< Draft – GE BI >

4. Major challenges of designing & Building the Water Cube

1>. Multi-culture cooperation and group work: Since there was involvement of different firms with not a common language and with different cultural backgrounds, it was difficult to handle manpower and to work on the local level. But this risk is always there when working on international projects and hence the management teams are to be prepared for that, but it can be sorted out with proper management.

2>. Material: In 2003, there is no building which is constructed by ETFE and no people is expert in this field in China. Although, in Europe, the number of ETFE constructions is increasing, for example, Eden Garden in UK and Allianz Arena in Germany, they are all opening membrane structure. However, there is not a completely enclosed large-scale membrane structure in the world. Chinese architectures faced this material firstly and they are seemed confused. In addition, the water cube looks beautiful, but the membrane structure also faces many problems such as heat insulation, temperature increase, and sound insulation. For example, if it rains outdoors, for example, the sound of raindrops is likely to overwhelm the sound of the pool. Also, if the sand wind is very heavy, whether the membrane structure has the ability to resist pressure. The last challenge of use of ETFE is that where can they buy this materials. In 2005, there are only four companies that can manufacture and install this material. Chinese architectures needed to cooperation with one of them and control budget at the same time.

3>. Budget and time management: The budget of this project is not enough and managers needed to save it as much as possible while completing the project. Also, time has become urgent and architectures needed to finish every step before deadline.

4>. Steel structure: Water Cube's steel frame structure not only requires to meet an over-limit seismic review, but also has a very high standard in the toughness and hardness of steel. There is less company which want to create this steel for the Water Cube because of these reasons. The government had to find a cooperation with them.

5>. Energy saving: Arup company must meet the China environmental standard when make the decision because there are some of limitations and principles of energy. Such as usage of power, CO2 emission, water usage and water recycling.

5. Major factors of team’s success -specific practice & process

1>. Leadership

Core leadership play the most important role in this team. And leaders of different departments such as designers, engineers, local workers created a trustworthy environment and engaged in brainstorming ideas in routine meetings. Also, leaders who come from different regions dealt with various emergencies well. They decided the idea of project and encourage researchers settle and contribute two-layer insulation. When conflict occurred, the leadership could solve the problem between team members and encourage team to innovation.

2>. High technology

Arup and CSCEC adopt lots of modern advanced technology. Choosing ETFE material as the surface of the Water Cube to create a beautiful appearance, and save energy to protect environmental at the same time. Others like optical devices that determine the relative positions of athletes, multi-angle three-dimensional image projection systems, etc., will help viewers to better watch the game. BIM and CAD software are this team's best skills.

3>. Management

The management team effectively assigned tasks and resolved the impact of multi-culture between China and Australia. They also control time and budget and both of these were not exceeded schedule.

4>. Cooperation effectively

All of team members come from different countries around the world. However, they trust each other, work hard for same ideal, help and build friendship in this period. This can increase the cohesion of team, enhance the work efficiency and can make headway for the project.

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