



**A CODING SCHEME BASED GENERATIVE CAPP
SYSTEM FOR PRISMATIC COMPONENTS USING
EXPERT SYSTEM METHODOLOGY**

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Table of Contents

	Page
LIST OF FIGURES.....	3
LIST OF TABLES.....	4
ABSTRACT.....	6
STATEMENT.....	7
ACKNOWLEDGEMENTS.....	8
CHAPTER 1. INTRODUCTION	9
1.1 CAD/CAM and CIM.....	9
1.2 THE COMPUTER AIDED PROCESS PLANNING(CAPP).....	10
1.2.1 The Variant CAPP.....	11
1.2.2 The Generative CAPP.....	11
1.3 AIMS OF THE RESEARCH WORK.....	13
CHAPTER 2. LITERATURE REVIEW	15
2.1 GT CLASSIFICATION AND CODING SCHEMES.....	15
2.1.1 The Opitz Classification and Coding Scheme.....	15
2.1.2 The KK-3 Classification and Coding Scheme.....	19
2.1.3 The MICLASS Classification and Coding Scheme.....	19
2.1.4 The DCLASS Classification and Coding Scheme.....	20
2.2 VARIANT CAPP SYSTEMS.....	21
2.3 GENERATIVE CAPP SYSTEMS.....	22
2.3.1 Component Design Representation.....	22
2.3.1.1 GT Coding Scheme in Generative CAPP Systems.....	23
2.3.1.2 Special Descriptive Language.....	23
2.3.1.3 CAD Models.....	25
2.3.2 Process Knowledge Representation.....	26
CHAPTER 3. THE NEW CLASSIFICATION AND CODING SCHEME.....	30
3.1 STRUCTURE OF THE NEW CODING SCHEME.....	30
3.2 THE PROPOSED NEW CODING SCHEME.....	34
3.2.1 Level One of the Coding Scheme.....	34
3.2.2 Level Two and Level Three of the Coding Scheme.....	34
3.3 TWO TYPICAL EXAMPLES OF THE NEW CODING SCHEME.....	41
3.3.1 A Cubic Prismatic Component Example.....	41
3.3.2 A Flat Prismatic Component Example.....	45

CHAPTER 4. THE CODING SCHEME BASED GENERATIVE CAPP EXPERT SYSTEM(CSBGCAPPES).....	48
4.1 OVERVIEW OF THE CSB-GCAPPES.....	48
4.2 KNOWLEDGE REPRESENTATION OF THE CSB-GCAPPES.....	49
4.3 THE INFERENCE ENGINE OF THE CSB-GCAPPES.....	51
CHAPTER 5. The CSB-GCAPPES PROTOTYPE	53
5.1 THE AUTOMATIC CODING MODULE	53
5.2 BLANK SELECTION MODULE	57
5.3 THE PROCESS SELECTION MODULE.....	59
5.4 THE TOOL SELECTION MODULE.....	62
5.5 MACHINE SELECTION MODULE.....	65
5.6 CUTTING CONDITIONS SELECTION MODULE.....	65
5.7 SEQUENCING OF PROCESS MODULE.....	68
5.8 THE PLAN DOCUMENTATION MODULE.....	69
CHAPTER 6. RESULTS.....	72
6.1 THE NEW CLASSIFICATION AND CODING SCHEME.....	72
6.2 THE PROCESS PLANNING EXPERT SYSTEM.....	72
CHAPTER 7. CONCLUSION.....	74
CHAPTER 8. FUTURE WORK.....	75
8.1 EXPANDING THE GENERATIVE CAPP EXPERT SYSTEM	75
8.2 INTEGRATING THE GENERATIVE CAPP EXPERT SYSTEM WITH CAD SYSTEMS	75
REFERENCES.....	76
APPENDIX : PART PROGRAM OF THE CSB-GCAPPES.....	81

List of Figures

	Page
Figure 3.1	The New Coding Scheme Structure.....32
Figure 3.2	The Three Levels of the New Coding Scheme.....33
Figure 3.3	A Cubic Prismatic Component44
Figure 3.4	A Flat Prismatic Component.....47
Figure 4.1	The CSB-GCAPPES.....49
Figure 5.1	Interface Windows.....54

List of Tables

	Page
Table 1.1	Summary of CAD/CAM Systems..... 10
Table 2.1a	Opitz Coding Scheme (Geometrical code) for Cubic Components..... 17
Table 2.1b	Opitz Coding Scheme (Supplementary Code) for Cubic Components..... 18
Table 2.2	KK-3 Classification and Coding Scheme..... 20
Table 2.3	DCLASS Coding Scheme..... 20
Table 3.1	Level One: Overall Description..... 34
Table 3.2	External Machined Shapes and Attributes..... 36
Table 3.3	Holes and Attributes..... 37
Table 3.4	Internal Machined Shapes Other Than Holes and Attributes..... 37
Table 3.5	Code for Machined Shape's Attributes..... 39
Table 3.6	Tolerances for Common Used Grades 40
Table 5.1	The <i>Facts</i> of the Cubic Component Example Code Values 55
Table 5.2	The <i>Facts</i> of the Flat Component Example Code Values 56
Table 5.3	Blank Data..... 57
Table 5.4	The Blank <i>Facts</i> of the Cubic Component Example..... 59
Table 5.5	The Blank <i>Facts</i> of the Flat Component Example..... 59
Table 5.6	Shape Process Capability..... 60
Table 5.7	The <i>Facts</i> of the Cubic Component Process Selection..... 61
Table 5.8	The <i>Facts</i> of the Flat Component Process Selection..... 61
Table 5.9	Cutting Tools Capability Knowledge..... 62
Table 5.10	The Cutting Tools in the CSB-GCAPPES..... 62
Table 5.11	The Cutting Tools Used for the Cubic Component..... 64
Table 5.12	The Cutting Tools Used for the Flat Component..... 64
Table 5.13	Machines..... 65
Table 5.14	Cutting Speed for HSS Cutting Tools..... 65
Table 5.15	Chip Thickness..... 66
Table 5.16	The Cutting Conditions for the Cubic Component..... 67
Table 5.17	The Cutting Conditions for the Flat Component..... 67
Table 5.18	The Process Sequence for the Cubic Component..... 68
Table 5.19	The Process Sequence for the Flat Component..... 69

Table 5.20	Final Process Plan for the Cubic Component.....	70
Table 5.21	Final Process Plan for the Flat Component.....	71

Abstract

This thesis describes a research project in which a generative computer aided process planning (CAPP) system, termed a coding scheme based generative CAPP expert system(CSB-GCAPPES), for machining prismatic components is developed. The research project is based on the principle that GT coding schemes can become the component's design representations, and that expert system technology can map the knowledge base required by a generative CAPP system. The CSB-GCAPPES aims to help the process planner produce quicker and more consistent process plans which will also optimise the machining process.

A new GT coding scheme based on existing GT classification coding schemes components has been developed in this research project which characterises engineering drawings of prismatic components. It has a hybrid code structure (monocodes and polycodes) and describes the component's design and manufacturing information. The monocodes represents the component's overall shape, maximum size and material while the polycodes represents the machined shapes such as plane surfaces, holes and slots and their attributes such as dimensions, tolerances, surface finishes and orientation. A code generated by the new coding scheme has enough design and manufacturing information to complete the process planning activity.

Using an expert system building tool, the CSB-GCAPPES is designed to generate a new GT code automatically, and capture and maintain the manufacturing knowledge of process planners for machining prismatic components. It is a rule-based program that recognises the new GT code and creates a process plan which lists all operations, sequences, machines, cutting tools and cutting conditions such as cutting speed, feed rate and depth of cut. The prototype system has demonstrated the feasibility of both the new GT coding scheme and the expert system approach for process planning in prismatic components manufacturing.

Statement

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference has been made in the text.

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