

June 28<sup>th</sup>, 2019

## [Interview Report]

### **Tokyu challenges global automobile market with IHI centrifugal compressors.**

The combination of high efficient three-stage centrifugal compressor "TRA series" and IHI group control panel greatly reduced unload time and realized the best energy saving operation.



Tokyu Co., Ltd., Inuyama plant, Japan

Tokyu Co., Ltd. was founded in 1941 as a company that manufactures sewing machines and textile machineries. Today, as a wholly owned subsidiary company of Toyota Industries Corporation, Tokyu has covered various business field which mainly engaged in two business, the automotive parts business including aluminum forged parts such as pistons, swash plate, shoes etc. used in car air conditioner compressor and industrial machinery business of own brand including casting machine, special machine and casting plant design.

**IHI Rotating Machinery Engineering Co.,Ltd.**

Compressor is the heart of car air conditioner and indispensable part for a safe, secure and comfortable car life and Tokyu has manufactured important functional parts of it. These parts are installed in Denso car air conditioners adopted by automobile manufacturers all over the world, and Tokyu's parts are installed in over 40% of cars all over the world.

Tokyu's plastic processing technology (aluminum forging and precise press technology) is improved for future market needs such as downsizing and weight reduction as well as enhancing quality that satisfies current market needs. In particular, the production volume of aluminum forged parts amounts to approx. 12,000 tons per year, which dominates top market share in Japan.

In addition, Tokyu's technology is utilized even for cast products that often require complicated shapes. The strength is comprehensive engineering that offers optimum casting machines, special casting machines and plant design through analysis of work environment of the casting factory, installation space and production volume. The flaskless automatic molding machine "AMF Series" is a best-selling model exceeding the cumulative production number of over 500 units because it produces castings of high quality and high precision and is space-saving design.

You can find voice of customer about background and operation results when Tokyu installed IHI three-stage centrifugal compressor "TRA series" in 2017 from following page.

### **1. [Background] Necessity of stable operation and energy saving**

Inuyama plant was established in 2001. We had used 5 centrifugal compressors for many years, totaling 1 unit of 200kW, 3 units of 340kW, 1 unit of 400kW as the driving source of machining machines. In recent years, the amount of consumed air had been increased to catch up production volume, all compressors had been operated without standby machines. Fortunately, there had been no serious trouble, but we had a risk of stopping production if any failure is occurred with even 1 unit.

We began studying basic renewal plan of compressor system which has standby machines by replacing 3 units of old 340kW centrifugal compressors because which were discontinued compressor model of production so that we were concerned future supply of maintenance parts.

In addition, it was also a problem that the compressor occupied a high proportion of 34% in the total power consumption of factory. Raising the electricity cost quickly reflects to product cost. Energy saving of compressors was a big issue in terms of efforts to reduce factory costs. Furthermore, Toyota Industries group had set the reduction targets for Co2 emissions in recent years. We decided to consider plans with emphasis on energy saving effects when introducing new compressors.

### **2. [Plan] Pull out maximum energy saving with TRA**

We firstly thought about having standby machines by increasing size of compressor from 340 kW to 400 kW, and increasing total air flow. TRA series was a state-of-the-art 3-stagess centrifugal compressor, and we were able to expect significant energy saving by just replacement because of much better specific power.

In addition, we received suggestion from IHI that improves compressor controlling. Originally, compressor room was divided into two, and each compressor was operated individually, so that 1 unit of 340 kW had repeated load and unload for capacity controlling before. According to the proposal of IHI, we expected unload operation time can be reduced by combination of group control panel and synchronous capacity control of inlet guide vane, so that we decided to install group control panel too.

### **3. [Results] Energy saving effect by 6% and truly stable operation**

As a result of installing 3 units of TRA series, we are very satisfied that we successfully

reduced electricity power consumption by 6% as well as we had calculated the effect with IHI before installation. Normally we have operated 4 units of centrifugal compressor during daytime and there have been almost no unload operation time thanks to the combination of group control panel and synchronous capacity control of inlet guide vane.

We have done maintenance suggested from IHI according to the state of compressor every year and we have never met serious trouble, so far we trust IHI's after sales capability very much.

In addition, we have asked IHI not only compressor, but also arrangement of other facilities in compressor room (e.g. piping, cooling tower, pump and others) for long time. We were able to install TRA series with certain confidence because we trust IHI engineering capability too.



3 units of "TRA series" centrifugal compressors (400kW)





“TRA series” centrifugal compressors (400kW)



“TRE series” centrifugal compressors (400kW)



IHI Group control panel

According to the signal from pressure transmitter on air tank in compressor room, group control panel controls every inlet guide vane of centrifugal compressor to follow fluctuated production capacity.

#### **4. [Future vision] Realize further energy saving**

Energy consumption of compressors has been reduced significantly, but it has still occupied a high proportion of over 30% in the total power consumption of factory.

We hope to work together to reduce power consumption continuously with IHI. Even at our side, we will promote policies that will make energy saving for compressors, such as reducing the amount of air used at factory and reducing discharge pressure. We hope IHI continues to develop more energy-saving compressors and better operation way.

(Interview date: December 14<sup>th</sup>, 2018)

Please find information of TRA series centrifugal compressor from [here](#).

[Company Profile]

Name: Tokyu Co., Ltd.

Foundation year: October, 1941

Address:

Head office: 1-60, Yono, Ooguchi-cho, Niwa-gun, Aichi, Japan

Inuyama plant: 1-6, Shinkawa, Inuyama city, Aichi, Japan

Website : <http://english.tokyu-jp.com/>

[Products]



Variable Capacity Compressor Piston



Variable Capacity Compressor Shoe



Valve Plate

(Note) The information on this page is presented "as is." Product availability, organization, and other content may differ from the time the information was originally posted. Changes may take place without notice.