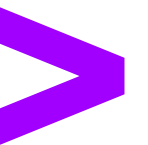


September 2023

Innovate

Trends and innovations that matter





Know more about the latest announcements impacting industry, from a digital-twin shipyard, an automated urban rail system in Canada, a game-changing way of manufacturing battery cells, and more.



**Industrial is
a front-runner
in combining
human ingenuity
with technology
and innovation.**

Thomas Rinn

**Senior Managing Director,
Global Industrial Lead, Accenture**



PowerCo's 'game changer' in battery cell production

Volkswagen subsidiary PowerCo SE has announced a new 'game-changing' technology for the production of its battery cells, which will boost efficiency and sustainability. The process involves dry-coating the cells with powder instead of applying and then drying a liquid slurry. This reduces the process steps and saves 30% of the energy used—mostly in the drying process—as well as 15% of the space required and millions of euros every year. The company has signed a joint development agreement with the German printing press manufacturer Koenig & Bauer AG, which will supply the roller presses to powder-coat the electrodes on an industrial scale. The new technology is planned to be used in PowerCo's production plants in Europe and North America.

Trane Technologies partners to boost efficiency of industrial heat pumps

In a continuing effort to reduce energy-related domestic GHG emissions, one-third of which are produced by the industrial sector, Trane Technologies has embarked on three new projects to improve the efficiency of industrial heat pumps. These units can provide a path to the electrification of high-temperature heating processes and offer an alternative to using fossil fuel combustion in the production of cement, food and beverage, chemicals, and other carbon-intensive industries.

The projects—in collaboration with the US Department of Energy (DOE) and two universities—aim to produce an ultra-high-temperature industrial heat pump that incorporates AI-enabled integration and process control, dehumidification, low-cost sensors and predictive controls. These projects have received DOE grants for the research and development of transformational technologies that decarbonize heavy industry.



France's postal service to test Michelin's new airless tires

Michelin has produced a radical new airless tire which promises to eliminate concerns about air pressure and punctures. It has signed a two-year agreement with the French postal service La Poste to test the performance of the innovative tire to gain a better understanding of its treadwear throughout its useful life. It plans to leverage that information for further development of the concept. Michelin's UPTIS prototype replaces compressed air with an internal structure of polymer spokes that supports the vehicle and provides a comfortable ride. In addition to offering peace of mind to drivers and fleet owners, it has the potential to reduce the number and frequency of tire replacements, thus limiting waste. The tire is being developed particularly for light truck delivery fleets, with the ultimate aim of producing a fully sustainable tire by 2050.

Bosch commits to using AI in all its products by end 2023

Robert Bosch GmbH has reasserted its ambition to be a world leader in the industrial application of artificial intelligence by advancing its goal to incorporate AI in all its products and solutions or in their manufacture—the 2025 deadline has been moved forward to the end of this year. Bosch has been a front-runner for some time, having filed more than 1,000 AI patent applications over the past five years. It has more than 300 AI researchers and an AI training program that has been completed by more than 25,000 employees. The company's Hungarian plants, for example, use AI in their manufacturing processes for data analysis to optimize production, for optical monitoring of product quality, and for planned maintenance of in-process equipment, among others. Generative AI has given rise to many new use cases, including searching Bosch's vast research database to extract overlooked knowledge that can be re-purposed. Chief digital officer Tanja Rückert explained: "Our primary aim is for AI to benefit people."

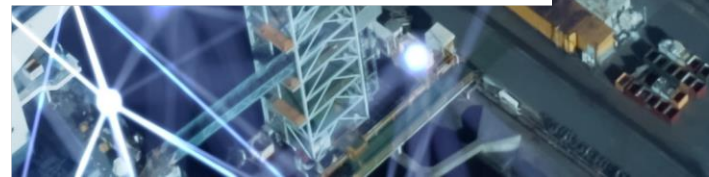


Ferrovial forms alliance to develop IoT- and AI-based digital solutions

The multinational infrastructure company Ferrovial has signed a strategic alliance with Sngular, a Spanish technology consultancy, to expand its use of AI and the internet of things (IoT) in the development of its digital solutions. The aim is to accelerate the digitalization and optimization of Ferrovial's operations leading to safe, sustainable development in construction and infrastructure management. A key focus will be connecting worksites, of which the company has more than 1,200 around the world. "Productivity in the construction sector has been flat for many years and developing sensors that turn construction into an industry 4.0 can change this," remarked Dimitris Bountolos, General Manager of Information Systems and Innovation at Ferrovial. The two companies are also developing efficient, autonomous sensors to monitor traffic and "explore opportunities on the highways of the future".

HD Hyundai Heavy Industries launches its smart shipyard

HD Hyundai Heavy Industries Co., the world's largest shipbuilder, says it has achieved a world first by creating a digital twin of its actual shipyard. It has installed internet of things sensors throughout its premises, both indoors and outside, to supply a continuous flow of the real-time data used to monitor all aspects of its construction process and inventory status. The facility's control center offers an at-a-glance view of each step of the process, from groundbreaking through to vessel delivery. While manufacturers of products such as semiconductors and domestic appliances find it relatively easy to create digital twins of their factories, this is much more challenging in a large mixed environment where there are many obstacles to securing the required data. The Smart Shipyard project is intended not only to improve the stability and productivity of the company's shipbuilding, but also to anticipate and pre-empt incidents that could potentially cause injuries, delays or cost overruns.



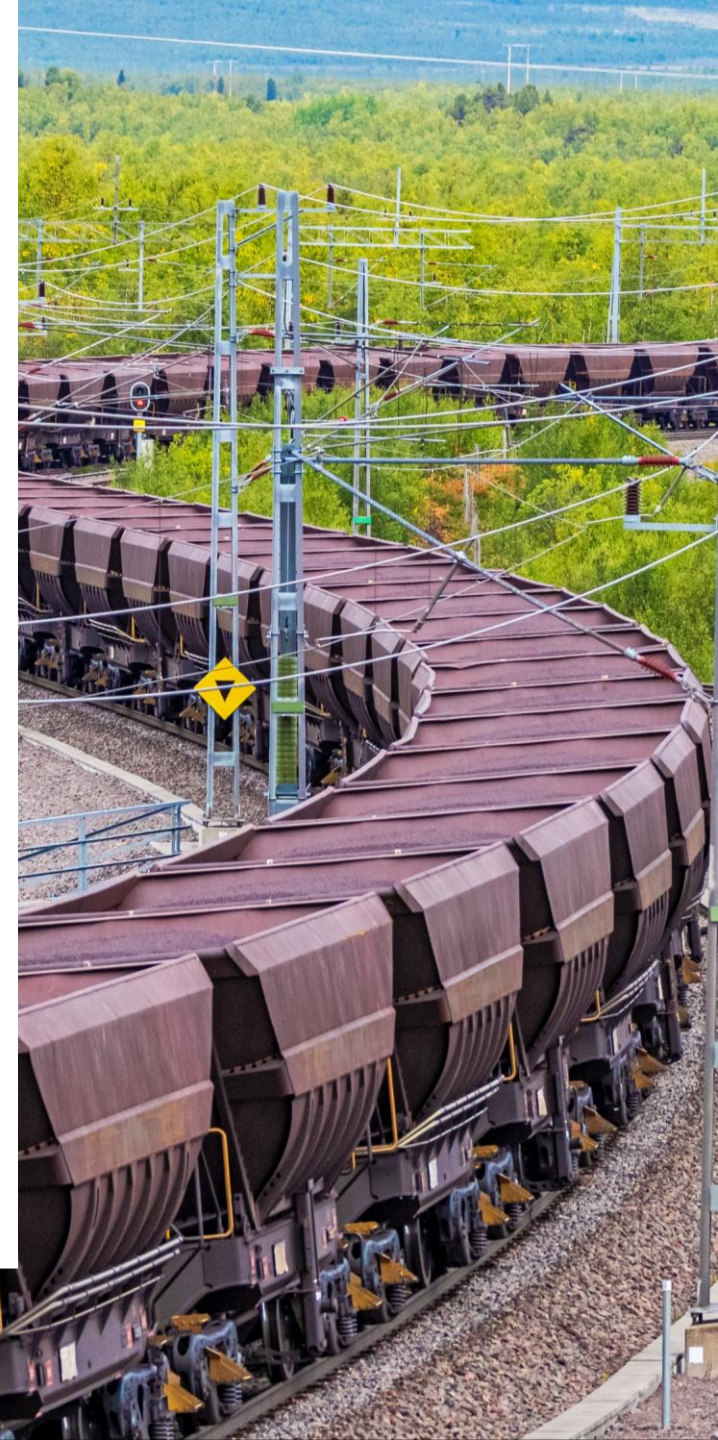
Montreal gets a world-leading automated urban train system

The rail transport company Alstom, together with its consortium partners, has inaugurated the first stage of an automated urban rail system which it says will revolutionize mobility in Montreal, Canada. The project comprises a complete driverless, automated metro system including rolling stock and signaling. It will provide a rapid service 20 hours a day, with trains arriving every four minutes at peak time. When completed, it will be one of the world's largest automated transport networks with 26 stations and 67 kilometers of track. The company says it will be a showcase for the latest in efficient digital mobility technology.



Vale and Wabtec to test ammonia as diesel substitute

Global miner Vale has partnered with Wabtec Corporation to test ammonia as a clean alternative to the diesel that currently fuels its locomotives. The plan is to initially maximize the energy efficiency of the world's longest iron ore train—330 railcars carrying 45,000 tons in Maranhão state, Brazil. Two or three of the current three to four diesel engines will be replaced with battery-powered FLXdrive locomotives. The electric locomotives will save a reported 25 million liters of diesel annually and reduce CO₂ emissions. The batteries will recharge every time the train brakes, giving them a greater range and reducing recharge downtime. Then, the fuel driving the remaining non-electric locomotives will be changed to ammonia, which emits no CO₂. While the feasibility of using ammonia will be lab-tested over the next two years, its advantages include a longer range than diesel, a high-octane rating and an established large-scale distribution infrastructure. The project is part of Vale's \$4 - \$6 billion investment in reducing its direct and indirect emissions.



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