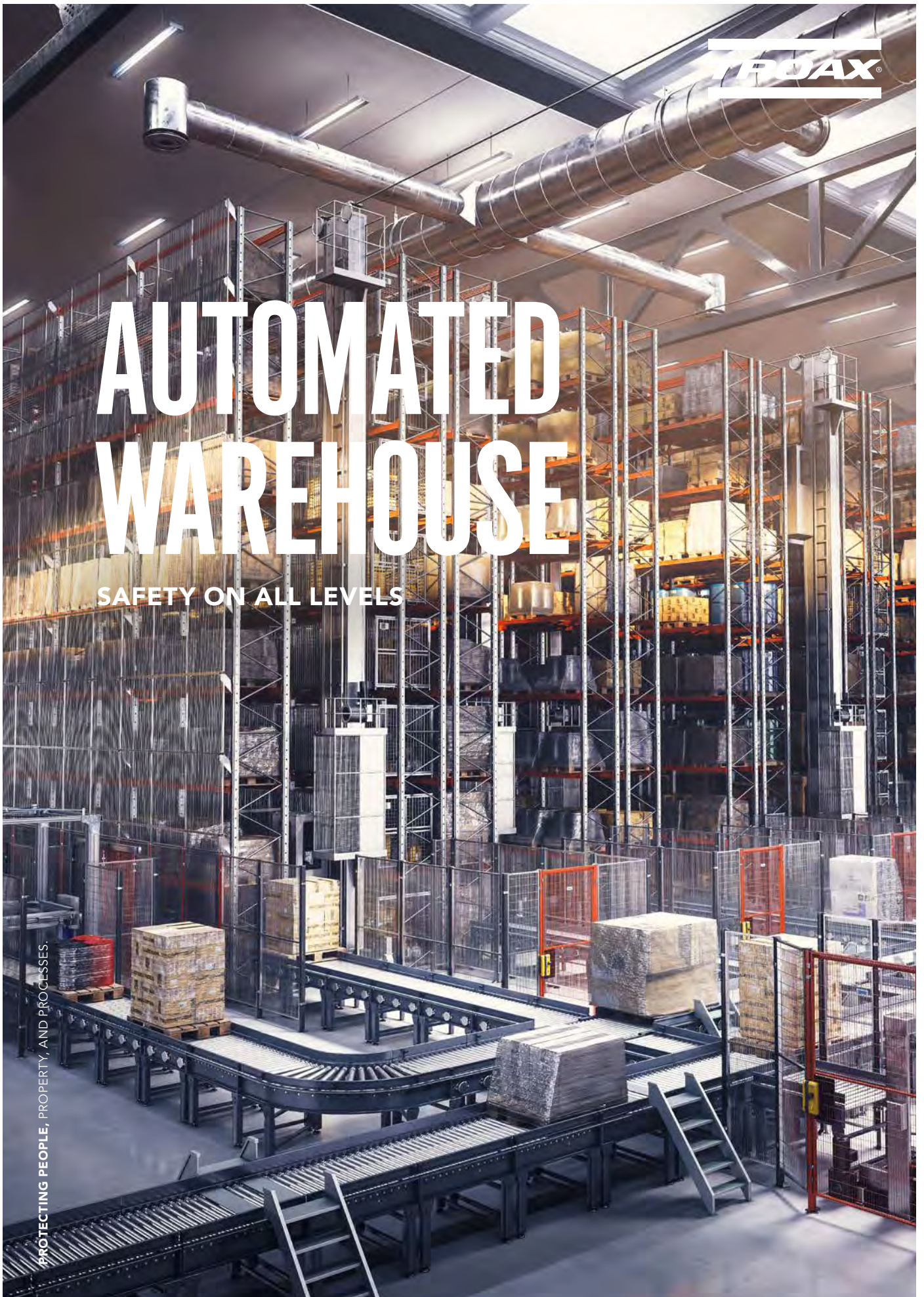


TROAX®

# AUTOMATED WAREHOUSE

SAFETY ON ALL LEVELS

PROTECTING PEOPLE, PROPERTY, AND PROCESSES.



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# SAFETY ON ALL LEVELS

THESE DAYS, EVERYTHING SEEMS TO MOVE AT A HIGHER SPEED; PEOPLE, IDEAS, AND LOGISTICS. AS CONSUMERS OF TODAY DEMAND MORE, SUPPLY CHAIN NETWORKS WILL NEED TO UNDERGO AN EXTREME TRANSFORMATION OVER THE NEXT FEW YEARS. THIS WILL CHANGE THE WAY WAREHOUSES ARE BUILT AND USED, AND WE ARE NOW FACING A NEW ERA WITHIN LOGISTICS. WE ARE REPRESENTED IN MORE THAN 40 COUNTRIES, AND OUR SALES REPRESENTATIVES WILL HELP YOU FIND NEW, AND FUTURE PROOF SAFETY SOLUTIONS FOR YOUR LOGISTICS UNIT AND AUTOMATED WAREHOUSE.

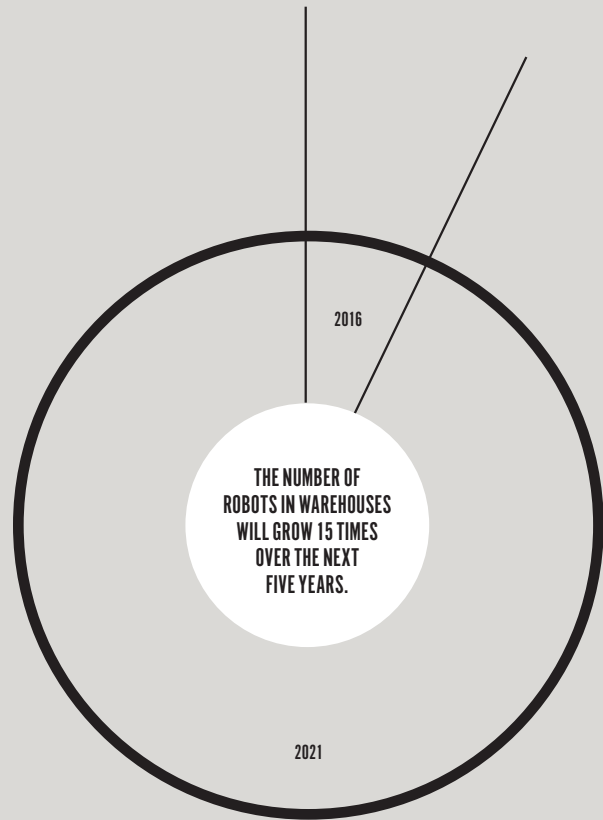


04

AUTOMATED WAREHOUSE TROAX

**TOGETHER  
WE CAN  
REACH NEW  
HEIGHTS**

**WITHIN AUTOMATED  
WAREHOUSES THERE ARE  
STRICT SAFETY REQUIRE-  
MENTS, AND NO MATTER  
THE NUMBER OF PEOPLE  
WORKING WITHIN THE  
WAREHOUSE, THEY STILL  
NEED TO BE SAFE.**



Automated Warehouses as a field of business is growing at breakneck speed, all of which is a result of rising costs due to operational challenges caused by higher consumer expectations.

On our part, this development is less about logistics and automations, and far more about safety. Because, no matter how automated the future may be, there are some co-workers who are just as fragile as ever. Humans. No matter what level of automation you apply, there still needs to be people on site to keep an eye on the process, for maintenance, and to make decisions. In order to create a safe working environment for both processes and people, a combination of the Troax Machine Guarding and Warehouse Partitioning systems can be applied.

Over the past 60 years we have learned that every project is unique. And just as there are different levels of automatization, there are different prerequisites when it comes to safety. No matter what your requirements are, we will help you find the right solution for any project.



*Westnacher Knowledge Series, Whitepaper:  
The Trend Towards Warehouse Automation, 2017.*

## PEOPLE AND PROCESSES

# FOUR LEVELS OF AUTOMATION

When investing in an automated warehouse, the safety mesh panel wall systems is generally a relatively small part of the total cost. But it can not be overlooked.

Depending on what level of automation that applies to your warehouse solution, the level of safety with mesh fence protection needs to be diversified and adjusted. At Troax we will help you to create the optimized solution for your safety needs, covering both machine guarding and anti-collapse systems.

To follow the trend towards automation and to develop a warehousing strategy, one needs to understand the various types of automation and the type of technologies being used. Learn more about them here.

1

### LOW AUTOMATION

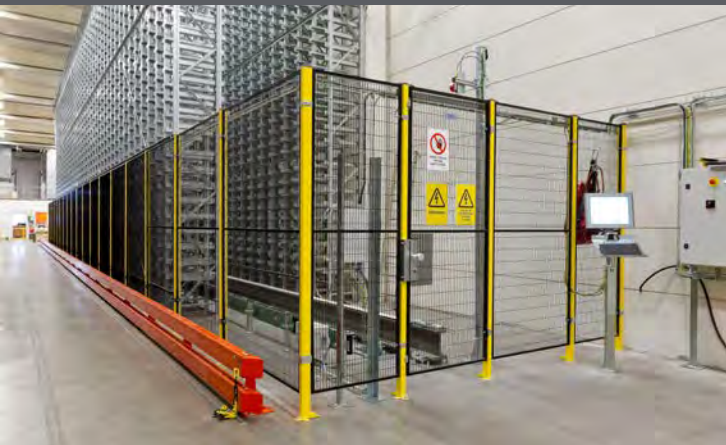
Usually, these warehouses mainly operate using printed papers. Decisions such as where to put specific products are made by humans. In general, workers need to travel long distances to put away or pick goods from shelves.



2

### SYSTEM AUTOMATION

Warehouses that use system-directed work to automate decision-making. Here, a Warehouse Management System is used to make decisions on where to put away or pick items and manage processes such as deconsolidation, and quality inspection. The system also optimises decisions on when to perform the tasks, and who should perform the tasks.



3

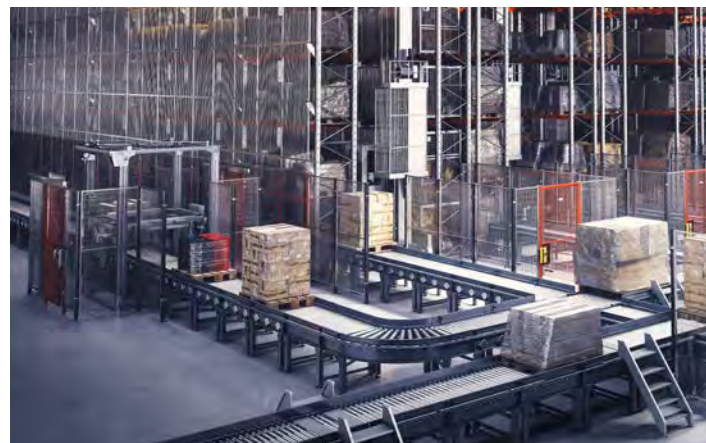
### MECHANISED AUTOMATION

In these warehouses both logic and goods-movements are automated. All goods are transported to the worker (goods-to-person model), from point A to point B by a conveyor belt system and an Automated Storage and Retrieval System (AS/RS). This both reduces travel distances and improves pick rates dramatically.

4

### SOPHISTICATED AUTOMATION

The most sophisticated level of automation will use highly automated equipment to eliminate manual movements and streamline order-picking processes. Here, systems such as automatic sorters, robotic picking-systems, Automated Guided Vehicles (AGV) and automatic palletizer will handle complex decision-making logic.

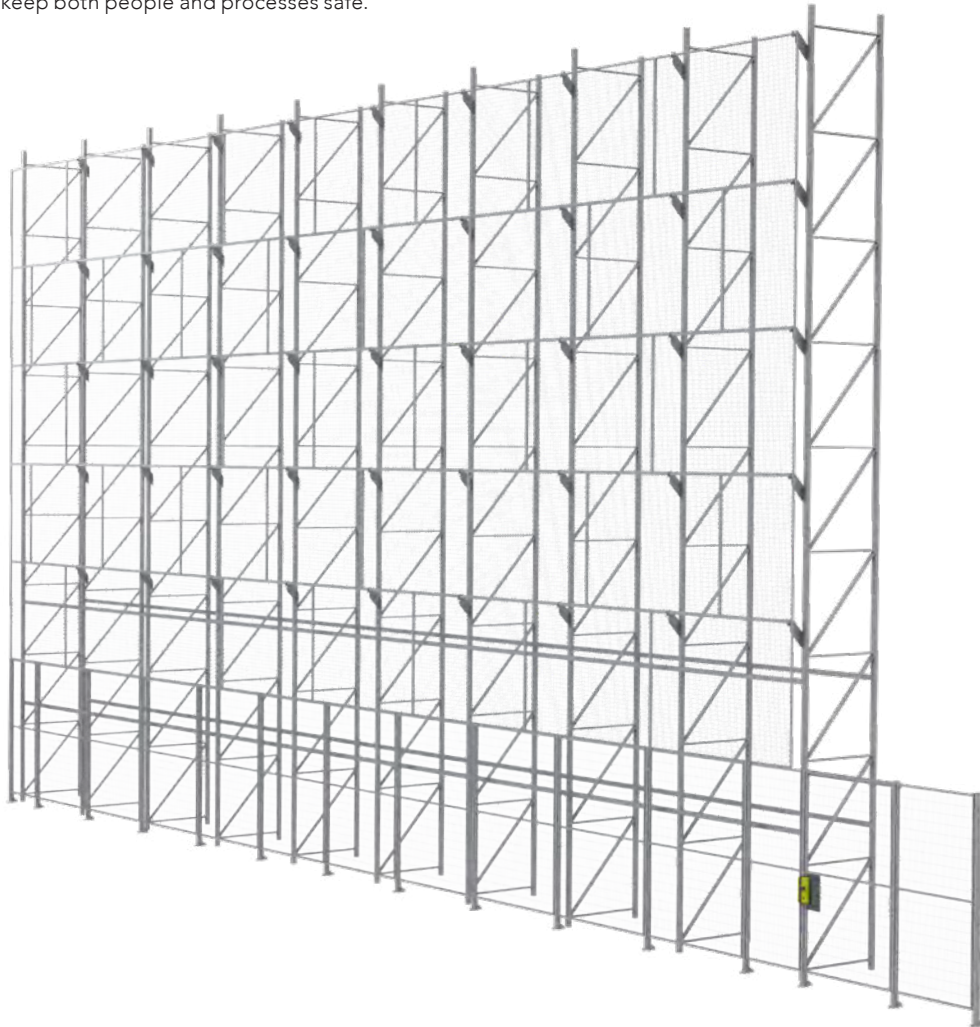


# COMBINING THE BEST OF TWO WORLDS

Whatever your safety needs may be, we can create a solution that will meet your requests in every aspect. Our wall systems suitable for automated warehouses are developed, manufactured, and marketed through the product segments Machine Guarding and Warehouse Partitioning. These mesh panel systems can be combined in a number of ways to suit your material handling and logistics needs. Also, this will provide an affordable and future-proof solution to keep both people and processes safe.

08

AUTOMATED WAREHOUSE TROAX







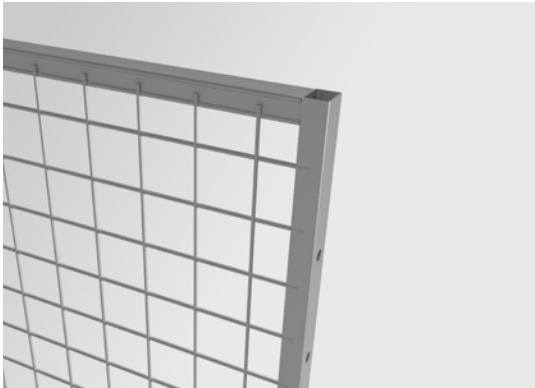
### ANTI-COLLAPSE BRACKET WITH SECURE

The bracket together with our design protected secure red wire loop and clip, creates an extremely strong fixing system for our anti-collapse screen.



### ANTI-COLLAPSE CLAMP

A bracket that connect the panels together on the short side.



### PANEL UR350 WITH MESH 50x50 MM

Strong anti-collapse panel, TÜV type approved for an impact of 2,500 Joules.



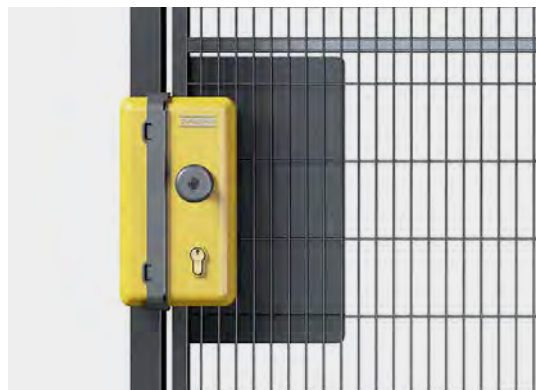
### PANEL ST20 WITH MESH 100x20 MM

Strong machine guarding panel, TÜV type approved for an impact of 1,600 Joules.



### SMART FIX SYSTEM

Easy and flexible assembly with a captive bolt, in accordance with the Machinery Directive.



### SAFE ESCAPE LOCK

An anti-panic knob and handle Euro cylinder lock with integrated safety switch.

# FLEXIBLE PRODUCTS TO ADD

TROAX OFFERS COMPLETE SOLUTIONS FOR YOUR ENTIRE LOGISTIC FLOW. OUR WAREHOUSE PARTITIONING APPLICATIONS WILL MAKE YOUR MATERIAL HANDLING BOTH SAFER AND MORE EFFICIENT. TROAX STEEL MESH PANEL SYSTEMS ARE THE MOST FLEXIBLE ON THE MARKET.

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AUTOMATED WAREHOUSE TROAX



## TROAX CAGE

Troax Cage is a quick and rigid anti-theft solution. The sturdy mesh panels of the cage allows great visibility and control over the stored items. Troax Cage is easy to assemble and can be used for both temporary and permanent installations.

## SHELVES

Troax mesh shelves can easily be adapted to fit most warehouse solutions, including those with an integrated backstop and/or dividers. The shelf is designed with a safety factor of at least 1.3, it can be used for anti-collapse purposes, it allows water from sprinkler systems to penetrate and it provides with good visibility.





## AEROSOL STORAGE

This solution is excellent for storage of explosive products. We offer mesh walls with 25×25 mm mesh to suit the particular requirement and specification. In case of an explosion, our small mesh size will protect both goods and people in the warehouse, from flying objects.

## PARTITION WITH PANELS

Areas or goods that need to be separated are effectively protected by our modular partition wall system with mesh or steel sheet panels. Our wall systems can either be built to reach the existing ceiling or be combined with our mesh ceiling.



## MEZZANINE GUARD

For fall protection, the Mezzanine system can be used in elevated working areas, in close connection to automated robot cells. With mesh panels and kick plates, the safety increases compared to only using a handrail. It protects both people and loose objects from falling down.

# EVERY NEW INVENTION STARTS WITH THE SEARCH FOR A SOLUTION

WE BELIEVE THAT OUR RANGE OF PRODUCTS IS NEVER COMPLETE. WE ALWAYS WORK ON IMPROVING OUR PRODUCTS AND THE REASON IS SIMPLE: WE WANT TO CONTINUE TO FIND NEW SOLUTIONS, DEVELOP NEW IDEAS AND GROW TOGETHER WITH OUR CUSTOMERS. HERE ARE A COUPLE OF EXAMPLES OF INNOVATIONS TAKING US FURTHER IN TERMS OF MAKING YOUR WORLD SAFE.

## **TROAX INNOVATION CENTER**

At first sight, what we do might seem plain, but beyond the visuals, there are decades of knowledge and technical expertise towards improving our products. Throughout the years we have worked on the most intricate and accurate details, to offer products of the highest quality and exceed the safety standards.

We develop our products to suit different contexts and environments all over the world, and our development team is constantly working on new ways to meet our customers' challenges and requirements.

# SPEED BOLT

SPEED BOLT IS PERFECT FOR OUR ANTI-COLLAPSE SYSTEM. THE NEW SPEED BOLT IS HIGHLY REQUESTED AND DEVELOPED ACCORDINGLY. WITH NO SEPARATE NUT OR BOLT THE ASSEMBLING IS EASIER AND FASTER, AND THEREFORE GENERATES INCREASED EFFICIENCY.

EASIER ASSEMBLING  
FROM THE FRONT



WITHSTANDS  
2,500 JOULES

ONLY ONE ITEM

# SAFE ESCAPE LOCK

Safe access. Safe Escape. As automated warehouse expands as a field of business, new needs and safety demands will occur. The new Troax Safe Escape Lock is developed in close collaboration with our customers, to help you increase safety on your plant.

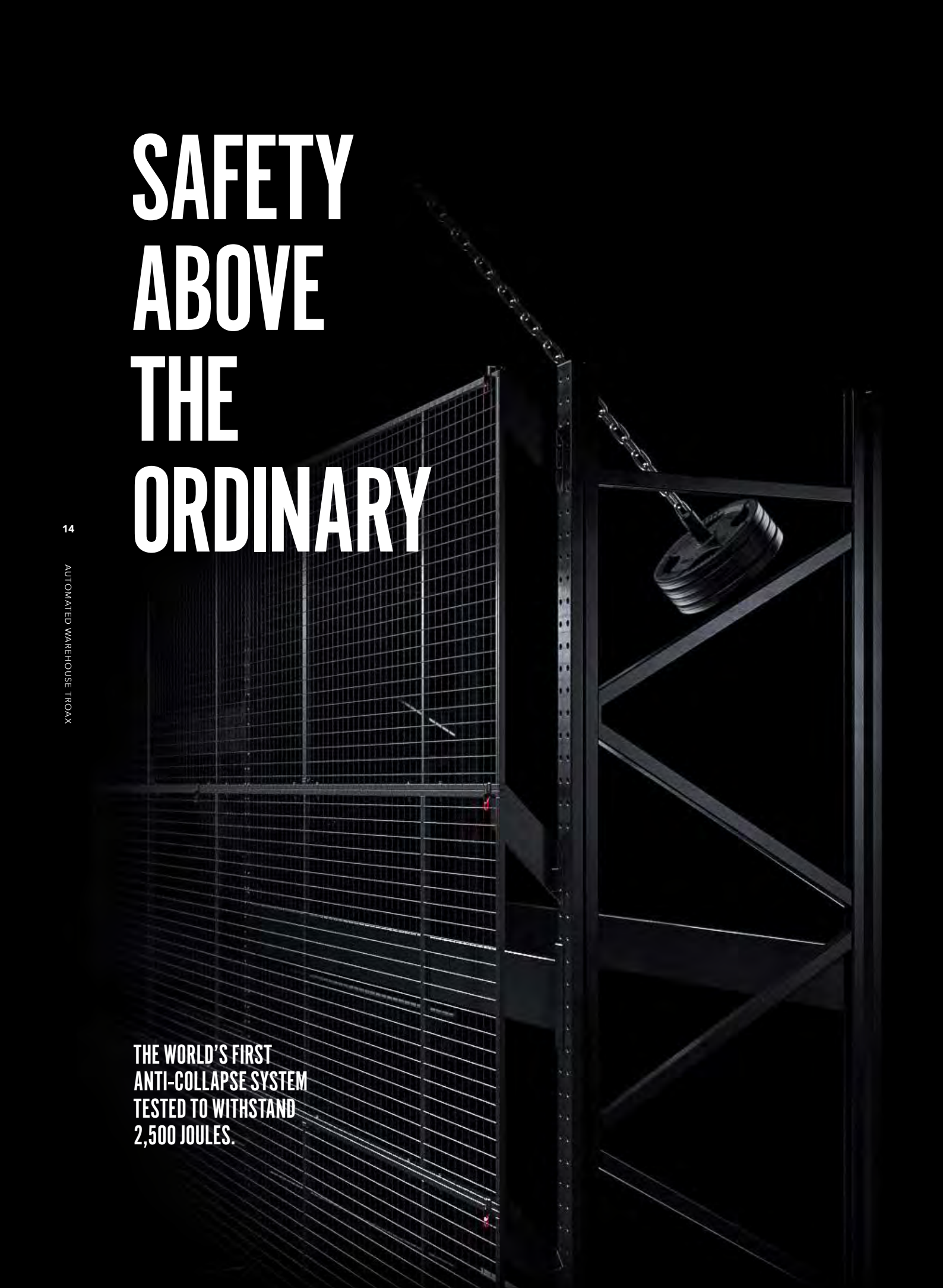
MULTI-  
FUNCTIONAL

SAFE WHEN  
PERFORMING  
MAINTENANCE

INTEGRATED  
SAFETY SWITCH



# SAFETY ABOVE THE ORDINARY



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AUTOMATED WAREHOUSE TROAX

THE WORLD'S FIRST  
ANTI-COLLAPSE SYSTEM  
TESTED TO WITHSTAND  
2,500 JOULES.

# REACHING THE HIGHEST LEVEL OF SAFETY

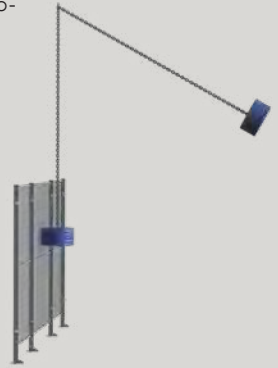
Our Anti-Collapse System is the strongest on the market, and will prevent any risk of spillage and overloading in high stacking situations. It is suitable for pallet racks of any height, with numerous levels of beams. The sturdy brackets together with our design protected kit Musca secure are available from 0 up to 400 mm as a stand-off to the pallet rack.

## OUR PENDULUM TEST METHOD

When testing our products, we use a method that itself is certified by TÜV. The purpose of the pendulum tests is to document the effect of high-energy impact tests. The Anti-Collapse System with bracket is tested with an impact of 2,500 joules, approximately 160 kilograms at 20.1 km/h. The result was good, the Anti-Collapse System with bracket withstood the impact and no parts departed. This is the industry's first TÜV type approval within the business.

Our Machine Guard System Smart Fix is tested in accordance with the test method stated in ISO 14120. The system is type approved by TÜV and withstands an impact of 1,600 joules. In the pendulum test, a weight of 100 kilograms hits the fence at 20 km/h.

WE PUT OUR TEST TO THE ULTIMATE TEST.



# THERE ARE NO SHORTCUTS WHEN IT COMES TO SAFETY

## INDEPENDENT TESTING

The core of our business is to make your world safe. In order to reach highest quality, we have decided never to take any chances, shortcuts or gamble, and we perform thorough tests on our products to ensure their strength.

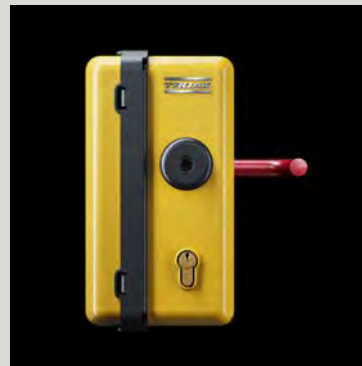
We collaborate with the organisation TÜV Rheinland to certify our products and test methods. They are a third-party testing institute, with independent consultants who validate the safety of products and services of all types, in order to protect people and the environment against hazards. TÜV Rheinland has very strict requirements for the approval of a product or service, and their certification is one of the strongest quality marks to be found.



CASE

# COLLABORATIONS FOR A SAFER FUTURE

WHEN A CUSTOMER TOLD US THEY WANTED  
A NEW TYPE OF SAFE ESCAPE LOCK,  
WE LISTENED – AND CREATED IT TOGETHER.



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AUTOMATED WAREHOUSE TROAX

“The idea for the new Safe Escape Lock came up when we had a meeting with our customer’s engineers about a year ago,” said Erik van der Meer, Troax Holland. They told us; »We want a special lock including a safety switch to secure logistics units within automated warehouses«. And together with the Troax Research and Development team, this journey could begin. And now, after a period of research, design, development, and quality testing, it’s available and introduced to the market. The reactions has been very enthusiastic. “We believe in working close with our customers, as it will lead to more creative innovations, taking all of us forward,” said van der Meer.

#### FROM INNOVATION TO INSTALLATION

The cooperation between Troax and the customer – a large European pallet rack manufacturer – has been going on for some years now, and after a couple of meetings we became their partner. “This is a keyword. To us, being a partner is somewhat different from being a traditional supplier. We are selling a small part of all the products needed in these large projects. But the products we deliver are about safety and they need to be taken seriously,” said van der Meer. “We try to be a total supplier, both in terms of a high service-level and being a partner.

#### STAY SAFE. STAY HAPPY.

Today, Troax is a global company and deliveries can be made world-wide. “Europe is ready for Automated Warehouses, and this market is growing rapidly. As a result, the need for safety panels is also increasing”.

*“We believe in working close  
with our customers, as it will lead  
to more creative innovations,  
taking all of us forward,”*

Troax’s focus within this line of business is the safety panels, and we have an expertise on everything concerning mesh panel systems. “The customer will tell us what they need, and we provide them with the right products. They know that what we offer is safe, and that their pallet racks and the mesh panels from Troax is a good combination, which the end user is happy about when it’s finished. Then they are safe, and happy,” said van der Meer.



## CASE

# HEADING TOWARDS NEW HEIGHTS

FOR NEARLY A DECADE, TROAX HAS WORKED CLOSELY WITH ONE OF EUROPE'S LARGEST FOOD DISTRIBUTORS. THE COLLABORATION HAS RESULTED IN NEW INNOVATIONS THAT HAVE BEEN USED IN AUTOMATED WAREHOUSES WHICH IS AN AREA OF GROWTH.



Generally, the safety mesh panel wall system is a relatively small part of the total investment within an automated warehouse; but it can not be overlooked. "When a business is starting up, safety is an extremely important factor, and keeping our promises for the installation is crucial. Major investments are

at stake, and it is crucial to have a continuous and open dialogue around the delivery," said Viktor Göhlin, Automated Warehouse Expert at Troax. For the past ten years, Troax has worked with one of Europe's largest food distributors on projects including solutions for automated warehouses on a large scale. For Troax's part, the project will be more about safety than logistics and robots.

*"In automated warehouses people and robots work side by side, and this means safety becomes a key issue within every logistics unit."*

### MACHINE GUARDING IN LOGISTICS UNITS

As for this case, the need for a well-founded solution that suited the application and the company's wishes became clear. Today, several kilometers – even tens of them – with safety mesh panels have been delivered.

"Automated warehouses include both robots and humans, and a combination of solutions within the Machine Guarding and Warehouse Partitioning segments could be applied. We also believe that the demand for high-quality safety solutions in automated warehouses will continue to grow as the market is expanding." Following the customer's growth, new solutions have been developed. The scope of the project has placed high demands on both production and delivery, and here the capacity of Troax to offer delivery dependability have been great assets.

"The customer has been able to fully rely on us to find the right safety solution. In total, the project has resulted in almost 20 km of Machine Guarding fence with approximately 1,000 Safety Doors, and 15,000 m<sup>2</sup> (equivalent to two football fields) of Anti-Collapse screens." said Viktor Göhlin.

### THE RIGHT SOLUTION FOR EVERY PROJECT

Within Automated Warehouses it is crucial that every specific detail, along with the solution itself, is thoroughly designed, and properly carried out in good time. This will prevent any form of delay, and any potential extra costs that may be incurred. Over time, a close collaboration between Troax and the customer has emerged.

"In automated warehouses people and robots work side by side, and this means safety becomes a key issue within every logistics unit."



**QUICK QUOTATIONS**



**WE WILL HELP  
YOU DRAW YOUR  
APPLICATION**



**CREATE THE IDEAL  
SOLUTION FOR YOUR  
REQUIREMENTS**



**EASY FLOW FROM IDEA TO ORDER**

It can be hard to imagine how your solution will look before it has been delivered and assembled. At Troax, we use a comprehensive drawing and rendering program. This allows you to view our proposal as 2D and 3D generated drawings before placing your order.

Read more about Troax at [www.troax.com](http://www.troax.com) – where you will also find product data sheets, 3D files and other downloadable material.

# **VIEW YOUR TROAX SOLUTION BEFORE ORDERING**

# MAKING YOUR WORLD SAFE SINCE 1955

For more than 60 years, Troax has been developing high-quality metal-based mesh panel solutions, with the vision to meet the demands for safe and secure storage, machine guarding, and warehouse partitioning. Today, Troax is the market leader within this field and our products protect people, property, and processes worldwide.



Troax was founded 1955. Throughout the years, growth has always remained strong in terms of international expansion, products, and sector providing security equipment for industry, storage, and property.

Today we are represented all over the world, and we are continuously developing our operations on all continents.

# MAKING YOUR WORLD SAFE

