The Goods on Goods-to-Person Technologies

Nearly **80%** of Americans have shopped online, with **43%** purchasing weekly.

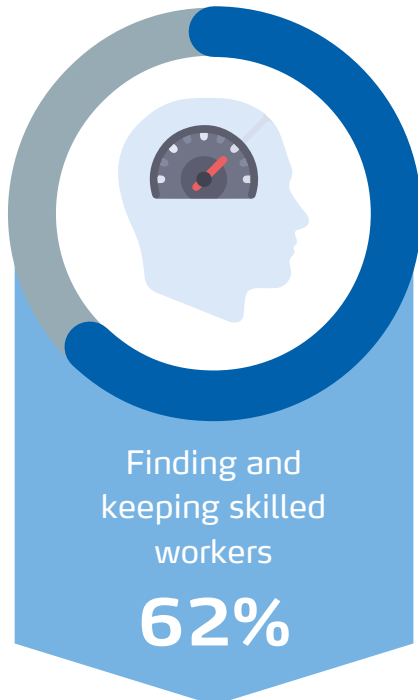U.S. online retail sales **surpassed $445 billion** for the first time in 2017.

E-commerce sales are projected to hit **$620 billion** by the end of 2020.

By 2018, the industry will need to fill approximately **1.4 million new jobs** at a rate of 270,000 per year.

The Bureau of Labor Statistics reports that **warehouse workers quit at a rate of 36%.**

When surveyed, more than 250 top logistics and supply chain managers said their three biggest workforce challenges are:

Finding and keeping skilled workers

62%

Increasing workforce productivity

57%

Controlling labor costs

45%

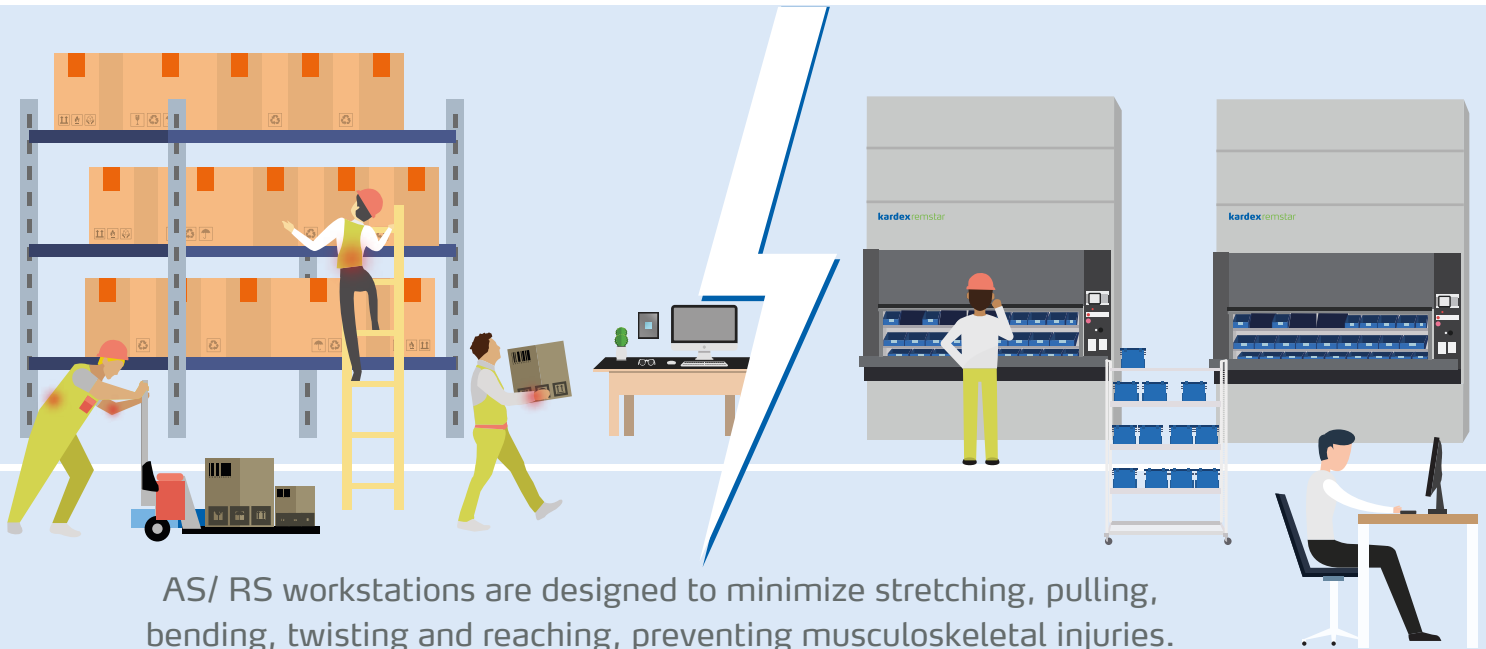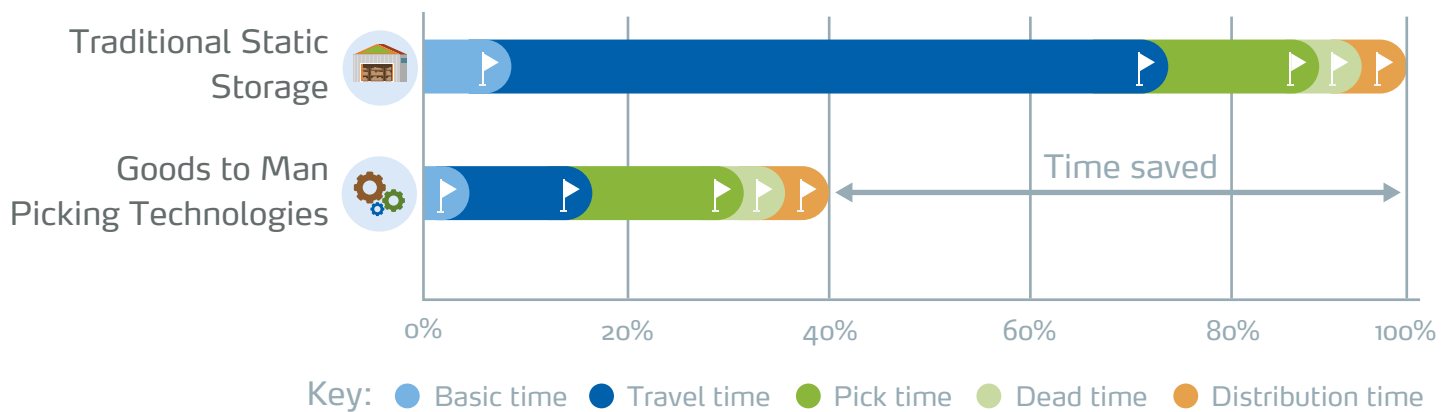Automated storage and retrieval systems (AS/RS) create highly compressed storage of

Pallets

Cases

Totes

and eaches (individual items)

Controlled by sophisticated software and mechanical controls, goods-to-person technologies deliver items required by an order directly to an operator.

kardexremstar

AS/ RS workstations are designed to minimize stretching, pulling, bending, twisting and reaching, preventing musculoskeletal injuries.

Non-fatal workplace injuries cost US businesses nearly **$62 Billion** yearly according to the 2016 Liberty Mutual Workspace Safety Index.

Traditional Static Storage

Goods to Man Picking Technologies

Time saved

0%   20%   40%   60%   80%   100%

Key: ● Basic time   ● Travel time   ● Pick time   ● Dead time   ● Distribution time

Installing an AS/ RS can reduce labor requirements by as much as **66%;**

can save as much as **85%** of floor space required to store the same number of items in shelving;

and can increase accuracy levels to more than **99.9%.**

Goods-to-Person Automation Technologies

Various different original equipment manufacturers (OEMs) design, engineer and manufacture a wide variety of self-contained, goods-to-person AS/RS systems. The technologies handle different volumes, types and velocities of non-palletized inventory at variable speeds to accommodate varying throughput demands.

Crane-Based Mini-Load AS/RS

With a single, crane-mounted load handling device dedicated to each extremely dense storage aisle, mini-loads handle loads in cases, totes or trays.

Robotic Shuttles

Handling cases, totes or trays, this type of goods-to-person automated storage system can deliver increasingly higher throughput based on the number of independently moving robotic shuttles inducted into the system.

Vertical Buffer Modules (VBMs)

The newest solution available, the Vertical Buffer Module, is a cost effective tote handling system consisting of an enclosed dense shelving system with a movable mast in the center that stores and retrieves totes, delivering them to an ergonomic turntable picking station or automatically delivering them via outbound conveyor.
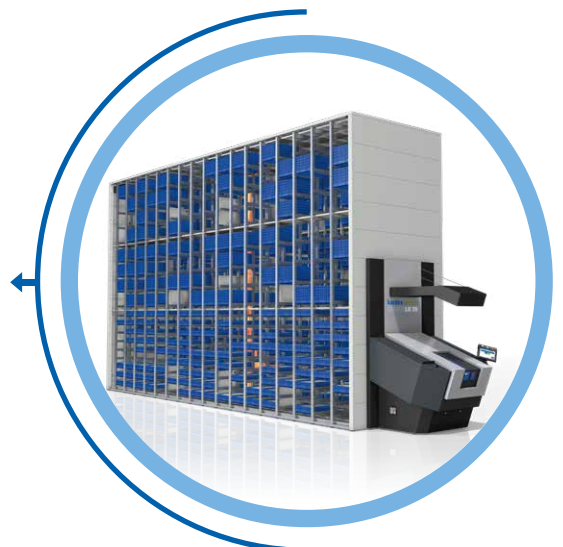
Floor Robots

The system acquired and used by the world's largest online retailer stores inventory on portable, high-density storage shelving retrieved and transported from storage to picker by a fleet of autonomous, mobile robots.

Horizontal Carousels

Consisting of highly dense storage bins mounted on an oval track that rotates horizontally to deliver product storage locations to an operator, for quick order fulfillment.

Vertical Lift Modules (VLMs)

These enclosed automated storage and retrieval systems consist of two columns of trays with an inserter/extractor in the center delivering trays of stored items to the operator as needed.
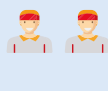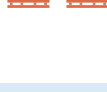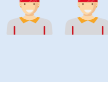
Vertical Carousels

Comprised of a series of carriers that travel bi-directionally in a vertical loop around a track (similar to a Ferris wheel), vertical carousels deliver stored items safely and quickly to an ergonomically positioned work counter at the operator's command.

kardex remstar

Side-by-Side Comparison of Automated Goods-to-Person Picking Technologies

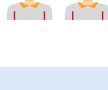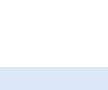Item Velocities: **Slow** · **Med** · **Fast**

1=Worst to 5=Best

Goods-to-Person Technology	Item Velocities			Storage Density	Floor Space Savings	Labor Savings	Potential System Throughput	Cost
	Slow	Med	Fast					
Mini-Load AS/RS			Fast					
Robotic Shuttles			Fast					
Vertical Buffer Modules			Fast					
Floor Robots								
Horizontal Carousels			Fast					
Vertical Lift Modules			Fast					
Vertical Carousels			Fast					