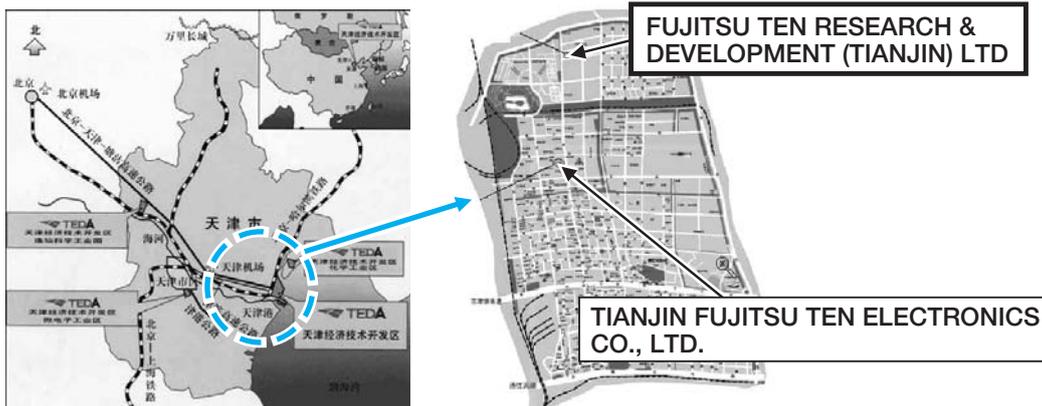


# INTRODUCTION OF OVERSEAS TECHNICAL CENTER

## *Introduction of Fujitsu Ten Research & Development (Tianjin) LTD. (FTRT)*

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### Abstract

In China, car sales have been growing rapidly since 2000, and now China has become the world's second largest market, surpassing Japan in 2006. In such circumstances, FUJITSU TEN established FUJITSU TEN RESEARCH & DEVELOPMENT (TIANJIN) LTD. (hereinafter referred to as FTRT) in November 2003 in Tianjin, China to launch our products into the Chinese market and strengthen our price competitiveness.

We improved the facilities of FTRT to perform design and evaluation work in China, and we began from nothing regarding securing and training human resources.

We have been promoting activities in order to realize local design, adding Chinese characteristics to the technologies that FUJITSU TEN KOBE cultivated in Japan. Here we introduce the activities of FTRT that marks its 5th year.

## 1 Introduction of Tianjin

Tianjin is one of the four government-ruled municipalities, adjacent to Beijing, the capital of China. Tianjin also plays a central economic role in the Bohai Gulf area and has the largest port in North China, opening up to the world. The city has a population of 10.5 million and it is known as the hometown of Premier Wen Jiabao.

Tianjin Economic and Technological Development Area, in which FTRT is established, is located east of Tianjin and is 50km from the center of the city. It is also situated next to Tanggu District and Tianjin Xingang Port and located at the center of "Binhai New Area."

Located in this development area are Tianjin FAW Toyota Motor Co., Ltd. and their many related Japanese companies as well as TIANJIN FUJITSU TEN ELECTRONICS CO., LTD. (hereinafter referred to as TIANJIN TEN), the manufacturing plant of FUJITSU TEN.

In 2006, the national policy to develop this "Binhai New Area" was announced and since then, this area has been attracting attention in China. Now in the "Binhai New Area", the economy has been growing steadily with investments in big projects such as airbus manufacturing and rocket development. The area aims to be an economic center of China, following Shenzhen in Guangdong and Pudong in Shanghai.

## 2 Corporate Profile of FTRT

### ① Background of Establishing FTRT

In the Chinese automotive market, sales have been growing rapidly since 2000, with China becoming the world's second-largest market in 2006. Competitors have also expanded their business to China to launch their products into the Chinese market and to strengthen their price competitiveness. In such circumstances, following the setup of TIANJIN TEN in China, FUJITSU TEN established FTRT as a design center to expand our business, control the design costs, and lower the product costs. FTRT was established in November 2003 with the purpose of planning, designing and evaluating our car audio products in China, and FTRT will mark its 5th year in November 2008.

### ② History of FTRT

November, 2003	FUJITSU TEN RESEARCH & DEVELOPMENT (TIANJIN) LTD. (FTRT) established.
January, 2004	Temporary office opened: defective products analysis of production line in TIANJIN TEN and Chinese market research started.
September, 2004	The first stage building completed: introduction of facilities for reliability testing started.

April, 2005	CD deck mechanism design, evaluation of product prototypes, and reliability evaluation started.
January, 2006	Design of derivative product model started (for Toyota Motors, etc.)
November, 2006	TS16949 obtained.
March, 2007	The second stage building completed (area: from 2,000m <sup>2</sup> to 6,000m <sup>2</sup> )
October, 2007	Research and development in Tianjin Economic and Technological Development Area approved (first in development area)
December, 2007	Tianjin High-tech Enterprise Certification obtained.
April, 2008	New deck mechanism development and product planning for China started.
July, 2008	ISO14000 obtained.

### ③ Transition of Employees

In January 2004, FTRT started its operations with 25 employees including 20 members transferred from the engineering department in TIANJIN TEN. Since then, in time for graduation in July, FTRT has hired about 40 employees focusing on new graduates every year, and as of October 2008, FTRT is a 250-employees development company (Fig. 1).

The average age is extremely low, 26 years old, and the male-female ratio is half and half approximately. This shows that there are many females aspiring to be designers.

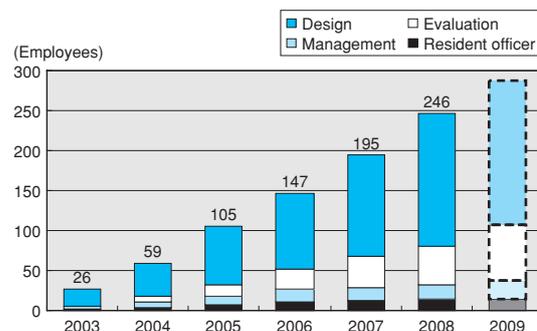


Fig.1 Transition of Numbers of FTRT Employees

### ④ Building and Facilities

In the early days of FTRT, it started its operation with a temporary office renting a room of a building. At that time, the heating did not work well so the employees had to work wearing a coat all day long. In September 2004, the building with an area of 2,000m<sup>2</sup> was completed on land with an area of 30,000m<sup>2</sup>. In April 2006, a two-story building with an area of 4,000m<sup>2</sup> was extended to be the current FTRT. The actual vehicle test tracks (Fig. 2) with a length of 80m and 10 kinds of rough roads have been created. The inside of the building is divided into two spaces. One is an office space where the design

work is conducted, and the other is a test space where the evaluation test is conducted. In the design work, most of the facilities needed for design verification and evaluation such as SG, oscilloscope, audio analyzer and other equipment for the electrical system, and such as G measuring instrument, luminance meter, dust test machine, 3D measuring machine for parts measurement for the mechanical system are available. For the design CAD software, FTRT introduces DS, SealSaver, and Mecia for electrical design, and solidworks, Pro-E, and CATIA for mechanical design [as the design department in FUJITSU TEN KOBE (hereinafter, referred to as FTL) does], as well as Cosmos/Motion for analysis, and CAE software. These are connected through the network to FTL to build the environment that enables data-sharing with FTL. Also, for the facilities for reliability evaluation (Fig. 3), FTRT introduces the temperature-controlled chamber, temperature/humidity-controlled chamber, thermal shock testing machine, vibration testing machine, system evaluation facilities, and others so that the same reliability evaluation can be conducted as FTL. In addition, FTRT has established the environment to create sound by setting up an acoustic evaluation room.

There are few companies that have those designs and evaluation facilities in China, and FTRT is highly appreciated by domestic customers. Customers from Japan, Europe and United States are greatly impressed by the facilities when they visit FTRT.



Fig.2 Actual Vehicle Test Tracks



Fig.3 Facilities for Evaluation Test

### 3 Efforts toward Design and Evaluation Operation

#### ① Training of Designers

After the establishment of FTRT, the first thing to do was to train the designers with the skills of FUJITSU TEN. FTRT hires the employees focusing on new university graduates, but the universities in China provide

education mainly focusing on production engineering. Therefore, it has been difficult to hire employees who were educated in products designs. Although car sales have been growing, few employees own their cars at home, so our employees had little interest or knowledge about cars.

**(In fact FTRT had to provide practical education about how to start a car engine.)**

The knowledge that the employees must acquire includes technical terms, how to use a measuring instrument, evaluation methods, decision-making criteria, development procedure, how to work in Japanese way, and the Japanese language, but the education approach did not work well because FTRT depended on desk education and individual self-development. Consequently, FTRT now promotes employee education by devising a method that conforms to the environment in FTRT, and by gaining cooperation of FTL, TIANJIN TEN, and manufacturers.

**(Main efforts)**

- **Learning of the manufacturing and product structure by providing production support in TIANJIN TEN (OJT on site)**
- **Holding of periodic study session by the local manufacturers**

\*Items mentioned above cannot be conducted at FTL.

- **Introduction of the measuring instrument recognition system and evaluation technology recognition system and their implementation**
- **Introduction of performance evaluation system (to motivate)**
- **Dispatching of employees to FTL for training**

FTRT made these efforts and kept the procedure manual for implemented items so that even new employees can conduct a certain level of the operation by following the procedure manual. The most surprising thing is the efforts of the FTRT employees. Most of them master the Japanese language during the one-year training in FTL and they become able to carry out routine tasks as well as to communicate with FTL in the Japanese language. Actually, an employee who participated in an exhibition of parts in China memorized the parts name in the Japanese language, and did not understand the parts name or explanation in the Chinese language.

Now FTRT has a system in which they identify excellent local human resources as key persons, then trains and encourages them.

#### ② Design and Evaluation Operation

##### a. Audio design

Audio design corps undertook the first design of derivative models at the beginning of 2006. The model name was 06CBU (Fig. 4). Although it was a derivative model, panel mechanical parts and printed board used for the front surface of the product nearly got to the newly-

designed level. While FTRT promotes the training or education, it was their first time to advance the development step based on the planning, and their actual skills were not sufficient. Therefore FTRT had to advance the development by receiving the assistance and criticisms of designers and related parties of FTL. However, in those circumstances, FTRT found many problems and the employees got firsthand knowledge of the problems. This has made FTRT grow. After that, FTRT became able to design most derivative models based on the FTL models, and in fiscal 2007, FTRT developed the derivative model of about 60 models. As for 06CBU, the further derivative models were produced and expanded worldwide, and now it is the most identifiable FTRT product.



Fig.4 06CBU

#### b. Design of deck mechanism

Currently, TIANJIN TEN principally plays role of the production base of deck mechanism. If they require the support of FTL, it takes time to get its response due to the problems of distance (time) or language. Therefore FTRT gives the plant support activities for TIANJIN TEN instead of FTL, utilizing the advantages that FTRT is close to TIANJIN TEN and can make confirmation on the spot and with local language. For the design of the deck mechanism, although FTRT can consider the structure and parts shape of the deck mechanism, they have to fully understand how to manufacture the parts and how to assemble them during the process, and then reflect that understanding in the design. Therefore FTRT requires enough knowledge and regards these supporting activities as an occasion for training of design ability. However, the design can be acquired only by making it themselves, so FTRT tried the design of a CD deck mechanism independently in 2007.

It remained at prototype level, but FTRT learned the difficulties of design and things that they should do, and accumulated experience in design. From fiscal 2008, FTRT starts the development of our first deck mechanism for mass production, cooperating with FTL. FTRT formulated the method to manufacture easily and to ensure the quality based on the experience obtained during the plant support activities, and is planning to incorporate them.

#### c. Acoustic design

The preference of sound depends on the regions. FUJITSU TEN has provided the optimum sound to our

customers, analyzing the characteristics of the region. However, analysis regarding China is incomplete. Therefore, FTRT conducts the system investigation of local car audio and benchmark of actual car and provides their information to FTL.

#### d. Evaluation test

Since establishment of FTRT, they have conducted the evaluation test aiming to establish an evaluation environment and to conduct the evaluation test that is almost the same as FTL. In 2004, FTRT completed the first introduction of facilities, and started the reliability evaluation of the products and deck mechanism. Since 2006, FTRT has worked on the new evaluation area such as system evaluation and whisker evaluation and has shown good results, introducing the facilities as needed. They started preparation toward the developed AVN evaluation in 2008.

On the other hand, they also conduct an audit of mass production deck mechanism through cooperation with TIANJIN TEN, and contribute to confirmation and securing of quality of mass production products.

#### e. Other self-investigation (investigation on Chinese characteristics)

In China today, many products or media that have the unique feature different from that in other countries are sold, and they are expanding rapidly. Therefore FTRT has to counter those products or media to increase their share in the Chinese market. FTRT conducts media research of market, benchmark of competitor's products as well as the investigation of its characteristics, utilizing the geographic advantage in China. As for the investigation results, they report them to FTL as well as analyze them so that the investigation results can be used as materials for independent planning.

## 4

### Cooperation with Related Companies in China and Other Countries

FTRT also promotes cooperation activities with its three related companies in China, Toyota Motors in China that is our principal customer, and FUJITSU TEN's related companies in other countries.

#### ① Business development with FUJITSU TEN-related companies in China

Currently, FTRT promotes the following business cooperation with TIANJIN TEN and FUJITSU TEN ELECTRONICS (WUXI) LTD. that are established as manufacturing plants of FTL, and FUJITSU TEN TRADING (TIANJIN) LTD. a sales subsidiary.

- Production support for launch of new products and mass production products
- Education for fostering of analysts
- Activities for local procurement of parts (seeking of maker, evaluation, etc.)
- Quality assurance activity for customers in China, consideration of actual vehicle evaluation, and others

- **Research on the Chinese market and product planning for China**

FTRT will further strengthen these activities and aim to build a framework that is complete from planning, design, and production to sale in China.

- ② **Cooperation with customers**

FTRT promotes the research operation with the technical centers of automobile manufacturers expanding their business to China.

Main activities are as follows:

- **Evaluation and investigation of radio community reception**

In this activity, FUJITSU TEN contributes to the development of the evaluation test course in Tianjin and Beijing, and conducts benchmark evaluation with other companies on the test course.

- **Participation in the cost benchmark of automobiles of other manufacturers**

FTRT participates in the cost benchmark of other automobile manufacturers in the Chinese market and conducts the investigation related to FUJITSU TEN's associated parts (audio, air-bag, etc.). FTRT reports the investigation results to the design departments of FTL, and they utilize the results.

FTRT exchanges information and holds meetings on the cooperation activity with the technical centers of automobile manufacturers periodically. FTRT will advance the cooperation so that they can develop the products suitable for the Chinese market.

## 5

**Future Efforts**

Five years have past since FTRT was established. It went through the time of technology introduction and now is in the time of technology application. FTRT has not yet become a company that has enough technology to fulfill the expectations of FTL and our customers, but we can say that FTRT has been growing steadily. The local key persons necessary to develop the company have been brought up, and FTRT will challenge the high-level design operation by accelerating the accumulation of technology.

As future efforts of FTRT, they will start the development of base models of inexpensive deck mechanism for China and Asia in mid-term, and they aim to commercialize the base models in 2010 so that they can increase their share in the Chinese market.

Also FTRT will play a central role in the design center outside Japan of FUJITSU TEN group in the long run, and in cooperation with each center in China, FTRT will aim to build a framework to complete all steps (from planning, development, design to mass production of products for the whole world) in China.

**Profiles of Writers****Taiji OTOMARU**

Entered the company in 1987. Since then, had engaged in design and development work for deck mechanism. Was involved in the establishment of Fujitsu Ten Research & Development (Tianjin) Ltd. from December 2003. Currently the General Manager of technical adviser in the design department in Fujitsu Ten Research & Development (Tianjin) Ltd.

**WANG Zhaomin**

Entered Tianjin Fujitsu Ten Electronics Co., Ltd. in 1997. Transferred to Fujitsu Ten Research & Development (Tianjin) Ltd. in January 2004. Since then, has engaged in company management and design promoting work. Currently the President Assistant and Department General Manager of design department.