

A large-scale open-pit mine is shown, characterized by its terraced, layered rock walls. A wide, unpaved dirt road winds through the site. A yellow dump truck, heavily loaded with dark material, is driving along this road. The sky is overcast, and the overall scene conveys a sense of industrial activity and heavy machinery in a rugged environment.

BLH NOBEL
A VPG Brand

**FULLY
INTEGRATED
ONBOARD
WEIGHING
SOLUTIONS FOR
INDUSTRIAL
VEHICLES**



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MAKE EVERY LOAD COUNT

Industrial vehicles today are expected to do much more than move heavy loads. With growing pressure to increase operational safety and efficiency – while also improving sustainability – there’s a rising need to integrate more intelligence into the vehicles. Smart systems that enhance safety, support real-time decision-making, and reduce wear and maintenance costs are becoming essential.

For dump trucks, loaders, and haulers, accurate onboard weighing is a critical part of this shift, providing real-time data to optimize performance and prevent costly inefficiencies.

BLH Nobel's industrial onboard weighing solutions meet this challenge head-on. They go far beyond basic weighing, accommodating dynamic working conditions to provide exceptional precision and reliability in the most demanding environments. Developed as a fully customized solution for each vehicle, our solutions integrate seamlessly into the vehicle infrastructure and system – bringing a new competitive edge to your vehicles.



WHY ACCURATE ONBOARD WEIGHING MATTERS

Companies in mining, construction, agriculture, and other heavy industries face increasingly complex challenges that advanced onboard weighing can help address – creating new opportunities for vehicle makers.



Pressure to increase efficiency

Rising energy and operational costs are driving the need for load optimization, increased fleet utilization, and reduced downtime.



Stricter safety and compliance standards

Safety regulations are becoming more stringent, with increasing risk of fines for overloading and other compliance issues.



Transition to green vehicles

Growing emphasis on sustainability is increasing demand for electric and hybrid vehicles, which require advanced weighing systems to maximize energy efficiency.



Adoption of autonomous operations

Autonomous haul trucks require real-time load data to maintain stability and minimize downtime.

Solution overview

CUSTOM WEIGHING SOLUTIONS FULLY INTEGRATED INTO YOUR VEHICLES

BLH Nobel offers high-performance onboard weighing solutions designed specifically for heavy vehicles such as dump trucks, articulated haulers, and wheel loaders. Engineered for reliability and durability in demanding environments, our systems use advanced strain-gage load cells and extensometers to capture load data with high accuracy regardless of the operating conditions. The weighing system is integrated directly into the vehicle control system, delivering real-time data for optimized loading and operations.

Our weighing systems are ideal for:

- Articulated dump trucks (ADT)
- Rigid trucks
- Wheel loaders
- Other industrial vehicles



Fully integrated weighing systems that fit your vehicles

- Solutions range from load cells with embedded amplifiers and/or extensometers to complete weighing systems with an electronic weighing unit
- The weighing system is seamlessly integrated into the existing vehicle infrastructure and communicates directly with the vehicle electronic control unit and display
- Specialized weighing software and communication interfaces, tailored to the vehicle
- Optimized development process, for smooth implementation with minimal engineering effort



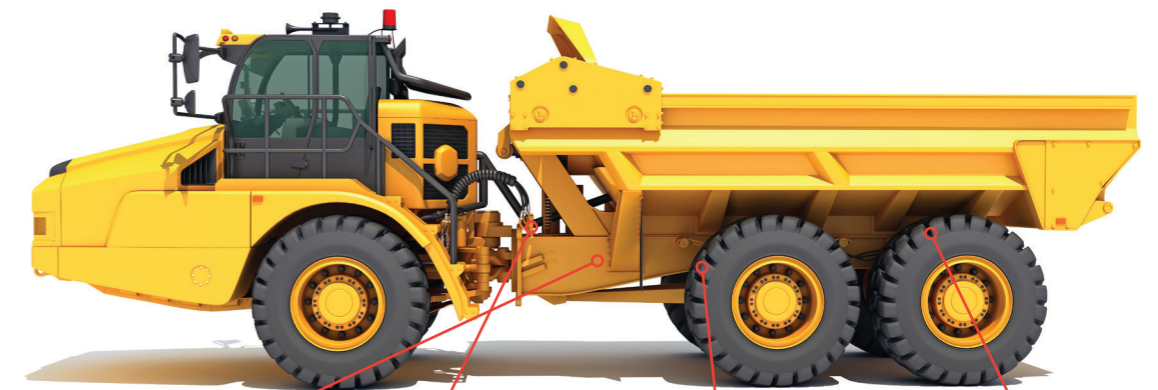
Outstanding accuracy and reliability

- Designed for continuous use in extreme temperatures, heavy vibrations, and harsh environments
- Strain-gage load cells and extensometers minimize friction and sensing variation, outperforming pressure transmitter-based systems
- Sophisticated software compensates for tilt, braking, and terrain variations
- Condition-based weight calculation increases real-world accuracy

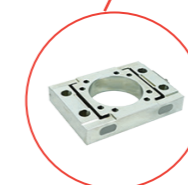


Unmatched expertise

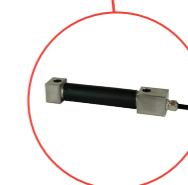
- Decades of experience in onboard weighing system development, testing, and calibration
- Tens of thousands of systems installed in industrial vehicles
- Complete in-house capabilities, including development, manufacturing, and ongoing support
- A trusted, proven for vehicle manufacturers and fleet operators, delivering the highest product quality and performance



Electronic weighing unit



Load cells in the front bucket support



Extensometers mounted on the frame



Load cells in the hinges

Key benefits

ADVANTAGES FOR YOU

Boost your edge with advanced solutions for integrated onboard weighing

BLH Nobel industrial onboard weighing solutions offer powerful benefits to you at every stage, from development and integration, through the warranty period, and beyond.

- **Custom-engineered solutions** – No need to adapt your vehicles; the onboard weighing system is customized to the specific design and operation of each model
- **Simplified integration** – Direct communication with the vehicle's electronic control unit ensures seamless operation and reduces engineering complexity
- **Faster time to market** – BLH Nobel's optimized development process shortens implementation cycles, reducing engineering effort
- **Improved sustainability** – Accurate load monitoring helps maximize battery efficiency, enhancing the green performance of your electric vehicle offering
- **Vital functionality for new autonomous vehicles** – Real-time load data is essential for stability, safety and operational efficiency
- **New competitive differentiation** – Fully integrated, high-precision load monitoring sets your vehicles apart in the market, keeps you ahead of industry trends, and helps drive higher customer satisfaction
- **Reduced warranty costs** – Overload protection reduces equipment failures and provides data-based evidence for warranty claim validation

VALUE FOR YOUR CUSTOMERS

Empower your customers to make every load count

With the accurate, real-time information provided by BLH Nobel onboard weighing systems, your customers can improve their efficiency and get the most out of their industrial vehicles, without the risks and costs of overloading.

- **Improved safety and compliance** – Protects workers, reduces risk of fines and disruption to operations
- **Increased load efficiency** – Supports payload optimization, reducing fuel consumption and wear
- **Lower TCO** – Prevents damage and excessive wear due to overloading, reducing maintenance costs and extending vehicle lifetime
- **Less unplanned downtime** – Enables predictive maintenance based on real load data
- **Enhanced sustainability** – Optimized payloads and real-time insights lead to higher energy efficiency and lower environmental impact
- **Better fleet utilization** – Allows smart scheduling and load balancing to maximize fleet efficiency

Product details

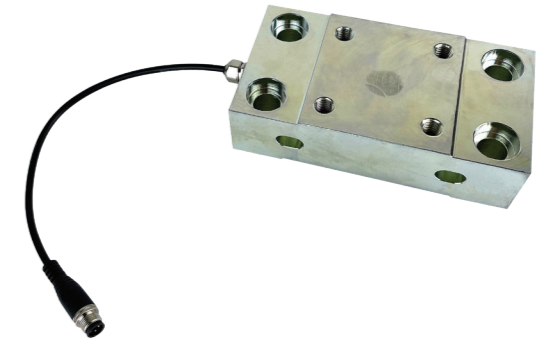
HIGH-QUALITY, CUSTOMIZED COMPONENTS

BLH Nobel industrial onboard weighing systems are comprised of load cells with embedded amplifiers and/or extensometers and an electronic weighing unit featuring flexible communication interfaces and specialized software, seamlessly integrated with the vehicle's electronic control unit.

Load cells

Custom-made load cells

Load cells tailored to the vehicle, enabling easy installation, zero or little change to the vehicle infrastructure, and significantly reduced downtime.



CLC load cell

An exceptionally low-profile load cell, insensitive against side loading and other interfering effects, providing long-term stability and high repeatability.



Custom extensometers

Tension-compression extensometers, customized for specific strain levels and physical dimensions according to the individual vehicle and application requirements.

Electronic weighing unit

Flexible ECU with power supply for sensors and digital conversion of analog signals. Embedded microcontroller for software and communication.

- CAN-interface (CANopen, J1939)
- Embedded software, customized for the target environment



Case study

PROVEN SUCCESS: VOLVO CONSTRUCTION EQUIPMENT



Background

Volvo Construction Equipment is a world-leading manufacturer of heavy-duty construction equipment and vehicles for demanding industrial segments such as construction, quarrying, agriculture, mining, utilities and others. It provides premium products and services that combine power and performance with a more sustainable way of working.

Need

For its articulated dump trucks, Volvo Construction Equipment required an improved onboard weighing system that could leverage existing inputs from a pressure transmitter signal. The solution needed to align with Volvo's specific technical and performance requirements and be suitable for high-volume truck production.

Solution

In cooperation with Volvo Construction Equipment, BLH Nobel developed a custom, state-of-the-art onboard weighing system for installation on the truck damper. Featuring a custom amplifier and precision-engineered custom load cells, the system offers premium quality at a cost-effective price point.

During loading, the operator can see the load indicator lights mounted on the outside of the machine, indicating partial load, nominal load, and overload. The load weight in tons is shown on the electronic display in the machine cab.

The onboard weighing system is fully automatic, requiring no human intervention. Load data can be accessed remotely via the Volvo telematics system, for payload management.

Results

The onboard weighing system enables operators to ensure the optimal load is carried on every cycle, for maximal productivity, improved fuel efficiency, and reduced machine wear in all site conditions and operations.

- Combining transported load measurements with fuel consumption data helps show the true productivity of the machine, combining fuel efficiency with tons of mass moved.
- The system also offers the ability to unlock a wealth of previously inaccessible information, such as the weight of "carry-back" left in the haul body after dumping.

The onboard weighing system has been used successfully in Volvo Construction Equipment articulated dump trucks for many years, helping make Volvo the preferred choice for articulated dump trucks across global markets. To date, BLH Nobel has equipped 20,000 - 25,000 Volvo trucks worldwide with the system developed for Volvo. The system is installed as a standard feature on some models and as an option on other models. Standard and optional availability also varies depending on geographic region.

About

BLH Nobel, part of Vishay Precision Group (VPG), is the pioneer and market leader in heavy-duty process weighing and force measurement solutions for demanding industrial applications. We design, manufacture, and support high-quality, high-performance, extremely accurate and robust weighing and control systems. Our wide range of standard products and custom solutions are meticulously engineered to optimize our customers' processes and integrate seamlessly with existing equipment. Installed in more than 100 countries, BLH Nobel systems reliably provide precise stress, force, weight, pressure, and current measurements in the toughest environments. Our strain gauge-based load cells meet the most stringent specifications for accuracy and reliability.

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