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Abstract

From August 2017 to October 2017 (3Q2017) the documentation errors (including lay-up errors and mixed styles) were 96% average in one Distribution Center at the west coast. DMAIC methodology was applied including lean principles to find the root cause of these documentation errors. A Kaizen exercise was executed to identify potential solutions to improve the current process. During the Kaizen exercise a SIPOC diagram was used to identify all relevant elements that can support the improvement of the process. As a result, layup error category was targeted to be improved because has a lot opportunities. Cause-and-effect relationship (fishbone diagram) was used to identify a range of potential solutions to the problem. Solutions were evaluated and prioritized by using a Pick Chart. Five actions items were proposed for improvement and a reduction of 17% was reached for the documentation errors (including layup error and mixed styles categories). Also, an increase of 24.70% for the Output per Hour (OPH), a reduction of 34.78% from shrink and an increase of 0.02% in the accuracy data. These results support to achieve the 15% goal of layup documentation errors reduction proposed by this project within 6 months period.

Introduction

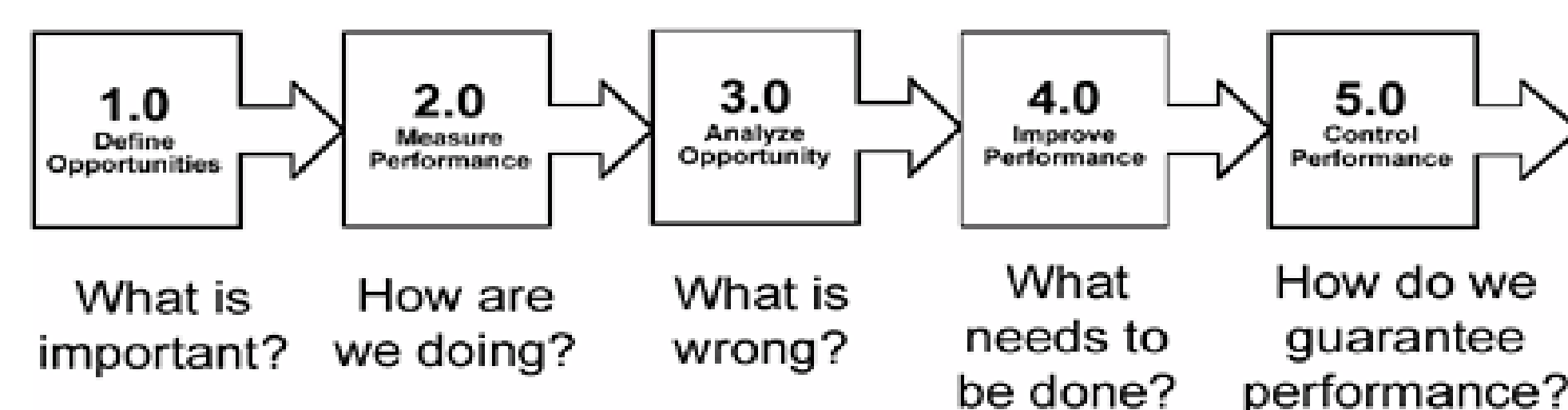
An improvement in the Lay-up process is needed to reduce at least by 15% of the documentation errors such as: incorrect count / cartons (miscount or calculation error), incorrect vendor or prepack, create error and mixed styles. The documentation errors are identified in two groups: lay-up errors and mixed styles. Currently, the documentation errors (including lay-up errors and mixed styles) were 96% average from 3Q2017 (Aug to Oct 2017). As a result, a modification (Document issue to report the event and correct the discrepancy) is required to correct the error and reduce the shrink impact. Therefore, the improvement of these ones will be caused a benefit in reducing shrink and increasing the productivity of the building. Lay-up is the first step in processing an order after it is received. Lay-up may involve sorting and counting by style, size and color.

Objectives

- To illustrate the trend executed for documentation errors during the lay-up process.
- To determine the factors associated with increased number of documentation errors during the lay-up process.
- To establish the methods and/or systems used to control the Lay-up errors reduction.

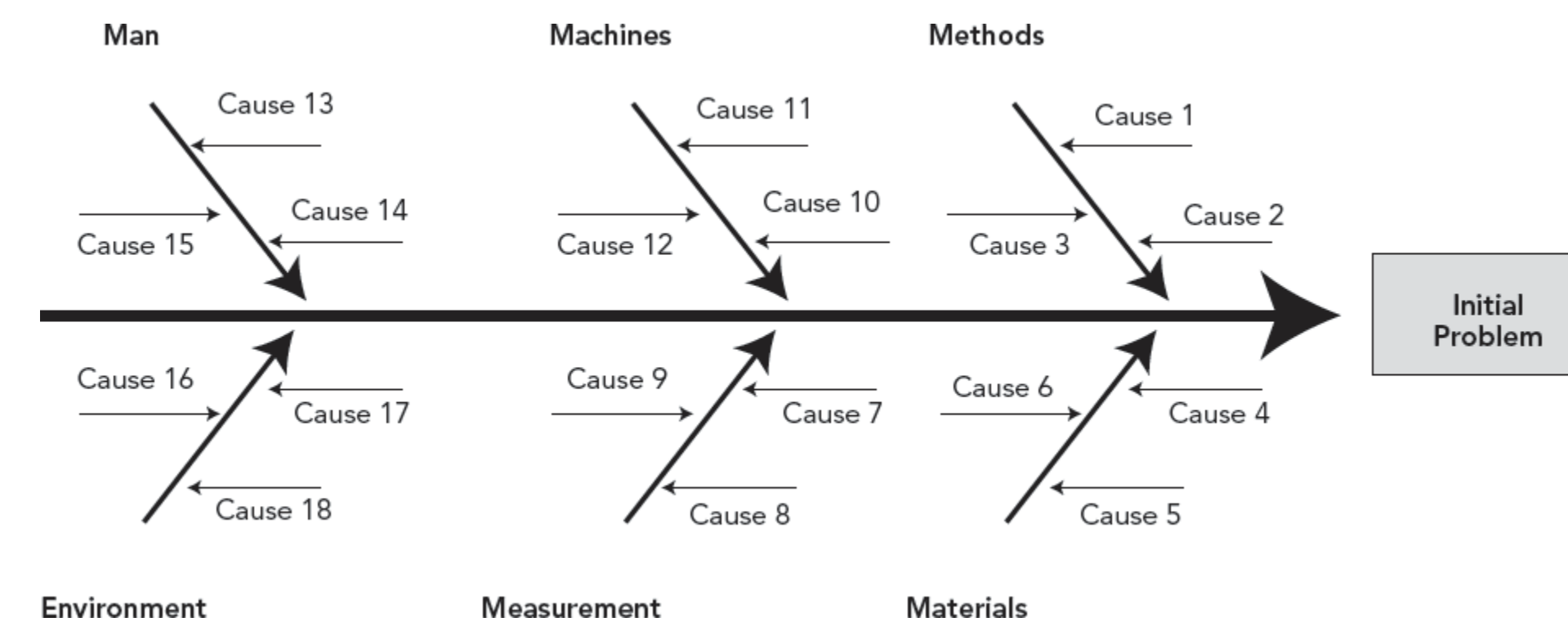
Background

According to the Lean Six Sigma Black Belt Handbook (Six Sigma Operational Methods) and Six Sigma Handbook (Fourth Edition); DMAIC methodology is a powerful five-phase approach to addressing a process that needs improvement. DMAIC stands for Define, Measure, Analyze, Improve, and Control (Figure 1):



Background (cont.)

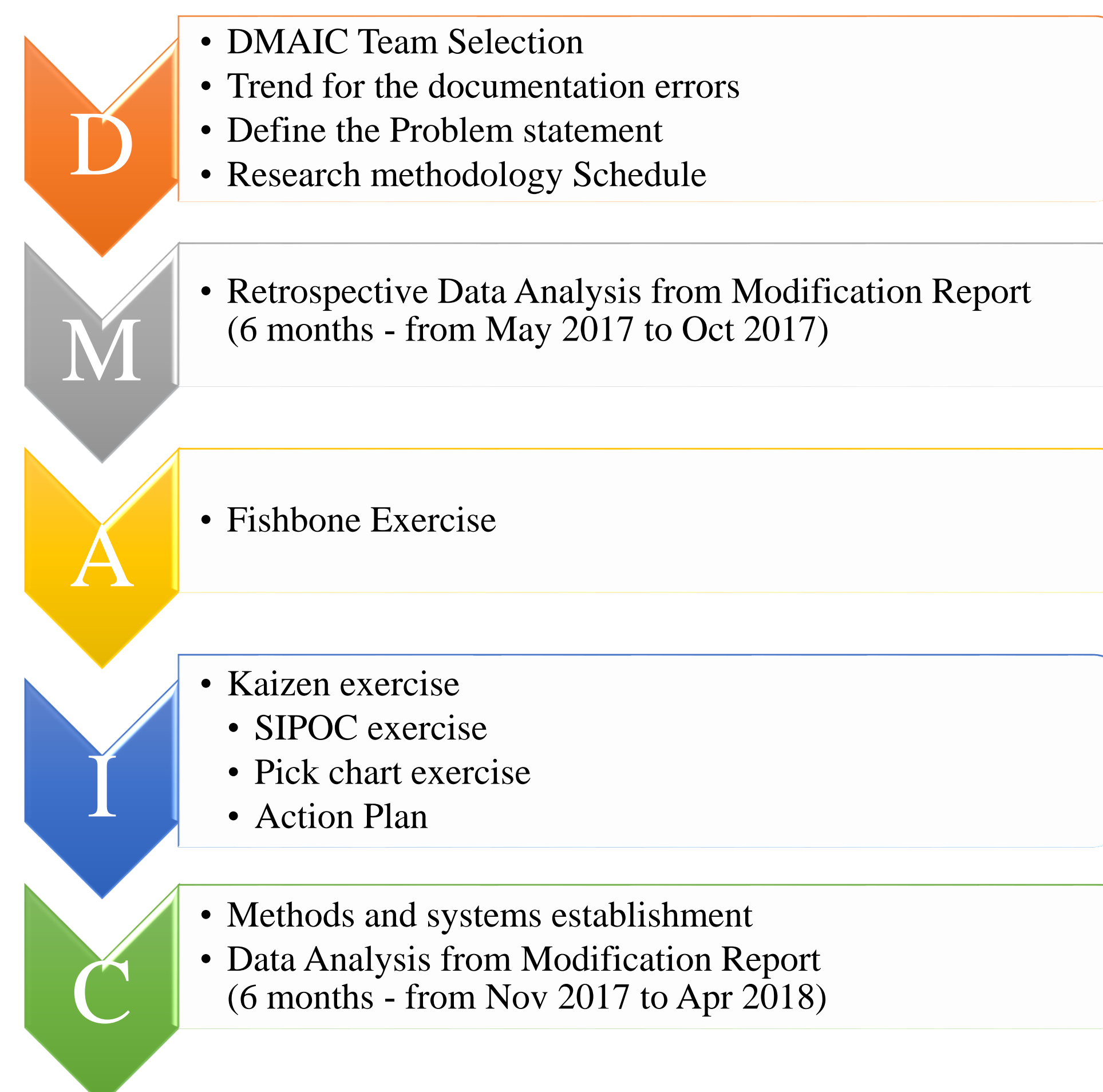
By using DMAIC methodology the team knows what comes next in the project since all steps are outlined [1]. The fishbone diagram is a visualization tool for categorizing the potential causes of a problem in order to identify its root causes.



By using Lean Six Sigma tools and methodologies this process can be improved by reducing the number of documentation errors in Lay-up, the number of quality errors reported in the Accuracy Report will be also reduced, and the OPH will continue to grow by avoiding redundancy steps. As a result, shrink will reduce and productivity of the building will increase.

Methodology

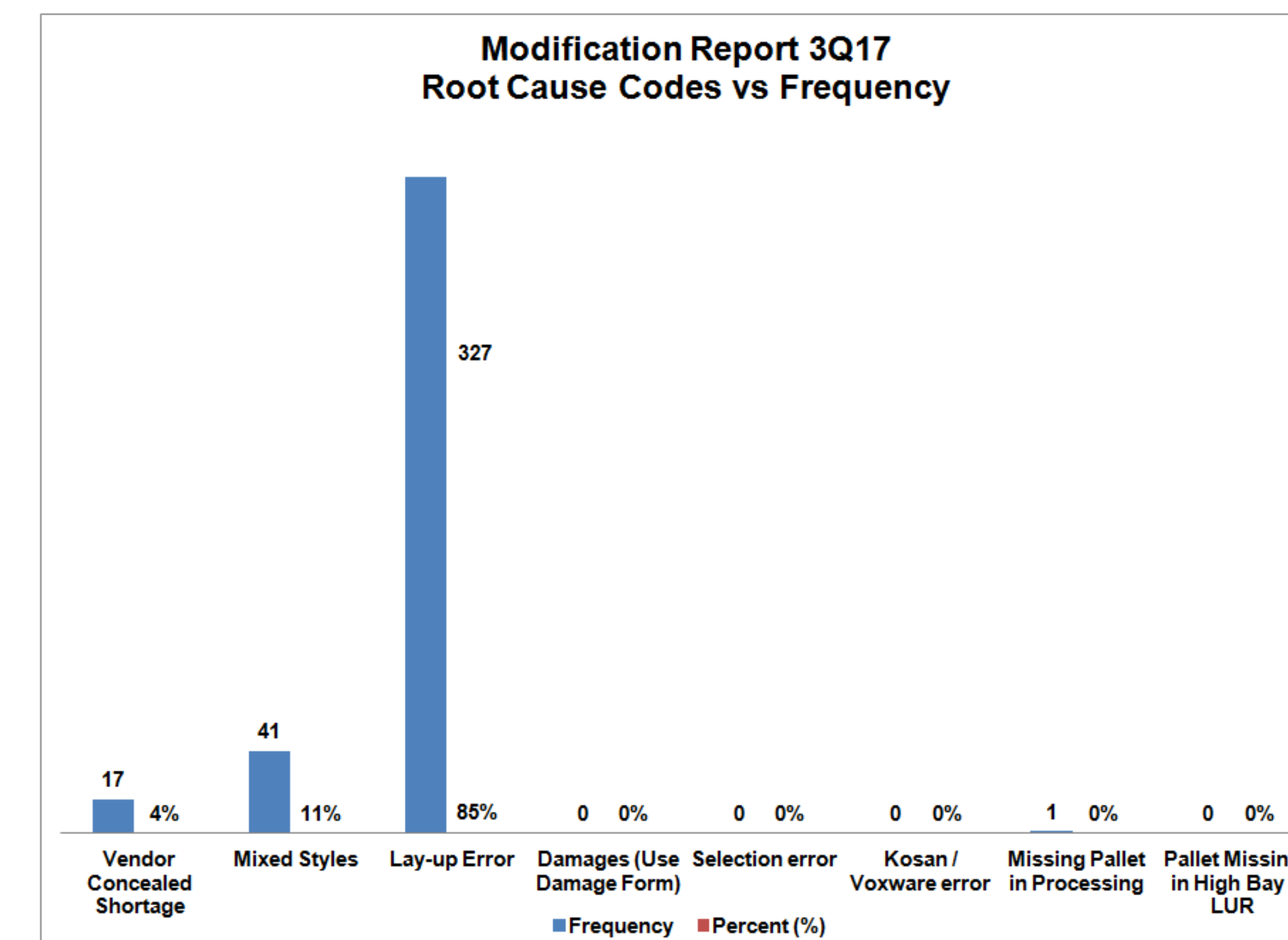
The DMAIC methodology was performed to accomplish the objectives of this project.



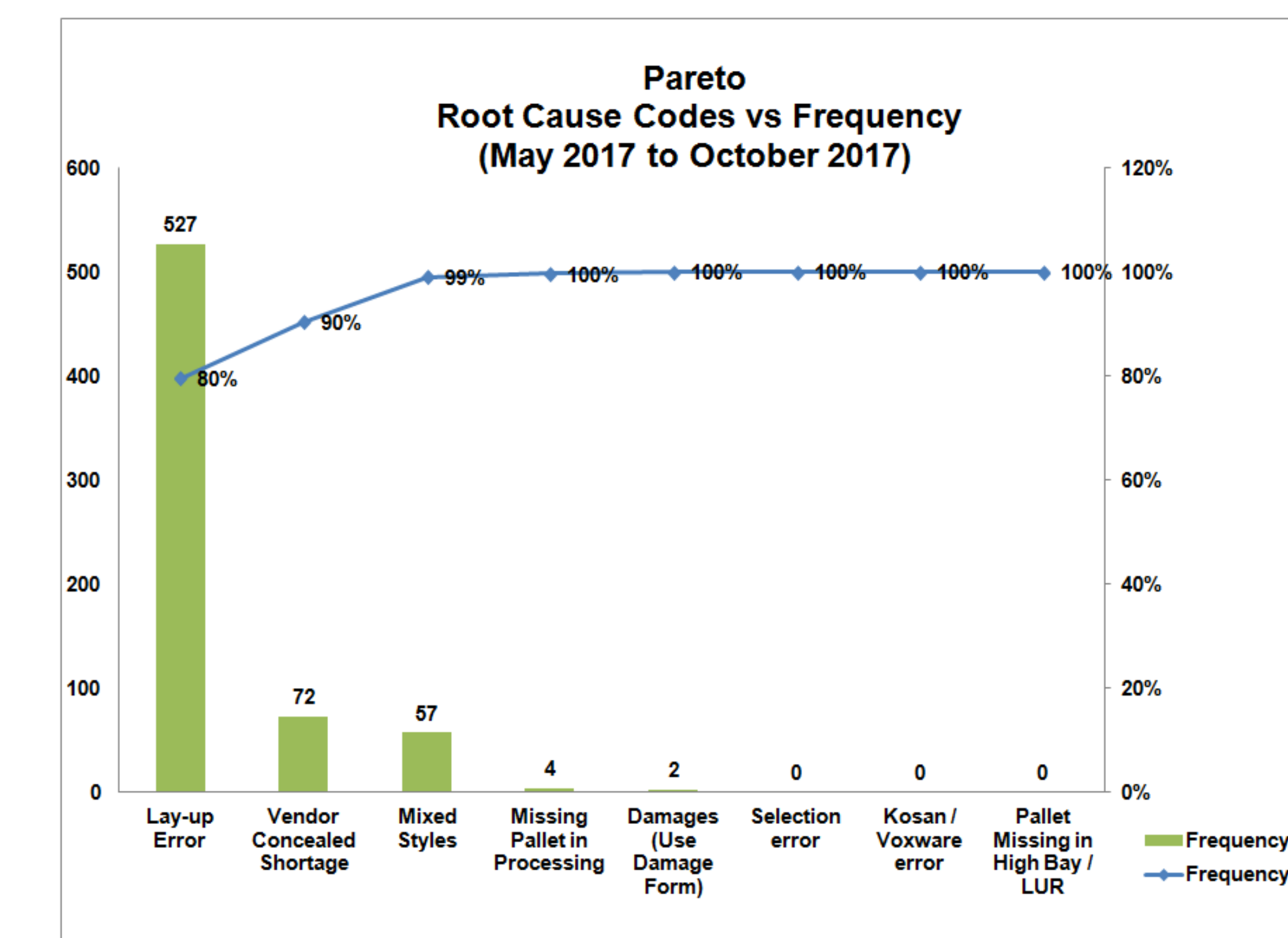
Results and Discussion

DMAIC methodology was applied. The team to support the project was selected and the goals were established for the improvement activity. In addition, the trend for the documentation errors and the problem statement was presented to the team.

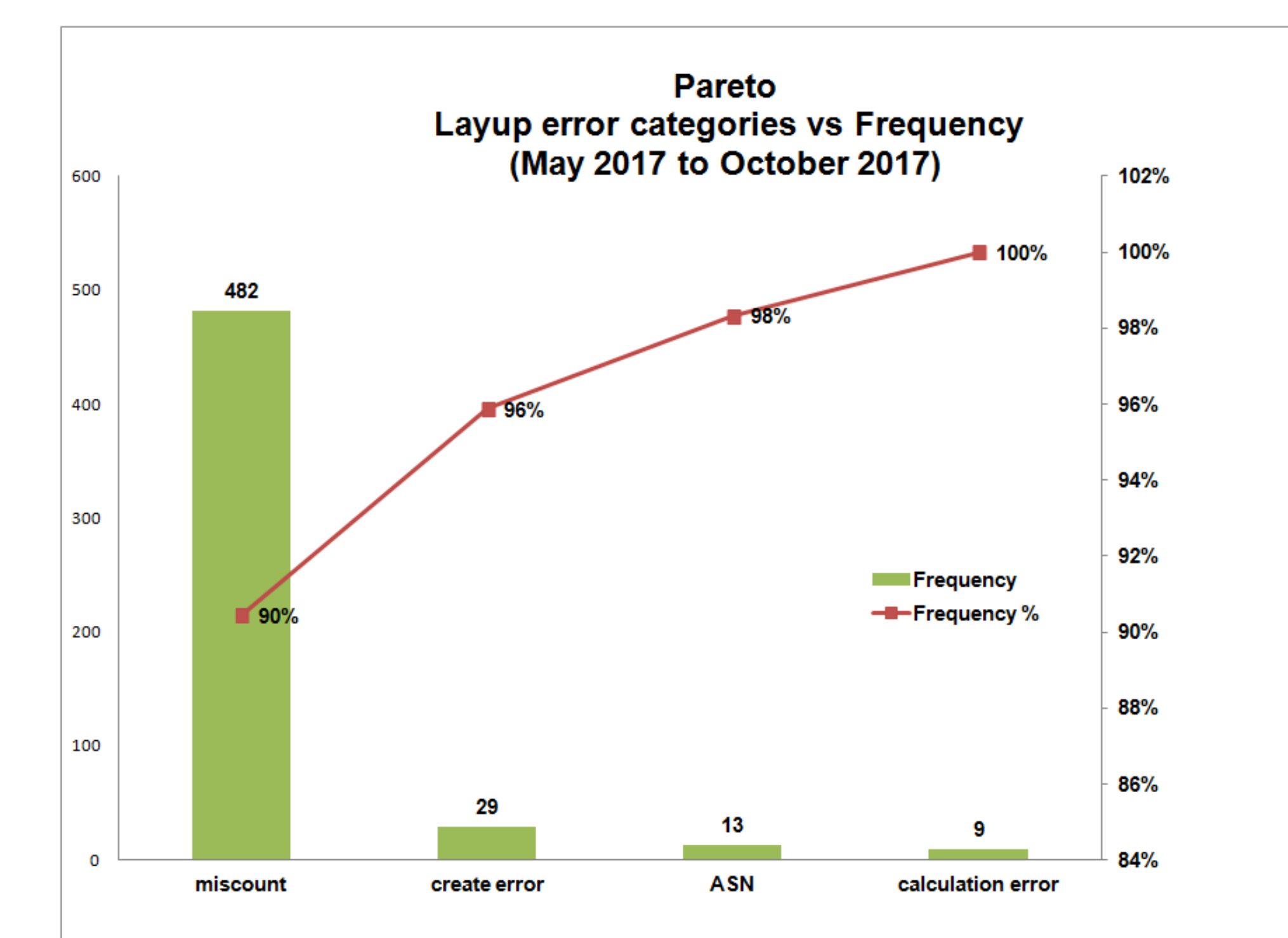
Results and Discussion (cont.)



The documentation errors (including Lay-up error and mixed styles categories) were 96% from August 2017 to October 2017. In addition, a Pareto chart was prepared and showed that Layup error category is 80% of the Modification Report root cause. For that reason, layup error category was targeted to be improve because has a lot opportunities.



Also, a Pareto chart was created to identify the contributors within the Layup error category and miscount was the biggest one with 90%.



Results and Discussion (cont.)

Then, a Cause-and-effect relationship (fishbone) was performed. The fishbone identified three potential root causes: No using calculator and attempting to calculate in their head or on paper; No performing all counts and; Doesn't know how to read DCPO so information is wrong on the DCPO. As a result, a Kaizen exercise was executed to identify potential solutions to improve the current process. During the Kaizen exercise a SIPOC diagram was created and Counts (units / cartons) in the Process for this project is the area to be improved.

KAIZEN – Lay-up Error Reduction

S	I	P	O	C
Vendors	Merchandise	Receivers unload cartons by style sort onto pallets	Merchandise to processing areas	Processing areas
Receivers	Associates	Enter carton count	Distro	Stores
Yard	Supplies (Calculator)	LU follows PO and go to 1 st pallet of Keytrol	Tickets	Associates
Supervisors	Methods	Perform multiple checks (Inspection)		Systems
Engineering Standards		Counts (units / cartons)		
		Document on DCPO (calculations)		
		Assigns Header suffix (locator & PO)		
		Slash & scan / link		
		Return PO to poles		
		Header is created & PO filed		



Solutions were evaluated and prioritized by using a Pick Chart exercise. As a result, an action Plan was established with the following potential solutions: Update method to mandate use the calculator; Create DCPO terms / Acronyms Job Aid; Refreshment of method; Lay-up Internal Audits / Blitz and; Accountability.

Conclusions

During this design project the documentation errors from the Layup process was studied for improvement. As a result, a reduction of 17% was reached for the documentation errors (including layup error and mixed styles categories), an increase of 24.70% for the Output per Hour (OPH), a reduction of 34.78% from shrink and an increase of 0.02% in the accuracy data.

Future Work

Five actions items were proposed for improvement following lean principles and are currently being worked by the selected team for future implementation with due date 3QY18.

References

[1] Thomas McCarty; Lorraine Daniels; Michael Bremer; Praveen Gupta: Six Sigma Black Belt Handbook (Six SIGMA Operational Methods). [Introduction to the DMAIC Process Improvement Methodology](#), Chapter (McGraw-Hill Professional, 2005), AccessEngineering
 [2] Greg Brue: Six Sigma for Managers, Second Edition. [Defining Quality and Measuring Performance](#), Chapter (McGraw-Hill Professional, 2015, 2002), AccessEngineering
 [3] Steve Borris: Strategic Lean Mapping: Blending Improvement Processes for the Perfect Solution. [Problem Solving and Decision Making](#), Chapter (McGraw-Hill Professional, 2012), AccessEngineering