Correction is Better Than Rejection!

Turbo Energy Ltd is a well-reckoned name when it comes to turbochargers in India. Established in 1982, the company caters to both domestic and foreign markets. Constantly trying to improve its productivity and enhance processes, the company incorporated a customized solution from Metrol Corporation India that resulted in zero component rejection and cost efficiency. Here's an in-depth look at the solution provided.

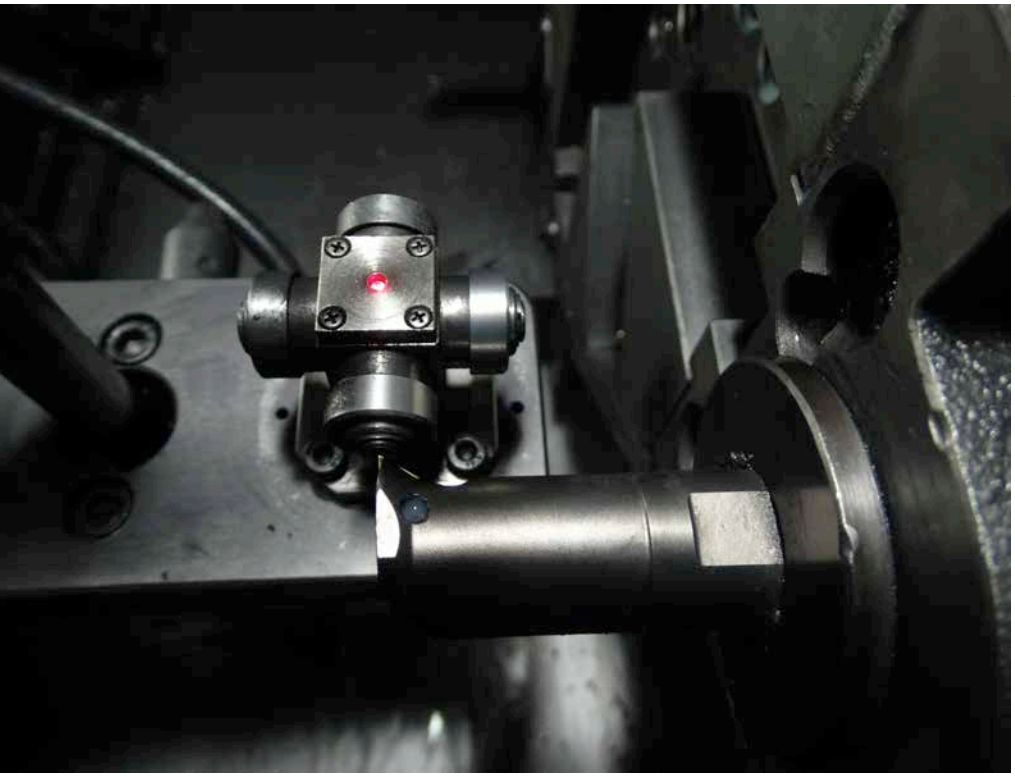
Turbo Energy Ltd (TEL) — formed as a joint venture between Brakes India Ltd, Sundaram Finance Ltd and BorgWarner Turbo Systems Worldwide Headquarters GmbH — is a supplier to all Original Equipment Manufacturers (OEMs) operating in India.

A leading manufacturer of turbochargers, the company primarily caters to the requirements of internal combustion engine industry for on and off road applications.

Nedra Pereira
Senior Feature Writer
Vogel Business Media India
nedra.pereira@vogel.de

Manager – Manufacturing, Turbo Energy Ltd, V Palanivel explaining the working of a turbocharger said, "In exhaust gas turbo charging, part of the exhaust gas energy, which would normally be wasted is used to drive a turbine. The turbine shaft is connected to a compressor, which draws in combustion air, compresses it, and then supplies it to the engine. The increased air supply enables more fuel to be burnt; hence, the engine develops more power. Increased air availability improves combustion of fuel, thus leading to reduced fuel consumption and emissions."

Because the profile of the turbocharger housing has to be precise, the components manufactured have to be accurate in measurement and consistent in quality. The manufacturing facility was seeking to achieve zero rejection in the machining of a particular profile of the housing to increase their productivity. The company approached Metrol Corporation India, pioneers in inventing tool setters for turning centers, for their predicament.



Source: Turbo Energy Ltd

Automatic tool setters for CNC lathes reduce setting time and increase the accuracy of components

Turbo Energy Ltd

Challenges

- Variation in quality of components
- 22 per cent of rejected components were due to variation in bore diameter machining
- Requirement for skilled labor

Solution

- Incorporation of the H4A-series tool setter by Metrol Corporation India

Results

- Consistent quality
- Zero rejection and zero reworking
- 4 per cent saving in tooling cost owing to accurate tool wear updation
- 10 per cent increase in time saving due to lower tool setting time
- Improved Process Capability Index (C_{pk})

Ensuring a complete solution

After several discussions between both the companies, the problem was found to be due to the variation in the bore diameter machining, i.e. the bores were either under-sized or over-sized.

Country Head, Metrol Corporation India Branch Office, Suraj Giri averred, "Turbo Energy Ltd focuses on process improvements at every step and it expressed the need to eliminate rejection due to variation in the component profile caused by the tool wear. Hence, we wanted to aid the company by providing a solution for automatic tool wear

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Country Head, Metrol Corporation India Branch Office, Suraj Giri

updation in their existing machine."

As the company wanted to use its current machine — the Takisawa TC-200, the machine required to be retrofitted with a tool sensor. This was done via careful study of the machine and the components produced. Giri asserted, "Once the feasibility was proved, the trials of mounting the sensor in the optimal location were undertaken."

The technical team from TEL made adjustments in the machine in order to accommodate the tool setter. Following successful mounting of the tool setter on to the TC-200, Metrol Corporation provided customized programming for the machine according to the given requirements and applications. Palanivel commented, "The tool setter automatically sends the required data directly to the control system, thereby automatically making the adjustments."

Speaking on the benefits of tools setters, Giri asserted, "By and large, the industry is still shy when it comes to exploiting the benefits of tool setters, but those who employ such tool setting devices affirm its effectiveness. The predominant method of manually setting the tools was preferred, until now, possibly due to good availability of skilled machine operators."

With tool setters, even semi-skilled to unskilled operators can run the machine. There is an increase in the accuracy in the workpiece, as the sensor ensures the precise measurement of the tool, compensating the thermal growth within the machine axis. Also the real-time wear of the tools are updated in the system automatically as opposed to approximate values entered by operators during manual tool setting. "In these changing times, companies see the reduction in manual errors and a remarkably lower tool setting time as very good incentives to install these sensors in their machines," continued Giri.

Improving processes

After the incorporation of the tool setter, the results have been phenomenal. Palanivel commented, "Our rejection rates have gone to zero. Before the incorporation of the tool setter, we required a skilled operator to do the initial setting, which took an average time of 2–5 minutes. However, now, an unskilled worker can do the same and that too within three minutes. In addition to this, our Process Capability Index (C_{pk}) value has improved." Through this, TEL has been able to continue to achieve customer satisfaction by being able to provide products and services of high quality at globally competitive prices.

"As a result of incorporation of tool setters from Metrol, we now have zero rejection rates and have been able to increase productivity and reduce energy consumption; thereby, reducing costs. In addition, consistency in quality of the machined components has been maintained."

Manager – Manufacturing, Turbo Energy Ltd, V Palanivel

Speaking about the extra savings the company is making, Palanivel stated, "Additionally, there is no requirement for reworking the pieces and hence we are saving on energy consumption."

Satisfaction guaranteed

TEL is so impressed with the results obtained that they have already implemented tools setters in four of their systems and plan to incorporate 50 more such setters in their machines. This example is the best illustration of how sensors can not only help reduce rejection rates but also increase tool life and cost-effectiveness. MMI