



ADVANCED

TEST & AUTOMATION

Systems and Software for a Complex World in Motion



Project Overview



Roller Bearing

Performance and Durability Test Stand

Who We Worked With

- ATA Inc. was approached by a new client with a need to perform performance and durability testing on their line of roller bearings



- The client was among the world leaders in the design and production of industrial and automotive bearing units

- The client wanted a solution focused towards testing of both radial and thrust types of roller bearings, including single and double row configurations of:

- cylindrical roller bearings
- needle roller bearings
- tapered roller bearings
- spherical roller bearings





Tailored To Specific Needs

- After careful analysis of the different types and sizes of bearings, and their operating envelope in terms of speeds and forces, ATA developed an initial layout of the test stand

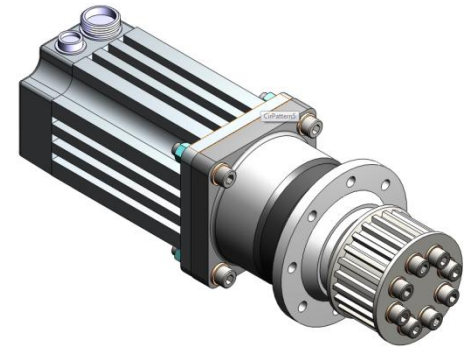


- Through this process ATA was able to gain additional understanding in terms of the types of tests that the client wanted to run according to custom OEM specifications
- The client was not looking for a simple, cost-effective, and reliable test machine, that would have the capability of being easily upgraded in the future.
- ATA was able to propose an architecture that complied with the client's requirements, in terms of overall functionality, budget and delivery time



Key Design Elements

- The first step of the design process was sizing all major test bench components specifically to client's products requirements, such as:
 - selection of drive motor by analysis of torque vs. speed profiles
 - belt-driven driveshaft for load application interface
 - inline torque sensor based on maximum torque
- The bearing under test was mounted on the belt-driven driveshaft, supported by pillow block housings on both ends
- Design of an integrated load application system included a pneumatic ram cylinder, that would act as the drive belt tensioner
 - loading was controlled by magnitude of air pressure in the cylinder, and angle of the cylinder relative to the belt
- For technical info regarding the test bench, contact ATA Inc.





Productivity & Expandability

- The test stand was developed as an expandable architecture, providing the client with a variety of additional analog and digital I/O channels, for easy future upgrades
- Built in software features such as PID control of the applied load, allowed for a high degree of automation in executing custom OEM test scripts
- Multiple test sequences were preloaded on the test stand, which when combined with the automatic safety features of the machine, allowed the operator for more unsupervised control
- The software graphical user interface along with the onboard system diagnostics, permitted users to simulate any type of test conditions either manually or by developing custom test scripts

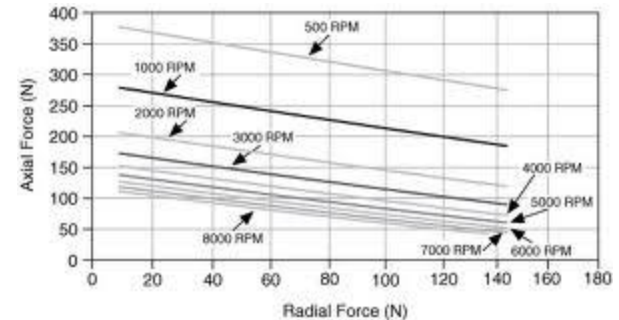


Superior Efficiency

- Quick unit under tests changeover times in-between tests, due to smart fixture and drive mechanism design
 - ability to perform high temperature testing by sealing off the test area around the bearing inside a thermal chamber
- Refined software features provide automatic test execution based on detecting the appropriate trigger conditions, such as reaching the desired test temperature
- Onboard system diagnostics with automatic alarming parameters, which notify the operator of the current test execution status, or if any conditions have cause the test to be aborted
- Extremely low maintenance requirements by using carefully selected sub-components, such as sealed pillow blocks and bearings with temperature monitoring sensors

Making Sense Of The Data

- Automatic execution of preloaded test scripts allowed the client to retrieve test data from tests such as:
 - free-running torque under various steady-state speed setpoints
 - bearing assembly response under custom speed profiles
 - torque response at constant speed under axial and radial loading
- Flexibility on the data logging format and the sampling frequency through the programming interface, in order to simplify report layouts or integration into existing databases or analysis tools
- Real-time graphing features provided live feedback of any measured parameter, including a variable historical buffer for operator reference



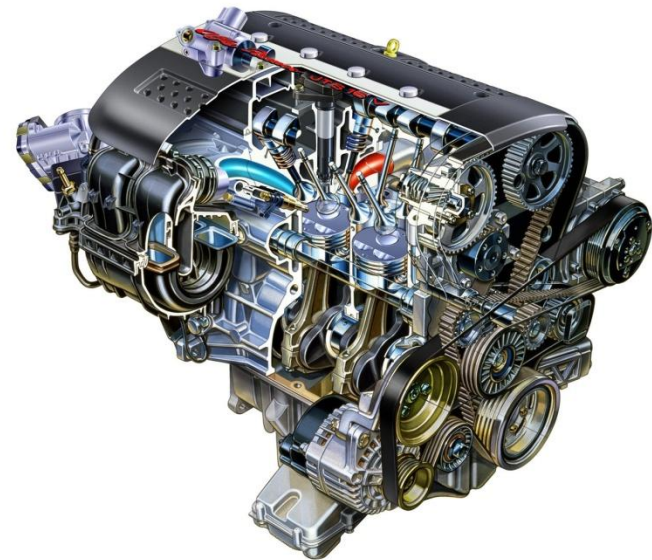
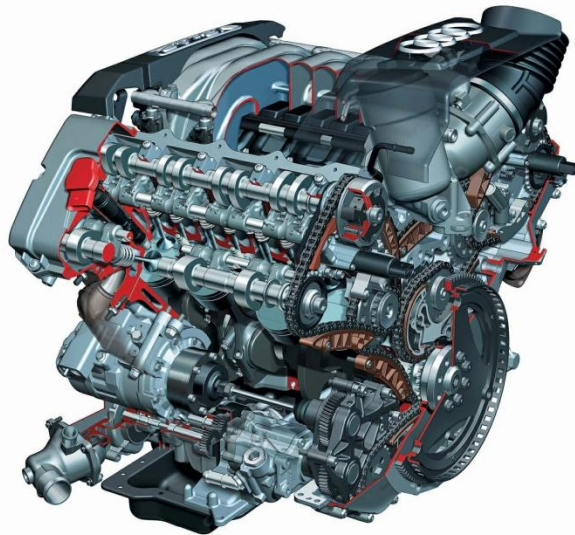


Project Milestones

- The project was delivered on-time and on-budget, and concluded with the notion that ATA will continue to support the client whenever difficulties during test stand operation, test script modification, or results analysis are encountered
- Upon project completion, all documentation needed for service and maintenance of the test stand was released to the client:
 - electrical, hydraulic and pneumatic drawings
 - mechanical drawings of custom fixtures and spare parts
 - comprehensive test stand and software manuals
- Proposal to full design time: 3 weeks
- Design to approval time: 2 weeks
- Build and commissioning time: 5 weeks
- On-site setup time: 1 week

Facts About ATA Inc.

- Certified Engineering Firm
- Specialized in Complex Rotating Components
- Formalized Project Management & Delivery Process
- Internal Design, Integration and Commissioning Team



ATA Inc.

Your Partner in Test

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