

The OSARO logo is displayed in a large, white, sans-serif font at the top left of the image. The background of the entire page is a photograph of a warehouse interior. On the left, the side of an orange semi-trailer is visible, with its rear wheels and a ramp extending towards the center. The warehouse floor is dark grey concrete. In the middle and right of the frame, several pallets are stacked with yellow cardboard boxes. The boxes are secured with blue straps. The warehouse ceiling is high, with a complex network of metal trusses and beams. The lighting is bright, coming from the open end of the warehouse, creating a clear view of the interior structure and the stacks of boxes.

OSARO[®]

Automate Your Mixed Case Depalletization

Reduce injuries and mitigate labor challenges

Increase throughput and improve ROI

Choose the right depal solution

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Introduction: The pallet problem

If there's one thing that is ubiquitous in the supply chain, it's pallets. They are the basic unit by which goods get organized, stacked, loaded, transported, offloaded, and then depalletized – the act of breaking down cases of goods at their warehouse destination for further downstream processing to end users. Without pallets, the millions of products generated every day couldn't make it from farm or factory to the consumer.

While pallets are essential to moving goods, they are a hazard. Warehouse pallets pose serious injury risks, mainly because of their weight, handling procedures, and potential for structural failure. Unloading them can be slow, inconsistent, and cause damage to products.

In both logistics and manufacturing, e-commerce is

driving the need to process more goods than ever – all requiring the manipulation of pallets. The good news is that there is an antidote to handle the volume and the safety.

In recent years, AI and machine learning vision software have made industrial robots smarter – and capable of doing the heavy lifting with the precision required by depalletization (depal). Depal can increase efficiency, improve safety, reduce labor costs, and enhance product quality.

Smart robots can handle different load types and sizes, as well as challenging mixed-case pallets, which require advanced vision and precision. The newest generation of robots is versatile enough to use in diverse industries with many different products or SKUs.



Why you need to stop manual depalletization

You can't afford it. Musculoskeletal disorders, which are typical of those in warehousing, account for nearly 500,000 injuries a year in the U.S. alone — at a cost of \$20 billion. That's about [one-third of all workman's comp costs](#), according to Bardavon, a firm that provides technologies and processes to mitigate worker injuries.

The U.S. Occupational Health and Safety Administration (OSHA) estimates the total economic burden of such injuries — as measured by compensation costs, lost wages, lost productivity including ancillary costs, such as the need to pay other workers overtime to cover missing workers, is actually between [\\$45 and \\$54 billion](#) annually.

Typical injuries caused by working while loading or unloading pallets include:

Back and muscle Injuries

Pallets are heavy when loaded. Poor lifting or carrying techniques can lead to back strains, muscle pulls, and other disabling injuries.

Manual handling Injuries

Incorrect manual handling practices, such as bending, twisting, or reaching improperly, can result in strains,

sprains, and muscle problems. Pallets often require workers to engage in repetitive lifting and carrying tasks that increase the risk.

Falling object Injuries

Pallets pose a hazard if they are not properly stacked or secured. If pallets collapse or if goods are improperly loaded and shift, workers nearby may be struck by the falling goods.

Cuts and puncture wounds

Broken or damaged pallets may have sharp edges, protruding nails, splinters, or other hazardous

elements. Handling or working near such pallets can lead to cuts and lacerations.

Training can mitigate these risks, but the National Institute for Occupational Safety and Health (NIOSH) puts elimination at the top of the list of ways to remove unsafe conditions. Automating your depal with robots achieves that.

On top of safety and cost concerns, the avalanche of products on the move is requiring faster processing.

'Transportation and warehousing' is among the top 4 most dangerous industry categories.

National Safety Council



Don't be left behind: Automated depalletizers are moving into warehouses

In the logistics and fulfillment industry, the growth in e-commerce sales has put enormous pressure on 3PLs, warehouses, and retail fulfillment centers to fill more orders at faster speeds. Despite inflation concerns and a temporary slowdown in the construction of greenfield fulfillment centers, e-commerce sales are projected to increase 56 percent from their 2021 level of \$5.2 trillion worldwide to about [\\$8.1 trillion](#) by 2026, according to research data firm Statista.

At the same time, an even more compelling incentive driving the automation of depalletization in particular is the need to reduce reliance on manual labor in the face of a severe worker shortage that shows no signs of abating. Indeed, from 2022 to 2027, the global market for robotic depalletizers is expected to balloon by \$1.7 billion to [\\$5.3 billion](#), according to a forecast by market research firm TechNavio.

As result, robotic depalletization, among other forms of automation, is being adopted across multiple industries from logistics to food and beverage, automotive, retail, and pharmaceuticals to deal with the surge.



End-to-End Decanting

The surge of automated storage and retrieval systems (ASRS) and automated mobile robots (AMR) integrating with Goods-to-Person systems has created the need to not only pick cases off the pallet, but also open the box and put product into totes for storage and retrieval. Advanced automation like this is available through automation innovators like [Robotica](#), which is part of an ecosystem of partner expertise created by some companies like OSARO.

Top industries that rely on robotic depal



Food and beverage

Robotic depalletization ensures careful handling of fragile items, such as cans, bottles, and packages, reducing the risk of product damage and improving food safety. Automation also enhances production line efficiency by integrating downstream processes like packaging and inspection.

Logistics and fulfillment

Robotic depalletization of uniformly packed pallets with same size boxes has been used in e-commerce and logistics operations for some time. But smarter, AI-driven robots that can handle the unloading of mixed case pallets with different types of packages or loads that shift and teeter in transit, are now moving fast into fulfillment and distribution centers. They operate with less injury and down time than human labor, improve cycle times, and boost warehouse productivity.



Health and beauty

In an industry that requires precise handling and traceability of products, such as medications, medical supplies, or cosmetics, robotic depal ensures sterile and controlled environments while handling pallets containing delicate items. Robots minimize contamination, optimize inventory management, and support regulatory compliance.



8 reasons why robotic depal is the right solution

Are workers quitting on you? Is it getting harder to maintain productivity with the crush of demand for product processing? Here are 8 reasons to get robotic depal in your operation.



Labor shortages and costs

Many industries are facing labor shortages, making it impossible to find and retain workers for physically demanding tasks like manual depalletization. Robotic depal reduces reliance on manual labor and the increasing costs associated with recruiting, wages, turnover, benefits, and training.



Precision and stability

Robots can be programmed to handle pallets and their contents with precision and stability, minimizing the risk of dropping or damaging items. This and reduces product damage and rework.



Increased efficiency and productivity

Robotic depalletization systems offer higher throughput, faster cycle times, and consistent performance compared to manual methods. Robots can work continuously without breaks, fatigue, or human error, resulting in improved overall efficiency and productivity. The ability to handle a high volume of palletized goods with speed and accuracy improves supply chain operations.



Adaptability to various loads

Robotic solutions can be designed to handle a wide range of load sizes, shapes, and weights. They are equipped with sensors and machine learning vision systems, such as OSARO's SightWorks™ vision software, to accurately detect and manipulate different types of items on pallets, including mixed cases which require the robot to adapt in real time to new SKUs.



Flexibility and scalability

Robotic depal systems can be reprogrammed or reconfigured to accommodate changes in product lines, packaging, or warehouse layouts. Unlike manual workers who may require overtime or simply be in short supply, robots can also be scaled up or down at no extra cost.



Industry-specific requirements

Certain industries, such as pharmaceuticals and food and beverage have specific requirements for efficient depalletization due to the nature of their products and safety regulations. Robotic depal systems can be tailored to meet such needs.

Overall, robotic depal systems allow faster unloading and sorting in warehouses. The use of robots helps improve productivity and reduces labor costs. It's important to consider the costs, maintenance requirements, and the need for proper integration and training when implementing such systems. Human supervision, which provides workers with opportunities to upskill, will still be necessary to oversee the operation and address problems as they arise.



Recognition of foreign objects and damaged boxes

Some advanced systems, such as OSARO's Robotic Depalletization System, are able to discern dangerous foreign objects, such as forgotten box cutters left on a pallet, and trigger an alarm to alert employees. Likewise, it can discern damaged boxes that may fall apart upon movement and stop unloading until the problem is removed.



Safety and ergonomics

As noted earlier, manual depalletization poses risks to worker safety. Robotic depalletization eliminates or greatly reduces them. A growing focus on worker safety and ergonomics across industries is also driving the adoption of robotics.

How robotic depal improves ROI

While the initial investment in robotic depalletization might seem daunting, popular and pervasive [Robot-as-a-Service \(RaaS\)](#) contracts reduce the investment risk of large capital outlays for equipment by shifting costs to annual operating expenses. With reduced labor costs, improved operational efficiency, and minimized product losses, robotic depalletization can lead to significant cost savings over time.

Labor cost reduction

Robotic depalletization significantly reduces the need for manual labor, which leads to cost savings associated with wages, benefits, training, and turnover. Companies can reallocate human resources to higher-value activities, such as quality control or complex tasks that require human intervention.

Improved accuracy and quality control

Robots are programmed to perform depalletization tasks with precision and consistency. This reduces the risk of errors, such as damaged goods or misplaced items, that can occur with manual

handling. Improved accuracy leads to better quality control, reducing waste, rework, and customer returns.

Reduced injuries and associated costs

Robotic depalletization eliminates or reduces the risk of injury, resulting in lower worker compensation claims, healthcare costs, and absenteeism.

Improved operational agility

Robotic depalletization systems can be designed to accommodate a wide range of load sizes, shapes, and stacking patterns. This scalability and flexibility allow companies to adapt to changing product lines, packaging requirements, or seasonal demand fluctuations without significant reconfiguration or additional investments. The ability to handle different loads and adjust quickly to changing needs contributes to operational agility.

Increased throughput and efficiency

Robotic depal systems can operate continuously without breaks, resulting in increased

throughput. The speed and efficiency of robotic systems enable faster unloading, sorting, and preparation of goods for downstream processes. This operational efficiency ensures consistent workflow and improved utilization of equipment.

Cost savings on damages and losses

The accuracy and control of robotic depallet systems minimizes damage or breakage during the

handling process. This reduces product losses, waste, and associated costs.

Do your math

It's essential to conduct a thorough cost-benefit analysis and consider the specific factors applicable to your operations to determine the financial impact and return on investment of implementing robotic depalletization.



How to pick the right depalletization solution

Making an informed decision requires consideration of several factors:

Operational requirements

Assess your specific operational needs. Consider factors such as the volume of palletized goods, required throughput, and the level of automation integration desired.

Load types and variability

Evaluate the types of loads you typically handle. Different robotic systems are designed to handle specific load characteristics, such as weight, shape, fragility, and stacking patterns. Ensure that the robotic solution you choose is capable of handling your load types effectively — especially if mixed case pallets are involved.

Flexibility and scalability

Consider the flexibility and scalability of the system you are evaluating. Can it adapt to changes in product lines, packaging, and load configurations? Can it be easily moved to other locations within the warehouse or to other facilities? Is it capable of

scaling up or down based on potential future changes in your operations?

Speed and throughput

Determine the required speed and throughput of your depalletization process. Evaluate the robot's cycle time, picking and placing speed, and the ability to handle multiple pallets simultaneously. Additionally, consider the reliability and uptime of the system, as any downtime can impact your operations.

Safety and reliability

Ensure that the robotic depalletization solution meets the necessary safety standards and regulations. Look for features such as collision detection, emergency stop buttons, and protective enclosures to ensure the safety of your workers.

Integration and compatibility

Evaluate how well the robotic depalletization system integrates with your existing infrastructure, such as conveyors, warehouse management systems (WMS), or other automation equipment.

Support and maintenance

Consider the technical support and maintenance services offered by potential vendors. Is there onsite deployment support? Inquire about training programs to ensure your staff is properly trained to operate and maintain the system.

Financing your system

Evaluate the total cost of ownership of a robotic depalletization solution, considering initial investment, maintenance costs, energy consumption, and potential productivity gains. Calculate the ROI based on labor savings, increased throughput, and improved efficiency to determine the financial viability of the solution. Ask your vendor about Robot-as-a-Service plans which shift upfront investment to lower operational costs.

It's advisable to engage with multiple solution vendors, conduct site visits, and request demonstrations, as you evaluate different options before making a final decision.



Let's talk

The automation train has left the station. Let us help you investigate the feasibility of robotic depalletization for your operation. [Engage with us at sales@osaro.com](mailto:sales@osaro.com).

[Book an appointment](#)

Solutions

OSARO delivers robotic piece-picking solutions for e-commerce in a variety of roles across the warehouse.



Pick and place



Robotic bagging



Robotic induction



Robotic kitting



Robotic depalletization

Why OSARO?

OSARO is a San Francisco-based company that has been a leader in machine learning-driven robotics for warehouse automation since 2015. OSARO delivers robotic piece-picking solutions for e-commerce where key challenges include high SKU inventories, complex packaging, and fragile items. Its intelligent robots enable goods-to-robot (G2R) use cases, where the greatest gains are yet to be made on the automated warehouse floor.

In the rapidly evolving world of logistics technology, OSARO offers not only smarter automation, but low-risk Robot-as-a-Service business plans, and its signature Hypercare customer support program from exploration to installation. A strong partner network ensures seamless integration of robotics into existing or new fulfillment operations.