WHITEPAPER

Protecting the produce

How reusable plastic containers solve an ongoing fresh food problem

Supply chain challenges facing the produce industry

Corrugated boxes and fresh produce don't mix.

That's the message coming from suppliers and retailers trying to protect their already thin margins.

Leaders at different nodes along the supply chain are paying increased attention to waste caused by collapsed corrugated boxes. Retailers want solutions that help decrease shrink and increase the overall quality of fresh produce that is ultimately sold to consumers. Suppliers want fewer rejections caused by the same culprit. Everyone wants bottom-line savings and to impact their sustainability goal.

Yet when it comes to transporting fresh produce along the supply chain from farm to retailer, corrugated boxes often are the default choice. This leads to higher food waste rates—farms and producers lose $15 billion annually, and manufacturers another $2 billion. The Food and Agriculture Organization of the United Nations estimates that **between 30% and 40% of total food production is lost before it reaches the market.** That number is pulled up by fresh produce. As much as half of what is raised never reaches retailers.

Fresh produce remains alive through respiration. It uses carbohydrates in the produce and oxygen from the air to stay alive and fresh. Carbon dioxide, water and heat are produced as byproducts. None of these byproducts are good for fresh fruit and vegetables trapped inside corrugated boxes. Heat and carbon dioxide lead to produce that over-ripens or wilts more quickly.

Water ruins the structural integrity of the corrugated fibers, causing boxes to collapse under the weight of those on top of them.

There is an increased need for tracking data and visibility across the supply chain to pinpoint where damage occurs, particularly throughout the transportation journey. Without the ability to trace products as they move, companies cannot face a problem until it is too late.

Produce's packaging problem

The toll taken by food waste is felt strongly by produce suppliers. The increased cost of the farm-to-retailer journey is creating pressure on leaders to find greater efficiencies.

Consumers have felt the pinch as retailers have passed along their increased costs. For example, **prices for fresh vegetables were 26.4% higher in March 2024 than they were the previous March.** That makes the cost of unsellable produce a bigger threat to a company's profitability than ever..

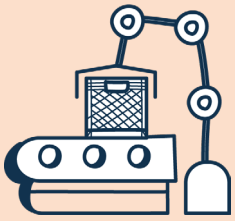
Prices for fresh vegetables were 26.4% higher in March 2024 than they were the previous March.

This truth is made even stronger by growing consumer demand for fresh produce, driven by the rise of online shopping and meal kits.

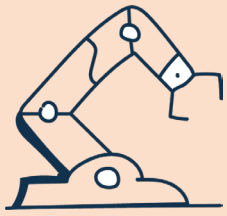
The U.S. fruits and vegetables market was valued at $96.26 billion in 2023. That is expected to grow to $127.61 billion by the end of the decade, an increase of nearly 33%.

The corrugated box—the container in which most produce is shipped—was patented in 1871. Other than a few minor modifications, it is much the same as it was when it first took over as the container in which America's fresh food was shipped. This 19th-century technology isn't meeting the 21st-century demands of American consumers.

There are six main problems created by this reliance on corrugated boxes for produce shipping.



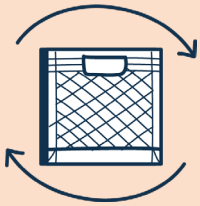
Corrugated cardboard can't handle moisture. The water produced through fresh fruit respiration destroys the structural integrity of corrugated boxes, creating box failures at many points in the supply chain. Box failures result in unsellable produce and increased labor costs because workers have to spend time cleaning up these messes.



Money-saving automation technology doesn't work with corrugated cardboard. Automation relies on standardized sizing and durability, and corrugated boxes come in too many shapes and sizes to play well with automation without downtime for continuous machine changes.

Poultry is heavy and corrugated cardboard can't stand up to the weight. When a pallet of produce packed in corrugated boxes is stacked for shipping, the product inside bears the weight of the entire stack as well as moisture from purge. This creates unstable pallets for shipping and greatly impacts product quality. It also results in a sticky film on the packaging that is a turn-off for consumers. Both lead to rejections for suppliers.

Box failures mean reduced cube. Corrugated boxes often fail under their weight, leading to unstable stacks. This in turn, requires additional labor for clean up and disposal. To reduce the extra work, corrugated boxes aren't stacked to their full capacity. They are partially loaded and sent to retailers, which means increased truck trips and higher emissions.



Corrugated cardboard boxes are a single-use container. They can't be reused, which means they are the source of tremendous packaging waste. This waste has to be disposed of at the baler — the water cooler of the warehouse — which results in more wasted labor time at stores.

Corrugated boxes have limited traceability. Corrugated boxes are typically plain cardboard with no built-in RFID tags, sensors, or tracking bar codes that can withstand the rigors of transport, particularly in cold or humid environments. This makes monitoring each box's location, temperature, or condition throughout the supply chain challenging, resulting in less visibility.

The RPC solution

The benefits of Reusable Plastic Containers (RPCs) can be touted across all product lines in the fresh-food supply chain, but perhaps nowhere are they as strong as they are for fresh produce. The increased consumer demand for produce and the increased product cost make getting more produce from farm to table paramount.

That is why more suppliers and retailers are turning to RPCs. At every step along the supply chain, RPCs solve the problems corrugated boxes create.

Supplier

PROBLEM: Jams box-former
Corrugated boxes frequently jam the box-former.

PROBLEM: Shrink
Corrugated boxes can leak, and their products can get damaged or squished when stacked.

PROBLEM: Rejection
Corrugated boxes lead to higher rejection rates at the next step, the distribution center, because of damaged products.

PROBLEM: Less Cube
Corrugated boxes can not be safely stacked to their highest capacity, and box failures lead to reduced cube.

PROBLEM Traceability:
Corrugated boxes have limited traceability options.

SOLVED: No box-former
RPCs have no box to form.

SOLVED: More fresh product
Stronger and sturdier RPCs, allow for higher stacks, meaning more product can be delivered to the customer.

SOLVED: Sturdier
RPCs are sturdier and protect the product better, leading to a more attractive presentation and better sales.

SOLVED: More cube
RPCs are designed to be safely stacked and switching to RPCs leads to 25% more cube.

SOLVED: Built-in traceability
RPCs have built-in RFID tags, sensors, or tracking bar codes that can withstand the rigors of transport, particularly in cold or humid environments.

Distribution Center

PROBLEM: Can't handle weight
Corrugated boxes can't stand up to the weight of meat, leading the product itself to bear the weight of the pallet.

PROBLEM: Not automation friendly
Corrugated boxes don't work well with automation systems because of the huge disparity in size and shape.

PROBLEM: Leak Flimsy corrugated boxes lead to failed pallets, which cause messes and injuries.

PROBLEM: Labor time Workers waste time unstacking and re-stacking unstable pallets.

SOLVED: 400% stronger
RPCs are sturdier and easily able to handle the product's weight.

SOLVED: Designed for automation
RPCs come in standard sizes that are designed for automation technology.

SOLVED: No spillage
RPCs are sturdier and stackable, reducing pallet issues and decreasing spillage and lost-time incidents.

SOLVED: Less labor time spent: RPCs are designed to be stacked and stable on pallets.

Retailer

PROBLEM: Labor time
Corrugated boxes create low-value activities like time at the baler, the retailer's water cooler. .

PROBLEM: Messy backroom
Corrugated boxes lead to messier, less organized backrooms.

PROBLEM: Product cleanup
Leaks from corrugated boxes lead to more time wasted on product cleanup.

PROBLEM: Low quality product
Corrugated boxes lead to fewer sales because of lower-quality product on the shelves.

SOLVED: Less labor time spent With RPCs, there is no need for a baler, resulting in more time spent by employees on valuable activities.

SOLVED: Organized backroom RPCs are standardized and stackable, leading to a more organized backroom.

SOLVED: No clean-ups
RPCs sturdy construction requires less time spent on low-value activities like cleanup.

SOLVED: Fresher Product
RPCs better protect the product, leading to more attractive displays and better sales.

RPCs offer a sturdier, safer alternative that better protects precious produce. Companies that switch to RPCs for fresher produce will likely see a dramatic decrease in shrink and labor costs. They will also contribute to global sustainability efforts that leave the planet a better place for future generations.

Corrugated boxes are often transported on wood pallets. Wear and tear on the wood can limit the pallet's usage to just a few trips. RPCs can be used hundreds of times and are 100% recyclable, helping businesses reach their sustainability goals.

The desire to protect the product and increase sustainability efforts led APS Group to turn to Tosca, a global leader in RPC pooling.

APS Group is the United Kingdom's largest tomato grower. Founded in 1949, the company ships over half a billion tomatoes yearly and is responsible for roughly 30% of the country's production. They were dealing with an increasingly complex operation and were looking for ways to improve productivity and efficiency.

APS Group hadn't been able to fully fill its existing shipping container for fear of damaging the products. That left each truckload at less than capacity. With Tosca's specially designed, nestable and stackable RPCs, **APS Group was able to optimize space during storage and transport while better protecting the produce. This led to a dramatic drop in shrink for APS Group.**

They also noticed benefits that directly impacted their customers, giving the company a competitive edge over other produce processors. For example, the use of a stronger box reduced the number of boxes that needed to be handled. **Since Tosca RPCs are strong enough to carry more product without breaking, APS Group could send the same amount of produce in fewer boxes.**

Transforming with Tosca

Tosca developed RPCs specifically for the poultry industry:

400%

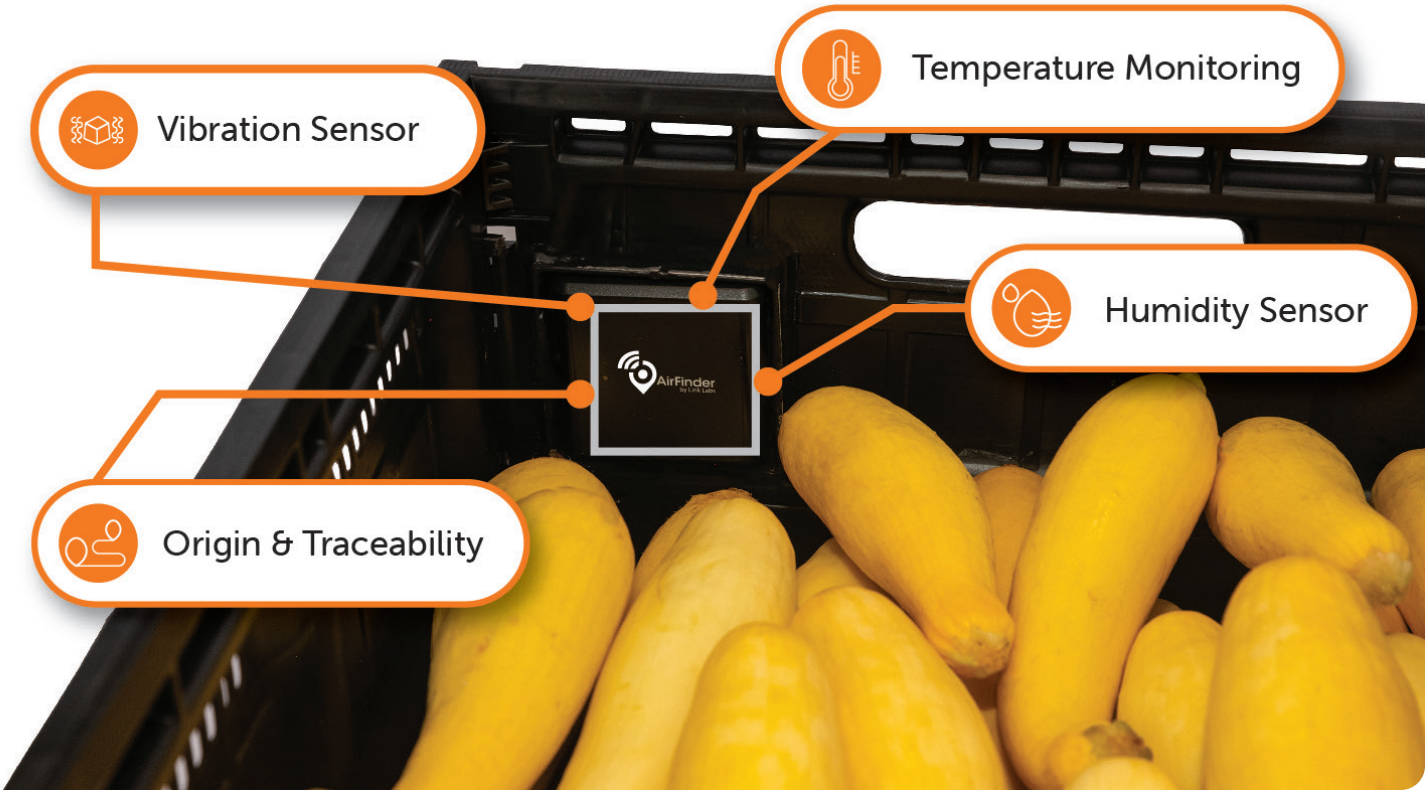
stronger than corrugated boxes. Engineered specifically for durability, they prevent product damage during transportation and significantly reduce shrink.

1-to-1

conversion from corrugated boxes because of the optimized container dimensions.

SUPERIOR VENTILATION

A unique design, which provides 5x faster cooling times and keeps produce fresher longer.



This last feature is especially important for fresh fruits and vegetables. Produce temperature is the most important factor affecting the quality of produce. Temperature is the primary factor controlling respiration rate. For fruits and vegetables, respiration increases by a factor of two to five for each 10ºC rise above its recommended holding temperature. For example, strawberries, raspberries, and blackberries have a shelf life of 7 days at 0ºC but only one day at 20ºC. Longer-living produce such as green beans, mushrooms, green onions, and pod peas last only two or three days at 20ºC.

On top of that, Tosca's RPCs were 5 to 8% less expensive than upgraded corrugated boxes. In fact, a corrugated box as strong as an RPC would cost 25% more than the Tosca product.

Tosca RPCs can be stacked higher and tighter than corrugated boxes, allowing for optimized storage space without sacrificing quality or safety.

In addition, Tosca's RPCs work with Tosca's Asset IQ solution, which provides real-time insights, can spot inefficiencies, and provides full control of your supply chain tracking.

> When we created our poultry RPCs, we knew we were setting out to do something different in a supply chain that hasn't been changed in decades. The fast turning, high volume nature of the poultry supply chain, added to the corrugated box failures and messes that come with them, have been a problem for years. We've created a better alternative
>
> - **Eric Frank,** CEO of Tosca

For more information on Tosca's poultry RPC options and its full line of RPC products, visit toscaltd.com

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