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COMPUTER ASSESSED DESIGN – A VEHICLE OF ARCHITECTURAL COMMUNICATION AND A DESIGN TOOL

BY

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Abstract. In comparison with the limits of the traditional representation tools, the development of the computer graphics constitutes an opportunity to assert architectural values. The differences between communication codes of the architects and public are diminished; the architectural ideas can be represented in a coherent, intelligible and attractive way, so that they get more chances to be materialized according to the thinking of the creator. Concurrently, the graphic software have been improving the quality of design activity, transforming it into an intensive design and management process correlated with the others building design disciplines involved. The computer modeling is today a refined and sophisticated artistic discipline that successfully reinterprets, communicates and promotes architectural concepts in the new virtual world. It also constitutes a creative process that helps optimizing and refining design concepts. It also makes possible the invention of new types of spaces and volumes whose structure could not be designed by traditional means. The computer graphics have changed the way architects create and communicate. But, however, the computer design techniques would evolve, at the basis of the architect’s profession remain the skills available at any time: intuition and creativity in modeling space and light, the ability of using the expressivity of materials.

Key words: computer aided design as creation tool; computer graphics as management process; computer graphics as instrument of communication and marketing.

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1. Introduction

Comparing with the communication limits of the traditional representation tools, the development of the computer graphics constitutes an important opportunity for promotion and assertion of the architectural values. The differences between the communicational codes are diminished; the architectural ideas can be presented to the public in a coherent, intelligible and attractive way (Fig. 1), so that they get more chances to be materialized according to the thinking of the creator.

The use of the software tools changes a lot the way architects design. The arduous drawing work is replaced with an intensive design and management process that determines the improvement of the design quality.



Fig. 1– Illustrations made by AND Inc., ASAI-AIP 17/21, Award of excellence 2002/06.

2. Changes in Architectural Creation Work

Besides the precision and accuracy of the drawing, the graphic software enables, in addition to the classical design methods, the achievement of some operations such as the quick checking of solutions related to the adaptation to site, light, composition, colours, materials, technical and economical problems; it allows studying the volumes from multiple angles and the possibility of getting inside the building, of perceiving its spatiality and experiencing and understanding it before the construction of the building. The graphic software may quickly switch from schematic drawings to construction details and may establish connections between the architectural design and the structure and installation software. Centralization of information from all the technical specialties involved in building design leads to a better team cooperation. Management and team communication, important factors in building design work, become much more efficient by the use of computers and Internet.

The future software systems may define exhaustively a building in its entire life cycle. These will be able to build a scenario based on a building data system, from the first and subsequent design phases to construction and exploitation (Kvan, 2004): results of engineering calculations, specifications of materials, organization of site work, functional, technical and economic data, calculating flows for circulation, minimizing energy consumption. The data system will be able to serve to maintenance and evolution, and even to refunctionalization or demolition of the building.

The development of the design and modeling software completely changes the way architects create, design and meet the requirements of buildings. Currently, the graphic software is not used up to its level of performance, but its influence is ascendant. IT tools have already marginalized or even eliminated the classical design means out of architectural offices. The best sign of this revolution, remarks Dana Vais (2008), is its awareness in education, by encouraging students to use the computer as a creation tool. Bernard Tschumi established the first paperless studio at the Architecture Department of the Columbia University from New York; Hani Rashid shows his students how the computer allow to see inside the designed buildings the effects of light and people's movement, in different times of the day. The stake of his lessons is not only to shorten the computation time but also to develop a new thinking of space.

3. Computer Graphic – an Artistic Discipline

Computer modeling of architectural objects is continuously improving, borrowing techniques and special effects from cinema and Web design. Currently, modeling is an autonomous discipline, the activity of some specialized companies, which make for architects illustrations, panoramas and animations. These representations are not imitation of reality, but an art in itself, (Jodidio, 2005, 2006) with its own rules and specific aesthetics. They require not only software knowledge, but also notions borrowed from the art film concerning ambience, framing or visual paths. They allow realistic spatial visualization from multiple angles and with a wider field of view of the interior and exterior of the architectural object in state of design. The artistic qualities of the illustrations come from the inspired choice of light, view and textures, the appropriate ambience and the sense of scale and space.

Often, the images of the modeled object are composed with pictures of the real site. With rendering skills and depending on desired effects, the differences between virtual and real may be drawn indistinguishable or, conversely, may be artistically enhanced in order to value certain ideas and concepts.

In the works made for Zaha Hadid, Herzog & de Meuron or David Chipperfield, neutral company uses in local touches this collage technique

between virtual and elements from the real world, without smoothing the difference between them. Manifestly, the virtual retains its own features and expression. It is composed with elements from the real world with precise scopes such as concepts, scale, context, and certainly not to create the illusion of reality (Bărbuică, 2003).

The animation brings the representation of movement, facilitating the process of understanding architectural design. It gets closer to the spatial and temporal reality of the object that is going to be built. That is very differently than the traditional architectural representation, based entirely on our capacities of reading and interpretation. The animation artistically uses for rendering cinematic and software techniques that were created for film or computer games industry. These techniques give the sensation of movement and offer a better understanding of space and architectural solutions (Fig. 2).

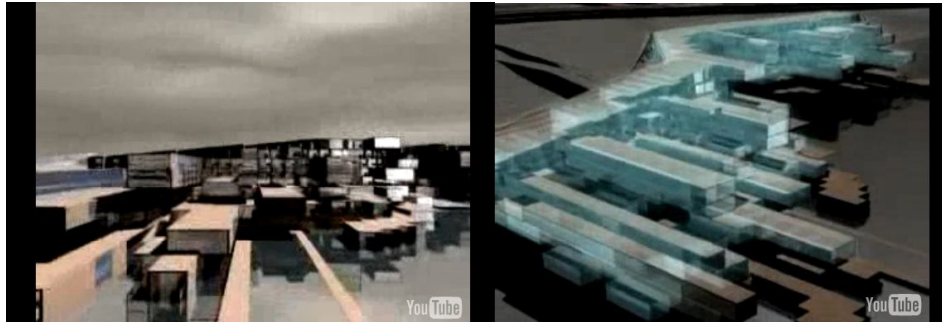


Fig. 2 – Images from the animation presenting the Zaha Hadid's concept for JVC hotel in Guadalajara, Mexico. 2001, created by neutral (Christian Grou, Tapio Snellman) with music by Andrew Lagowski.

4. Computer Modeling – a Creative Design Tool

Beyond many conservative or naive-pastiest attitudes – for instance, Alberto Perez-Gomez recently said: “I believe, however, that using the keyboard makes it difficult to report to the tactile dimension of architecture and estranges us from the importance of the building process. Somehow the computer doesn't value the process, is more directly oriented to final product” (Perez-Gomez, 2003) – computer modeling develops continuously, currently being a refined and sophisticated artistic discipline that reinterprets, communicates and successfully promotes architectural concepts, and also a creative process that helps develop ideas during the design. The animations and illustrations are now an excellent communication and marketing instrument through which architects may coherently promote their concepts. In addition, they help to analyse architectural solutions, more than any other presentation technique, transforming concepts in images, explains Tapio Snellman (2003), member of Neutral team. He considers these techniques not only an advertising

medium, but also a means of refining design and a source of inspiration. It is not only a presentation technique, but rather a means of investigation and testing architectural solutions, which transforms modeling into laboratory work. The using the three dimensional modeling techniques is a great potential opened to architectural design. The computed representations may constitute an intensive creative and analytical process closely linked to the design activity, a creative tool that verifies, optimizes, reinterprets and communicates the ideas and solutions during the design process. Naturally, architecture is influenced by these new possibilities, as it has always been influenced by the work tools, notices Greg Lynn: architects have always worked in a virtual world, imagining and representing their buildings through various techniques (Rauterberg, 2008).

5. Inventing Novel Volumes and Spaces

Besides the advantages brought in the developing, refining and promoting architectural concepts, the computer modeling offers the possibility of exploring new types of shapes, volumes and spaces, not possible to design by traditional means. The architectural ideas may be three-dimensionally illustrated and processed from the beginning and in all phases of creation. For instance, by means of CATIA software, created for spacecraft design, the exuberant volumes and shapes imagined by Frank Gehry may be detailed and calculated (Fig. 3).

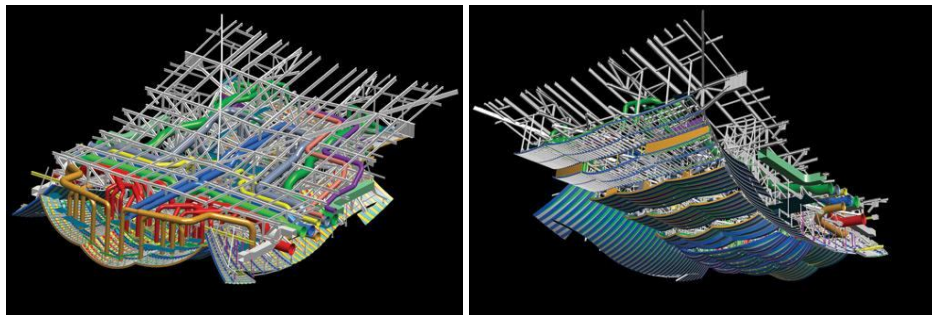


Fig. 3 – Elements of the Disney Concert Hall designed by Frank Gehry using CATIA 3-D design software.

Marcos Novak is inspired by computer techniques in the creation of an interactive “liquid architecture”, capable of adaptation to every user. In the paper “Transarchitecture and transmodern”, Novak assess that the technical drawing, which has limited the architecture creation, is replaced with a new world of representation without descriptive limits (Fig. 4). “The plan is dead. Representation has been temporalized and operationalized as interface for dynamic simulations” (Novak, 2005).

The development of the presentation techniques brings realism and artistic qualities; due to it, the computer representation start up a new cultural

world in cyberspace, coexisting alongside the real built environment. To this imaginary world belongs the computer data-based virtual city designed by the Holland team MRDV, with functional areas set on ecological principles, or the



Fig. 4 – Allocortex/Alloneuro, “liquid architecture”, 2005, architect Markos Novak.

virtual transactional space of the New York stock market invented by Asymptote, that give real time information. Asymptote team also created a virtual Guggenheim museum (Fig. 5), “the first important virtual building of the XXI century, a fusion between cyberspace, art, trade and architecture” (Jodidio, 2005), an online navigable interactive space that adapts to the preferences of each guest in part.



Fig. 5 – Guggenheim Virtual Museum, Asymptote Architects, 2001; the first important virtual building of the 21st century – a fusion of information space, art, commerce, and architecture

6. Virtually Recovering of Some Great Unbuilt Works of Architecture

This new virtual world offers architecture another great benefit: the opportunity to recover, in the shape of digital images, valuable building designs that had not been constructed. Takehiko Nagakura, computer assessed design associated professor at Massachusetts Institute of Technology, Cambridge, set

the project „Unbuilt Monuments” that carry out illustrations and animations of some modern architectural works that had remained in state of design.

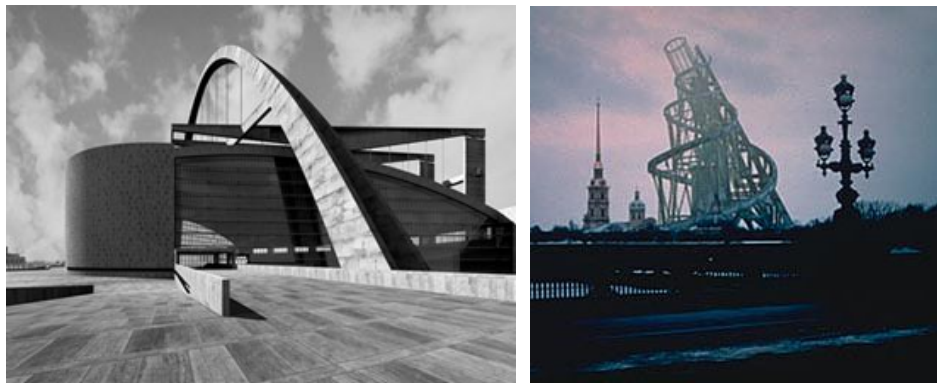


Fig. 6 – Illustrations made by Takehiko Nagakura for The Monument of the 3rd International, designed by Vladimir Tatlin and Palace of Soviet conceived by Le Corbusier in 1931-32.

Works such as Danteum created by Terragni and Lingeri, in 1938, The Monument of the 3rd International, designed by Vladimir Tatlin, the Palace of Soviets conceived by Le Corbusier in 1931-32, the church Altesten, the work of Alvar Aalto in 1967 are computer modeled and graphically rendered with realistic qualities.

The virtual architectural objects are implanted into a current real picture of their site and have applied effects that suggest time consequences, resulting an image of the way The Monument of the 3rd International or Palace of Soviet would look now if they have been built at their time (Fig. 6). The illustrations and animations of Takehiko Nagakura are exposed in Tokyo, Osaka, Orlando, Los Angeles, Paris, Milano, Florența, San Francisco, at film festivals and conferences about computer graphics, making known to the whole world valuable architectural concepts. The project „Unbuild Monuments” bring an important service to the culture and history of architecture, by promoting valuable architectural ideas that had not been put into practice due to an unfavourable social and political context .

7. Conclusions

The graphical computer techniques therefore bring many advantages on the cultural level: the assertion of the architectural values in the new virtual computerized world, the improving of communication of the architectural ideas in state of design, and the possibility of inventing new spaces and volumes whose structures could not be designed by traditional means. But, however, the

design techniques would evolve, at the base of the architectural craft remain the professional abilities available at any time: intuition and creativity for modeling the spaces and controlling the expressivity of materials and light. As Tapio Snelmann (2003) says: “would consider it tragic if the architects relied on 3-D modeling first of all and not on imagination, instincts and the knowledge of using materials and light”.

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PROIECTAREA ASISTATĂ PE CALCULATOR – UNEALTĂ DE CREAȚIE ȘI MIJLOC DE COMUNICARE ARHITECTURALĂ

(Rezumat)

Față de limitele de comunicare ale mijloacelor clasice de reprezentare, dezvoltarea tehnicilor grafice computerizate constituie o oportunitate importantă pentru promovarea și susținerea valorilor arhitecturale. Diferențele de coduri de comunicare sunt estompeate, ideile arhitecturale pot fi reprezentate într-un mod coerent, inteligibil și atractiv, astfel încât au mai multe șanse să fie puse în practică conform intențiilor creatorului. Softurile grafice computerizate au determinat ridicarea calității activității de proiectare, transformarea sa într-un proces intensiv de design și management corelat cu celaltele discipline implicate în conceperea clădirilor. Modelarea computerizată constituie în prezent o disciplină artistică rafinată și sofisticată ce reinterpretează, comunică și promovează cu succes conceptele arhitecturale în noua lume virtuală. Ea

constituie și un proces creativ ce ajută la dezvoltarea și rafinarea ideilor pe parcursul proiectării și oferă posibilitatea inventării de noi tipuri de spații și volumetrii, a căror structură constructivă nu ar fi putut fi proiectată prin metodele clasice. Grafica computerizată a schimbat modul în care arhitecții creează și comunică. Dar oricât ar evolua tehnicile de lucru în proiectare, la baza meseriei de arhitect rămân abilitățile profesionale valabile în orice epocă: intuiția și creativitatea în modelarea spațiilor, în controlul expresivității luminii și a materialelor.

