CASE STUDY

How BEMA prepares future operators for Industry 4.0 with HBK's smart load cells featuring and IO-Link interface

The shift to Industry 4.0 has already transformed industrial operations beyond recognition. For technicians and engineers, it's never been more important to have advanced training solutions on hand to prepare them for the future of smart technology.

CHALLENGE

Give operators a chance to gain hands-on experience with modern, connected production environments and advanced smart sensors that pre-process data efficiently.

SOLUTION

Integrating the HBK PW4M-OP load cell with an IO-Link interface into the EcolCafé training system, it has the capacity to offer intuitive, plug-and-play functionality and access to field-level sensor data and diagnostics information.

RESULT

Future technicians and engineers who use EcolCafé systems gain practical experience in managing and optimising industrial processes with Industry 4.0-aligned technologies, such as strain-gauge-based load cells with IO-Link interface.

THE FUTURE OF INDUSTRY 4.0 STARTS WITH PEOPLE

BEMA is one company that is changing how manufacturing companies can bridge the gap between technological education and Industry 4.0.

Its mission is to provide technicians and engineers with hands-on experience using cutting-edge industrial equipment. This ensures operating teams are ready to work with smarter, more data-driven technology in real-world production environments.

BEMA originally created the EcolCafé system – its automated coffee capsule production line – in 2016. Used as an educational tool for managing coffee pod production, the system provided learners with practical experience in industrial manufacturing processes like quality control, data monitoring, and automation.

However, BEMA knew that to further develop EcolCafé's capabilities, it needed to make its technology even smarter. A way to give operators the opportunity to learn about the data-driven technologies of Industry 4.0 – just in a real-world setting.

Crucially, this would give technicians and engineers the education and competitive edge they need to ensure they're ready for modern, connected production environments.

MODERNISING TECHNOLOGICAL EDUCATION IN A SMART, SCALABLE WAY

BEMA had already started off well on their journey towards educating people in Industry 4.0 technology. Its partnership with IFM – a global company specialising in manufacturing sensors and controls for industrial automation – put them one step closer to their goals.

But there were more challenges BEMA needed to overcome before its EcolCafé production line could truly be called Industry 4.0-native.

Adopting advanced smart sensor technology

Industry 4.0 relies on automated, connected technologies that require operators to understand and configure different sensor networks.

That's why future operators need to learn how to use smart sensors and advanced communication systems to prepare them for modern industrial environments. Without this knowledge, they would struggle to optimise production – leading to inefficiencies and creeping operational costs. Something BEMA was keen to resolve for its customers.

Handling and interpreting real-time data

Today, manufacturing systems generate enormous swathes of data. The ability to analyse this information is vital to make sure operations stay efficient, quality control is maintained, and downtime stays minimal.

The EcolCafé production line should provide operators with the proper training for collecting, interpreting, and using this real-time data in a way that would optimise their production performance.

Without that essential training, operators risk missing major system inefficiencies or anomalies that could jeopardise production, leading to costly disruptions.

Integrating into modern production ecosystems

BEMA understood that industrial equipment, such as weighing machines – like its EcolCafé Control, Weighing, and Sorting Station – needed to integrate into broader connected systems using digital communication protocols like IO-Link.

Otherwise, operators would struggle to deploy and maintain their Industry 4.0 systems, leading to bottlenecks in production. Far removed from the greater efficiency and streamlined workflows they needed from their smart factory environments.

Making moves to predictive maintenance

To truly embrace Industry 4.0 technologies, operators need to adopt data-driven strategies to anticipate and prevent machine failures. This predictive maintenance – made possible through smart sensors – helps to extend equipment life and dodge any unplanned downtime.

BEMA needed to make sure it chose the right smart sensor in its EcolCafé technology that could also scale with its entire production line. This would help train future operators with real-time monitoring tools and predictive analytics, allowing them to maintain production efficiency and reduce repair costs.

ONE SMALL SENSOR, MULTIPLE GIANT BENEFITS

When BEMA contacted us for support with integrating smart sensors into its EcolCafé production line , we jumped at the chance to help.

Seamless plug-and-play integration

The HBK PW4M-OP load cell with IO-Link provides BEMA with a hassle-free, plug-and-play solution. HBK sensors with IO-Link interface offer flexible interoperability with a range of IO-Link-enabled solutions from different technology providers – including IFM.

For BEMA, this means they can easily use HBK smart load cells alongside EcolCafé's pre-existing IFM components. As a result, operators can quickly integrate the sensor into their existing setups, without the need for extensive technical expertise or manual wiring and parameterisation required with traditional load cells. This allows them to focus their efforts on analysing their data, rather than complex installations.

IO-Link's standardisation also makes it easier than ever to configure and scale across the entire EcolCafé system, providing smooth communication between sensors and control systems.

Monitoring performance with real-time data

The PW4M-OP load cell's ability to transmit sensor data in real time thanks to IO-Link also means operators can collect precise weight data instantly. This not only helps them monitor and optimise their machine's performance – it gives them the power to detect anomalies early to make any immediate adjustments before issues escalate.

Compatible communication across multiple systems

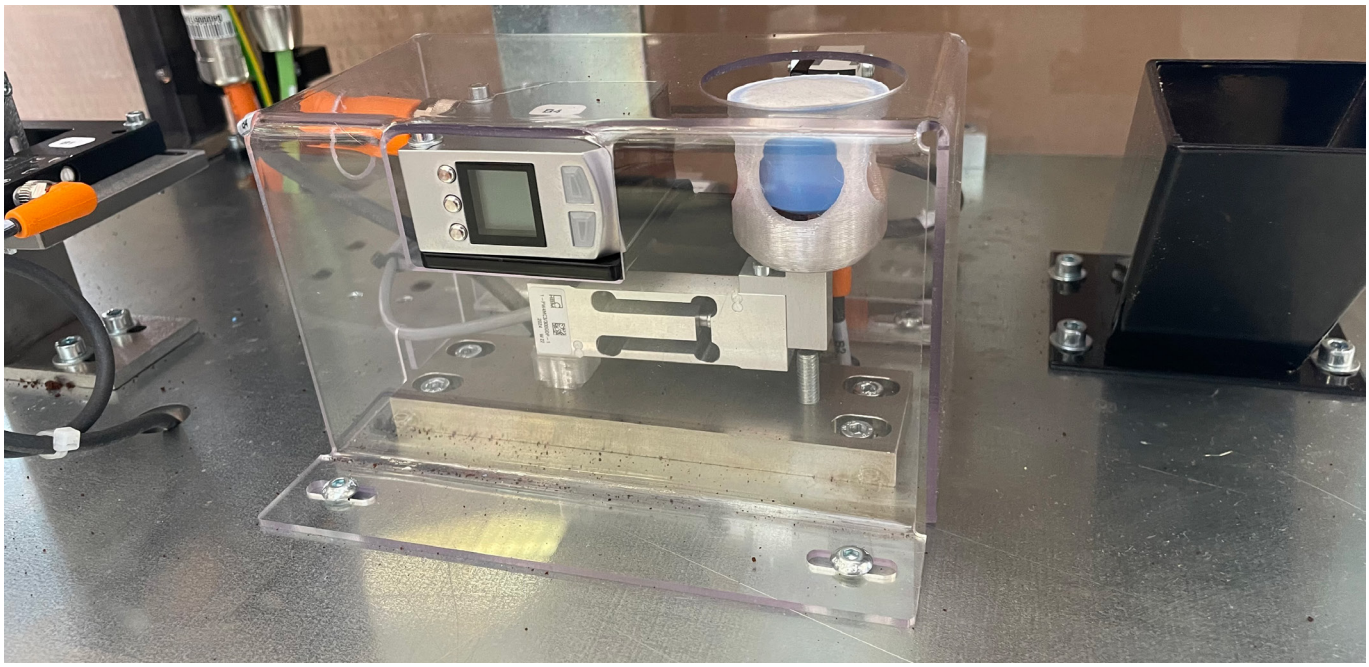
To stay as versatile as possible, the PW4M-OP sensor is capable of communicating across various industrial environments. After integration, this makes the EcolCafé system highly adaptable to different manufacturing processes.

The PW4M-OP sensor is a smart load cell consisting of an LCMC measurement chain with IO-Link, allowing advanced communication and real-time remote monitoring. These smart load cells offer:

- Precise weight results with the highest levels of accuracy
- A digital signal chain. featuring specific filters for weighing applications
- Integrated weighing algorithms (including for check-weighers and fillers)
- Sensor health monitoring, which continually tracks the loads applied on the sensor and gives warnings if exceeded.

Reducing downtime with predictive maintenance

Real-time monitoring and analytics with the PW4M-OP sensor with IO-Link allows operators to learn how to anticipate equipment failures before they happen. This proactive approach gives learners the skills they need to not only reduce downtime, but also improve machine longevity, minimising unexpected maintenance costs.



BRIDGING THE GAP BETWEEN TECHNOLOGICAL EDUCATION AND INDUSTRY 4.0

The results of integrating BEMA's EcolCafé system with HBK's PW4M-OP load cell with IO-Link have been nothing short of staggering.

Firstly, it has massively boosted training and hands-on learning capabilities. The EcolCafe system's automation and data-driven processes – aided by HBK's IO-Link sensor – are giving future technicians the practical experience they need to confidently operate industrial production lines and troubleshoot Industry 4.0 systems.

Unlocking access to real-time sensor data also gives operators the power to make more informed decisions. Powerful data analytics means more optimised manufacturing performance.

As a result, interpreting and acting on data insights with an interconnected training system like EcolCafé prepares future operators for much more data-driven smart manufacturing environments with Industry 4.0.

This, in turn has helped operators to reduce their downtime and maintenance costs, by mastering predictive maintenance strategies on their equipment. Learning how to prevent unexpected failures, improving equipment reliability, and reducing overall operational costs are invaluable for maintaining high-efficiency industrial production.

All of these outcomes form major wins for BEMA in establishing their position as a forward-thinking leader in technological education.

CONCLUSION

BEMA's collaboration with HBK and partnership with IFM has created an advanced educational tool that prepares engineers trainees and technicians for real-world industrial challenges.

By integrating smart sensor technology and automation solutions into its EcolCafé systems, future operators gain the essential experience they need to excel in highly technical manufacturing roles in the competitive world of Industry 4.0.

The EcolCafé system shows how easily a scalable, data-driven approach can help train workforces to be ready for smart technology. Companies that adopt similar models for future training programs – using partnerships with technology leaders like HBK and IFM – will equip their operators with vital skills in automation, real-time data analysis, and predictive maintenance.

Despite the world of Industry 4.0 changing at a rapid pace, though, one thing remains certain – the demand for skilled technicians who can understand interconnected production environments will continue to grow.

Now, BEMA's EcolCafé system is at the forefront of training technicians with the skills they need to succeed. Integrated with the PW4M-OP sensor for precise weighing and IFM's automation technologies, the EcolCafé system is ready to prepare the workforce of tomorrow to meet more modern-day challenges.

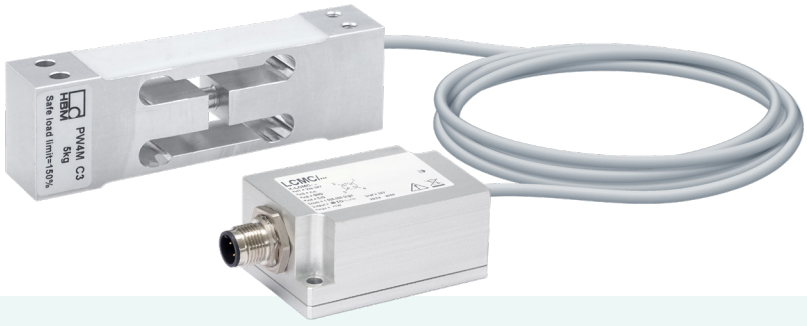
Choose future-forward measurement technology for your company – get in touch with the HBK team today.

ABOUT BEMA

BEMA is a company that specialises in designing and manufacturing products and solutions for technical education, as well as custom machines and robotic solutions for industrial production lines. With 30 years of experience, BEMA operates from two sites, producing approximately 200 products annually, all manufactured in France.

ABOUT HBK

HBK (Hottinger Brüel & Kjær) was established in 2019 through the merger of HBM and Brüel & Kjær, each with over 80 years of experience in precision test and measurement technology. At HBK, we provide innovative testing solutions and software spanning various industries, including aerospace, automotive, energy, and manufacturing.



HBK – Hottinger Brüel & Kjær
www.hbkworld.com
info@hbkworld.com