



**TRIOMOBIL**  
DIGITAL FACILITY SOLUTIONS

**PREVENTING FORKLIFT BASED  
RISK AND THREATS  
UTILIZING  
IOT TECHNOLOGIES**



# **Track Your Forklifts, Prevent Forklift-Based Accidents and Ensure Occupational Safety with Trio Mobil IoT Solutions!**

Forklifts provide substantial efficiency growth in the industry, facilities, warehouses, and all businesses.

Forklift trucks transporting heavy materials are one of the most critical and indispensable assets of businesses for all industries, from retail to construction or from factories to warehouses.

The greatest value additions of forklifts can be defined as making the transportation process safer and saving costs.



Trio Mobil Forklift Safety Solution Provides Significant Contribution to Both Occupational Safety And Increase of Efficiency.



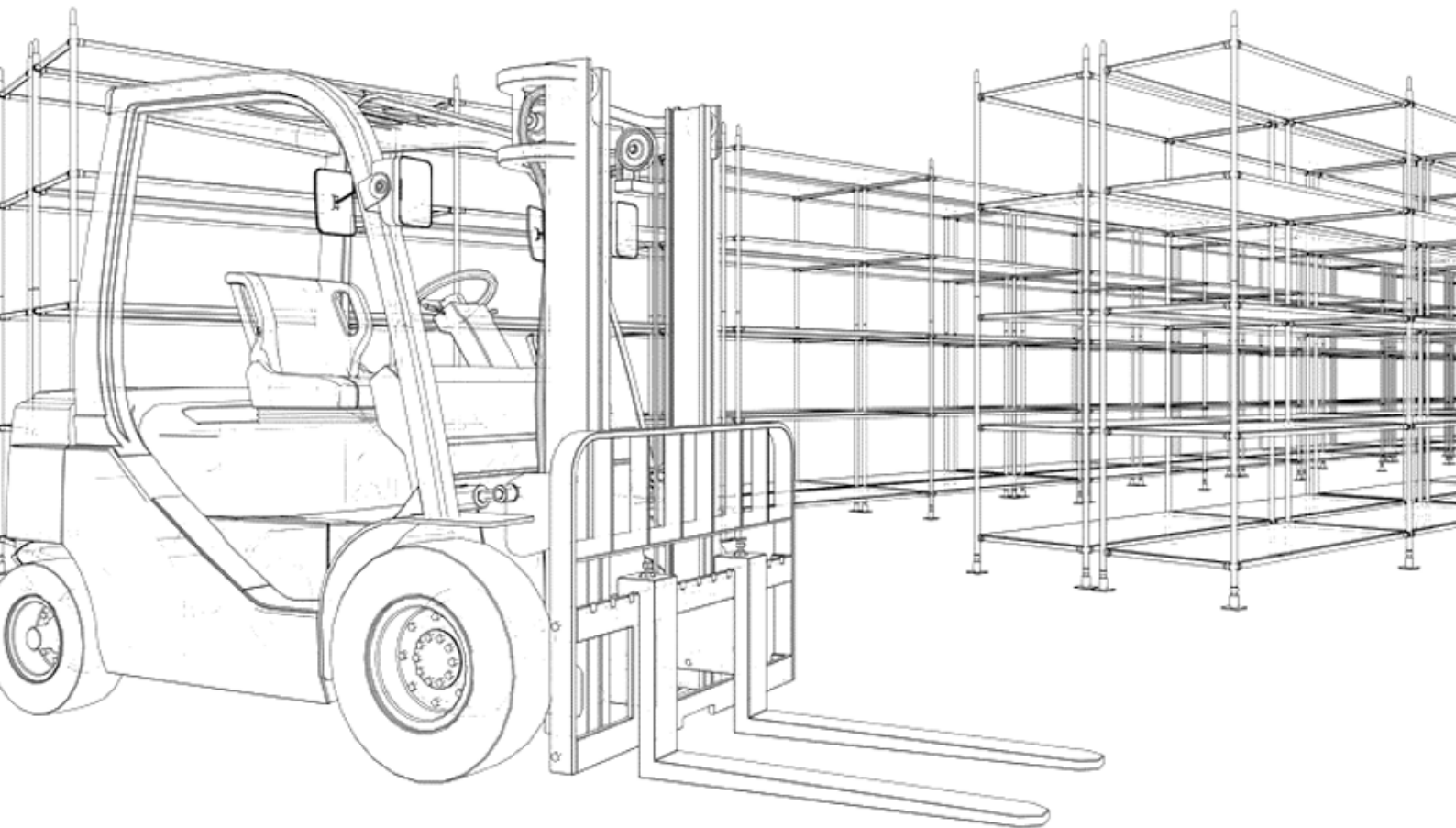
Forklifts play important roles in getting the work done in a fast, efficient, and safe manner..

Approximately **1.5 Million** forklifts are sold in the world every year. Especially with the development of the transportation and logistics industries, forklift usage is increasing every day.

Besides, e-commerce orders were up **104%** in 2020 compared to 2019. Forklifts play important roles in the supply chain processes of these orders.

Despite all the benefits, it carries great risks that may pose a danger when working in situations such as careless handling of forklifts or operator/human error.

Serious forklift accidents are encountered very frequently in enterprises, due to the design of the forklifts, the environmental conditions, and the high risks in their operating workplaces.



# Analysis of Forklift-Based Possible Risks and Threats

Based on the OSHA (Occupational Health and Safety Association) statistics

- Forklifts account for around 85 deaths every year.
- Forklift accidents that result in serious injury are around 35,000 annually.
- Non-serious injuries related to forklift accidents reach 62,000 each year.
- A forklift overturning is the most common incident, accounting for 24% of all forklift accidents.



Figure 1 Graph of Occupational accidents in storage and supporting activities group for transportation by years (SSI statistics, 2019).

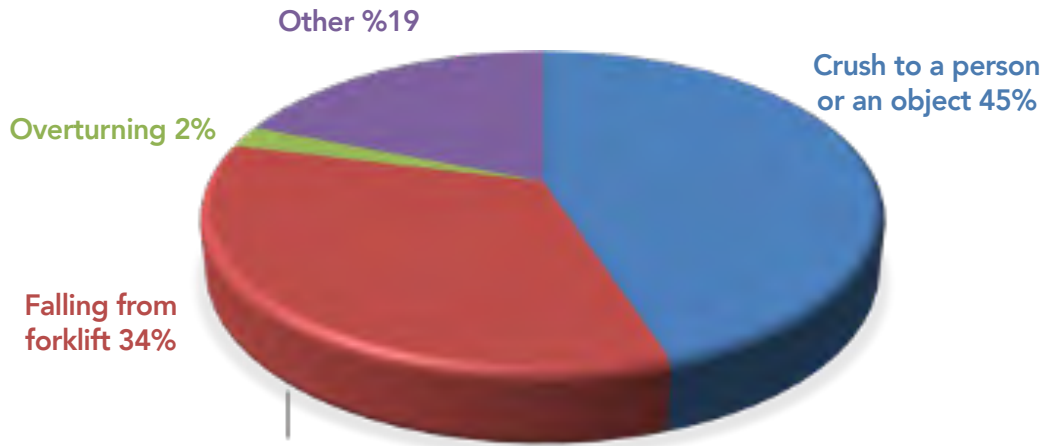
It has been determined that the number of occupational accidents in warehouses and supporting activity groups increase significantly every year. Approximately 50% of these figures consist of forklift-related accidents. When looking at the data, it is clear that businesses do not attach enough importance to safety in forklift operations.

Considering both the results and the Occupational Health and Safety standards, it is of great importance that enterprises give maximum importance to the safety of forklift operations.

When the statistics of accidents caused by forklifts are examined, almost 50% of the accidents occur as "Crash into a Person or Object" at a rate of 45%.

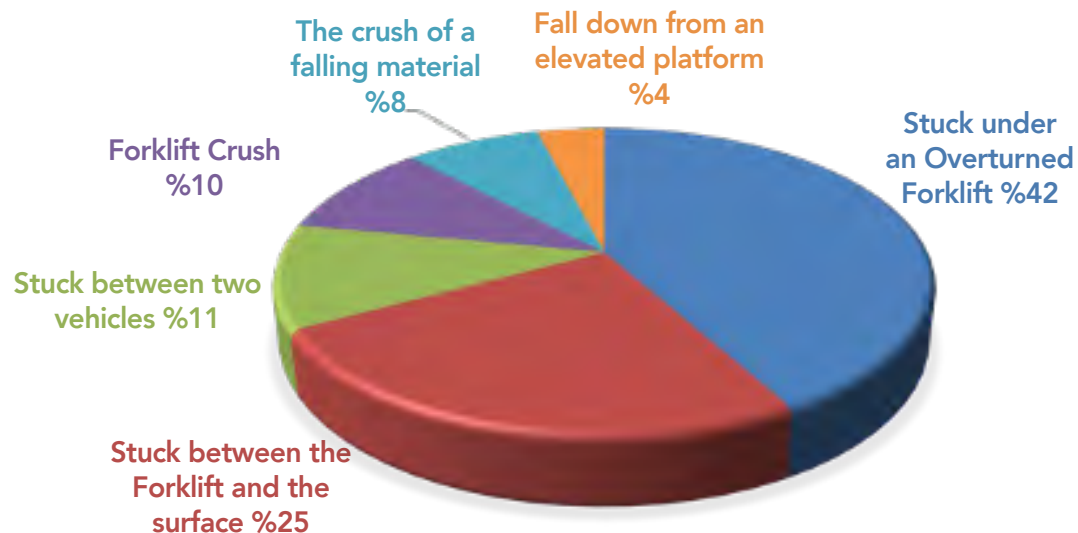
According to statistics, most forklift accidents during transportation or operations are caused by driver errors.

## FORKLIFT ACCIDENT TYPES



According to the SSI data, when the accidents experienced by the personnel during the transportation and storage operations are examined, it is clearly seen that all the causes of the accidents are due to the faulty and misuse of the forklifts.

## WORK ACCIDENTS CAUSED BY FORKLIFTS



Forklift accidents occur in all industries, but statistically, there is a significant difference in fatal accidents, especially in the manufacturing industry compared to others. It is seen that the number of pedestrians in the manufacturing industry, the number of narrow corridors and passageways, and the weight of forklifts and transported products are the main reasons for the basic problems in this industry.

## FATAL FORKLIFT ACCIDENTS



**Forklift-Pedestrian  
Accident Prevention System**



**Forklift-Forklift  
Accident Prevention System**



**Zone-Based  
Forklift Deceleration System**





## **The main reasons for forklift accidents are;**

### **1-Behavioral Factors:**

Excessive speed, incorrect maneuver or braking, improper parking, moving with elevated load, carrying people on the fork, improper push-tow, poor communication...

### **2-Working Environment and Load Conditions:**

Narrow passageways and corridors, obstacles and traffic on driveways, unsuitable ground, unsuitable loading ramps, excessive slopes and curves, insufficient lighting, unstable loads, load blocking the line of sight...

### **3-Forklift Condition:**

Brake and steering system problems, insufficient safety and warning system, disrepair, forklift's age, hydraulic oil leaks, worn tires, non-ergonomic design, exhaust emissions, blind spots...



# **Systemic Problem Error and Negligence Causing Forklift Accidents from the Manager's Perspective**

Although most of the threats associated with forklifts are known, until today, low-level risk control interventions occurred which are mostly focused on operator protection and training

However, the solutions developed for the risks generated by the forklifts remain insufficient.

The most critical issue is the absence of automated systems to support the implementation of the precautions taken regarding the operation of forklifts, and leaving these precautions to personal memory and initiative.

Accidents that occur when operating a forklift usually occur through a chain of errors. Sometimes skipping a single substance has great consequences.





## Human error:

Forklift operation is one of the risky professions in terms of the dangers it involves. When operating a forklift, the forklift operator can endanger both himself and other employees.

The majority of accidents caused by forklift operators are listed as follows;

- Driving the forklift over the specified speed limits,
- Failure to notice pedestrians in the blind spot,
- Losing control of the environment while maneuvering,
- Entering bends and turns with more speed than necessary,
- Crashing into workers/pedestrians, other forklifts, stationary objects by making mistakes, in absentia or negligence.

## The most reliable solution to ensure compliance with Occupational Safety rules and to avoid human error: **Control with automated systems**

Against a security issue with such huge consequences and risks;

- All possible dangers should be identified,
- Rules and procedures should be determined,
- Regular training should be given to staff,
- Audits should be performed,

**• As the most critical item: : automated systems should be used to ensure the implementation of precautions without human error and initiative.**

### In Brief;

- Forklift safety measures; It is one of the most indispensable occupational safety headlines of a workplace.
- Work sites where machines such as forklifts operate are potentially open to work accidents and minor to major injuries.
- Taking some important safety precautions and following these measures are of vital importance in terms of occupational health and safety.
- It should be controlled by automated systems without giving place to Human Error.
- It is the responsibility of employers and company officials to ensure this follow-up.

# How to Take Forklift and Pedestrian Safety Precautions?

It is now an obligation for employers and employees to use technology as the safest way to ensure operational continuity on such a critical issue, without causing the human error.

The **"Forklift and Pedestrian Safety System"**, developed by Trio Mobil using the most advanced IoT and Artificial Intelligence technologies supported by Data Analytics, not only **increases the efficiency** of the operations but also slows down the forklifts at the time of encountering each other or pedestrians, thereby **preventing the risks** of work accidents.

## Scope of the Solution

Trio Mobil Forklift Safety System Solutions ensure;

- Tracking of forklifts instantaneously,
- Automatic speed reduction of forklifts in accordance with specified speed limits by defining safe zones,
- Automatic speed reduction of forklifts in case of "forklift-forklift" or "forklift-pedestrian" encountering.

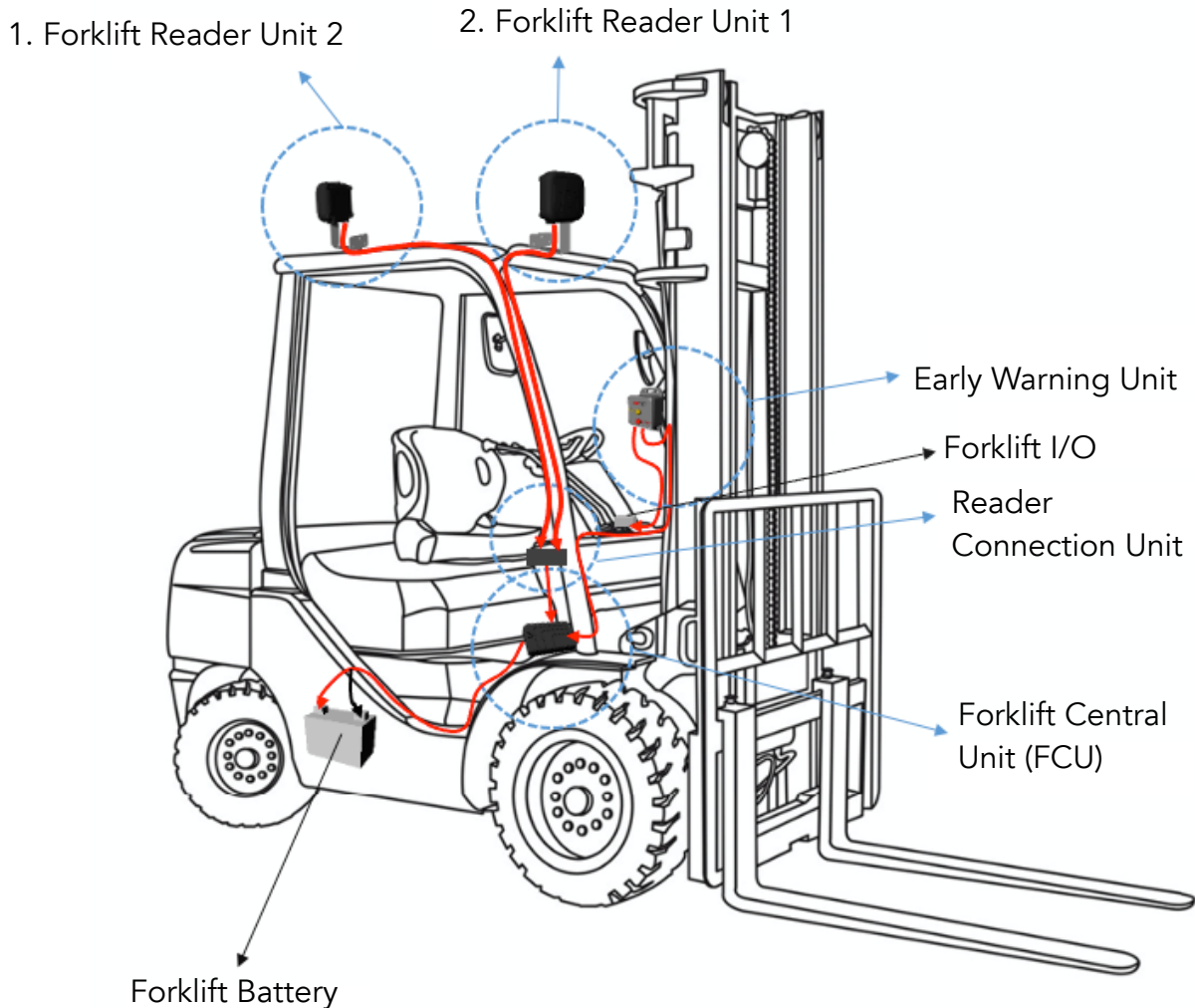
Thus, forklift-based work accidents and collisions in working areas are prevented, and a safer working environment is provided.

## What are the Capabilities?

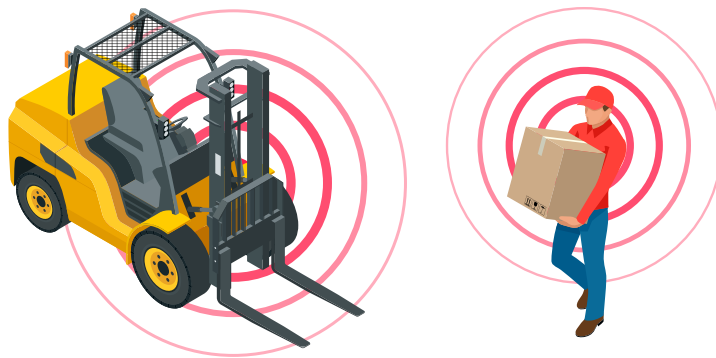
With Trio Mobil Forklift Safety System Solutions;

- High precision position tracking is provided, forklifts can be monitored instantaneously whether in an open or closed area,
- Speed limitations can be determined in the regions specified as safe zones. When forklifts enter these areas, they are slowed down automatically and possible accidents and collisions are prevented.
- The speeds of forklifts are reduced automatically in case of "forklift-forklift" or "forklift-pedestrian" encounters. Hence, possible work accidents and collisions are prevented.
- A safe work environment is ensured by preventing potential forklift accidents and collisions.

# Trio Mobil Forklift Safety System Structure



# **Increase Your Occupational Safety in 3 Ways with Forklift Safety System, Prevent Forklift-based Work Accidents and Collisions!**

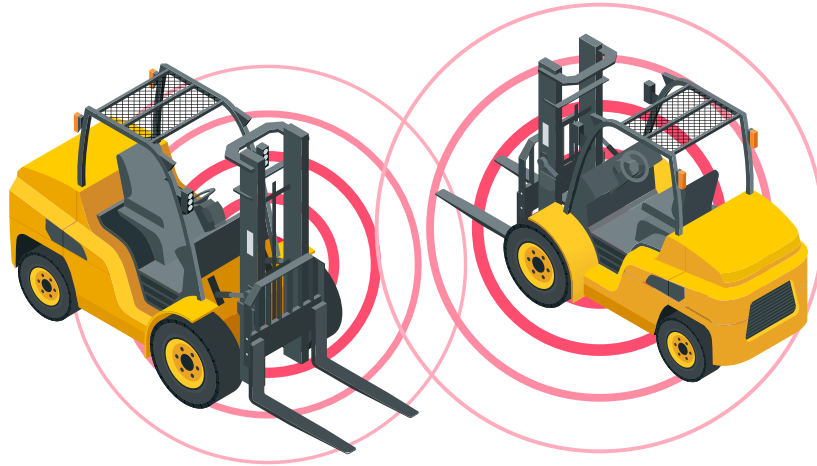


## **1. Forklift-Pedestrian Collision Prevention System**

The system allows the forklift to take action in two stages as soon as the forklift encounters the pedestrian. It first slows down, then totally stops the forklift automatically. Distance and speed for both stages are defined in the system. For example, it can be defined as; reducing the speed to 6 km/h within 10 meters range and to 2 km/h within 5 meters range.

- In the forklift to pedestrian collision prevention system, a warning is sent to the system when a pedestrian enters the danger zone of the forklift.
- With the warning sent, the speed of the forklift is lowered to the predetermined speed level.
- If the system identifies people in a blind spot, such as a corner, it automatically decelerates.
- In addition, both operator and pedestrian are warned by audible and visual alarms on the forklift.



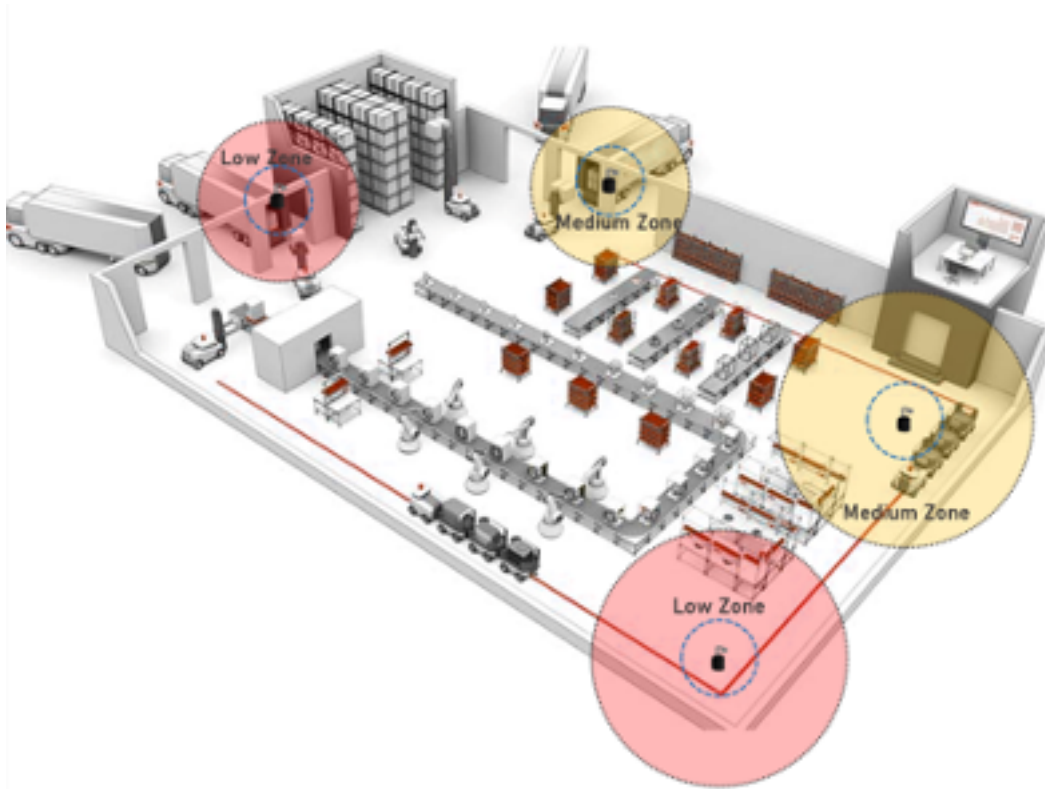


## 2. Forklift-Forklift Collision Prevention System

The system allows the forklift to take action in two stages as soon as the forklift encounters another forklift. It first slows down, then totally stops the forklift automatically. Distance and speed for both stages are defined in the system.

For example, it can be defined as; reducing the speed to 6 km/h within 10 meters range and to 2 km/h within 5 meters range.

- With the system applied on the forklift, a wireless cage is built around it. The system controls all four sides of the forklift instantly.
- When any forklift enters the danger zone of another forklift, both forklifts are slowed down.
- It is ensured that they go only at the defined speed until they exit each other's danger zone.
- Audial and visual alarms are created by the system integrated on the forklift.



### 3.Zone-Based Forklift Deceleration System

In the zone-based deceleration system, a warning is sent to the system when the truck enters the predefined zone. With the warning sent, the forklift is lowered to the predetermined speed level. At the same time, both the forklift operator and the pedestrians in the zone are notified with audible and visual alarms. The forklift returns to normal speed when it exits the zone.

- Route optimization and forklift usage rates can be analyzed in real-time with a precision of 30- 40 cm. With these analyzes, effective use of the forklifts is ensured by evaluating the current status of the forklifts and optimizing the route.
- With the zone determination feature, entrance/exit times and waiting times in prohibited zones can be recorded and monitored.
- Comprehensive analyzes can be made with zone-based reports and heat maps.
- With the Timeline feature, all routes of the forklift can be recorded and viewed in animation.
- The operational efficiency of the forklift can be analyzed and improvements can be performed. Forklifts in a specific zone can be detected at any time.
- Loaded/Unloaded periods and usage rates can also be examined.

You can watch our [Youtube video](#) to get more information and send mail to **sales@triomobil.com** for solutions specific to your industry.

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