

绿色设计的发展及其在日本大阪大学的应用

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摘要: 在介绍所参与研究项目设计的基础上, 探讨了日本绿色设计的进展与应用。探索了生态村的可持续发展生活方式设计及其三维图形处理的应用, 展示了市民的参与设计模式与虚拟现实技术在沟通交流上的功能, 并希望藉此提供一种独特的绿色设计思路: 自下而上, 软件先行。

关键词: 绿色设计; 生态村; 三维图形处理; 虚拟现实

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The Current Developments of Green Design in Japan and Applications at Osaka University

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Abstract: Based on some real design research projects, the current trend about green design in Japan is introduced. The sustainable life style is explored with the approaches of 3DCG video demonstrating lifestyle in eco-village. The citizens' participatory design method is introduced with the validity of VR (Virtual Reality) to be an effective communication tool. The research on the developments and application of green design has a tendency not toward a top-down approach but a bottom-up approach, and also not toward a hardware approach but toward a software approach.

Key words: green design; eco-village; 3DCG; VR

1 Introduction

On 2007, "2050 Japan Low-Carbon Society" scenario team mentioned in its report entitled "Japan Low Carbon Society Scenarios: Feasibility study for 70 % CO₂ emission reduction by 2050 below 1990 level" that Japan has the technological potential to reduce the emissions of CO₂, which is the major greenhouse gas, by 70 % by 2050 from the emission level in 1990 while satisfying the required amount of energy services in either of the two possible socioeconomic sce-

narios ("2050 Japan Low-Carbon Society" scenario team, 2008)^[1]. An environmental performance assessment of buildings is also carried out using CASBEE (Comprehensive Assessment System for Building Environment Efficiency) in many buildings in Japan (JaGBC/JSBC, 2009)^[2]. These are significant approaches for Green Design in Japan.

The author's interests include environmental design, participatory design, development of digital design or communication tool using VR, MR and 3DCG, and application of the system. He has joined domestic/international research

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projects. Taking examples from these projects, he would like to show the current trend about green design in Japan.

2 Sustainable Lifestyle Design & 3DCG-Kobunaki Eco-village

The increasing concern about global environmental and social issues has led to discussion of how architecture, cities, and human life should be adapted to move towards realization of a sustainable society which curbs greenhouse gas emissions. Each human's lifestyle has direct environmental and social impacts. Therefore, an important issue is that a sustainable lifestyle should be designed and disseminated to the world. As a method of dissemination, 3DCG (3-D computer graphics) which is a powerful and easy to understand medium is expected to be particularly effective (Sasada, 1999)^[3]. About this theme, sustainable lifestyle design and 3DCG, the author attempted some projects such as Kobunaki Eco-village project (Fukuda, 2006; Fukuda, 2008)^[4-5], new LRT (Light Rail Transit) project (Kawaguchi, 2009)^[6] and Next Gene 21+ in Taiwan (Next Gene 21+, 2008)^[7]. The Kobunaki Eco-village in Omihachiman-city, Japan is focused in this paper.

2.1 Kobunaki eco-village

The Kobunaki Eco-village project in Omihachiman-city, Shiga, Japan represents an opportunity to explore what individuals in a community can do to realize a sustainable society through their lifestyles. The eco-village concept is not just for special people in a unique place, but for wide application throughout Japan and the world. The author has been involved with the project since 2004, studying progressive approaches, making design proposals and 3-D simulations, and so on, as well as discussing issues with many people in various disciplines.

2.2 Eco-lifestyle design

What would an ecologically-sound lifestyle look like? Of course, the answer depends on where and how you like to live. To explore this question, we designed an example of an "eco-life" and showed what it would be like in a short video. We hope that the video will stimulate people to discuss and consider what living in such a world would mean for them. Key categories and examples of the eco-life we designed include the following:

- 1) Connecting dining table and food source
 - A vegetable garden in each house
 - Meals made using vegetables from a household garden

- Composting of food scraps and garden waste

- Using agricultural products from local farms

2) Connecting home and nature

- Buildings constructed by inhabitants

- Design of buildings and gardens to promote social interaction and exploit "microclimate" conditions

- Storing rainwater for watering plants

- Participating in village forest preservation activities

3) Green village landscape

- Guidelines for architectural design and gardening

- Participatory design to develop sense of involvement

- Village pedestrian and bicycle paths

- #### 4) Partnering with universities and non-profit organizations (NPO)

- Inviting world-class researchers

- Communication between inhabitants and researchers

- Workshops on sustainable agriculture

2.3 3DCG video: lifestyle in an eco-village

To show what life in an eco-village would be like, we created a short video using 3DCG (7 minutes 20 seconds, resolution HDV 720 p) after the eco-life design project was complete. First, the basic scenario is explained briefly. Then the eco-village site itself is approached, showing an environmental sustainable-type residence, vegetables being harvested and material circulation. At the community center, international researchers and inhabitants discuss environmental issues. Residents are seen enjoying the four seasons in a microclimate-based landscape design. At night, they relax and enjoy community activities. Narration and captions were kept to a minimum. For example, the design of a home and microclimates is represented visually, keeping in mind that, although written and illustrated explanations may help the audience to understand the concepts, to move them to take action. It is also important for them to feel a sense of satisfaction and be motivated to action. Mr. Kentaro Sato (A Japanese composer under activity in the United States) composed the original music, titled A Day in the Village.

A questionnaire was distributed to viewers after a screening of the video, and the results indicated that they had not only acquired an understanding of the project but were also supportive of it. In order for humanity to solve global environmental problems, each person needs to live an environment-friendly life. We believe that this short video can be effective in showing people what this might look like.

Kobunaki Eco-village of the first stage was completed in October 2008.

3 Downtown Renovation by Citizen Participation for Compact City-Patio Design

In order to reproduce a downtown area which has problems of people and businesses leaving the city centre, and aging of society, an approach was developed in which local residents and storekeepers participate in the renovation process positively themselves, sending a continuous message that the downtown area is energetic and sustainable. For this, there has been an increasing need for effective use of open street space. For example, social experiments in which cafes extend into the street space temporarily have been increasing rapidly since 2003. To improve the charm of public spaces, there are two reasons that citizens' participation in municipal affairs is indispensable (Project for Public Spaces, 2000). One reason is that local residents have many ideas which can assist with a design. Another reason is that local residents continue to have an interest in the state of their town when they participate positively in community development of an area. Such participation produces the attractive idea leading to the design described previously.

When taking forward space study with a citizens' participatory design method, the validity of VR (Virtual Reality) has already been shown to be an effective communication tool among stakeholders. The VR system is intuitive and easy to understand interactively. About this theme, downtown renovation by citizen participation using VR, the author attempted some projects such as a patio design (Fukuda, 2009), a historical shopping street (Fukuda, 2007) and a shopping street in an old town. The Patio design in Takamatsu-city, Japan is focused in this paper.

3.1 Patio design

The small patio design is a citizen participatory real design project, which is a road lot, and surrounded by buildings in downtown Takamatsu-city, Japan. Originally, there were benches, signs, electric poles, garbage cans, etc. all over the open space in disorder. Moreover, multiple-purpose and constant use of the area was not possible. Therefore, the design concept removed the existing unnecessary elements. In this project, three shopping malls and a residents' association established the patio council, and this council furthered the plan as the project executor. Moreover, the patio council

members took a lead role in furthering the plan, took responsibility for maintenance, and planned events. There were four main steps in the design process of the patio. First, a designer and design team created design alternatives. Then, the patio council studied the alternatives. The alternatives were re-created based on the patio council's study. Then, administrators, such as the government and the police, studied the alternatives. Design publicity was carried out from the stage where the consensus-building of the alternatives was carried out to the last stage. The process continued with feedback.

3.2 VR application for continuous design study

A total of 22 study meetings were held from May, 2005 to October, 2006. In these, VR was updated and utilized a total of 13 times. In the VR use, reaching an exact understanding of space according to the content of the space study, and lively discussion on the design are mentioned. The latter is described in more detail. From the initial stage of a design process, VR of rough accuracy was shown, like a study model. In the initial stages, there were few opinions from the patio council members because it was the first time for council members who were non-professional to see VR. However, after three months of VR use, more opinions were expressed because council members were familiar with VR.

3.3 Result

Through the citizen participatory design process, the patio was completed in August 2007. In Japan, it is still very rare to set up parasols permanently and lawfully on a road lot. Over a period of one year since completion of construction, the patio council members have organized more than 10 events. A presentation of the satisfactory solution for each position, continuous tenacious deliberations, and an intelligible communication tool were required in order to realize this. This new example is realizable with the continuous design study and tenacious deliberations using VR.

4 Conclusion

This paper described some projects the author drove forward in Japan for pointing out the current trend about green design. These contents have a tendency not toward a top-down approach but a bottom-up approach, and also not toward a hardware approach but toward a software approach.

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“绿色之辨——2010年绿色设计国际学术研讨会”在湖南工业大学隆重举行

5月21日~23日,由湖南工业大学和中国《装饰》杂志社联合举办的“绿色之辨——2010年绿色设计国际学术研讨会”在湖南工业大学隆重召开。

22日上午,湖南工业大学校长王汉青教授、《装饰》杂志主编方晓风教授等人先后在开幕式上致辞,来自设计领域的130多名海内外知名学者、专家汇聚一堂,共同探讨了“绿色设计”这一核心主题。

开幕式后,主办方还举办了多场围绕“绿色设计”的主题报告会,并分组讨论了建筑中的环境因素、视觉艺术与科学创新模式、经济与设计的互动关系等问题。与会专家、学者在讨论时强调了“绿色设计”对生态环境的良性循环和可持续发展具有重要意义,并从人性的角度分析了实现“绿色设计”的关键在于消费模式和消费观念的转变,而消费模式和消费观念的转变要以高等教育为支撑。会议期间,与会代表还在制定更完善的法规、建设监控体系、打造设计媒体等方面达成了共识。

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