


**KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA**
**BORANG PENGESAHAN STATUS TESIS\***

JUDUL: MANAGEMENT AND IMPROVEMENT OF CAD/CAM SYSTEM - STEELCASE  
ARTWRIGHT MANUFACTURING SDN BHD

SESI PENGAJIAN : 2001/2005

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**NATIONAL TECHNICAL UNIVERSITY COLLEGE OF  
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**Management and Improvement of  
CAD/CAM System – Steelcase  
Artwright Manufacturing Sdn Bhd**

Thesis submitted in accordance with the requirements of the  
National Technical University College of Malaysia for the Degree of  
Bachelor of Engineering (Honours) Manufacturing (Process)

By

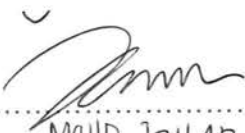
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## DECLARATION

I hereby, declare this thesis entitled “Management and Improvement of CAD/CAM System – Steelcase Artwright Manufacturing Sdn.Bhd” is the results of my own research except as cited in the reference.

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MANAGEMENT AND IMPROVEMENT OF CAD/CAM  
SYSTEM – STEELCASE ARTWRIGHT  
MANUFACTURING SDN BHD

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## **APPROVAL**

This thesis submitted to the senate of KUTKM and has been accepted as fulfillment of the requirement for the degree of Bachelor of Engineering (Honours) Manufacturing (Process). The members of the supervisory committee are as follows:

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## **ABSTRACT**

The term CAD/CAM implies that an engineer can use the system both for designing a product and for controlling manufacturing processes. This thesis develops the management and improvement of CAD/CAM system at Steelcase Artwright Manufacturing Sdn Bhd to maximize material (sheet metal) utilization. AP100 software was used to improve the CAD/CAM system in this company. Besides that, two types of CNC punching machine were involved to produce very large numbers of identical parts from sheet metal. Due to the high volumes of parts produced, even small inefficiencies in material utilization per part can lead to very large amounts of wasted material over a good management of CAD/CAM system. This system hardware and software must be in working order and available and all other resources must be in place. The system should be backed up frequently to prevent unnecessary loss of working data. Furthermore, less knowledge and do not have standards system from workers, staff and engineer was one of the weaknesses in production management. To achieve maximum benefits from the use of CAD/CAM, the system that has been improved in this thesis should be in productive use as much as possible. This requires good planning and organization. The real situation of this thesis had been implemented at Steelcase Artwright Manufacturing Sdn Bhd for finding a best way to improve their quality system of CAM/CAM management.

## ABSTRAK

Istilah CAD/CAM menerangkan bahawa seseorang jurutera boleh mengawal kedua-dua sistem untuk merekabentuk dan mengawal sesuatu proses pembuatan. Tesis ini berkenaan membangunkan dan membaiki terhadap pengurusan sistem CAD/CAM di kilang Steelcase Artwright Manufacturing Sdn Bhd. Pembangunan ini bertujuan untuk meminimumkan penggunaan bahan mentah daripada kepingan logam. Dalam pembangunan ini perisian AP100 telah dipilih bagi meningkatkan sistem CAD/CAM yang sedia ada di kilang ini. Perkaitan diantara dua buah mesin penembusan CNC dengan sistem ini juga telah dikaji. Kedua-dua mesin CNC ini digunakan untuk menghasilkan komponen-komponen kecil bagi sesuatu produk kepingan logam dalam suatu kuantiti yang banyak. Oleh itu, selaras dengan penghasilan produk dalam kuantiti yang banyak, tahap pengurusan dalam sistem CAD/CAM amatlah dititik beratkan. Hal ini kerana, sedikit sebanyak pengabaian terhadap tahap pengurusan bagi sistem ini terutama masalah pembaziran penggunaan kepingan logam boleh mendatangkan kerugian dari segi kos bahan kepada syarikat. Kaedah yang digunakan lebih kepada pembangunan pengetahuan dan piawaian CAD/CAM yang sistematik terhadap pengurusan dari segi pekerja, kakitangan, dan jurutera. Bagi mencapai matlamat ini, pembaikan yang maksimum terhadap sistem CAD/CAM di kilang ini telah dilaksanakan dengan teliti mengikut kaedah memaksimumkan penggunaan perisian AP100 dan kaedah pembaikan pada CNC mesin. Pembaikan ini telah meletakkan satu piawaian kerja yang bagu bagi pengurusan CAD/CAM di kilang ini. Keputusan pembaikan ini telah diperlihatkan melalui graf peningkatan keuntungan dari segi kos bahan yang mana ia telah dijalankan di kilang Steelcase Artwright Manufacturing Sdn Bhd.



## **DEDICATION**

*To my beloved parent, family and friends*

## ACKNOWLEDGEMENTS

In the name of Allah SWT, I thank Him, as for His bless, I was able to finish this Projek Sarjana Muda report.

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# TABLE OF CONTENTS

Abstract.....	i
Dedication .....	iii
Acknowledgement .....	iv
Table of Contents .....	v
List of Figures .....	viii
List of Tables .....	x
Sign and Symbols .....	xi
List of Appendices .....	xii
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Objectives of the Research.....	2
1.3 Scope of the Research .....	2
1.4 Problem Statements.....	3
1.4.1 Performance of Material Usage for CNC Punching Machine Process.....	4
1.4.2 Utilization of AP100 Software in Controlling CAD/CAM Process for Punching Machine (model PEGA 357 and ARIES 245).....	4
1.4.3 Profit and Quality of CAD/CAM.....	5
1.5 Work Plan .....	6
<b>2. LITERATURES REVIEW.....</b>	<b>8</b>
2.1 Introduction to Thesis Literature Review .....	8
2.2 Actual CAD/CAM and CNC Management System.....	8
2.2.1 Component of CAD/CAM System in the Industry.....	9
2.2.2 Specification Information of CNC Punching Machine.....	11
2.2.3 Current Situation Information .....	12
2.2.4 Turret Press Information.....	12
2.2.5 Machine Specification.....	13

2.2.6 Computer Control.....	15
2.2.7 Process Flow for CAD/CAM Management System.....	16
2.2.8 Monthly Material Waste Data.....	17
2.2.9 Material of Sheet Metal.....	17
2.3 Theory Research.....	20
2.3.1 Definition of CNC.....	20
2.3.2 Definition of CAD/CAM.....	22
2.3.3 Ongoing CAD/CAM/CAE Management.....	23
2.3.4 Material Waste and Scrap Reduction.....	25
2.3.5 Software Installation.....	26
2.3.6 Integrated Network.....	30
2.3.7 Quantitative Analysis for Management.....	31
<b>3. METHODOLOGY.....</b>	<b>32</b>
3.1 Introduction to Methodology.....	32
3.2 Method to Data Analysis.....	32
3.3 Improvement Management of CAD/CAM.....	35
3.3.1 Method to Maximize Utilization of AP100 Software.....	35
3.3.2 Method to Controlled Performance of CNC Punching Machine (AMADA PEGA 357 and ARIES 245).....	38
3.4 Approximately Cost Material Waste Calculation.....	40
<b>4. ANALYSIS AND RESULT.....</b>	<b>41</b>
4.1 Introduction to Analysis and Result.....	41
4.2 Result of Material Waste Quantity at Zone 7.....	41
4.2.1 Result of Material Waste Quantity before Improvement.....	42
4.2.2 Result of Material Waste Quantity after Improvement.....	43
4.3 Result of the Profit for Material Usage at Zone 7.....	44
4.3.1 Result of the profit for Material Usage Before Improvement.....	45
4.3.2 Result of the profit for Material Usage After Improvement.....	46

## LIST OF FIGURES

1.1	Flow Chart of Thesis Convolution Scope	3
1.2	Flow Diagram of Work Plan	7
2.1	Component of CAD/CAM system for sheet metal zone (Zone 7) at Steelcase Artwright Manufacturing Sdn.Bhd,2004.	10
2.2a	Model AMADA PEGA 357 CNC Machine at Steelcase Artwright, Puchong.	11
2.2b	Model AMADA ARIES 245 CNC Machine at Steelcase Artwright, Puchong	11
2.3	Flow Chart of CAD/CAM Management at S.A.M,2004	16
2.4	Flow Chart from Amada Integrated Network System. Source; AMADA (MALAYSIA) SDN BHD, Temasya Industrial Park, Section U1, Gleanmarie, Shah Alam,Selangor	30
2.5	The process flow of quantitative analysis for management in industry	31
3.1	The process flow of quantitative analysis for management of material wasted	33
3.2	Method to Maximize Utilization of AP100 Software	37
3.3	Method to Controlled Performance of CNC Punching Machine (AMADA PEGA 357 and ARIES 245)	39
4.1	Graph of Material Waste Quantity Before Improvement Since January till April 2005 at Zone 7 (Steelcase Artwright Manufacturing Sdn Bhd)	42
4.2	Graph of Material Waste Quantity After Improvement since Jun till August 2005 at Zone 7 (SAM)	43

4.3	Result of the Graph for Material Wasted Cost in January,2005 till April,2005 Before Implement the Standard CAD/CAM System at Steelcase Artwright Manufacturing Sdn Bhd	45
4.4	Result of the Graph for Material Wasted Cost in Jun,2005 till August,2005 After Implement the Standard CAD/CAM System at Steelcase Artwright Manufacturing Sdn Bhd	47
5.1	Comparison Graph for Cost of Sheet Metal Waste Before Implement the Standard CAD/CAM System and After Improvement Steelcase Artwright Manufacturing Sdn Bhd.	51
5.2	Comparison Graph for Quantity of Sheet Metal Waste Before Implement the Standard CAD/CAM System and After Improvement Steelcase Artwright Manufacturing Sdn Bhd	52

## LIST OF TABLES

1.1	Work plan chart	6
2.1	Shows the differentiation of between AMADA PEGA 357 with AMADA ARIES 245 on their specification, basic equipment and programming mode link at Steelcase Artwright Manufacturing Sdn Bhd.	14
2.2	The Material Information List for Sheet Metal at Steelcase Artwright Manufacturing Sdn Bhd	18
2.3	The table shows current price of sheet metal material for year 2005 at Steelcase Artwright Manufacturing Sdn Bhd	19
4.1	Cost with quantity of sheet metal waste since January 2005 till April 2005	44
4.2	Cost with quantity of sheet metal waste since Jun 2005 till August 2005	46
4.3	Analysis and target Data of Improvement for AP100 Software Performance	48
4.4	Result of Improvement for AP100 Software Performance	49
5.1	Comparison of actual system before improvement and after improvement at Steelcase Artwright manufacturing Sdn Bhd	54

## SIGN AND SIMBOLS

3D	-	Three dimension
2D	-	Two dimension
DWG	-	Drawing
CAD	-	Computer Numerical Control
CAM	-	Computer Added Manufacturing
RM	-	Malaysian Ringgit
IT	-	Information Technology
SAM	-	Steelcase Artwright Manufacturing Sdn Bhd
SME	-	Small Medium Enterprise



## LIST OF APPENDICES

1	Gantt Chart	APPENDIX A
Data 1(a)	Table of Material Quality Issue from PIC for Month of January 2005, Steelcase Artwright Manufacturing Sdn Bhd	APPENDIX B
Data1(b)	Table of Material Quality Issue from PIC for Month of Febuary 2005, Steelcase Artwright Manufacturing Sdn Bhd	APPENDIX B
Data 1(c)	Material Quality Issue from PIC for month of March 2005, Steelcase Artwright Manufacturing Sdn Bhd	APPENDIX B
Data 1(d)	Material Quality Issue from PIC for month of April 2005, Steelcase Artwright Manufacturing Sdn Bhd	APPENDIX B
Data 2(a)	Table Quantity of Reject Part with Different Type of Material since January 2005 till April 2005.	APPENDIX B
Data 2(b)	Table Quantity of Reject Part with Different Type of Material since Jun 2005 till August,2005.	APPENDIX B
1	Handbook For Working 2D Drawing and Program Simulation	APPENDIX C
2	Handbook For Problem and Solution Of CAD/CAM System At S.A.M	APPENDIX C

Example 1	Operations Instructions Before Improvement For Part V2QTB U SHAPE BRAC	APPENDIX D
Example 2	Operations Instructions Before Improvement For Part V2 QTB I CONNECTOR BRACKET	APPENDIX D
Example 3	Operations Instructions Before Improvement For Part V2 WC1 PIECE2..	APPENDIX D
Example 4	Operations Instructions After Improvement For Part V2PMSQ 060090	APPENDIX D
Example 5	Operations Instructions After Improvement For Part V2QTB-L BRACKET	APPENDIX D
Example 6	Operations Instructions After Improvement For Part V2QTB U COVER.	APPENDIX D

# CHAPTER I

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

The study was conducted in Steelcase Artwright Manufacturing (M) Sdn. Bhd. It is focused on the plant layout for Zones 07, CAD/CAM system and CNC machines in the factory. This manufacturing plant was established and located at Puchong, Selangor. Steelcase Artwright is internationally recognized as a leading office interiors company. The brand name is known for design, innovation and a range of products named System MX workstations, that provides a fully integrated and highly flexible office interiors solutions developed from the ground-up.

Company name	: Steelcase Artwright Manufacturing Sdn Bhd,
Address	: No.17, Jalan Puchong 22KM, 47100 Puchong, Selangor.
Product	: Office Furniture (System MX workstations)
Working Hours	: Normal shift – From 8.00am to 5.00pm Others shift ; 1) 8.00am – 6.00pm 2) 6.00pm – 7.00 am
Number of Staff	: 300 persons.

## **1.2 Objective of the Research**

All of the objective are refer to the Steelcase Artwright Manufacturing Sdn Bhd, Puchong, Selangor. It is include ;

- i) To improve quality of CAD/CAM management system in industry.
- ii) To optimize material usage for sheet metal and increase company profit.
- iii) To maximize utilization of AP100 software in controlling CAD/CAM process for punching machine (model PEGA 357 and ARIES 245).

## **1.3 Scope of the Research**

Scope for the thesis is refer to Zone 07 (sheet metal zone) at Steelcase Arwright Manufacturing Sdn Bhd. The research and analysis focus on improvement CAD/CAM system management and process of controlling two type of CNC punching machine model. There models are;

- i) AMADA PEGA 357 Punching Machine and,
- ii) AMADA ARIES 245 Punching Machine.

This two type of CNC punching machine are operating 24 hours per day. It is produce many part for sheet metal product. The research also focus on their improvement utilization of AP100 software in controlling this two types of CNC machine. So that, the overall scope must related to the CNC punching machine and the AP100 software at Steelcase Artwright Manufacturing Sdn Bhd.

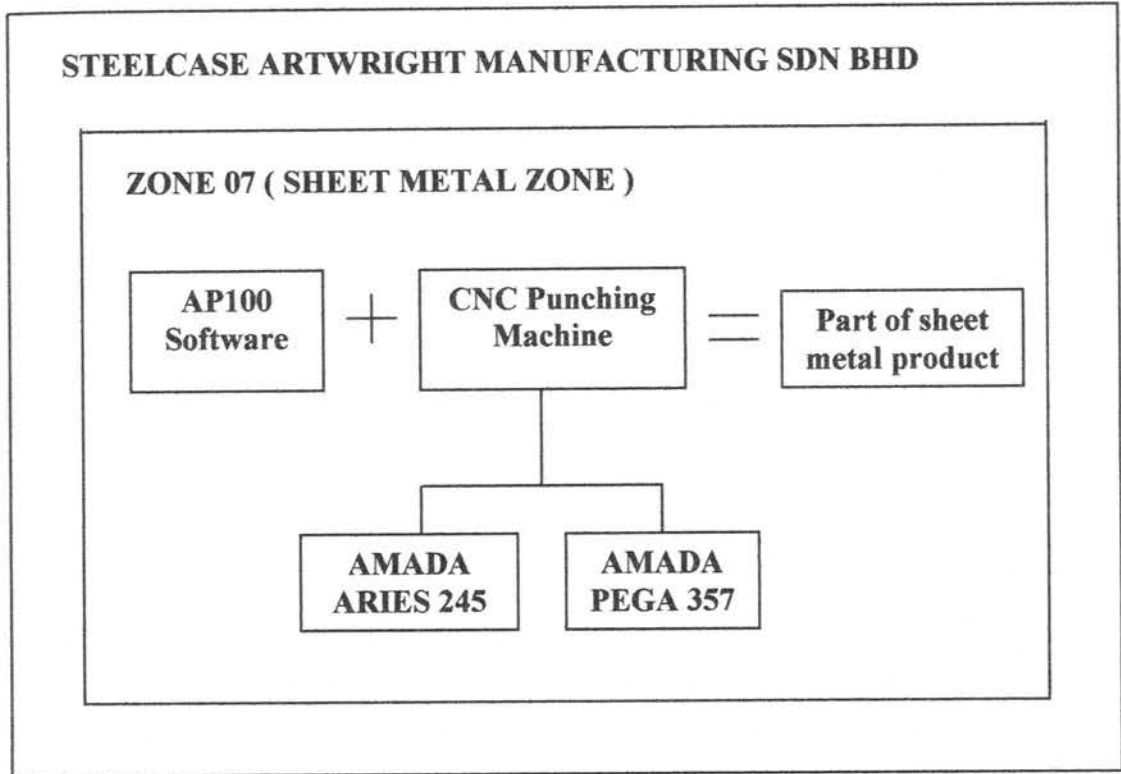


Figure 1.1: Flow Chart of Thesis Convolution Scope.

#### 1.4 Problem Statement

Often processes involve the application of raw materials to a minimum specification (e.g. filling or coating processes). In many cases the manufacturing specifications are set to ensure customer conformance but if the process could be controlled better, the process set point could be set lower and still meet the minimum requirement. A saving of only 1% of material cost can add up if the material is a significant one.

There are several problems occurred in this thesis that needed to be solved. Problem statement in this thesis include ;

- i) Performance of material usage for CNC punching machine process
- ii) Utilization of AP100 software in controlling CAD/CAM process for punching machine (model PEGA 357 and ARIES 245)
- iii) Profit and Quality of CAD/CAM

#### **1.4.1 Performance of Material Usage for CNC Punching Machine Process**

There are many problem associated in material waste of manufacturing plant at zone 7, Steelcase Artwright Manufacturing Sdn Bhd. Two type of CNC punching machine was be identified as a major problem in given negative impact of material usage in the factory. There are many scrap, and reject part had happen from the punching process and also low performance of CAD/CAM management system in the factory.

#### **1.4.2 Utilization of AP100 Software in Controlling CAD/CAM Process for Punching Machine (Model PEGA 357 and ARIES 245)**

To achieve maximum benefits from the use of CAD/CAM, the system should be in productive use as much as possible. System hardware and software must be in working order and available and all other resources must be in place. The system should be backed up frequently to prevent unnecessary loss of **working data**. Less knowledge and do not have standards system from workers, staff and engineer was one of the weakness in production management. The problems of minimum utilization in AP100 software should be the worst thing for achieving high productivity in fabrications industries. This problem must be counter for improve their productivity.

### **1.4.3 Profit and Quality of CAD/CAM**

The problem statement included on this matter are ;

- i) Low quality of CAD/CAM management at SAM.
- ii) The cost for material waste of sheet metal is too high.

a) Low quality of CAD/CAM management at SAM

There is no research or detail development done to control the quality rate of CAD/CAM management at SAM. In this situation bring the negative effect to the company profit by produce many rework and reject part. This problem are the most important thing to improve now.

b) The cost for material waste of sheet metal is too high.

Waste and scrap reduction are probably in the top three critical issues affecting global industries competitiveness. The recent push to emphasize total quality management and re-engineering certainly highlight its importance. But, even before these holistic assessments, there are many obvious areas where process-by-process waste reduction and minimization are cost-effective. As with other cost control issues, proper measurement and reporting is the critical first step.