Standex Electronics

PARTNER | SOLVE | DELIVER®

Standex Electronics: How Customized Gear Tooth Sensors Take Precise Measurements in Punishing Off-Road Conditions

The Challenge

The customer came to Standex Electronics in the early design stages of a new drivetrain system, revolving around a set of helical gears. In helical gears, teeth are set at an angle. They're great for high-power, high-speed applications: they minimize noise and vibration, can carry higher loads, and streamline power transmission compared to conventional spur gears. But their unique alignment eliminates most off-the-shelf speed and direction sensors as an option.

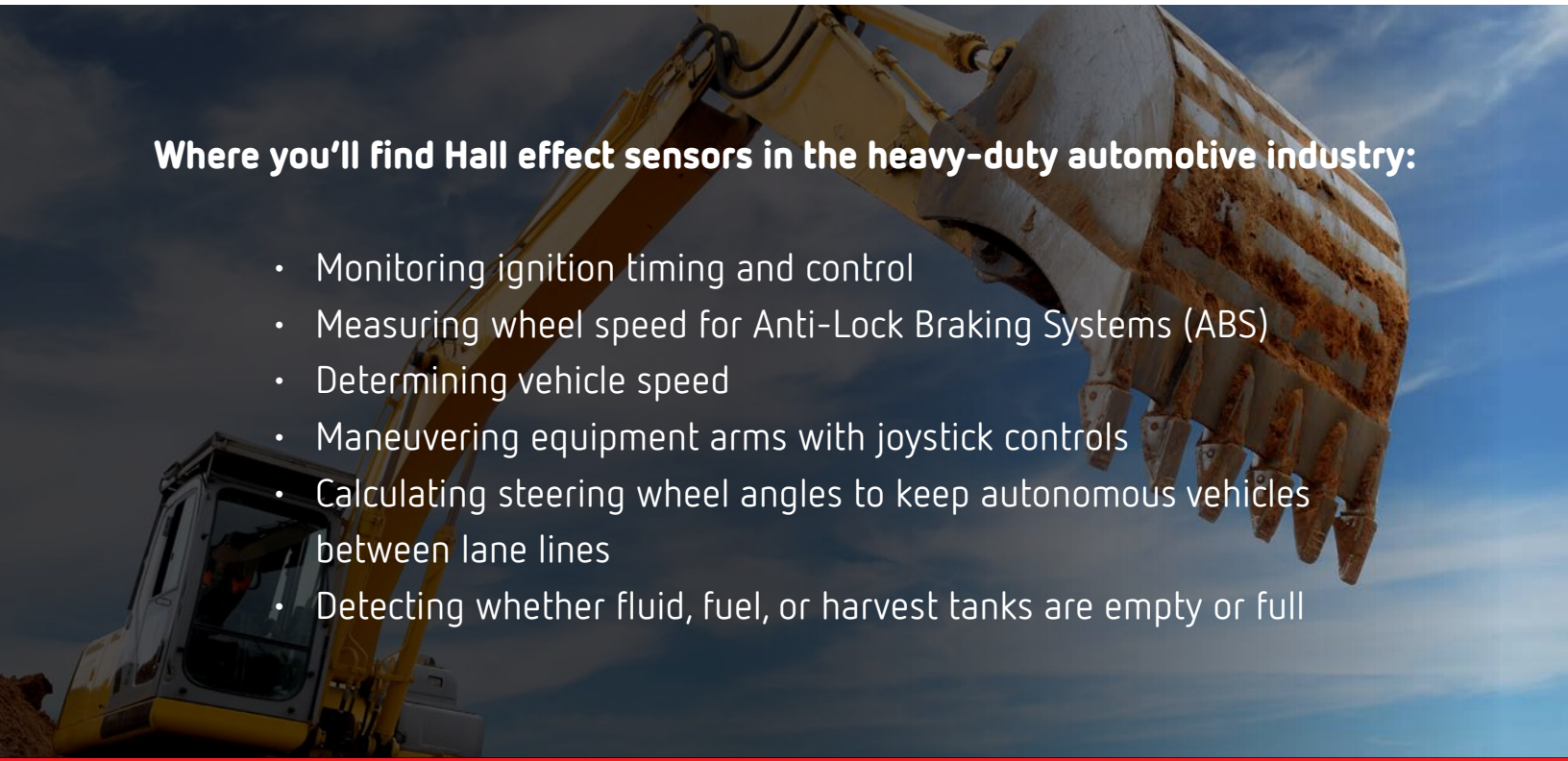
The customer needed a fully customized sensor suite, capable of collecting precise data in a harsh environment and compatible with their electronic control system.

The Answer

Hall effect sensors have a two-fold duty: they detect the **presence** and **strength** of a magnetic field. Millions of Hall effect sensors inhabit the products we use every day — from a bicycle speedometer to the magnetic cover that turns off your tablet when you shut it closed. They're used in nearly every industry to:

- Detect precise positions of objects, such as blades, gears, or liquid levels
- Monitor and control threshold values
- Measure direction or speed

In the heavy-duty equipment industry, punishing environments like grit, grime, and heavy vibration can distort the readings of other sensor types. Hall effect sensors are rugged, high-performance magnetic sensors that run smoothly even in treacherous, off-road applications.



Where you'll find Hall effect sensors in the heavy-duty automotive industry:

- Monitoring ignition timing and control
- Measuring wheel speed for Anti-Lock Braking Systems (ABS)
- Determining vehicle speed
- Maneuvering equipment arms with joystick controls
- Calculating steering wheel angles to keep autonomous vehicles between lane lines
- Detecting whether fluid, fuel, or harvest tanks are empty or full

How it Worked

A Choreography of Two Sensors

For this project, we worked with the customer on a **quadrature gear tooth sensor.** It's a double-duty device that collects two out-of-phase signals to not only count the gear teeth as they pass, but to determine the direction the gear is turning.

The unique form factor of the helical gear makes dual data collection an especially delicate job in a very tough environment. Precise calibration required a fully custom sensor.

Creative Testing Methods for All Product Designs

In off-road applications like construction worksites, farmlands, and mining operations, larger gears are used to meet power demands. Not every sensor specialist has the ability to properly test, evaluate, and prototype complex gearboxes.

At Standex Electronics, we have the equipment and facilities to work with gears in all shapes and sizes. Through creative, end-to-end test solutions and apt simulation strategies, we were able to test and analyze sensor alignment on this larger helical gear design.

Adaptable Innovation

At Standex, we think further out than the project on the table. We build solutions that can work in your greater product line-up to help you simplify your engineering process.

The customer implemented the final quadrature sensor in two other products within months of the initial launch. Standex Electronics' answer not only solved their problem at hand, but positively impacted other areas of the customer's business by slashing part numbers and expediting qualification.

What Brings the Client Back to Standex Time and Time Again?

To your end customer, our products are invisible. But they can make all the difference. If our products draw attention, that means they're not working. So we strive to remain *invisible and unnoticeable*—by ensuring our products work over the long haul.

Extensive Technical Support

We're more than just a catalog. We forge a genuine collaboration to build the right custom solution for your project. Heavy equipment manufacturers are faced with plenty of grueling challenges. You don't always have the time to develop the expertise needed to manage all the switches, sensors, and relays needed to power today's off-road equipment. That's where we come in: saving you time by lending our specialized knowledge to your team's expertise.

Open to Low MOQ Projects

At Standex, we don't measure a project's worth by its size. Our team welcomes ventures of all scales, including this request for a few hundred customized sensors. Despite the small quantity, we tackled this challenge with our full backing of resources and expertise.

Where Else Will You Find Standex?

You'll also find Hall effect sensors in...

- Agriculture (positioning of harvesting arms and dual-braking systems)
- Utilities (tracking systems for solar panels)
- Industrial automation (moving multi-axis robotic arms into place)
- Consumer electronics (automatic screen shut-off of smartphones, laptops, tablets)
- Smart home appliances (detecting the position of doors and control knobs)

Now, more than ever, you need sensors that:

- Consume minimal power
- Survive the most rugged conditions
- Last for millions, if not billions, of cycles

We're here to help.

PARTNER | SOLVE | DELIVER®

Standex Electronics

Standex Electronics
Worldwide Headquarters
4150 Thunderbird Lane
Fairfield, OH 45014 USA
+1.866.STANDEX (782.6339)
info@standexelectronics.com

Agile Americas (NH)
+1.800.805.8991
info@agilemagco.com

Minntronix Americas (SD)
+1.605.884.0195
productsales@minntronix.com

Northlake Americas (WI)
+1.262.857.9600
sales@northlake-eng.com

Renco Americas (FL)
+1.800.645.5828
sales@rencousa.com

StandexMeder Europe (Germany)
+49.7733.9253.200
salesemea@standexelectronics.com

StandexMeder Asia (Shanghai)
+86.21.37606000
salesasia@standexelectronics.com

Standex Electronics India (Chennai)
+91.98867.57533
salesindia@standexelectronics.com

Standex Electronics Japan (Kofu)
+81.42.698.0026
sej-sales@standex.co.jp

IATF 16949 CERTIFIED · ISO 9001 CERTIFIED · ITAR · NIST · AS9100 CERTIFIED

standexelectronics.com