

project was awarded as the first prize of science and technology innovation for heritage protection in 2009, China.

Year of completion: 2011 In operation since: 2011

Questions to be responded to by the firm submitting the application

Why do you think this project should receive an award? How does it demonstrate?

- innovation, quality, and professional excellence
- the principles of transparency and integrity
- sustainability and respect for the environment

1. A series of technical problems were overcome and the innovation achievements are international leading

(1) Based on the principle of ‘no pressure vessel’, the protection technology for cultural relic site under deep water was proposed for the first time. A series of technical problems were overcome, such as thin layer sandstone with inscription easily destroyed by infiltration water pressure, inscription buried and abraded by sediment accumulation, floodwater drawing off and shipping safety affected by the large protector structure.

(2) Auto-adaptive purified water pressure balance system combining with water cycle purification, automated monitoring and control was developed in the project. Standard for controlling water turbidity in protector and water pressure difference inside and outside the protector was established, and the technical problems of engineering safety and cultural relic safety brought by large water pressure difference caused by changing of river water level were solved.

(3) Technologies and corresponding facilities for visiting gallery under 40m deep water, high-power LED lights resistant to high hydraulic pressure, and underwater cable connectors through cabin were developed. System for safe visiting and exhibition of cultural relic under deep water was created. Objective of the White

Crane Ridge paleohydrology inscription displayed for public all weather was realized, and the project become a successful example of making cultural relic 'live up'.

(4) Various disciplines and special technologies including cultural heritage, hydraulic, architecture, municipal, transportation, military and special equipment were integrated in this project. It is a systemic project in the field of domestic and international cultural heritage protection.

2. Excellent technology and superior quality

(1) Based on the principle of 'no pressure vessel', distinctive purified water pressure balance system and system for safe visiting and exhibition of cultural relic under deep water was created, the first underwater museum for cultural relic site in the world was built, the protection purpose for inscription by original site, original sample and original environment was realized. The project provides reference for study and practice of cultural relic conservation.

(2) Through the unique protection mode of the White Crane Ridge underwater museum project, the international cultural heritage protection concept and technology was enriched and innovated, and the leading position of China was established in the protection field. The project achievements were appraise by experts as international leading level, awarded as the first prize of science and technology innovation for heritage protection in 2009, China. One authorized invention patents, four utility model patents (Authorization number: ZL 2011 0038121.1, ZL 2010 2 0684138.5, ZL 2011 2 0038761.8, ZL 2005 2 0040724.5, ZL 2012 2 0117435.0) and one software copyright (2014 SR 011098) were awarded, and two monographs and over twenty articles were published.

(3) The project was appraised by UNESCO as the pioneer of the protection and exhibition for the similar type heritage, and it will be the outstanding representative of the special landscape and the first successful example of in-situ protection for underwater cultural heritage sites in the world. The project was also appraised by ICOMOS as the first completely preserved museum in similar type museums and an innovative special case in-situ protection for underwater cultural heritage sites.

(4) Running for 5 years, the underwater museum experienced kinds of extreme working conditions and operated normally. In December 2014, the project was appraised by the Science and Technology Department of Hubei Province, China as a systematic project with important implications in the field of protection of cultural heritage in the world. Currently, the state of conservation and exhibition for the inscription is well, the structure of the protector is safe and easily maintained, and the shipping and floodwater drawing off in the river where the project exists is normal.

The White Crane Ridge underwater museum project, with excellent technology, operating well, is a high-quality project which will be withstood by the test of time.

3. It is transparent and integrity project

(1)Engineering consulting services is transparent, efficient, open and competitive, Chongqing University was

commissioned for supervising the whole design process of the project. Based on quality, Changjiang Institute provide professional, objective, impartial service and advice for the client.

(2) Domestic first-class research institutions including Shanghai Jiao Tong University, Wuhan Institute of the second ship, Chongqing China Three Gorges Museum, Chinese Academy of Cultural Heritage, China Railway Major Bridge Engineering Group CO., LTD and Chinese Academy of Sciences were commissioned to assess the project studies and implement the project technologies transparent and open.

(3) Ethics system for consulting engineers was established, in the phrase of construction, procurement and bidding, based on the principle of leading technologies, reasonable proposals for the client were provided and the rights of client were maintained.

(4) In 2012, the project was through audits, and the using of project funds was proved reasonable and standard.

4. Sustainability and respect for the environment

(1) In-situ conservation for precious cultural heritages under deep water is a worldwide problem, the successful implementation of the White Crane Ridge underwater museum project, realizing the in-situ conservation for cultural heritages under more than 40 meters deep water, making an important contribution for the promotion of underwater cultural heritage protection, and be of important reference and promotional value.

(2) The retention of cultural information of the White Crane Ridge paleohydrology inscription was maximized preserved by the White Crane Ridge underwater museum. The project is in accordance with the principle of the truth, integrity, ornamental and continuity requirements for cultural heritage protection in the ‘Venice Charter’.

(3) Environment protection, green energy, and the coordination among architecture, natural and human environment were emphasized in the White Crane Ridge underwater museum project. Purified water pressure balance system and LED lighting system are in accordance with the principles of environment protection and energy saving, realizing the sustainable development of the human environment.

(4) The investment for the White Crane Ridge underwater museum project is less and the effect obvious, sustainable development of local economic is effectively promoted. After running, the museum has been a unique cultural landscape, becoming one of the six tourist projects in Chongqing city, promoting tourism development for Chongqing and the Three Gorges, achieving the sustainable use of national key cultural relics, be of broad social influence.

What services did the member firm provide to the project? Please describe briefly.

Changjiang Institute of Survey, Planning, Design and Research is the leading design and consulting company for the White Crane Ridge underwater museum project, responsible for the research of overall technical

program of 'no pressure vessel', carrying out in-depth comparison and demonstration for the arrangement of the project plan, viewing, safety, cost and other technical and economic issues, carrying out research for ten key technology subjects, completing three-dimensional nonlinear finite element calculation and analysis of underwater protector, underwater lighting and CCD remote observation system, purified water pressure balance system, security monitoring system, transport and visiting galleries and construction programs and other monographic studies, undertaking engineering design and construction service for the project.