SIX SIGMA GREEN BELT SAMPLE PROJECT

Project Name:	6 Sigma Improvement Project for Warranty Returned Goods		
Team Leader:	Kirby Sneen, Sr. Manufacturing Engineer	**Today's Date:**	X/X/XXXX
Sponsor:	Ronald Jones	**Planned Start Date:**	X/X/XXXX
Area or Process Impacted:	Warranty Returns	**Estimated Time to Complete:**	6 months

Element	Description	Information
1. Problem Statement	Specifically, and clearly defines the problem (including Scope)	Warranty returns have become a major contributor to our Cost of Quality (COQ). It is one of the company's strategic initiatives to reduce the COQ this year. In 2024 our highest sales volume motor (TitanX-500) incurred $60,000 in annual warranty costs out of $120,000 total in claims. This needs prompt attention to improve our customer experience and prevent complaints. This project will focus on reducing warranty claims for the TitanX-500, other product lines are out of scope for this project.
2. Commitment Statement	Quantify the opportunity using SMART objectives. Include consideration of Benefits to Customers, Business Impact and expected deliverables. (Improve "X" to "Y" by "when").	To reduce warranty costs and improve customer satisfaction, our objective is to decrease warranty expenses for the TitanX-500 from $60,000 per year to $30,000 per year (a 50% reduction) within six months. This will be achieved through process improvements, supplier collaboration, and enhanced quality controls. Success will be measured by a sustained reduction in warranty claims while maintaining or improving product performance.
3. Metrics	What are the metrics that will be impacted and need to be measured? Examples: Sigma value, defects, yield, capacity, cycle time, closure rate, etc. *add more rows as needed*	**Metric Description** / **Baseline** / **Goal** / **Results** TitanX-500 Warranty Expense / $60,000/yr / $30,000 / $15,000/yr TitanX-500 Warranty Expense as % of Sales / 3% / 1.5% / .75% / / /
4. Team Members	Identify team members required to be successful.	Bill Kearney – Quality Manager & Project Leader Dick Fettig – Information Services Joey Lloyd – Supplier Quality Engineer Maxine Maples – Department Lead Tony Moline – Quality Technician Susan Schinke – Customer Service
5. Knowns & Unknowns	Identify any risks, constraints, critical assumptions or other significant resource needs and how they will be addressed.	Knowns: • The TitanX-500 accounts for 50% of total warranty claims. • Current warranty costs for this motor are $60,000 annually. • Warranty failures primarily originate from a few recurring failure modes (to be validated). • Supplier engagement is necessary to address potential design or manufacturing defects. • Process improvements may involve design modifications, inspection enhancements, or supplier quality controls.

		Unknowns: • The exact root cause(s) of failures—whether they stem from design flaws, supplier variability, or internal process gaps. • The impact of proposed changes on production efficiency and cost. • Potential unintended consequences of the redesign, such as new failure modes. • Customer response to the changes in performance or durability. To mitigate unknown risks, the team will conduct detailed root cause analysis, collaborate with customers, suppliers, and implement a phased verification approach.			
6. Milestones	What needs to be done by whom and when to meet the project deadline. Add more rows as needed	Action	Owner	Due Date	Status
		Project selection and approval, team selection	Kirby Sneen	2/1	Done
		Write the project charter, scope and plan	Kirby Sneen	2/18	Done
		Meet with IS to get historical baseline data	Kirby Sneen	3/28	Done
		Identify failure modes and contact supplier for causes	Maxine Maples	4/22	Done
		Engineering redesign based on supplier input	Kirby Sneen	5/27	Done
		Implement new supplier quality inspection and monitor on-going warranty claims.	Kirby Sneen	6/3	Done
		Review ongoing warranty data and determine project results	Kirby Sneen	7/27	Done
		Submit Completed Project to MA	Kirby Sneen	8/1	Done
7: Initial Approval:	Manager approval of you doing this project	Mike McDonald		**Date:**	2/2/XXXX

Project Details

8: Six Sigma Tools	List the tools you used during the project. Attach the samples in the appendix	Pareto chart Box Plot Fishbone Diagram 5 Whys Trend Chart
9: Current State	Describe current conditions, starting point, challenges anticipated, etc.	The warranty return rate for the TitanX-500 is significantly impacting Cost of Quality (COQ), accounting for $60,000 in annual expenses. Initial data analysis suggests that a small number of recurring failure modes contribute to most claims. However, the root causes have not yet been fully identified. Challenges anticipated: • Limited historical data from past warranty claims may slow down root cause identification. • Supplier cooperation may be required for design changes, potentially affecting lead times. • Implementation of new quality control measures and/or assembly methods may require process adjustments on the production floor.

10: DMAIC Outline	Provide details of actions and activities conducted during each of the project phases. Use specific examples. This section shows the understanding and application of the DMAIC process.
Define	Defined the Project • Created the Project Definition • Project Objective • Project Scope • Key Challenges and Goals Identified Customers as External (End User) and Internal (Receiving, Customer Service, Production, and Accounts Receivable) Completed the milestone chart showing milestones, responsible person and dates Collected costs for the current process to be used for potential cost savings as % of sales Completed a flowchart of the process
Measure	The team discussed the best measurements to use. • IT provided a database of the required warranty and sales data (see Warranty Trend chart) • Maxine H. gathered data for the Warranty Failure Modes (see Failure Mode chart) A Box Plot confirmed that the TitanX-500 had the highest variability and defect rates across production runs, reinforcing its selection as the focus of this project Data was reviewed by team
Analyze	The Team Brainstormed ideas by category (see Fishbone chart) Identified root causes by asking 5 Whys (see 5 Why diagram) Analyzed data using Trend Chart, Box Plot, and Pareto I documented the results
Improve	Bill received approval from upper management for the redesign Bill trained and communicated changes internally and externally
Control	I wrote internal procedures for motor test sequence Tony wrote new test frequency for heightened inspection for the next 6 months Bill wrote on-going audit process to maintain performance

11: Results & Final Conditions	Describe the change from the current state. There needs to be at least one measurable result. (Complete the metrics section in **element 3** with the numerical information)	Following the implementation of process improvements, warranty expenses for the TitanX-500 were reduced from $60,000 annually to $15,000 annually, surpassing the initial goal of a 50% reduction and achieving a 75% reduction. The warranty expenses as % of sales were reduced from 3% to .75%, surpassing the goal of a 50% reduction and achieving a 75% reduction.		
12: Sustainment	Describe how the project outcomes will be sustained. Who owns it? What actions will happen if the results change?	To ensure these improvements are sustained: • A daily audit has been added to leader standard work and will transition to weekly and then monthly audits over time. • The Quality team will monitor warranty claims monthly and investigate any spikes in failures. • Supplier quality reviews will be conducted quarterly to verify ongoing compliance with updated quality standards. • If warranty costs begin to rise again, a corrective action plan will be initiated, including a reassessment of failure modes.		
13: Next Steps & Lessons Learned	Where else can the improvements be applied? What went well? What would you change?	Next Steps: • Expand similar process improvements to other motors. • Conduct a post-project review to identify best practices that can be standardized across product lines. • Explore automation or digital tracking enhancements to streamline warranty claim analysis. Lessons Learned: • Cross-functional collaboration (Engineering, Quality, and Supplier teams) was key to success. • Having top management support accelerated decision-making and implementation. • Early supplier involvement could have improved efficiency in identifying and implementing design modifications. • A structured root cause analysis process prevented assumptions and ensured data-driven decisions.		
13B: Group Project Reflections	If it was a group project, add reflections for each member here	N/A – Not a group project, I was the project owner.		
14: Manager Approval:	Manager signs off that project was successful	Mike McDonald	**Date:**	7/30/XXXX
14B: Peer Approval:	A Peer signs off that project was successful	Danielle Flannagan	**Date:**	7/30/XXXX

15: Appendices:

Figure 1 – Fishbone

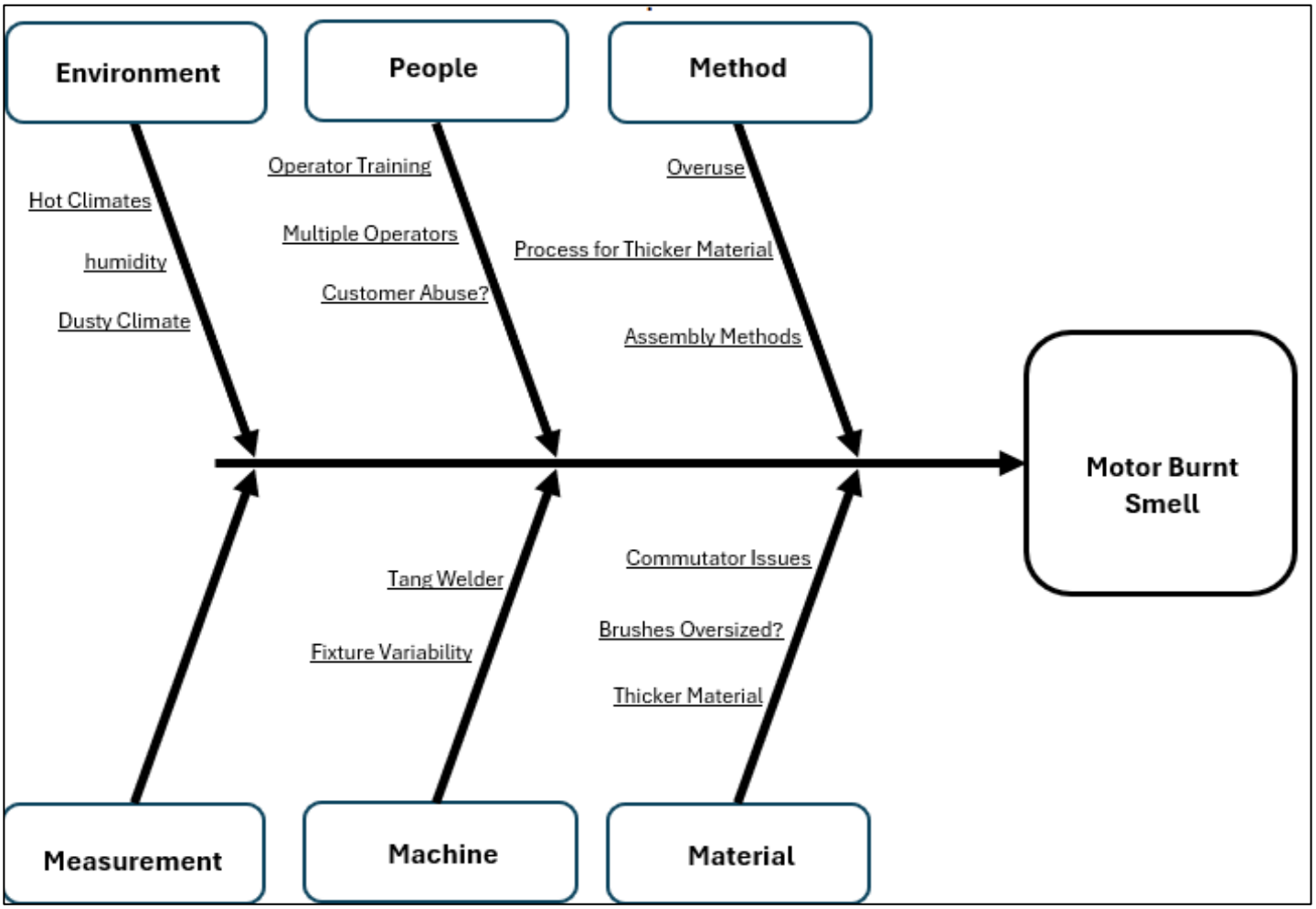

Figure 2 – TitanX-500 Warranty Failure Type

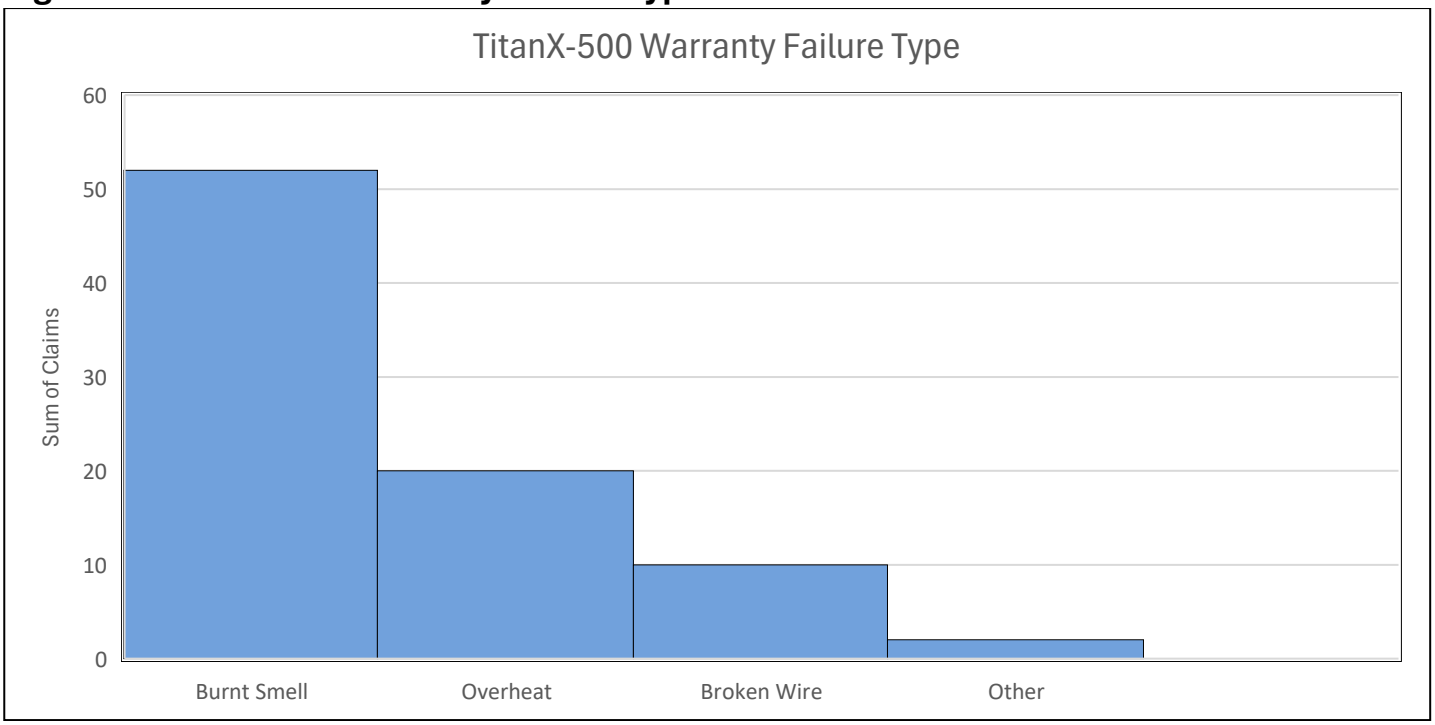

Figure 3 – "Burnt Smell" 5 why

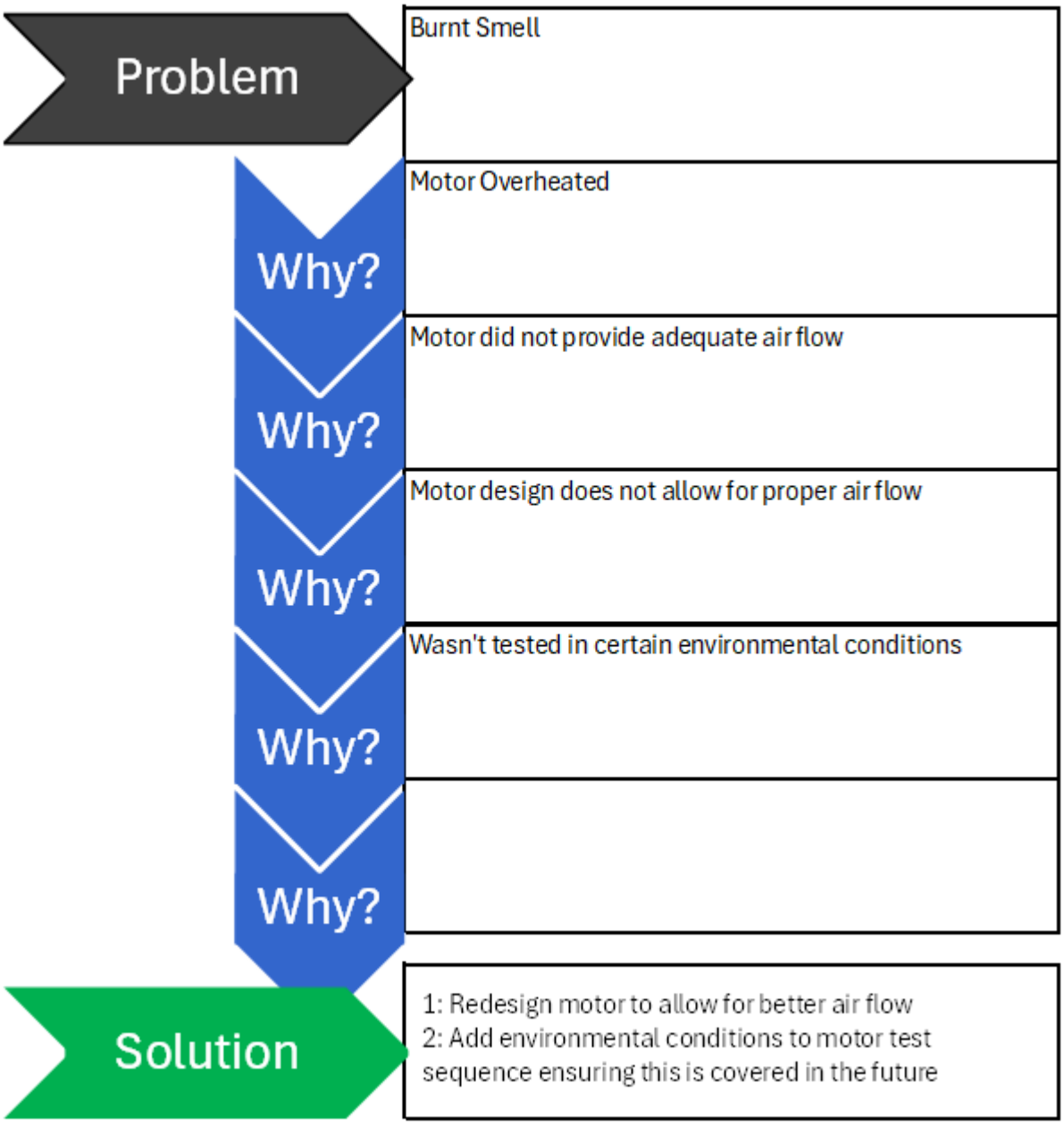

Figure 4 – TitanX-500 Warranty Trends by Month

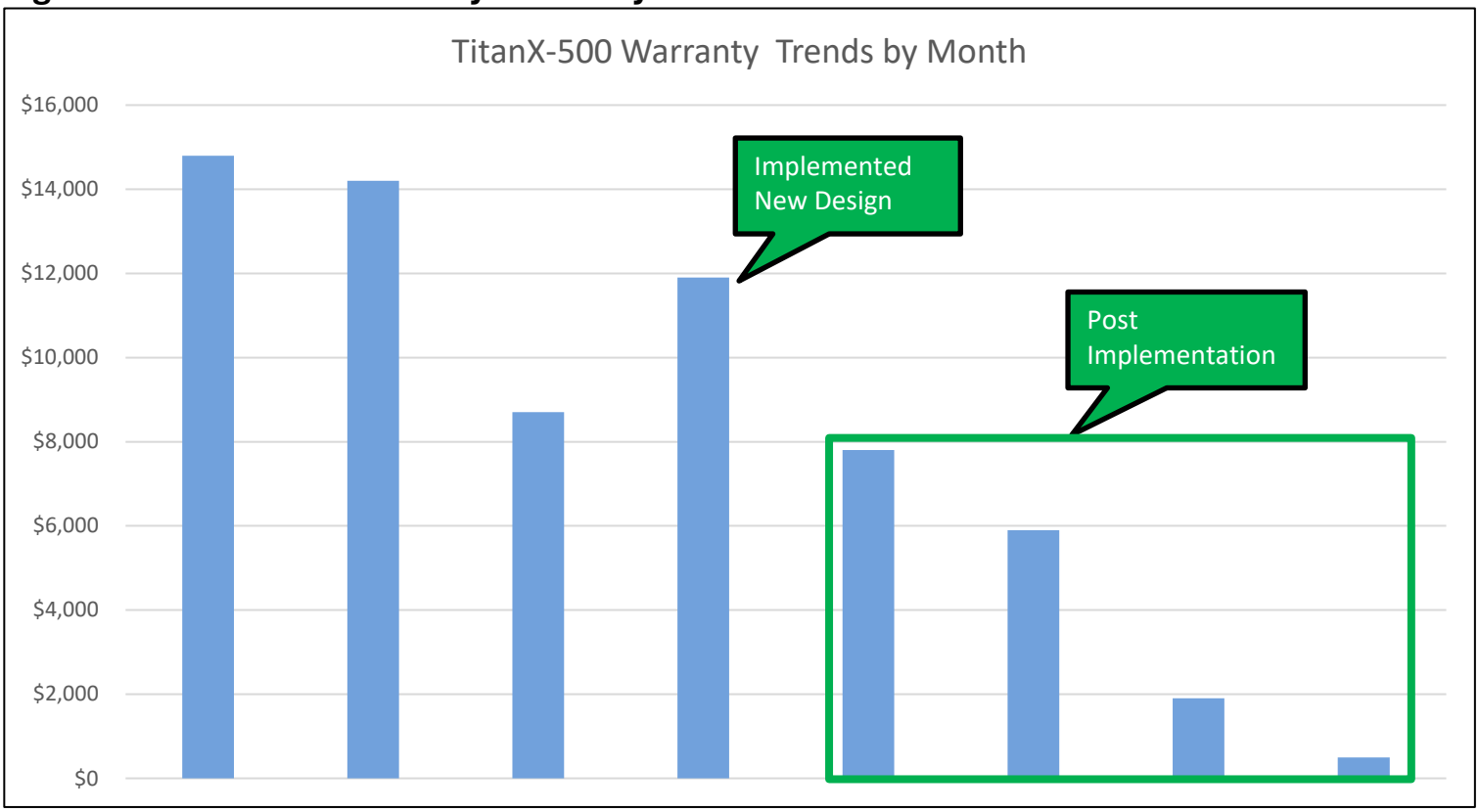

Figure 5 – Warranty Claims Box Plot