Maintenance Call Volume Study for STIHL

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Company Background

STIHL is a German manufacturer and seller of products such as chainsaws, trimmers, and blowers for professional, commercial, farm, and consumer markets. Since its founding in 1926 in Waiblingen, Germany, STIHL has been a leader in this manufacturing in field, with their chainsaws being the number one selling brand on the market.

STIHL's United States headquarters is in Virginia Beach, Virginia where 1,900 of their 2,100 nationwide employees work.

Problem Statement

Line 4180 has an average of 63 maintenance calls per week, but the number of calls can range anywhere from as low as 15 calls to as many as 170 per week.

Currently, there is no method of predicting how many calls the maintenance team supporting Line 4180 should expect, which can lead to an increased cost for STIHL.

Background on Line 4180

Highest volume line in the plant at 780,000 units/ year

44 operators, 1 team lead, 1 rework operator, and 2 material handlers

Produces three types of engines for trimmers

Line is 18 years old

Project Description and Objectives

Understand reliability of data collected on Line 4180

Create a model that will use key indicators to predict the number of maintenance calls for each shift on a given day

Verify model findings and develop/implement best practices to reduce call volume

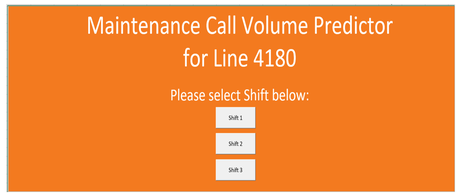
Predict maintenance call volume on 4180 within 80% accuracy

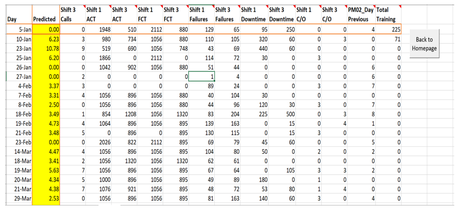
Reduce the total maintenance cost by $50,000 over 3 years

Reduce the maintenance call volume by 10% over 3 years

Solution and Implementation

- ➔ **Used statistical analysis to determine significance of key indicators for increased maintenance call volume**
- ➔ **Used regression analysis to create a model that predicts maintenance call volume on a shift based on key indicators**
- ➔ **Held a Kaizen event that included members of the engineering team, the 4180 supervisor, and the 4180 line lead to validate data analysis and brainstorm improvements in areas in which the analysis and the qualitative data overlapped**
- ➔ **Built the regression analysis into an accessible platform so that STIHL can utilize it predict maintenance call volume**
- ➔ **Analyzed which machines to target that cause problems most frequently**

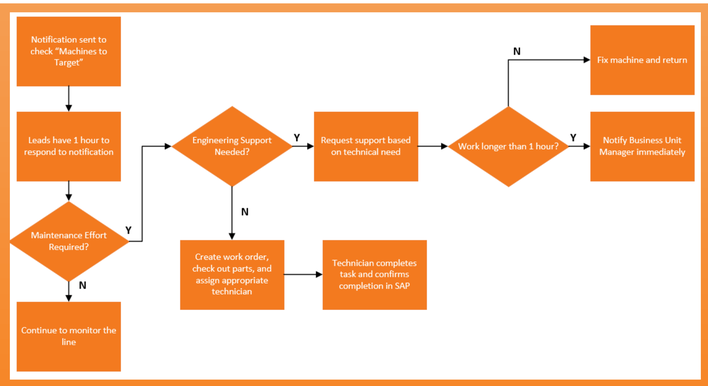




Day	Predicted	Shift 3 Calls	Shift 1 ACT	Shift 3 ACT	Shift 1 FCT	Shift 3 FCT	Shift 1 Failures	Shift 3 Failures	Shift 1 Downtime	Shift 3 Downtime	Shift 1 C/O	Shift 3 C/O	PM02_Day Previous	Total Training	
5-Jan	0.00	0	1948	510	2112	880	129	65	95	250	0	0	4	225	
10-Jan	6.23	3	980	734	1056	880	110	105	320	60	0	3	0	73	Back to Homepage
23-Jan	10.76	9	519	690	1056	748	43	69	440	60	0	0	0	0	
25-Jan	6.20	0	1866	0	2112	0	114	72	30	0	3	0	0	0	
26-Jan	0.00	0	1042	902	1056	880	51	44	0	0	0	0	6	0	
27-Jan	0.00	2	0	0	0	0	1	4	0	0	0	0	6	0	
4-Feb	3.37	3	0	0	0	0	89	24	0	0	3	0	7	0	
7-Feb	3.81	4	1056	896	1056	880	40	104	30	0	0	0	0	0	
8-Feb	2.50	0	1056	896	1056	880	44	96	120	30	3	0	7	0	
18-Feb	3.49	1	854	1208	1056	1320	83	204	225	500	0	3	8	0	
19-Feb	4.73	4	1064	896	1056	895	139	163	0	15	0	4	1	0	
21-Feb	3.48	5	0	896	0	895	130	115	0	15	3	0	0	0	
23-Feb	0.00	0	2026	822	2112	895	69	79	45	60	0	0	5	0	
14-Mar	4.47	4	1056	896	1056	895	104	80	50	0	2	0	2	0	
18-Mar	3.41	2	1056	1320	1056	1320	62	61	0	0	0	0	0	0	
19-Mar	5.63	7	1056	896	1056	895	67	64	0	105	3	3	2	0	
20-Mar	4.34	5	1000	896	1056	895	49	89	180	0	1	0	0	0	
21-Mar	4.36	7	1076	921	1056	895	48	72	53	80	1	4	0	0	
29-Mar	2.53	0	1056	896	1056	895	81	163	140	60	3	0	4	0	

Application to Predict Maintenance Calls

New Notification System



Escalation Structure for New Notification System

When maintenance call volume on the previous shift exceeds the average, a notification should be sent to the line lead to make a round on the "Machines to Target" for the current shift.

Shift	Machines to Target
1	M-2095, M-2955, M-2718, M-1782, M-2150, M-2164
2	M-2285, M-2675, M-106, M-1782, M-4361, M-495, M-2150,M-2993, M-2003, M-2296, M-3440
3	M-040, M-046, M-1028, M-105, M-1631, M-2090, M-2095

Suggested Improvements

<u>Checklists/One-Sheets:</u>
Provide reminders of the Standard Operating Procedures and ensure employees are following the appropriate protocols

<u>Improve Inventory Control System:</u>
One unified system for Planning and Production; have Production run system more than one per day

<u>Mobile Technology Upgrade:</u>
Each line lead/line supervisor should have a tablet with an SAP app; Easier for the line lead to get an overview of the line and communicate with operators and engineering/maintenance staff

<u>Station Diagnostics:</u>
Dummy parts should be provided at each workstation to help diagnose between machine and part failures; Could reduce duration of maintenance or eliminate need for call altogether

<u>Employee Accountability System:</u>
Employees sometimes leave machine issues for the next shift, which can become breakdowns; Accountability system needs to be in place to reduce call volume at beginning of shifts

Impact

Improvements in the Workplace (3 Year Lifespan)	
Workforce Practices	**Yes**
Employee Skills	**Yes**
New Processes	**Yes**
Labor Cost Savings	$35,000
Unnecessary Investment Savings	$15,000
Total Estimated Cost Savings	$50,000

Project Impact for STIHL