CAREER EPISODE 1

Systems and Procedures Study on Prototype Production Department and Product Development Unit on DesMichels Corporation at Quezon City, Philippines

INTRODUCTION

(CE 1.1)

This career episode details the activities that I had for 6 months from November 2010 until April 2011, while I was an Industrial Engineering student at the University of the Philippines (the premier Government run state university in the Philippines). I led a team of four to conduct an improvement project on the prototype production department and product development unit of DesMichels Corporation in Quezon City. The study was undertaken to enhance the processes for one of the Philippines' leading manufacturer of silver jewelry.

BACKGROUND

(CE 1.2)

This project was completed as a requirement for our Systems and Procedures course at the University of the Philippines. The team consisting of four members conducted a process improvement study to enhance the current state of order processing time for DesMichels Corporation, as well as to improve the processing time involved in making prototypes.

(CE 1.3)

DesMichels has been experiencing two major process challenges in its manufacturing operations, namely: (1) reworking the ordered silver jewelry orders (at 15% of the total orders) and (2) having a long lead time for the prototype creation. Accordingly, the primary goal of the team's improvement study was to decrease the non-value adding activities being undertaken by the corporation by identifying unnecessary activities and converting it to more efficient process activities.

(CE 1.4)

In undertaking the improvement project, I suggested to the team to follow an adapted production systems methodology. This approach included: (1) Documenting the current state of the system, (2) Analyzing the current system, (3) Formulating improvement solutions, (4) Evaluating the developed solutions, (5) Implementing the solutions, and (6) Further enhancement and standardisation of the operations. In this project, the team under my leadership used different process improvement tools such as Detailed Activity Diagram, the Ishikawa Diagram and Cross Functional Flow charts to identify improvement opportunities.

(CE 1.5)

As the team leader for the study project, I was responsible in: (1) distributing tasks evenly to all team members; (2) coordinating with DesMichels personnel for company visit schedules; (3) documenting the company's systems and processes; (4) leading the team in problem analysis (5) guiding the team in solution formulation and evaluation of alternatives, (6) preparing the implementation plan and (7) presenting the study to DesMichels.

PERSONAL ENGINEERING ACTIVITY

(CE 1.6)

To fully understand the end to end process of the company, I suggested having a site tour of the manufacturing plant of the silver jewelry. Initial discussions with the DesMichels department heads were performed to clarify and ensure that the team is correctly identifying the root causes of the problems that they were experiencing. With the data gathered with the tour site and initial discussions, the team created an initial assessment of the current operational state. From this, I presented the analysis to the DesMichels senior management by defining the correct scope and limitation of the study, as well as its main targets and objectives. Upon agreement with the company, I then created a Gantt chart to identify and monitor the progress of the set improvement activities that must be completed.

(CE 1.7)

In the succeeding plant visits and interviews, all necessary information was gathered for the study. From the visits, the scopes identified to be included were: product design development, master and tool making and sample making. To balance the group activities, I proposed that one of the team members needed to cover one major process so we can gather data about current operating system, work environment, and process documents. In leading the team, I provided guidance to each of them, and aligned their activities with the set tasks included in the agreed Gantt chart.

(CE 1.8)

With the data gathered, I created a Detailed Activity Diagram (DAD) for each major process with the use of Microsoft Visio (see Figure 1 for a sample DAD). The Responsibility column contains the person or team who is responsible in performing the process. The Activity column details a step by step process flow which also indicated all documents that moved along the process. The Operation Description column discusses in details the process for each activity. The Observed Time column tells the duration for each activity. This tool helped the team to clearly understand the entire operations involved in the study.

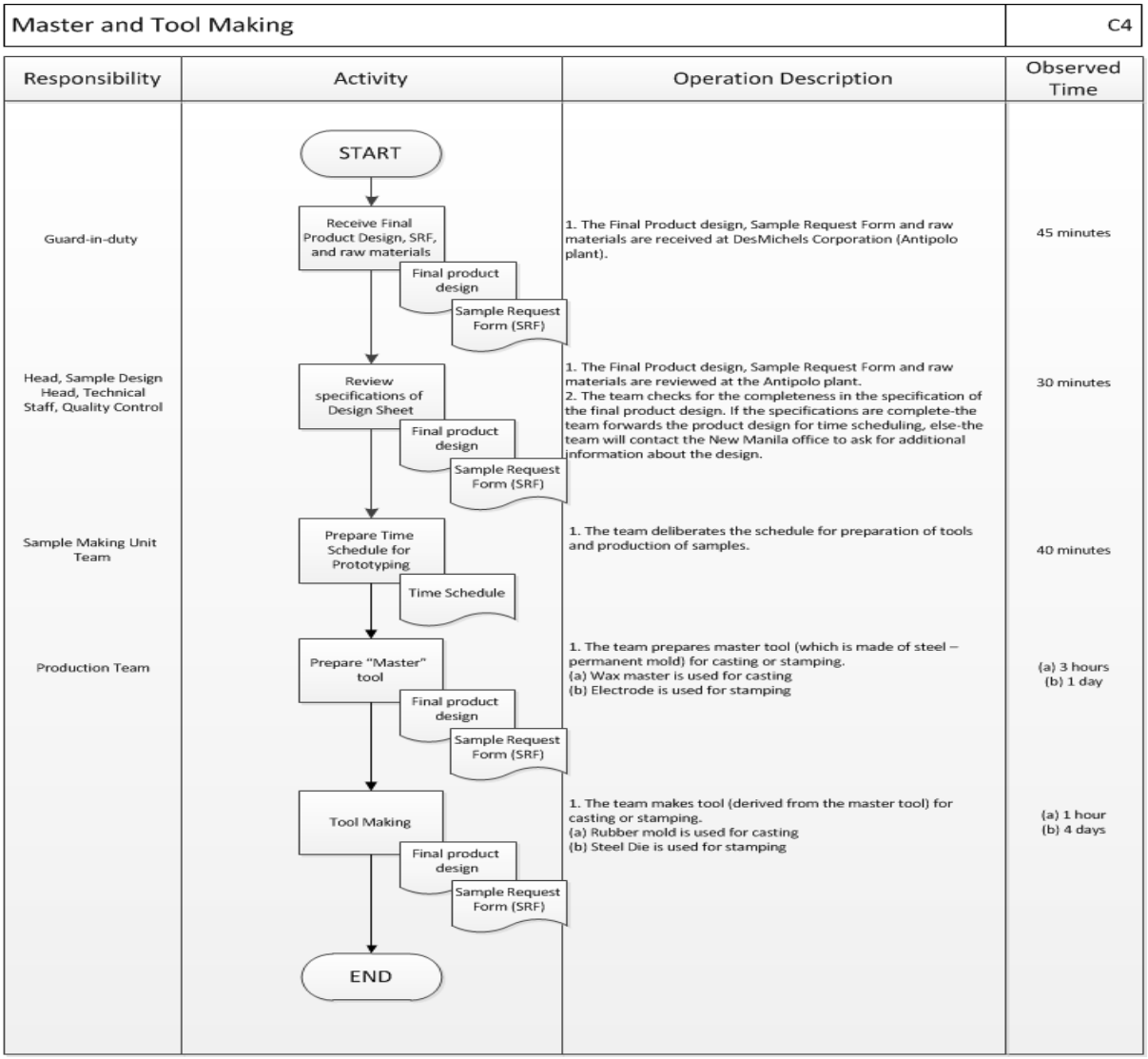

Figure 1. Detailed Activity Diagram for Master and Tool Making.

(CE 1.9)

After documenting the current system, the team conducted the analysis and identify problems being experienced – which are long processing time for prototype production and high reject rate for prototyping production. In analyzing the identified problem, I led the team in the creation of an Ishikawa diagram which revealed root causes such as: (1) Unclear Design Specifications and Form Inefficiencies and (2) Miscommunication.

(CE 1.10)

One of the team's challenges was identifying the correct root causes of the problems. Identifying the correct root cause of the problem is essential at this point since without this, the suggested solutions will be questionable. I consulted my academic professor to assist in this process. Based on our discussions, he suggested verifying our findings through a number of ways, including the creation of cross functional flow chart to notice the occurrence of the delays in prototyping. I created a Cross-Functional Flowchart for a noticeable occurrence of delayed prototype production brought about by

having an unclear design specification (see Figure 2 and Figure 3). This alone is the process where the design specification moves along the different functions across the company. Our findings showed that one of the root causes of the problem is that the Product Design Development was done at New Manila (a suburb in one of the cities within the National Capital Region (NCR) of the Philippines) and it is being delivered to Antipolo (a city within NCR, which is around 30 kilometres from New Manila) for Master, Tool Making Unit and Sample Making. Designs are manually drawn on paper and attached to Sample Request Forms (SRF). They are both delivered by a truck driver from New Manila to Antipolo together with the raw materials needed for manufacturing. DesMichels recognized their struggles because of the distance but advised us to not focus on this cause if we want realistic and practical solutions that they can implement easily.

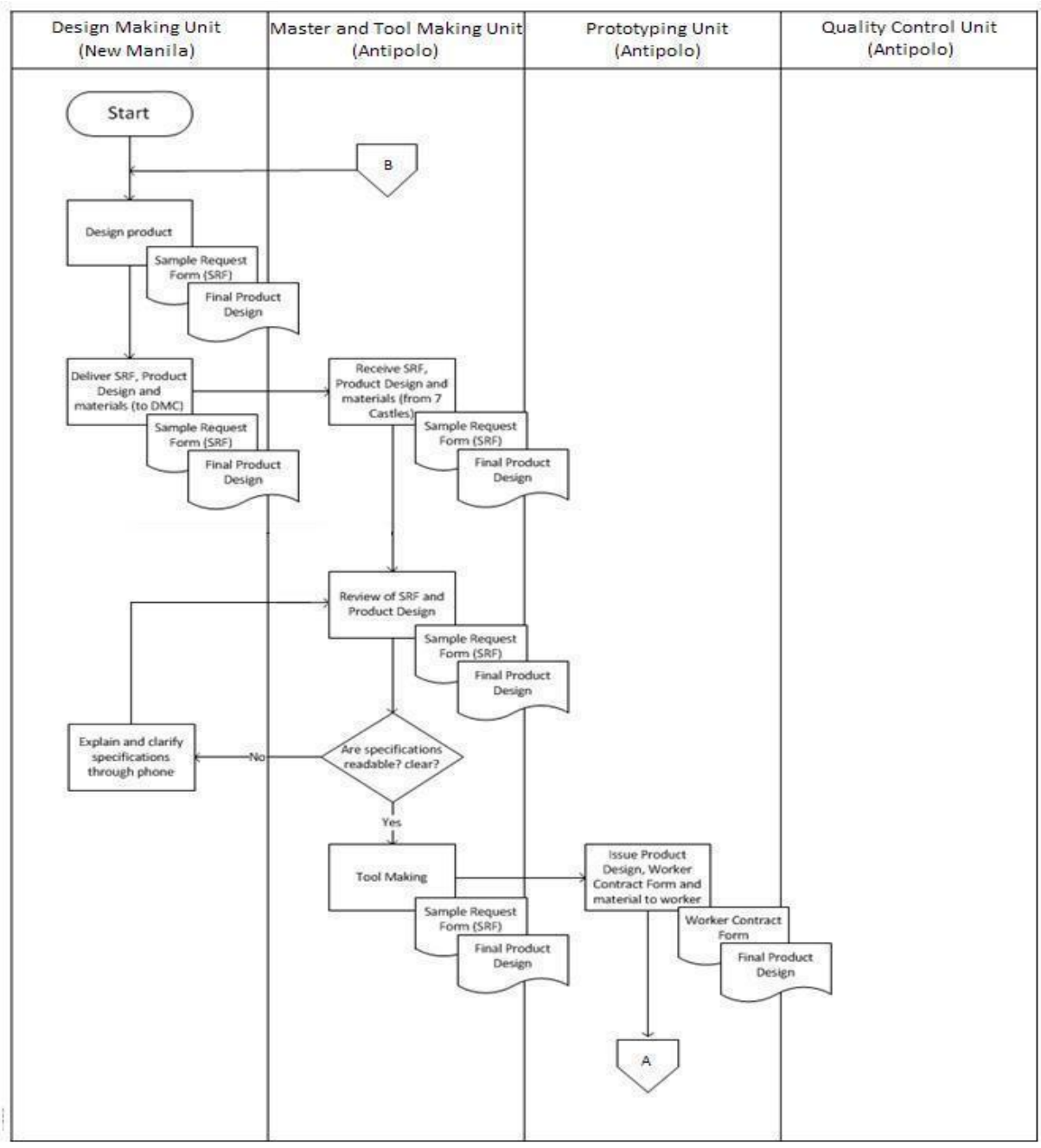

Figure 2. Cross Functional Flowchart for Design Specification.

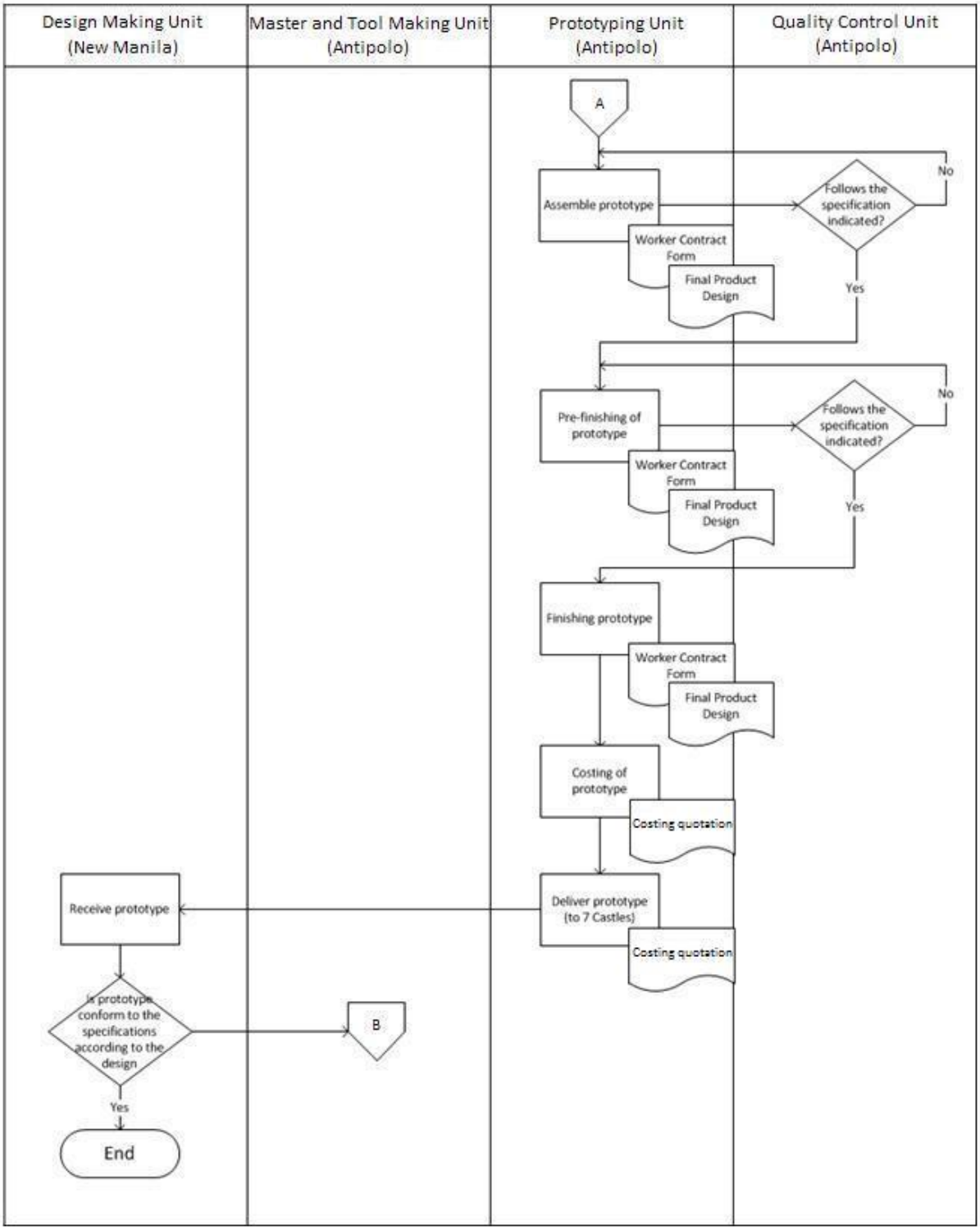

Figure 3. Cross Functional Flowchart for Design Specification.

(CE 1.11)

The Cross Functional Flowchart created was used to verify the two causes. The first cause of Unclear Design Specifications, revealed two true root causes, namely: (1) Inefficient Sample Requests Forms and (2) technical problems in disseminating SRF. SRF contains all relevant information about design specifications and they move until the very end of sample making process. Meanwhile, the problem

on SRF dissemination happened when a photocopying machine stopped working. Relevant to the second cause (i.e. Miscommunication), it revealed a deeper root cause: Distant Facility Location. The Product Design Development is done at New Manila while the Master, Tool Making Unit and Prototype Production are done at Antipolo City. The information exchange and inquiries are done manually through phone calls and not thru email nor use of any system. This is due to the fact that technology is not yet a big factor for DesMichels. The team agreed to my proposal to redesign SRF as I convinced them that this will have an impact on both causes of the problem.

		Unclear Design Specifications & Form Inefficiencies and Miscommunications		
		Alternative 1	**Alternative 2**	**Alternative 3**
		Train product designers to use AutoCAD	Purchase color photocopying machine	Purchase desktop computers
COSTS	**Primary Costs**	Php 225,000.00 + Php 10,000.00 + Php 5,000.00	Php 45,000.00	Php 70,000.00
	Maintenance Costs (monthly)		Php 1,500.00	Php 3,500.00
BENEFITS	**Money** (monthly)	Php260.00/order x 40 orders = **Php 10,400.00**	Php800.00/reject x 15 rejects = **Php 12,000.00**	Php800.00/reject x 15 rejects = **Php 12,000.00**
	Time (monthly) and conversion of saved time to saved employee wage	55min/order x 40 orders = 2200 min or **36.67 hours**	50.1 hours/reject x 15 rejects = 751.5 hours + 3.75 hours (15min/reject x 15 rejects) = **755.25 hours**	50.1 hours/reject x 15 rejects = 751.5 hours + 3.75 hours (15min/reject x 15 rejects) = **755.25 hours**
		36.67 hours x Php 43.125/hour = **Php 1581.39**	755.25 hours x Php 43.125/hour = **Php 32,570.16**	755.25 hours x Php 43.125/hour = **Php 32,570.16**
	TOTAL (yearly)	**(Php 10,400.00 + Php 1581.39) x 12 months = Php 143,776.68**	**(Php 12,000.00 + Php 32,570.16) x 12 months = Php 534, 841. 92**	**(Php 12,000.00 + Php 32,570.16) x 12 months = Php 534, 841. 92**

Table 1. Costs and Benefit Analysis.

(CE 1.12)

Solution formulation began as the team came up with a list of alternatives to be done in order to address the problems. These were as follows: (1) Train product designers to use AutoCAD software; (2) Purchase color photocopying machine; (3) Purchase desktop computers. To evaluate them, I suggested to the team to use Cost and Benefit Analysis for each alternative. Costs are composed of primary and maintenance costs while Benefit consist of money and time. I manage to convert time benefit thru conversion of saved processing time based on the average salary of a Filipino worker in Antipolo; thus the measure is in monetary value of Philippine Pesos (see Table 1).

	Unclear Design Specifications & Form Inefficiencies and Miscommunications		
	Alternative 1	**Alternative 2**	**Alternative 3**
	Train product designers to use AutoCAD	Purchase color photocopying machine	Purchase desktop computers
Initial Investment	Php 240,000.00	Php 45,000.00	Php 70,000.00
Annual Expenses (cash outflows)		Php 18,000.00	Php 42,000.00
Annual Revenues (cash inflows)	Php 143,776.68	Php 534, 841. 92	Php 534, 841. 92
Annual Cash Flow (Annual Revenues – Annual Expenses)	Php 143,776.68	Php 516,841.92	Php 492,841.92
Payback Period (Initial Investment / Annual Cash Flow)	**1.67 yrs**	**0.09 yr**	**0.14 yr**

Table 2. Payback Period Computation.

(CE 1.13)

I also suggested using Payback period (see Table 2) to justify the investments corresponding to each proposed alternative. The measure is in years. Both technical measures suggested that purchasing a color photocopying machine and desktop computers have a positive impact to the issue at hand. These two alternatives together with redesigning the SRF made up the three solutions formed along the course of the improvement project.

(CE 1.14)

The team suggested techniques on how to manage change on DesMichels manufacturing processes if the proposed solutions got implemented. I compiled the defined implementation plans created by the team. These plans have incremental steps as these are needed for the proposed improvements to have a significant effect on DesMichels. The plan consists of process stage, designation, nominating a person responsible and time frame. The team proposed that a week of observation and trial run would be enough time for the implementation of the plans.

SUMMARY:

(CE 1.15)

The process improvement study had some minor revisions so as to account some recommendations from our course instructor but it was completed on-time. The project garnered one of the highest grades on the course that time which is evidence that we had done a great systems and procedure project study. I, together with the team discussed the study with DesMichels management presenting them the solutions that would help them save an estimated 755.25 hours per 100 pcs order. This corresponds to a savings of 11.98% of the operation time wherein they were greatly satisfied of it even emphasizing that goal and expectations of both sides were all met.

(CE 1.16)

My significant contributions in creating process flowcharts, critical thinking in problem analysis and practical solution formulation, added by my strategic innovations and team management skills all factored in for the success of the process improvement study for DesMichels Corporation.