Team vibration news

Spring 2009

Systems & Solutions

Engineered vibration testing solutions for improved product quality.

In This Issue:
* * *

A-10 Warthog Undergoes Vibration Testing

By using Team's high frequency servo hydraulic vibration systems, researchers have been able to prolong the life expectancy of the U.S. Air Force A-10 Thunderbolt II or "Warthog." This aircraft was developed for the United States Air Force to provide close air support of ground forces by attacking tanks, armored vehicles and other ground targets. The A-10 is able to do this effectively because the airframe was designed around the primary built-in weapon, a 30 mm GAU-8/A Avenger Gatling gun. One of the most powerful aircraft cannons ever flown, it can fire 60 rounds of depleted uranium, armor-piercing shells per second.

The Air Force contracted with Northrop-Grumman to perform fatigue testing on the A-10 with the goal of prolonging the aircraft's life expectancy. Their concern was that the vibration stress input from both the cannon recoil and automatic magazine loading may cause damage to the airframe with the expected long term use.

Using a pair of high frequency servo hydraulic actuators, Team was able to duplicate the vibration waveforms from the aircraft's barrel and magazine. The gun recoil vibration was duplicated by one actuator driving through a single pivot spherical coupling into the airframe attachment point via a long stinger. The magazine vibration was achieved by another actuator reaching into the side of the aircraft (via a double pivot spherical coupling) to the magazine attachment points. Both of these actuators were able to input the vibratory forces because the actuators were backed up by heavy steel reaction blocks floating on air bags.

With this testing, researchers were able to assess potential damage to the aircraft as it happened, determine at what point it occurred and initiate the best repair for the damage. The outcome of this testing has proven the A-10 can be certified for many additional years of operation.

A-10 Magazine

New Order

* * *

Weatherford International/ Fort Worth Manufacturing are building a state of the art environmental test lab to effectively test their down hole logging toolsand surface systems. As a part of the environmental lab, they are investing in a Team Corporation High Frequency Dual Shaker Vibration System to accurately simulate vibration conditions their tools will encounter during their life cycle. The results of the vibration test will help them improve the reliability of their products by indentifying manufacturing and design weaknesses before the tools are put into service.

Spectrum Technologies Continues Testing with the CUBE ™

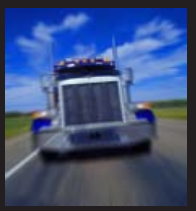
Spectrum Technologies is an independent test lab in the Detroit area. You would think that with the doom and gloom of the auto makers that their business would be pretty slow. However through the forethought of owner Mike Pickel they are still busy doing multi-axis testing for several major companies. Spectrum has two systems capable of simultaneous multi-axis testing. The first is the Team CUBE™, a servo hydraulic 6 degree of freedom test rig and the second is a Tensor, the 3 axis (X, Y & Z) electrodynamic test rig.

Using Team's multi-axis CUBE™ , they are able to realistically duplicate their customer's simultaneous vibration environment for Sine, Random or Time Waveform Replication.

This is a much more accurate test allowing Spectrum to duplicate the same failure in the test lab as seen on the test track. Whether it's a front end module, bumper, gas tank, heat exchanger, transmission or the complete shipping container, Spectrum Technologies is able to accurately duplicate the components vibration environment allowing the manufacturer to build higher quality products, reduce cost and warranty problems. These tests can run anywhere from 30 – 500 hours (24/7) of continuous testing.

"The CUBE ™ continues to run flawlessly" remarks Mike Pickel of Spectrum.

Team Corporation Newsletter
Spring 2009



Contact Us:

* * *

Team Corporation
11591 Watertank Road
Burlington, WA 98233
(360)757-8601
Fax: (360)757-4401
sales@teamcorporation.com
service@teamcorporation.com
www.teamcorporation.com

Team Corporation UK
Team Corporation UK Ltd
11 Old Ladies Court
High Street
Battle
East Sussex
TN33 OAH
United Kingdom

Tel: +44(0)1424 777004
Fax: +44 (0)1424 777005
sales@teamcorporation.co.uk
service@teamcorporation.co.uk
www.teamcorporation.co.uk

News from the UK

* * *

Team Corporation UK Ltd. has recently employed a new sales applications engineer to support our European sales effort, Kevin Francis is based in the UK office. He joins Team Corporation from the elevator design and installation industry and has previous experience in providing wind tunnel test equipment to the aerospace industry. Kevin is a family man with a wife and two children, and enjoys motorcycling, fishing and other outdoor pursuits.

Diesel Engine Intake & Exhaust Test

Purdue University is using the Team intake & exhaust valve actuators in tests for a 2008 6.7 liter ISB diesel engine. This research will include studies in advanced combustion, low temperature combustion and fuel-flexible combustion control.

The actuators developed for this application use a very small, light weight, titanium, piston rod to keeping the moving mass to a minimum. Although this engine has 4 valves per cylinder, Team supplied a single actuator to drive each pair of valves (intake or exhaust) duplicating pushrod actuation configuration. Each actuator is fitted with a piston position sensor allowing accurate positioning of the pair of valves. This control is needed to duplicate the many different cam profiles that this type of study requires. The accompanying drawing (figure 1) shows this configuration using 6 actuators driving the 12 intake valves. Alternate configurations might be 12 exhaust valves or 3 complete running cylinders.

Over 20 years ago Team worked with a major automobile manufacturer to come up with a small, high force, high frequency actuator to operate under position control to exactly position the intake and exhaust valves of a running internal combustion engine. These initial studies were driven by the need to reduce the emissions from a running engine.

Since that initial project, Team has developed many slightly different engine valve actuation systems to perform this same task. These systems have helped to reduce exhaust emissions and increase overall fuel efficiency by optimizing the camshaft lobe profiles.Customers have successfully operated Team's engine valve actuators on an engine running at 6000 RPM.