A Computer Model for Chinese Traditional Timber Structure:
the Foguang Temple

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Signature:
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# Table of Contents

**Table of Figures** .................................................................................................................. 5

**Abstract** ................................................................................................................................. 10

**CHAPTER 1 Introduction** ........................................................................................................ 12

1.1 Research on Historic Architecture ....................................................................................... 12

1.2 Computerised Model: An Intelligent Model .......................................................................... 13

1.3 A Brief Background on Chinese Architectural History and Research ................................. 14

1.3.1 The Development of Ancient Chinese Architectural History ..................................... 14

1.3.2 The Background of Ancient Chinese Architecture Research ...................................... 17

1.4 New Situations for Ancient Chinese Architecture Research ............................................. 20

1.4.1 Digital Techniques for Ancient Chinese Architecture Research ................................. 21

1.4.2 An Intelligent Model for Ancient Chinese Architecture ............................................. 21

1.4.3 Application Possibilities of Computerised Model for Ancient Chinese Architecture .... 22

1.5 The Foguang Temple ........................................................................................................... 23

1.6 Research Scope & Approach ............................................................................................... 24

**CHAPTER 2 A Brief Review on Computer-Aided Historic Architecture Research: Cases & Theories** .................................................................................................................. 26

2.1 The Reconstruction of Historic Site ....................................................................................... 26

2.2 Kinds of Model .................................................................................................................... 27

2.2.1 Models of Archaeological Excavations ....................................................................... 27

2.2.2 Model for Architectural Visualization ....................................................................... 28

2.2.3 Model for Detailed Historic Architecture Research and Teaching ........................... 30
2.3 Method Used for Digital Modeling and Representation of Historic Site

2.3.1 Strategies and structures of modelling .............................................. 33
2.3.2 Representations associated with computer database ......................... 38

2.4 Digital Model for Chinese Historic Sites .................................................. 39
2.4.1 The limitation of current works of Ancient Chinese architecture ........ 39
2.4.2 Appropriate situation for the modeling in this study ......................... 41

CHAPTER 3 RESEARCH METHODOLOGY .................................................................. 42
3.1 Interpretive Historic Research and a Case Study Approach ................. 42

3.2 A Theoretical Basis for Digital Modelling of Historic Architecture ... 43
3.2.1 The development of shape grammar theory ...................................... 43
3.2.2 Shape grammar theory as an approach to study Chinese traditional structural ................................................................................. 46

3.3 Methodology for Reconstructing a Digital Model of the Foguang Temple (Main Hall) ............................................................... 49
3.3.1 Data collection and validation ............................................................... 49
3.3.2 A grammatical understanding of the Foguang temple .................... 52
3.3.3 Build a database for the representation of the wooden structure of the Foguang temple ............................................................... 54
3.3.4 The methodology framework for the practical process of modelling .... 60

3.4 Methodology for Dealing with Contingencies and Insufficient Information ........................................................................................................ 62
3.4.1 The concept of an "ideal model" ............................................................ 62
3.4.2 The concept of minimal adaptation ....................................................... 63

3.5 Methodologies for Representation ............................................................ 65
CHAPTER 4 BUILDING THE DIGITAL MODEL FOR THE FOGUANG TEMPLE .......... 67
  4.1 INFORMATION MANAGEMENT PRIOR TO MODELING .................................. 67
    4.1.1 Graphic information collection ............................................. 68
    4.1.2 Graphic information validation ............................................. 69
  4.2 A BASIC STUDY OF THE CONSTRUCTION RULES ..................................... 70
    4.2.1 The “Grammar book” as modelling reference ................................ 70
    4.2.2 Possible construction rules .................................................. 72
    4.2.3 Adoption of rules and grammars in Computer drawing of the temple ...... 75
  4.3 COMPUTATIONAL MODELING .................................................................. 76
  4.4 MODELLING THE “UNKNOWN” PART ...................................................... 79
    4.4.1 A Theoretical Model ................................................................. 81
    4.4.2 Structural functions of the unknown section .................................. 83
    4.4.3 Segment organization ............................................................... 85
    4.4.4 Elements dimensions and details ............................................... 86
    4.4.5 Modelling the unknown part – a step by step record ....................... 87
    4.4.6 An unresolved issue: the connectivity of Nidaogong and Lan’e .............. 103
    4.4.7 Final effect and representation of the digital structure ..................... 104
  4.5 CREATING THE DATABASE .................................................................. 106
  4.6 REVIEW AND REVISE THE MODEL ...................................................... 110

CHAPTER 5 DISCUSSION .............................................................................. 111
  5.1 AN ASSESSMENT OF THE MODEL AND MODELING PROCESS .................. 111
    5.1.1 Evaluation of the model ............................................................. 111
    5.1.2 A review of the computer modelling process: strengths and limitations ... 114
    The strengths of the study include: .................................................. 114
5.1.3 3D modelling based database ................................................................. 114

5.2 SOME ISSUES GENERATED DURING THE MODELING PROCESS ................ 115

5.2.1 The naming system of the building .......................................................... 115

5.2.2 Ambiguity in drawings .............................................................................. 117

CHAPTER 6 CONCLUSION ......................................................................................... 119

6.1 A REVIEW OF THE STUDY PROCESS .............................................................. 119

6.1.1 Research framework .................................................................................. 119

6.1.2 Standards of judging .................................................................................. 119

6.2 SOME CONTRIBUTIONS FROM THIS STUDY ................................................... 120

6.2.1 A computer model for ancient Chinese building ........................................ 120

6.2.2 Digital techniques and historic Chinese architecture studies .................... 121

6.2.3 Digital techniques & historic architecture studies ...................................... 121

6.3 FURTHER RESEARCH .................................................................................... 122

BIBLIOGRAPHY .................................................................................................. 123

APPENDIX A: CD OF VISUALIZATION EFFECTS .................................................. 127
Table of figures

(Figure 1-1, Figure 1-2, Figure 1-3: photos of the Main Hall of the Foguang Temple) ................................................................. 23
(Figure 2-1, Figure 2-2: the shape-type list and the whole features of the structure, “The wooden construction data modeling of Korean traditional architecture, CAADRIA Conference”) .................. 32
(Figure 2-3: City level, “Digital reconstruction of medieval Chinese cities, the Global Design Studio, CADA”) ........................................ 34
(Figure 2-4: Compound level, “Digital reconstruction of medieval Chinese cities, the Global Design Studio, CADA”) ...................... 35
(Figure 2-5, Figure 2-6: Ward level, “Digital reconstruction of medieval Chinese cities, The Global Design Studio, CADA”) ............ 35
(Figure 2-7: digital model of artist’s holiday house on the lake, Galli & Muhlhoff, 2000) ................................................................. 36
(Figure 2-8: digital model of horticulturist’s house, Galli & Muhlhoff, 2000) ...................................................................................... 36
(Figure 2-9: computer simulation of the Mongolian Palace comparing with the photo of ancient Chinese building) ...................... 40
(Figure 3-1: methodologies for data validation) .................................. 51
(Figure 3-2: disassembling to structure to three segments, “Guo, 1999, The structure of Chinese timber architecture”) ...................... 53
(Figure 3-3: a basic database structure) ............................................. 55
(Figure 3-4: tabular format database) .............................................. 56
(Figure 3-5: a database structure for ancient Chinese buildings) .......... 58
(Figure 3-6: the implementation framework) ..................................... 60
(Figure 3-7: Idea of the modelling process) ................................................................. 63

(Figure 3-8: The computer layout of the database on single element) ........ 65

(Figure 4-1: Previous manual drawing input computer) ................................. 69

(Figure 4-2: Photos of physical reality input computer) ....................................... 70

(Figure 4-3: The link between manual drawing - photos) .................................... 70

(Figure 4-4: A digital drawing based on the manual drawing) ............................. 70

(Figure 4-5: The standard module of elements) ....................................................... 73

(Figure 4-6: Structural relations) ............................................................................ 74

(Figure 4-7, Previous drawing of the plan of the column network) .................... 74

(Figure 4-8, Computer drafting of the network of the columns of the structure) ......................................................................................................................... 75

(Figure 4-9: Samples of standard timber units) ..................................................... 75

(Figure 4-10: Manual and digitalised drawings of the elevation to conform to unit) ......................................................................................................................... 76

(Figure 4-11: An example of section drawing with completed elevation as reference) ................................................................................................................. 76

(Figure 4-12: Structure components de-constructed) .......................................... 78

(Figure 4-13, Figure 4-14: Modelling of different elements) .................................. 78

(Figure 4-15: From elements to segment) ............................................................. 79

(Figure 4-16: From components to the whole structure) ...................................... 79

(Figure 4-17: Photos of the detail) ......................................................................... 79

(Figure 4-18: Previous drafts of the detail) ............................................................ 80

(Figure 4-19: The modelling process diagram) ..................................................... 82

(Figure 4-20: A framework of the “hypothesis-review” modelling system) ... 83
(Figure 4-21, Figure 4-22: The Model Before the Simulation of the Corner Structure) ................................................................. 84
(Figure 4-23, Figure 4-24: Hypothesis of the Tie-Beams) ....................... 84
(Figure 4-25, Figure 4-26: The Bracket System From the X and Y Direction) ... 85
(Figure 4-27: Final Effects) ..................................................................... 86
(Figure 4-28: Different Dimensions According to Directions) ................. 86
(Figure 4-29, Figure 4-30: The Elements Changing) .............................. 87
(Figure 4-31, Figure 4-32) .................................................................... 88
(Figure 4-33, Figure 4-34) .................................................................... 88
(Figure 4-35, Figure 4-36) .................................................................... 88
(Figure 4-37, Figure 4-38) .................................................................... 89
(Figure 4-39, Figure 4-40) .................................................................... 89
(Figure 4-41, Figure 4-42) .................................................................... 90
(Figure 4-43) ....................................................................................... 90
(Figure 4-44, Figure 4-45) .................................................................... 90
(Figure 4-46, Figure 4-47) .................................................................... 91
(Figure 4-48, Figure 4-49) .................................................................... 91
(Figure 4-50, Figure 4-51) .................................................................... 91
(Figure 4-52, Figure 4-53) .................................................................... 92
(Figure 4-54, Figure 4-55) .................................................................... 92
(Figure 4-56, Figure 4-57) .................................................................... 93
(Figure 4-58, Figure 4-59) .................................................................... 93
(Figure 4-60, Figure 4-61) .................................................................... 93
(Figure 4-62, Figure 4-63) .................................................................... 94
(Figure 4-64, Figure 4-65) .................................................................... 94
(FIGURE 4-66, FIGURE 4-67) .................................................................................................................. 95
(FIGURE 4-68, FIGURE 4-69) .................................................................................................................. 95
(FIGURE 4-70, FIGURE 4-71) .................................................................................................................. 96
(FIGURE 4-72, FIGURE 4-73) .................................................................................................................. 96
(FIGURE 4-74, FIGURE 4-75) .................................................................................................................. 96
(FIGURE 4-76: STRUCTURAL DETAILS OF THE CAPITAL-BLOCK) ............................................................. 97
(FIGURE 4-77: THREE TYPES OF JOINT OF THE BRACKET SYSTEM OF THE INTERIOR CORNER COLUMN) ................................................................................................................................. 97
(FIGURE 4-78, FIGURE 4-79, FIGURE 4-80: STRUCTURAL DETAILS OF THESE JOINTS) .................. 98
(FIGURE 4-81, FIGURE 4-82: STRUCTURAL DETAILS OF THE JOINT BETWEEN GUA ZI GONG AND XIA ANG ON THE EAVE CORNER COLUMN) .................................................................................. 99
(FIGURE 4-83, FIGURE 4-84: STRUCTURAL DETAILS OF THE JOINT BETWEEN MAN GONG AND XIA ANG ON THE EAVE CORNER COLUMN) .................................................................................. 100
(FIGURE 4-85: STRUCTURAL DETAILS OF THE JOINT BETWEEN CAO RO FU AND YA CAO FANG ON THE EAVE CORNER COLUMN) .................................................................................. 101
(FIGURE 4-86: STRUCTURAL DETAILS OF THE JOINT BETWEEN JIAO BEI ON THE INTERIOR CORNER COLUMN) .......................................................................................................................... 101
(FIGURE 4-87: STRUCTURAL DETAILS OF THE JOINT BETWEEN CAO RO FU ON THE INTERIOR CORNER COLUMN) .......................................................................................................................... 102
(FIGURE 4-88: STRUCTURAL DETAILS OF THE JOINT BETWEEN JIAO BEI ON THE INTERIOR CORNER COLUMN) .......................................................................................................................... 102
(FIGURE 4-89: UNRESOLVED CONNECTIVITY) .................................................................................. 103
(FIGURE 4-90: THE "UNKNOWN PART" (SHOWN IN RED COLOR) AND THE WHOLE STRUCTURE) .......................................................................................................................... 104
(FIGURE 4-91: MORE DETAILS OF THE "UNKNOWN PART" (SHOWN IN RED COLOR) .......... 105
Abstract

This thesis presents a study of an ancient Chinese timber structure - the main hall of the Foguang temple built in China in the Tang Dynasty (857), which is regarded as one of the most important temples in that period. The research represents a detailed digital model of the structural timber components and their connectivity.

The research questions are:

- Firstly, how to identify and represent the structural components, and the ways they are assembled. This is not covered in the few previous studies of the temple, which just offered brief introductions and general descriptions of the construction of the timber structure.

- Secondly, how to create a digital model for such a structure where there is insufficient or incompatible information. These are common issues that arise in the simulation and representation of historic architecture.

The outcome of the research is the presentation of a digital model that is much more detailed than previously existing representations.

During the process, two concepts were developed and adopted:

- Firstly, the concept of “building an ideal model”. Rather than seeking the representation of the timber structure as built, the notion outlined in this thesis is to create an ideal digital model according to the vocabulary of structural components and the predefined spatial relations of their assembly connectivity.

- Secondly, the concept of “simplest adaptation”. When choosing from a number of reasonable hypotheses about a component or assembly detail, it is assumed to be the simplest possible adaptation of an already accepted component or assembly detail.
The thesis is organized as followings:

Chapter 1: an introduction to the research on ancient Chinese architecture

Chapter 2: a review of the computer simulation and representation of historic architecture

Chapter 3: a discussion about the methodology on the concept of “building an ideal model”, and the methodology for modelling when there is a lack of information

Chapter 4: a record of the digital modelling process

Chapter 5: discussions on and conclusions of the research.

The thesis has an accompanying CD which contains the representation information, including:

- A 2D ‘Flash’ presentation that shows the brief contents of the research
- 3D animations that represent in detail the timber structure and the assembly process
- A database that represents the structural components and their relations.