



CASE STUDY



PRODUCT DESIGN
VERIFICATION BY
MEASURING TORQUE
OUTPUT OF A TRACTOR
PTO SHAFT IN THE FIELD

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BACKGROUND STORY

Modern livestock farming is a double-benefitting system that helps farmers to profit and provides us with food (as well as wool and leather) all year round. Economically, it is the most important agricultural sub-sector, contributing up to 80% of agricultural GDP in developing countries.

However, the amplified demand for meat products (which is expected to almost double in the next 15 years), creates tremendous challenges for the industry's future, already burdened by rising feed costs, strict animal welfare, and sustainability regulations.

To meet these needs and enable farmers to operate in profit, livestock farming has undergone huge improvements in the recent years, heavily focusing on improvement of animal health and increased yield. Intensive livestock farming, milking robots and precision feeding systems are just a few examples of technological solutions, created to ensure an adequate food supply in a sustainable manner.

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THE CLIENT

Feed is a major cost for livestock farmers. As feed mixers are an integral part of their day-to-day operations, taking steps to develop an optimal feeding system is critical to successful farm management.

Comer Industries™ is a worldwide leader in design and production of systems for power transmission for agricultural and industrial machinery worldwide. The company, working together with Kirby Manufacturing, who specialise in producing cattle feeding equipment in the USA, developed a shaft power transmission for a high capacity feed mixer with ability to shift gears while the machine is running (without interruption of working operation).

The system is a mechatronic system that integrates the mechanical transmission, the hydraulic package for the management of the clutches and the electronic control unit (the brain of the product), which manages the changes of speed without torque interruption.



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POWERSHIFT TRANSMISSION: LA SOLUTION
MÉCATRONIQUE POUR MÉLANGEUSE TRÂINÉE



comer industries

POWERSHIFT TRANSMISSION: MECHATRONIC
SOLUTION FOR TRAILED VERTICAL FEED MIXER

- MECHATRONIC PACKAGE
- ELECTRONIC CONTROL UNIT
- COMPLETELY UNINTERRUPTED OPERATION



THE CHALLENGE

Potentially, this new **2-3-speed** power transmission could allow the end user to change speeds of augers without stopping the tractor's PTO, thus avoiding wasting time, and obtaining fuel savings. As a result, farmers are looking at developing the ability to handle the cattle more efficiently, by saving time & labour, improving feed rations and preventing expensive breakdowns of high capacity feed mixers.

However, before introducing the product to the market, Comer Industries wanted a full understanding of how their product would be used an end customer. To find out the difference between predicted duty cycle and an actual use in the field, they had to had run numerous tests in the field to verify optimised performance of the Powershift gearbox.

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DATUM PTO TORQUE TRANSDUCER

Datum PTO (**Power Monitoring System**) is a convenient and cost-effective solution, specifically designed to monitor and log torque & shaft speed for Power Take Off shafts in agricultural machinery. The sensor is very robust which makes it an ideal solution for use in the field application (if required).

With torque measurement (possible in both directions clockwise and anti-clockwise) up to **1,800 Nm** and speed up to **1,000 samples per second**, the PTO transducer offers visibility of the engine usage of the tractor and output performance.



"Datum PTO System is easy to set-up and use,. It is also backed up by fantastic customer service".

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THE IMPACT

Looking to increase gearbox efficiency, Comer Industries' team ran numerous tests under multiple real-world applications and conditions.

As a result of accurate measurement of motor output torque and power, they were able to better understand gearboxes and get a detailed comparison between theoretical and physical results.

The testing helped to improve the transmission performance and reliability of Comer's gearbox, creating a potential to improve fuel economy of agricultural machinery by 30%, as well as reducing the mixing time of feed mixers through continuous operation.



CONTACT DATUM

Whether you're looking for an opportunity to increase efficiency of electrical and mechanical equipment or want to discuss torque and shaft power measurement in general and how it can help your business, give our sales team a call on **+44 (0) 1983 28 28 34** or drop them an email to: web@datum-electronics.co.uk



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