



SMART AGRICULTURE: DEVELOPING INNOVATIVE FORCE SENSORS

#smart farming #mechanical engineering #digital model #load sensor

Monroc designs and manufactures trailer axles for agricultural and industrial machines. It contacted the mechanical engineering experts at Capacités to help develop an innovative force sensor that measures the longitudinal force caused by towing while simultaneously filtering out vertical and lateral gyration forces. It is designed to be positioned at the hitch of tractors that haul loads weighing several dozen tons.

© Sutterstock

AGRICULTURAL MACHINES: DESIGNING AND DEVELOPING TOW FORCE SENSORS

Monroc wanted force sensors to attach to trailer chassis. Its aim was to offer customers a system for monitoring farm machines' driving. The mechanical engineering experts from Capacités enclosed a force sensor within a connection plate. The connection plate-force sensor assembly forms a patch that is welded to the trailer chassis. This eliminates costs linked to assembling complex parts.

Designing this patch required hours of research and development. The steel connection plate had to be sensitive to force so the sensor could measure the tow-force strain. Capacités' experts used calculations and a digital model to determine the amount of material to remove from the connection plate in order to obtain the appropriate level of sensitivity.

A prototype of the plate-sensor-hitch assembly was machined and then laboratory tested on a five-ton capacity universal testing machine. These tests allowed Capacités' experts to calibrate the sensor, determine its sensitivity and ultimately approve the sensor developed for Monroc.

To successfully complete this project, the Capacités' experts benefited from support and technical equipment from the GEM laboratory (Research Institute for Civil and Mechanical Engineering), joint research unit of the Université de Nantes, Centrale Nantes engineering school and CNRS (The French National Centre for Scientific Research). ■

Expertise :

- Mechanical
- Monitoring structures
- SHM

CAPACITÉS

Created in 2005, Capacités is the private engineering and research valorisation subsidiary of the University of Nantes. It employs 90 employees, mainly engineers and PhDs, who work directly with scientists in the research laboratories.

