

**REPRESENTATION OF A REINFORCED CONCRETE DESIGN
CODE AS AN OBJECT ORIENTED MODEL**

M.Phil. Thesis

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**UNIVERSITY OF MORATUWA
SRI LANKA**

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**REPRESENTATION OF A REINFORCED CONCRETE DESIGN
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by

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ABSTRACT

Design standards comprise many knowledge types such as text, rules, equations, tables, graphs and figures. The attempt is to encode the standard without distorting the format of the standard, i.e. to represent the standard clauses and tables in the same format as in the standard. This effort will facilitate changes to the standards without much variation to the programme code.

This thesis presents a framework to model standards using the Object Oriented Programming paradigm. It also presents the concept of a common interface, i.e. to accommodate several design standards for reinforced concrete design in one module; however, implementation is carried out only for BS8110. The programme uses an inferencing mechanism for execution, which is a similar method of execution to that of a standard's user; it is not a hard coded structured programme. This is a novel concept when compared to the available software for reinforced concrete design.

The literature review investigates the structure of typical standards and the available standards processing technique such as Predicate Logic, Decision Tables, Production Systems and Semantic Networks before choosing Object Oriented programming as the preferred one. The review also compares both the provisions and design outputs of several reinforced concrete standards.

The Common Interface for Design Standards (COIDS) has three main modules (or models), namely the Product Model, Standards Model and Interaction Model. The Product Model handles the product data, e.g. Frame Data. The Standards Model handles the standards data, i.e. it contains all the knowledge in a standard. The Interaction Model handles the data exchange between the user, COIDS objects and external software. It transfers data from the COIDS to external analysis software and maps analysis output files to COIDS. An Object Oriented Shell called KAPPA was used to develop the object oriented model.

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DECLARATION

This thesis is a report of research carried out in the Department of Civil Engineering, University of Moratuwa, between July 1996 and December 2009. Except where references are made to other work, the work has not been submitted in part or whole to any other university. This thesis contains 102 pages.

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LIST OF FIGURES

Fig.2.1 Prolog Implementation of a Table	16
Fig.2.2 Prolog Implementation of Calculation of Tension Steel area in a Beam	17
Fig.2.3 Calculation of $(x/d)_{lim}$ using a decision table.....	17
Fig.2.4 Calculation of Longitudinal Spacing for shear using a decision table	18
Fig.2.5 Production System Implementation of Calculation of Tensile Steel area in a Beam	19
Fig.2.6 Details of Backtracking through a rules given in fig. 2.5.....	20
Fig.2.7 Semantic network which shows the relationship of physical objects in a design standard	21
Fig.2.8 Semantic network that shows details of one particular object.....	21
Fig.2.9 Knowledge Representation in a hierarchy of frames that show inheritances..	22
Fig.2.10 Frame of a Beam.....	23
Fig.2.11 Data Abstraction Levels of Building Structures.....	25
Fig.2.12 Object oriented representation of Parent Class and the Child Class	26
Fig.2.13 Object oriented representation of single inheritance and the multiple inheritances	27
Fig.2.14 Object oriented representation of object instances	27
Fig.2.15 Object Orientated representation of Objects, which includes both slot value (attribute) and the method to evaluate the attribute (Encapsulation).....	28
Fig.2.16 Object oriented representation of concept polymorphism, A single message to carryout multiple task	29
Fig.3.1 Part of the Contents (Section 3) of BS8110 Part 1 (1997) structured based on element type	31
Fig.3.2 Part of the Contents (Section 6) of Euro Code 2 (BS EN 1992-1-1:2004) structured based on stress states	31
Fig.3.3 Definition of Dimensions (Figure 2.2 of EC2).....	35
Fig.3.4 Approximate effective span for calculation of effective breadth ratio (Figure 2.3 of EC2)	35
Fig.3.5 Stress block used in EC2 is compared with that in BS110.....	38

Fig.3.6 Service Loading arrangement (Example 7, of Graded Example in reinforced concrete design by W.P.S.Dias, 1998).....	40
Fig.4.1 Conceptual Model of the COIDS	43
Fig.4.2 KAPPA representation of the Conceptual Model of the COIDS as an Object Hierarchy.....	44
Fig.4.3 Product Data Object Hierarchy.....	45
Fig.4.4 Typical Element Instance	46
Fig.4.5 Standards Data Object Hierarchy	47
Fig.4.6 Basic Data Object Hierarchy	48
Fig.4.7 Sub Class Durability_BS	48
Fig.4.8 Common Steel Class.....	49
Fig.4.9 Steel_BS Sub Class	50
Fig.4.10 Lotus 123 representation of the BS Table 3.4 (BS34).....	51
Fig.4.11 Class Table_BS and the Method BS34 look up routines.....	51
Fig.4.12 Derived Data Object Hierarchy	52
Fig.4.13 Class Clause Object which includes the common slots clauses	53
Fig.4.14 Sub Class Clause_BS Object, slots for inferencing and BS 8110 clauses as methods	53
Fig.4.15 KAPPA Method BS3415 represents the BS8110 clause 3.4.1.5	54
Fig.4.16 CLAUSE_BS effective_span slots	54
Fig.4.17 Sub Class Symbol BS, which handles the Symbols data Items in the Object's Slots and the corresponding methods in the Object's Methods	55
Fig.4.18 Interaction Model Object hierarch.....	56
Fig.4.19 KAPPA Function's Input Frame Data Method	57
Fig.4.20 Class User Query Methods	58
Fig.4.21 Durability Data dialog box posted to the user by the User Query object.....	58
Fig.4.22 Class Mapping	59
Fig.4.23 COIDS Graphical User Interface.....	60
Fig.4.24 Class Draw Data	60
Fig.4.25 Class Data Item Network.....	61
Fig.4.26 Class Data Item Network, slot Check Condition store flags to identify the check state.....	62
Fig.4.27 Class Processed Data	63

Fig.4.28 Class Beams.....	64
Fig.4.29 Class Beams_BS.....	64
Fig.5.1 KAPPA Main Window with seven Icons.....	67
Fig.5.2 KAPPA’s Main Object hierarchy.....	68
Fig.5.3 KAPPA’s Extended Object Hierarchy which indicates the image object hierarchy.....	69
Fig.5.4 COIDS Object Connected to the Class Root.....	70
Fig.5.5 KAPPA Active Images Tool Box.....	71
Fig.5.6 KAPPA Active Images package.....	71
Fig.5.7 KAPPA Knowledge Tool Window.....	72
Fig.5.8 KAPPA Rules linked to the COIDS standards clause BS3444.....	74
Fig.5.9 COIDS strategy to execute standards clauses using KAPPA rules.....	74
Fig.5.10 COIDS Goal “CheckCondition” to find the stress state of the element to be checked.....	75
Fig.5.11 Instruction flow from KAPPA Functions to COIDS (Stage 1).....	76
Fig.5.12 Data Item Network Object sends a message to forward chain the KAPPA rules (Stage 2).....	77
Fig.5.13 Forward Chaining KAPPA Rule Beams will execute the method Get_ CheckBeamData to get data from user (Stage 3).....	78
Fig.5.14 Forward Chaining rule CheckBSBeams will calculate the requirement specified by the standard (Stage 4).....	78
Fig.6.1 Common Interface Session Window.....	79
Fig.6.2 Basic Data Input Session Window.....	80
Fig.6.3 KAPPA Product Model Hierarchy.....	81
Fig.6.4 KAPPA Function Editor INIT method will send messages to COIDS Objects.....	81
Fig.6.5 Basic Data Input Session Window, Initialise button will initialise the COIDS.....	82
Fig.6.6 Basic Product Data Dialog Box.....	83
Fig.6.7 Product Model hierarchy with the Instances generated based on the frame data user input.....	83
Fig.6.8 Typical Node Data User Input.....	84
Fig.6.9 Display User Node Inputs.....	84
Fig.6.10 Typical Element Data User Input.....	85

Fig.6.11 Display User Element Inputs	85
Fig.6.12 Typical Support Data User Input.....	86
Fig.6.13 Typical Section Property Data User Input.....	86
Fig.6.14 Element number to input Element Load.....	86
Fig.6.15 Number of Load types on the Element.....	86
Fig.6.16 Load types on the Element to be defined.....	87
Fig.6.17 Typical Uniform Load Input data.....	87
Fig.6.18 Typical Material Data User Input.....	88
Fig.6.19 Typical Material Data User Input for concrete.....	88
Fig.6.20 Typical Durability Data User Input for Fire Resistance.....	89
Fig.6.21 Typical Durability Data User Input for Exposure Condition	89
Fig.6.22 User Define Path of the Analysis Package executive path.....	90
Fig.6.23 MICROFEAP-11 Analysis Software.....	90
Fig.6.24 User to insert the element number.....	91
Fig.6.25 User to insert which standard to be used for checking the element.....	92
Fig.6.26 Ele_9 Instance is generated based on the user input.....	92
Fig.6.27 User to input the stress states or Serviceability Limit States to be checked..	92
Fig.6.28 User to input the path of the Analysis Data File.....	93
Fig.6.29 Message to the user by COIDS Indicating the Mapping is complete.....	93
Fig.6.30 User to input the percentage redistribution.....	93
Fig.6.31 Reinforcement data at section 1 (Support)	94
Fig.6.32 Reinforcement data at section 2 (Middle Section)	94
Fig.6.33 Reinforcement data at section 3 (Support)	95
Fig.6.34 Ele_9 Instance which included the processed data-items.....	95
Fig.6.35 COIDS message to user Section 1 is satisfactory in Flexure	95
Fig.6.36 COIDS message to user Section 1 satisfactory in Shear	96
Fig.6.37 COIDS message to user regarding shear reinforcement.....	96
Fig.6.38 COIDS message to the user stating that the Task is completed	96

LIST OF TABLES

Table 3.1 Structure and Philosophy of Design Standards.....	32
Table 3.2 Recommended Live loads.....	33
Table 3.3 Recommended basic load safety factors.....	33
Table 3.4 Recommended Material Properties.....	34
Table 3.5 Recommended Material safety factors.....	34
Table 3.6 Recommended equations to calculate the flange width of a beam	35
Table 3.7 Recommended pattern loading in BS8110 and EC2	37
Table 3.8 Recommended stress block diagrams by other standards.....	39
Table 3.9 Summary of output of the design example	41

LIST OF KEY WORDS

Common Interface, Expert Systems, Knowledge Base, Object Oriented Programming, Standards Processing, Reinforced Concrete Design

TABLE OF CONTENTS

Abstract.....	i
Acknowledgements	ii
Declaration	iii
Table of Contents	iv
CHAPTER 1 – INTRODUCTION	1
1.1 Significance of Research	1
1.2 Objectives	4
1.3 Methodology	5
CHAPTER 2 – DESIGN CODES AS EXPERT SYSTEMS	7
2.1 Introduction	7
2.2 Design Standards	7
2.3 Aim of Building Standards.....	8
2.4 Properties of Standards	8
2.5 Expert Systems.....	9
2.6 Model-Based Reasoning	10
2.7 Design Standards as Expert Systems	12
2.8 Standards processing techniques	14
CHAPTER 3 – COMPARISON OF DESIGN STANDARDS.....	30
3.1 Introduction	30
3.2 The Structure of Design Standards.....	30
3.3 Basis of Design	32
3.4 Loads, Load Combinations and Partial Safety Factors.....	32
3.5 Material Properties	33
3.6 Physical Geometry of Structures	35
3.7 Other Key aspects of design standards	36
3.8 Design Example	40

CHAPTER 4 - COMMON INTERFACE CONCEPT AND IMPLEMENTATION ..	42
4.1 Introduction	42
4.2 Product Model.....	44
4.3 Standards Model	46
4.4 Interaction Model.....	56
CHAPTER 5 – KAPPA APPLICATION DEVELOPMENT SOFTWARE	65
5.1 Introduction	65
5.2 The KAPPA Interface	67
5.3 Knowledge Processing Techniques in KAPPA	72
5.4 Execution process of COIDS in Checking Mode.....	75
CHAPTER 6 – TYPICAL COIDS SESSIONS	79
6.1 Data Input Mode	79
6.2 Analysis Mode	89
6.3 Checking Mode.....	90
CHAPTER 7 – CONCLUSIONS AND RECOMMENDATIONS.....	97
REFERENCES	99