

## Not Giving Up is a Step to Success —Turkey: Cross-Bosphorus Tunnel—



After placing the tunnel segments on the seafloor, 60m below surface (a world record for deepest seafloor) (far right, Mr. Koyama) (Photo: Mr. Koyama)

Turkey's largest city, Istanbul, is divided by the Bosphorus into an Asian side, where many residential areas are located, and a European side, where business centers are concentrated. For residents to move in and out of the strait that cuts across the city, there are ferry services, the First Bosphorus Bridge, and the Second Bosphorus Bridge which was constructed in part with Japanese economic and technical assistance. However, with the economic development of Turkey, the traffic of cars and other vehicles which cross the strait has increased, and chronic traffic jams and air pollution were problems with the two bridges.

In order to solve these problems, Japan has provided ODA loans to Turkey since 1999 for the construction of a rail tube across the Bosphorus<sup>\*1</sup>.

Managing the works for the tunnel part of the rail tube construction was Mr. Fumio Koyama of Taisei Corporation. He had admired, from a child, large-scale civil engineering works, such as the Wakato Ohashi Bridge. During his university years, he became interested in offshore structures, whose construction he became engaged in after joining Taisei Corporation.

The company will construct the tunnel for the rail tube that will cut across the strait using the "submerged tunneling method." By this method, which requires a high technique, the tunnel will be constructed by submerging and connecting several concrete tunnel segments which are made above ground in advance (11 segments, each 135m long in this case) under water.

The Bosphorus is deep, at a depth of about 60m. There the water current is fast, and the tide flows in opposite directions between the sea surface and sea floor of the strait. Because of such factors, the Bosphorus is said to be a difficult area for construction work. In addition, as large vessels and ferries navigate the waters in this area, a risk of collision exists with the workboat which will submerge the cross-sectional surface of the tunnel.

Despite the difficulties of the area, Mr. Koyama said, "As an engineer, I had grand dreams of challenging myself" with regards to this project in the historical land of Turkey that flourished as a crossroad of "eastern and western civilizations."

However, Mr. Koyama was swept with fear, for this project was described as "close to impossible" by experts from Japan and the other countries. "Can we complete the construction without trouble? Perhaps the construction will not finish this time?" He said there were many nights he could not sleep or was woken up by a dream of making mistakes. He said, fighting these fears in the firm belief that the project will definitely succeed, the project team as a whole thought candidly about ways for overcoming many difficulties.

The efforts of Mr. Koyama and the staff were fruitful. In September 2008, the construction work to connect the 11 segments was completed without any problems. Now, work is underway to complete the construction of the cross-strait railway by 2013. Thinking back on the construction, Mr. Koyama said, "I learned through this project that 'not giving up' is the first step, and at the same time the last step to success."

In 2010 "Japan Year in Turkey," various events were held in Turkey to deepen the friendship between the two countries. Mr. Koyama noted, "We must pass down" the history of the friendship between Japan and Turkey, which began with the rescue by Japanese people of the Turkish warship Ertuğrul that was shipwrecked off the coast of Wakayama Prefecture 120 years ago.

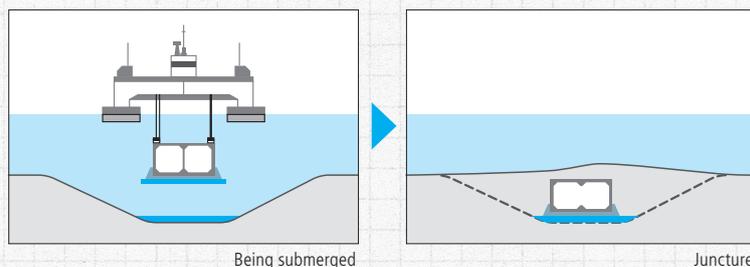
There is a drawing in the project office. It is an illustration of a seabed tunnel that a Turkish person dreamed about and drew 150 years ago. Now, as this dream is about to become a reality, Mr. Koyama said, "It would be the ultimate joy for us civil engineers if this project is etched into the memories of the Turkish people as 'work that will stay on the maps' and 'work that will go down in history'."



Workboat that submerges the tunnel segments (Photo: Mr. Koyama)



Diagram of the submerged tunneling method (Source: Taisei Corporation)



\*1 Bosphorus Rail Tube Crossing Project (I) (II)