

# SCHMITT PORTABLE BALANCER FOR HAULM TOPPER MACHINES

Established in 1993, Driffield firm Agriweld quickly gained a reputation for innovation in design and excellence in quality. They primarily manufacture agricultural machinery, but are also involved in the forestry and recycling industries. Agriweld are renowned for their hydraulic box rotators and Rhino range of cultivating equipment. A recently won contract to manufacture the Grimme type KS-6000 Three Bed Folding Haulm Topper meant the addition

rotor as lugs and shafts are welded on. This removes heat and minimises distortion during the welding process, reducing the potential run-out when the rotor is ready for balancing. This proprietary water purging process has been found to significantly reduce run-out.

The Schmitt SB-1700 portable balancer is capable of measuring and correcting unbalance in 1 or 2 planes and can measure vibration on components rotating from 300 to 60,000 RPM. It uses a laser speed sensor which can measure up to 2 metres from the rotor, and two magnetically mounted accelerometers - one placed on each of the pedestals, picking up vibration on each end of the component. The speed and vibration inputs, along with the addition of a known test mass enable the unit to tell Agriweld how much and at which angle, weight must be added or removed in order to compensate for unbalance in the

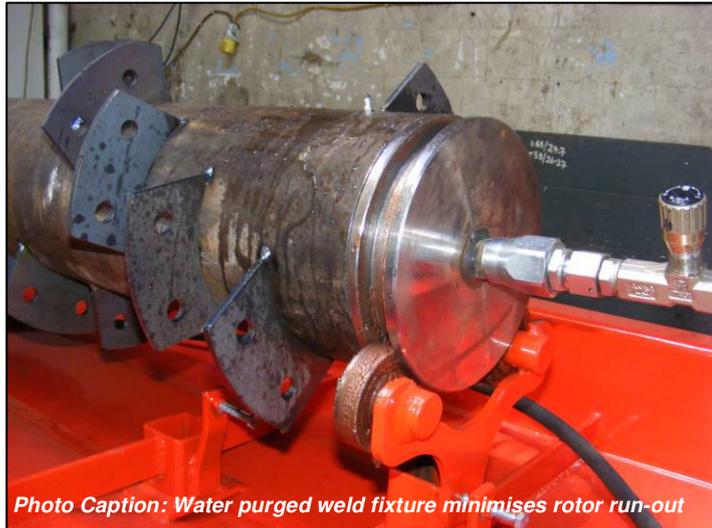


Photo Caption: Water purged weld fixture minimises rotor run-out

of a dynamic balancing process and the purchase of a Schmitt Balance Systems (SBS) SB-1700 portable balancer from Coventry based Schmitt Europe Limited. The Haulm Topper removes the foliage material (haulm) from the top of a potato plant, stunting growth and maturing the tuber prior to removal from the ground. A PTO (Power Take Off) on the back of a tractor drives a high speed rotor inside the topper at 1300RPM via a gearbox, rotating the blade which removes the haulm.

The high rotational velocity, welding operations during manufacture and non-symmetrical geometry of each rotor means they are inherently out of balance, leading to a potential dynamic couple effect when in operation. This dynamic unbalance can cause excessive vibration of the rotors during use, leading to early component failure in a machine. With consultation from Schmitt Europe, Agriweld designed and manufactured a bespoke balancing machine to be used in conjunction with the SB-1700 instrumentation. This included machine base, pedestals, belt driven spindle and inverter/ motor combination on which to mount and drive each rotor.

Interlocked guarding protects the operator and a quick release system allows rotors to be installed and removed very quickly. A process has also been developed to minimise rotor run-out prior to balancing. A water purging welding fixture was conceived and built by Agriweld, which pumps cold water into a coupling and through the seamless tube of each

rotors. In this case mass is added by welding steel weights of known values to the rotor. Agricultural machinery is not the only application for the SB-1700 instrument - it is capable of balancing most rotating machinery. This can be fans, impellers, pumps, electric motors, high speed spindles and grinding wheels. The firmware in the instrument includes calculations for split weight, combine weights, interrupted radius, drill depth calculator and also an ISO-1940 limits calculator - handy for providing the determination of the maximum permitted unbalance level when working with ISO standard G grades. Vibration monitoring and analysis software is also included as standard, and the unit permits quick measurement of a broadband vibration spectrum, aiding balancing problem solving. The ability to save both balancing and vibration analysis data is provided.

Balancing reports for up to 200 rotors or machines can be saved and uploaded to any PC running MS Windows, enabled with RS-232 cable that is included as part of the package.



Photo Caption: A balanced rotor installed inside a Haulm Topper



The unit can be powered from the mains or through its built in Ni-Cad battery pack providing 6 hours of operating life with screen back light running, or 9 hours without.



"The rotor is at the heart of the Haulm Topper and has to run smoothly with minimum vibration" says Agriweld's Managing Director Dean Foster. "The Schmitt SB-1700 portable balancer along with our water purge welding system enabled us to achieve this. The SB-1700 is easy to use, and we are routinely achieving balancing down to 4 or 5 grams of residual, which is fantastic. The old method of static balancing was very hit-and-miss, but the Schmitt balancer gives us the reassurance that the rotor is good as it leaves our factory. The instrument can even provide a certificate with every rotor and its serial number if required".



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