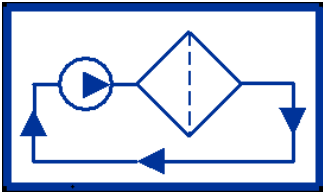
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