

國立交通大學建築研究所

碩 士 論 文

初探數位構築術的浮現

Emerging Phenomena of Digital Tectonics



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中華民國九十三年七月

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中文摘要

資訊時代下建築的空間型態已發展到另一個階段，自由形體生產是普遍存在的現象，其中電腦參與了多樣的階段，包括形式、結構、材料與計畫，許多設計創意源自數位媒材與電腦科技所發展下的軟體工具與硬體設備。構築術意指營造的知識呈現，強調構造接點與富創造力的細部，藉由詩意的構築表現建築形態，然而，當代數位建築強調動態的表面與結構、內部與外部空間的連續性等特質，都與傳統建築生產的空間型態有別，不能再用傳統靜態的構築觀點去詮釋。

研究中以案例分析嘗試定義數位構築術的特徵與現象，以十件數位自由形體建築作為分析的對象，首先進行紙上數位建築案例研究，分析使用電腦媒材在數位環境操作與表現下，是否還存有構築術所強調的構造關係與知識呈現結構，進一步探討數位環境中自由形體空間構築的可能方法與影響，及其運用電腦媒材的特性；之後，進行實體數位建築案例研究，研究中再選出五件已進行建造之自由型體建築案例，分析數位構築方法對實際建造中自由型體之構造與材料等構築性的影響，探討數位設計與落實之間的關係；最後分析與討論出數位構築設計過程的技術與機制，驗證電腦媒材影響下自由形體的型態與構築性的呈現現象。

本研究反映出：數位設計生產過程的技術與機制，促使數位媒材與電腦科技應用成為數位構築過程，數位自由形體等複雜空間型態唯有透過數位構築術而被理解；數位構築術與傳統構築學已互相影響滲透，在數位的時代電腦這一資訊化的材料，藉由其動態的衍生過程而呈現了數位時代特有的空間形式，數位構築術不僅承接了傳統構築的知識內涵，同時延伸了傳統構築觀點，將靜態的平面操作延伸到一動態的視野中。

關鍵字： 構築術、自由形體、數位媒材、電腦科技、知識呈現

Abstract

During this information age, spatial form in the field of architecture has advanced to a new level. Digital free-form space is commonly seen as the use of computer media has increased. Computers are used in various stages of this process with regard to form, structure, supplies and planning. Many designs seen now are computer generated and have come about as a result of the development and implementation of new computer software and hardware. Tectonic knowledge representation of construction, which emphasizes structural joints and attention to detail in creativity, displays architectural form by means of poetry of construction. However, present day digital architecture emphasizes dynamic surface, with its three-dimensional curves, and the interior and exterior continuity of its topological spaces. This is all quite different from the spatial form produced by traditional tectonics view, making it impossible to explain these modern designs within the field of traditional architecture.

This study uses digital free-form projects as a basis for analysis, and attempts to define the phenomena and aspects of digital tectonics. This investigation comprised three phases. First, ten virtual projects are selected to conduct the case-study for paper architecture. In this phase, the constructive conditions and knowledge representation of digital tectonic processes associated with the use of computer media to transform design ideas are analyzed. Moreover, through digital free-form case study, the relationships between tectonics and computer media manipulations are discussed. And then, the five real free-form projects selected are analyzed as case-study based on the digital tectonics discussed before. The digital tectonic processes and their influences on construction and materials in real free-form projects are considered to determine the tectonic relationships between the digital design environment and the physical environment. Finally, the results of these two phases are combined to elucidate the technical and mechanistic themes of digital tectonic processes and the free-form features by means of tectonic expressions in computer media.

This study reflects the technique and mechanism of the process of digital design production, which, through the use of computers, becomes digital tectonics. Digital free-form architecture can only be understood through digital tectonics. Digital tectonics and traditional tectonics have already had a profound influence on each other. In this information age, we could say that computers, the home of material reborn as information, are the means of displaying a very special spatial form. It does this by means of a dynamic process. Digital architecture not only carries on in the knowledge and intention of traditional architecture, it also extends the vision of traditional tectonics. It extends manipulation of the static plane, causing it to possess a dynamic vision.

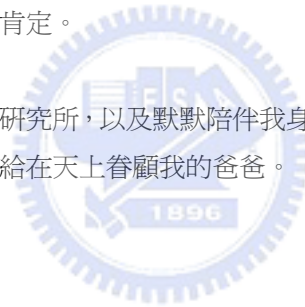
Key word: tectonics, free-form, digital media, computer technology, knowledge representation

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