

TRACTOR MANUFACTURER POWERS UP WITH ULTRASONIC BOLT TENSION MEASUREMENT



When the UK plant of the world's largest manufacturer of agricultural machinery needed to increase the power output of its largest engine, the company's development engineers used Norbar Torque Tools' USM-II ultrasonic bolt tension instrument to monitor the precise tension required in the cylinder head bolts.

The assembly of the joint between the cylinder head and block in these high performance engines is critical, and the bolts need to be tensioned with more accuracy than can be achieved by measuring the torque applied to the bolts alone.

To produce the necessary securing force in the joint the bolts are taken to "yield", and this involves tightening the bolts so that the steel is approaching its elastic limit – the point at which the bolts would no longer return to their original length when the tension on them is released.

Engineers used Norbar's recently introduced USM-II ultrasonic measuring instrument to perform over 10,000 tests on the cylinder head bolts as part of the development of the control program for the bolt running machine.

The USM-II works by introducing a sonic pulse at one end of the fastener and measuring the time taken for the echo to return. As the fastener is tightened, the bolt stretches, and the increasing stress level in the bolt reduces the sound velocity, both of which increase the echo time.

Now the engine is in production, engineers continue to use the portable Norbar instrument to perform regular audits of its performance in accordance with the company's +/-3% Sigma statistical process control.

The USM-II was designed by Norbar to put precision ultrasonic measurement within reach of production, maintenance and quality control engineers who in the past had to rely on torque measurement alone – and it has made an important contribution to the successful development of the higher rated engines needed to power these modern, efficient agricultural machines.