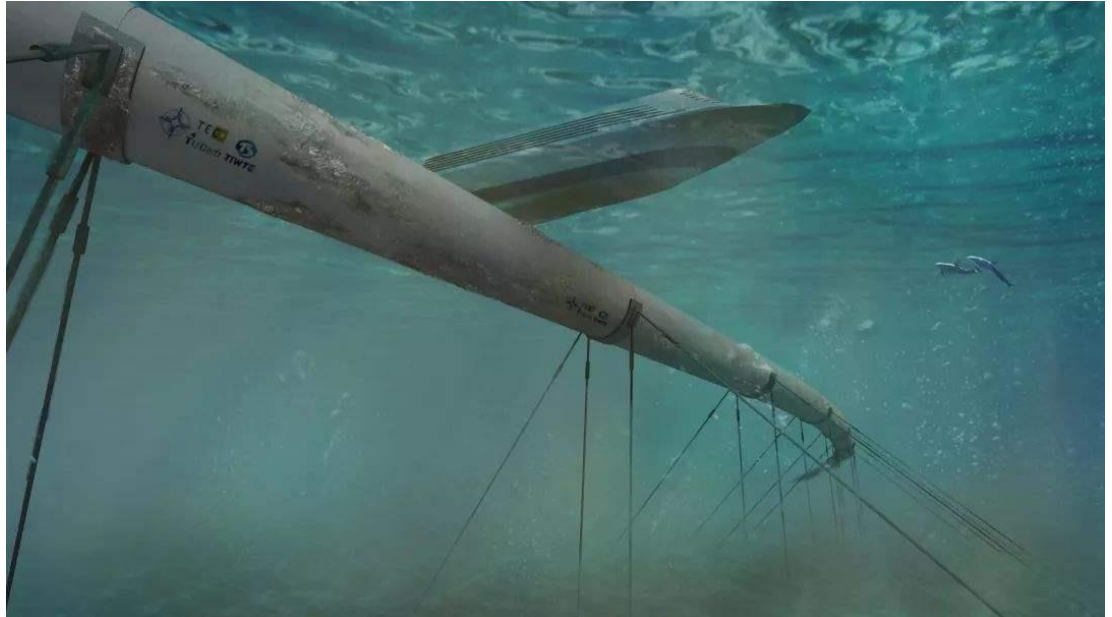


Project identification

Submerged Floating Tunnel Joint Technical Research

Type of project

Applied research



Client

China Communications Construction Company Ltd. (CCCC)

In co-operation with

TU-Delft, Tianjin research Institute for Water Transport Engineering (TS TIWTE)

Project assignment

Fundamental research to the application of Submerged Floating Tunnels (SFT's)

Country

People's Republic of China

Location

n.a.

Project duration

4 years

Project phase

Conceptual design

Construction cost

n.a.
(excl. VAT)

Consultancy fee

€ 1,200,000 (TEC part)
(excl. VAT)

Office

Laan 1914 no 35
3818 EX Amersfoort
P.O.Box 28013
3828 ZG Amersfoort
The Netherlands

Telephone

+31 (0)88 348 2540

E-mail

info@TEC-tunnel.com

URL

www.TEC-tunnel.com

Submerged Floating Tunnel Joint Technical Research

Fundamental research to the application of Submerged Floating Tunnels (SFT's)

Project description

The objective of the Submerged Floating Tunnel (SFT) Joint Technical Research project is to further develop the concept of an SFT as a safe and economically affordable alternative to bridges and sub-seabed tunnels for strait, estuary and fjord crossings. The development of the concept is aimed at the level of finding solutions for all scenarios and failure mechanisms, enabling contractors and designers to make safe and economical preliminary design of SFT's for a potential location of a major fjord crossing and/or a link to an island near the Chinese mainland.

Scope of work

The SFT Joint Technical Research project has 11 defined tasks or work packages. The activities in the TEC lead work packages are:

- WP-01 Structural design research
Assessment of double hulls, compartments and flooding, comparison of cross-sectional shapes, comparison of straight and curved alignments, optimising buoyancy-weight-ratio, deriving SFT motion criteria, structural dynamics research and Vortex Induced Vibration (VIV) study
- WP-02 Hydrodynamic and structural model analysis research
Review of laboratory and CFD work to measure forces on SFT structures, investigation of the types of hydrodynamic forcing applicable, 2D laboratory experiments on rectangular and circular cross-sections in TU-Delft water lab, 2D force measurements in China research facility, 3D force and displacements measurements in China wave basin.
- WP-03 Risk and reliability assessment
A risk assessment method is developed for SFT's to determine the risks of a given configuration and to inform on the implementation of safety measures. Risk identification, analysis and mitigation.
- WP-04 Numerical model development
A numerical analysis procedure has been developed to simulate the behaviour of the SFT in wave and current conditions. Use is made of aNySIM and DIFFRAC (software developed by Marin). The results are validated with the physical model tests.
- WP-05 Anchoring system research
Literature surveys to offshore mooring concepts. The concepts are assessed for theoretical and practical applicability.
- WP-06 Joints and shore connection structure research
Several concepts for the joints between the submerged elements and for the joints at the transition between the shore and water are developed. The joints are developed to a basic design level and are checked for their structural capacity (in terms of forces and deformations) in permanent load, hydrodynamic loads and seismic load conditions.
- WP-09 Design & Construction guideline
A construction manual is developed in which all relevant environmental conditions are described from which load can be derived. Material and functional requirements listed as well. The manual is useful in the concept design of a SFT structure and can be considered as a Basis of Design.

