

MAY 2026

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# Modernising palletising: from bottleneck to breakthrough

In cement production, efficiency is often judged by kiln output and grinding performance, but the true test comes at dispatch. When bagging and palletising systems underperform, even the most optimised production line can falter. This article examines how one European plant transformed its end-of-line operations from a persistent bottleneck into a high-performance asset, demonstrating that reliable, precise palletising is not just supportive infrastructure but a decisive factor in throughput, cost control and customer satisfaction.

■ by **Wiz Machinery, China**

In cement production, the dispatch stage is often underestimated in terms of its impact on overall plant efficiency. While considerable attention is typically directed towards kiln performance, grinding optimisation and emissions control, the reliability of bagging and palletising operations plays an equally critical role in maintaining throughput and customer satisfaction. When end-of-line disruptions occur, the consequences can quickly extend upstream, restricting output and increasing operational costs.

A European cement producer recently undertook a comprehensive modernisation of its palletising operations after persistent performance issues began affecting dispatch reliability. The plant supplies bagged cement to regional distribution networks and infrastructure projects, operating continuous bagging lines designed for high availability. However, its ageing palletiser had gradually become a bottleneck.

## Operational challenges

Over time, mechanical wear and repeated interventions reduced the availability

*“... the reliability of bagging and palletising operations plays an equally critical role in maintaining throughput and customer satisfaction.”*

In cement plants, the dispatch of product is often underestimated and would benefit from improved packaging solutions, including hybrid automation strategies



of the existing palletising system. Maintenance frequency increased, leading to unplanned downtime and production interruptions. Operators reported difficulties maintaining consistent stack geometry and bag deformation during pallet formation occasionally resulted in torn packaging.

In several cases, unstable pallet loads led to customer complaints related to transport damage. Although upstream bagging capacity was sufficient to meet demand, the palletiser constrained output to approximately 1500-1700 bags per eight-hour shift. The disparity between filling capability and palletising capacity limited the plant's responsiveness during peak periods.

Management concluded that incremental repairs would not provide

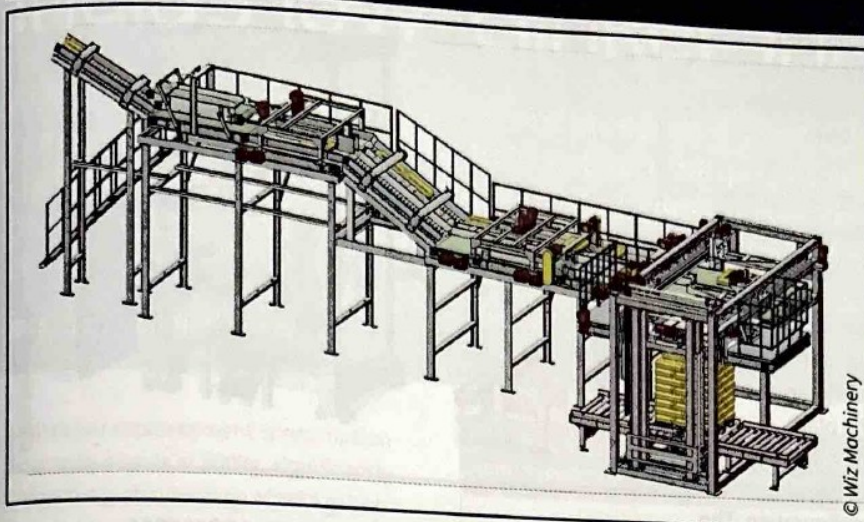
a sustainable solution. A replacement system was required that would improve throughput, stabilise pallet formation, reduce maintenance intervention and integrate within the spatial constraints of the existing packing hall.

## Engineering assessment and solution

Following a detailed technical evaluation of site conditions and operational requirements, Wiz Machinery proposed the installation of a high-level palletiser incorporating a mechanical push system for full-layer transfer. The solution was selected for its structural robustness, simplified mechanical design and suitability for heavy-duty cement applications.

The high-level configuration allows layer formation to occur at an elevated

The high-level configuration allows layer formation to occur at an elevated position above the pallet



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position above the pallet. Bags arriving via conveyor are arranged into a complete layer before transfer. A reinforced push plate then moves the entire layer horizontally onto the pallet below.

This method differs from single-bag placement systems, which rely on sequential positioning and can introduce cumulative alignment deviations. By transferring complete layers, uniform compression and consistent geometry are maintained throughout the stack, significantly improving pallet stability.

### Increased precision through ultrasonic measurement

To enhance positioning accuracy, the system integrates ultrasonic measurement technology. Each bag is measured prior to final layer formation, allowing the control system to detect dimensional variations and apply real-time positional correction.

This feature is particularly relevant in cement operations, where variations in filling density or settling behaviour may influence bag geometry. By ensuring correct alignment before transfer, the ultrasonic system minimises mechanical stress and prevents progressive misalignment across successive layers.

The result is improved stack consistency, reduced bag deformation and enhanced load integrity during storage and transport.

### Mechanical robustness and maintainability

The push mechanism and structural frame are engineered specifically for continuous operation in dusty cement environments. Reinforced components accommodate the mass and dynamic forces associated with bag handling. Mechanical assemblies are designed for ease of access, simplifying inspection and reducing downtime during servicing.

Compared with more complex palletising technologies, the simplified architecture reduces the number of moving components. This design philosophy prioritises reliability and availability, critical factors in cement plants operating around the clock.

### Automated pallet logistics

In addition to the palletiser itself, the modernisation included the integration of a fully automatic empty pallet magazine. Pallets are separated, elevated and positioned within the palletising station

without manual intervention.

This automation eliminates one of the common sources of stoppage in conventional systems, where operator-dependent pallet supply interrupts production flow. Once loaded, finished pallets are transferred via roller conveyors to the packaging section, ensuring continuous movement from pallet formation to final wrapping.

The integrated pallet logistics improve safety, reduce labour dependence and stabilise line performance.

### Stretch hood packaging integration

As part of the comprehensive upgrade, the plant implemented a Wiz Machinery automatic stretch hooder wrapping machine. Stretch hood technology offers several advantages in cement applications, including load stability, weather protection and energy efficiency.

The system applies a preformed film hood over the pallet using controlled vertical motion and film tensioning, without the use of heat. The film transport mechanism introduces the hood smoothly, reducing stress on the material and optimising consumption.

Short cycle times support high packaging capacity, while economical drive systems and reduced compressed air demand improve overall energy performance and film usage. In the context of rising energy costs and sustainability objectives, these gains contribute positively to the plant's operational efficiency.

The transparent, highly elastic film ensures full load visibility while providing effective protection against humidity and environmental exposure. Improved load containment further enhances transport safety by reducing the risk of shifting during handling.

### Spatial integration within existing infrastructure

One of the project's constraints was limited available floor space within the packing hall. The vertical orientation of the high-level palletiser maximises use of existing height while maintaining a compact footprint. Careful layout planning enabled integration with existing conveyors and bagging equipment without extensive structural modification.

This approach allowed the plant to modernise its end-of-line operations without major reconstruction, reducing project complexity and installation time.

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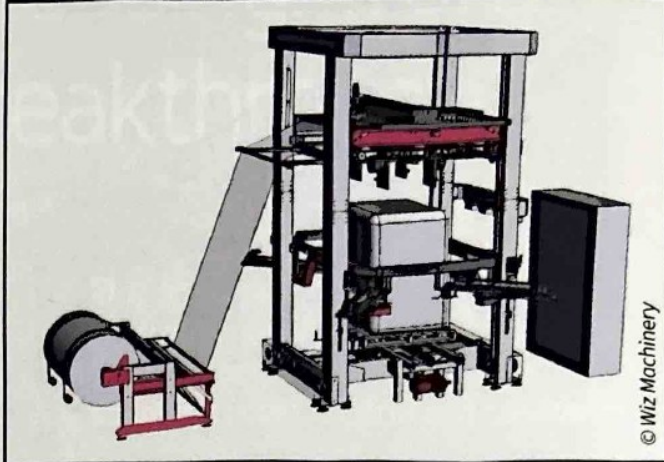
### Hybrid automation strategy

In parallel with bag palletising upgrades, the facility introduced a robotic arm palletising cell to manage cartonised construction materials produced at the same site. The robotic arm system provides flexibility for varied packaging

formats and smaller production runs, thanks to its visual recognition system.

By combining mechanical high-level palletising for high-volume cement bags with robotic handling for diversified products, the plant benefits from a balanced hybrid configuration. The mechanical system ensures robustness and throughput, while the robotic cell offers adaptability through programmable pattern control.

Stretch hood technology offers load stability, weather protection and energy efficiency



The system applies a preformed film hood over the pallet using controlled vertical motion and film tensioning, without the use of heat



### Performance outcomes

Since commissioning, palletising throughput has increased significantly. The plant now exceeds 19,000 bags per eight-hour period, representing a substantial improvement over previous output levels.

Unplanned downtime has been markedly reduced and maintenance interventions have declined due to the simplified mechanical design. Pallet stability has improved consistently, eliminating previous issues associated with bag damage and load deformation.

Customer feedback has been positive, particularly regarding load integrity during transport. By addressing both mechanical reliability and stack precision, the modernised system has strengthened dispatch performance and operational confidence.

### Customer satisfaction wrapped up?

While kiln efficiency and grinding performance remain central to cement plant economics, dispatch reliability directly influences deliverability and customer perception. Production gains upstream cannot be fully realised if palletising limitations constrain output.

The installation of a high-level push palletiser with ultrasonic positioning, automated pallet logistics and energy-efficient stretch hood packaging demonstrates how targeted end-of-line modernisation can deliver measurable improvements in throughput, availability and load stability.

In an increasingly competitive cement market, robust and precise palletising systems are no longer ancillary equipment, they are integral to operational continuity and customer satisfaction. ■