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# Optimizing Warehouse Safety & Efficiency

## A COMPREHENSIVE CASE STUDY ANALYSIS OF BILATERAL COLLISION AVOIDANCE SYSTEM (HALOGUARD360) WITH LOCATION POSITIONING IN WAREHOUSE OPERATIONS

3/11/24

# Introduction:

## In warehouse operations, safety and efficiency are paramount concerns, prompting companies to adopt innovative solutions driven by advanced technologies.

This White Paper explores the comprehensive capabilities of our Bilateral Collision Avoidance System (BCAS) which is known as “HaloGuard360” integrated with Location Positioning (LP) in addressing these challenges. We delve into its multifaceted approach, enhancing safety in collision avoidance, optimizing fleet management, and managing employee workload. Through the analysis of case studies from two distinct Automotive Supplier Companies, we showcase the efficacy of our solution in overcoming these challenges and providing valuable insights.

*HaloGuard360 by Modjoul*

# Case Study 1

## Motor Vehicle Company (A):
## Deployed HaloGuard360 with Location Positioning System

### 1. Problem Statement:

The challenge lies in tracking how often an operator was redirected from their inspection duties to troubleshoot or perform repairs at a specific location along the production line. Specifically, there was a need to monitor pedestrian movement on the line and measure the time spent by operators in that vicinity.

### Solution:

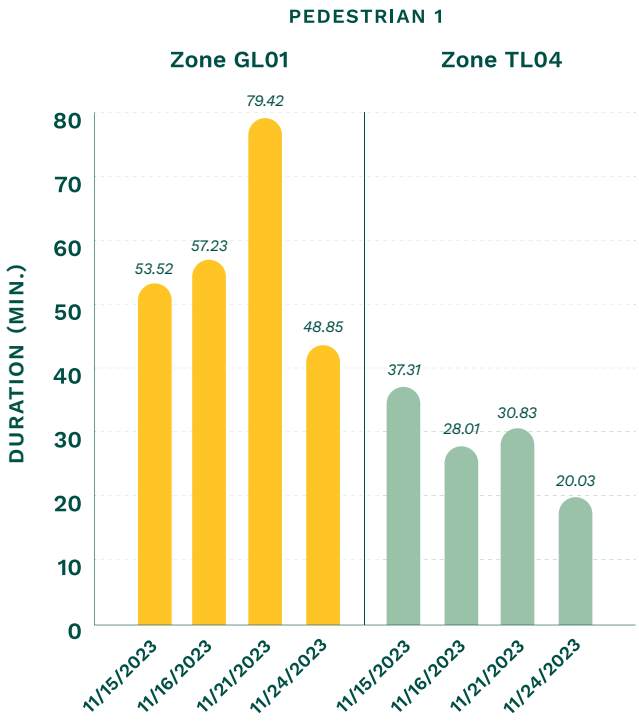
The problem was resolved through the implementation of our Location Positioning Solution, which involved the following steps:

a. Deployment of our UWB location beacons in the necessary areas for coverage.
b. Defined multiple zones within the warehouse, with each production line being treated as a single zone.
c. Utilized Location Positioning system to track pedestrian movements within the warehouse, focusing on specific lines on the warehouse map. This allowed us to accurately determine the amount of time spent by pedestrians in each zone.

# Case Study 1 (cont.):

## Solution (cont.):

### Pedestrian Time Spent in Each Zone





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### 2. Problem Statement:

The problem was to assess whether all available forklifts were being fully utilized. This evaluation aims to help determine whether there was a need to acquire additional forklifts or not.

### Solution:

The issue was resolved by deploying our Bilateral Collision Avoidance System i.e. HaloGuard360 with Driver Attribution Feature. Through the technology, we were able to compute the Forklift Optimization and efficiency Key Performance Indicators (KPIs).

#### a. Forklift Utilization (Number of Forklifts in Use):

- It was observed that the maximum number of forklifts in use simultaneously was 3 out of 9 forklifts.

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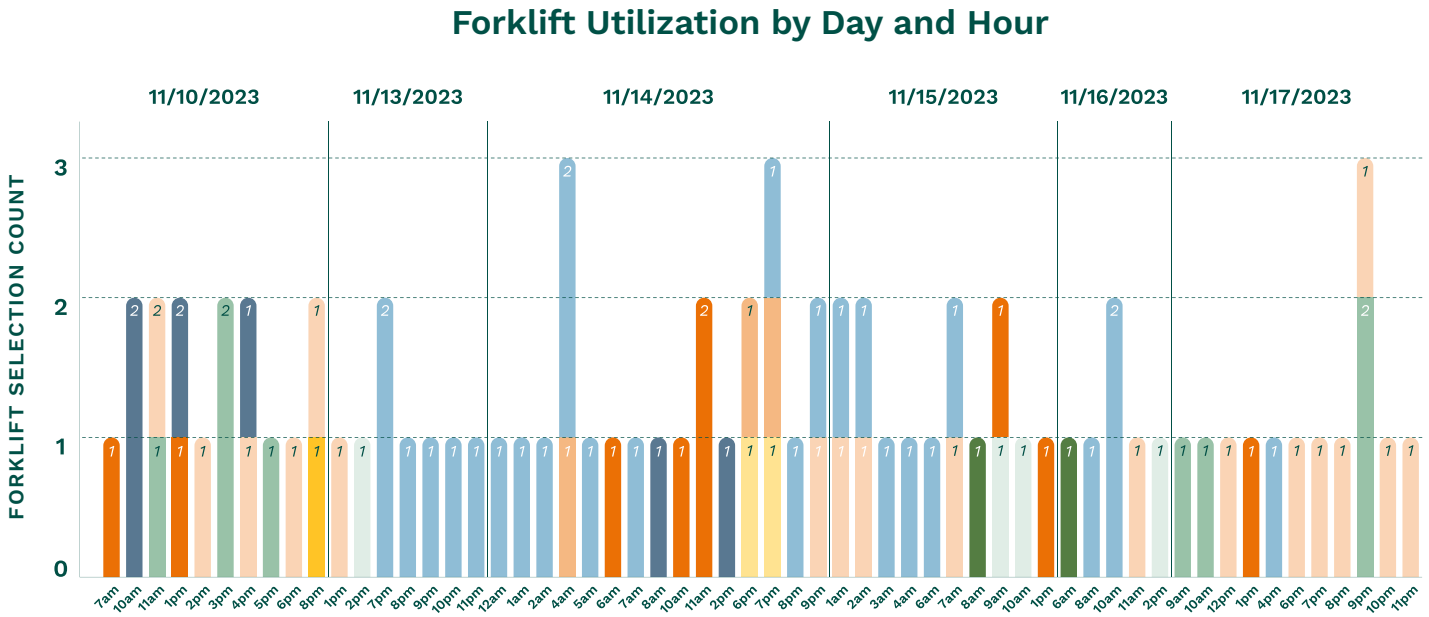
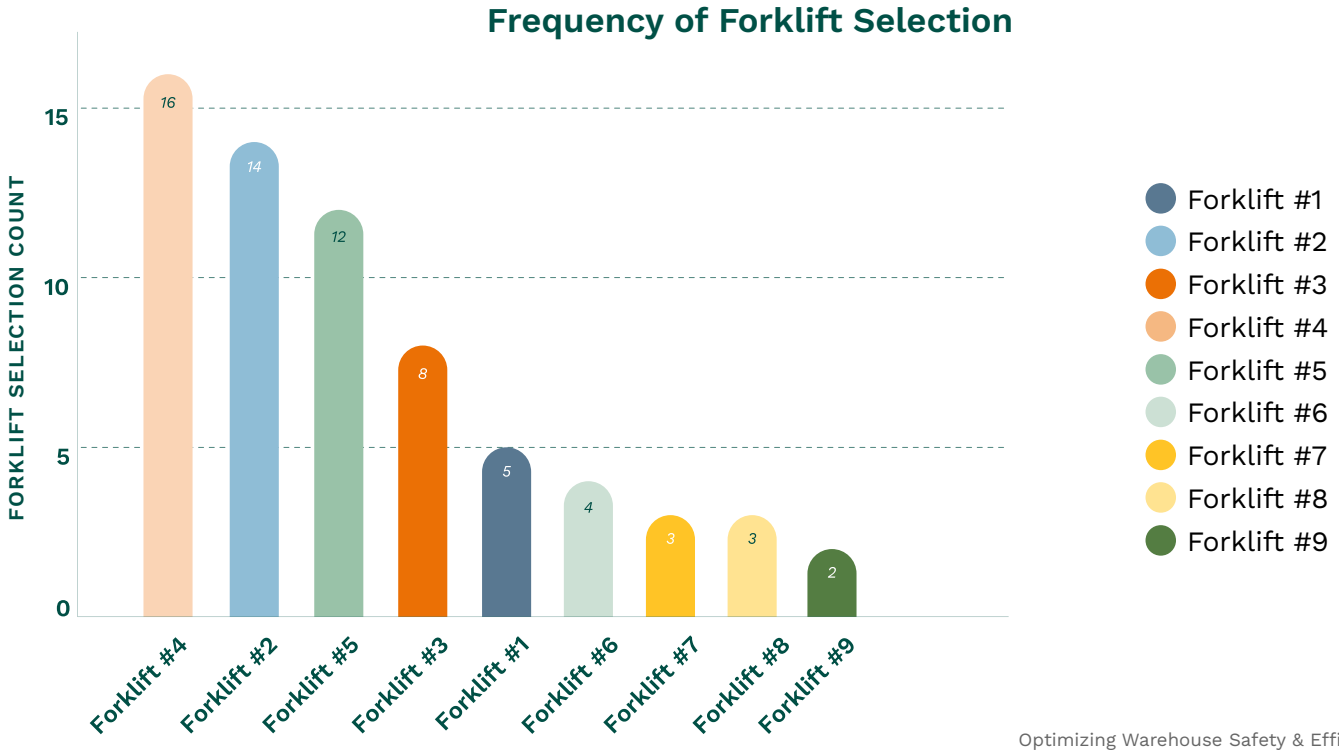
# Case Study 1 (cont.):

## Solution (cont.):


### a. Forklift Utilization (Number of Forklifts in Use) (cont.):

- Drivers showed a preference for Forklift 4 over Forklift 9, with Forklift 9 being utilized the least.

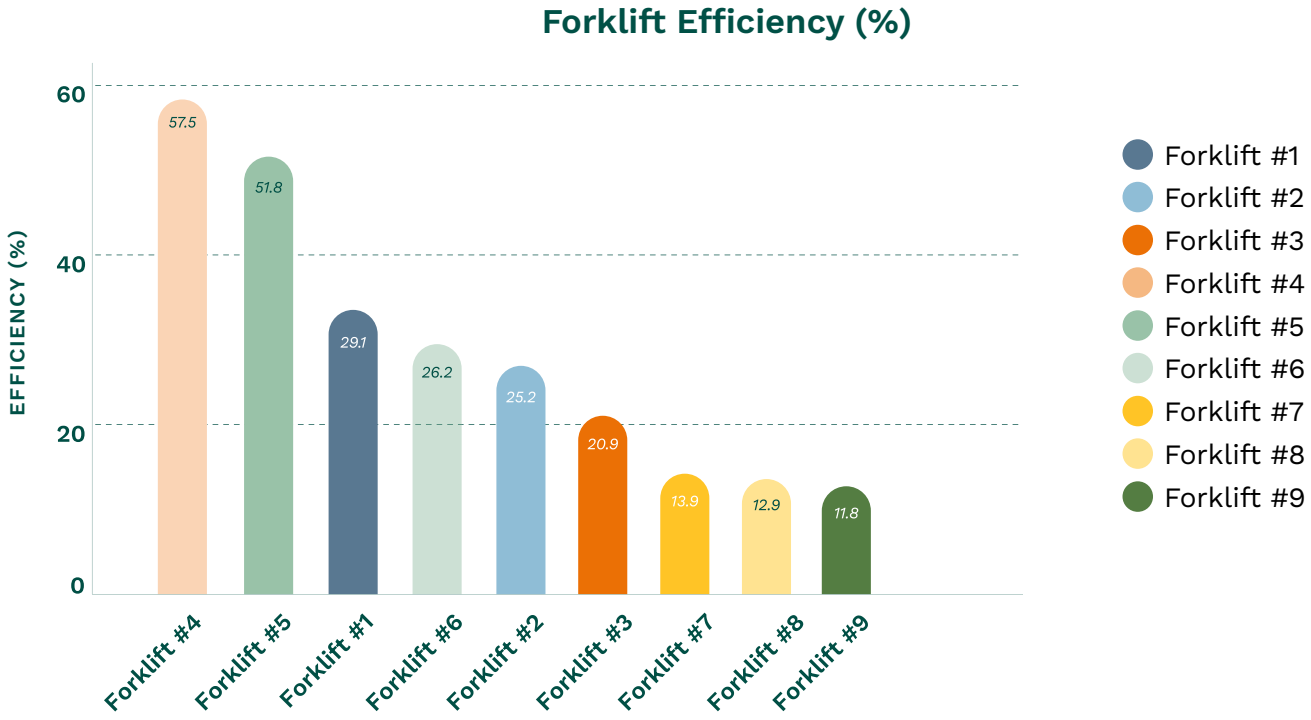


# Case Study 1 (cont.):

**Solution (cont.):**

**b. Forklift Efficiency (Forklift Active Hours):**

- Forklifts were observed to have uneven distribution in usage across all 9 forklifts.
- The most utilized forklift logged 9.25 hours per day, while the least utilized recorded 1.7 hours per day.




**Outcome:**

Potential savings resulting from the solution implementation include:

- **Capital Savings:** By optimizing forklift utilization and potentially reducing the fleet size by 3 forklifts, the company stands to save $105,000 in capital expenditure.
- **Maintenance Cost Reduction:** With improved forklift usage efficiency, the company anticipates a reduction in maintenance costs of $6,000 per year.

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# Case Study 2:

## Motor Vehicle Company (B):
## Deployed HaloGuard360 with Location Positioning System along with No – Alerting Zone Beacon

### 1. Problem Statement:

Deploy Bilateral Collision Avoidance System on a Tugger and aim to capture its movement.

### Solution:

a. We implemented the HaloGuard360 (BCAS) solution on the Tugger, following the same procedure used for the Forklift.
b. To track its movements within the warehouse, we utilized the Location Positioning System (LPS), by deploying our UWB Location Beacons to record the vehicle's location coordinates throughout the facility.

### Outcome:

- The platform enabled the customer to utilize the product not only for forklift collision avoidance but also for Tugger vehicles. This indicated that the platform is not limited to just one type of vehicle, thereby expanding the applicability and versatility of the product to the multitude of different powered industrial trucks.

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### 2. Problem Statement:

The client had requested the Breakout Area in the warehouse be designated as a No-Alerting Zone. This area was fenced off, preventing forklifts from entering. Individuals within the Breakout Area preferred not to receive notifications when a forklift was in proximity.

### Solution:

a. A No-Alerting Zone Beacon was deployed in the Breakout area. When a pedestrian entered the Breakout area, the pedestrian wearable detected the No-Alerting Zone beacon, triggering a silencing event. This event ensured that if the wearable detected the No-Alerting Zone beacon, it would cease buzzing or vibrating, even if a forklift was close.

### Outcome:

- **False Positive Prevention:** The implementation successfully prevented false positive alerts, ensuring that pedestrians within the Breakout area were not unnecessarily disturbed by proximity alerts from their wearables while enjoying their break. This enhances their overall experience within the warehouse environment.
- **Supervisor Satisfaction:** The supervisor expressed high satisfaction with the accurate and efficient operation of the No-Alerting Zone feature. This positive feedback indicates that the solution effectively met the requirements and expectations of the supervisor, contributing to overall satisfaction with the system implementation.

# Case Study 2 (cont.):

**3. Problem Statement:**

a. Identifying the hotspots where the highest number of interactions occur.
b. Identifying areas with high traffic.
c. Determining the peak hours of the day when the most interactions were observed.

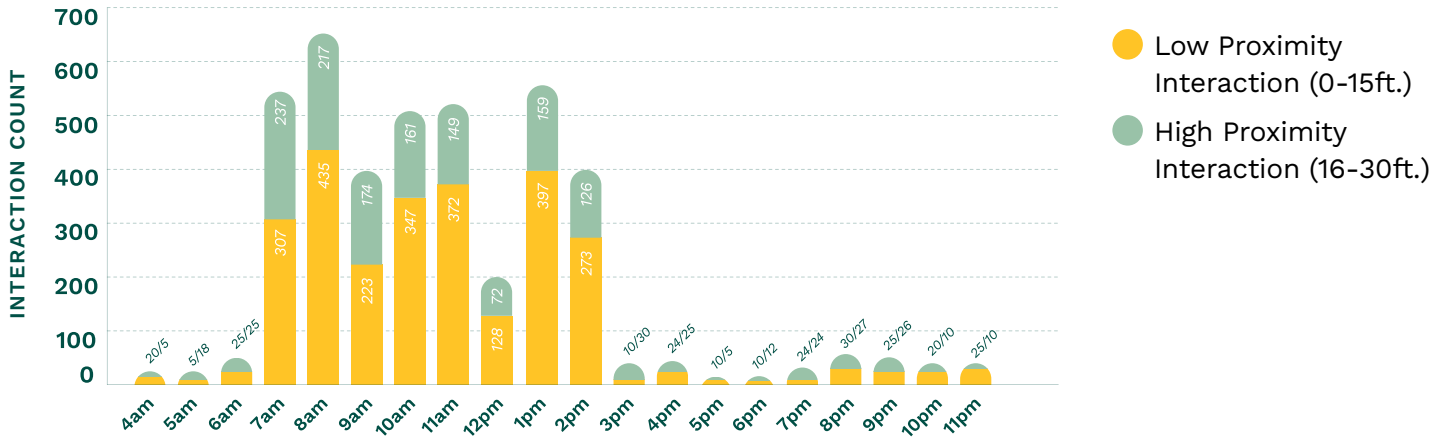
**Solution:**

a. Hotspots were identified in aisles with low visibility where many were occurring.
b. Utilizing the Location Positioning System, it determined that the logistics area experiences high traffic due to frequent loading and unloading activities. Additionally, it was discovered that drivers tend to cut corners during their turns.

## Traffic Map


c. It was observed that the highest number of interactions occurred during the 7am to 2pm timeframe, corresponding to the first shift.

## Interaction by Hour of Day



## Case Study 2 (cont.):

**Outcome:**

- Observing time-specific patterns in pedestrian and driver interactions provides insights into potential areas of heightened risk.
- Recognizing instances of high interaction suggests the necessity for ongoing, targeted training to reinforce safety protocols and cultivate a safety-conscious culture.
- Employee Feedback:
  - *"The device has been helpful. There are times I forget I have it on me until a forklift is passing by and I get the alerts."* – Anonymous
  - *"I appreciate [Company B] caring about our safety, and everyone should be wearing one."* – Anonymous

## Conclusion:

### In conclusion, the case studies presented highlight the effectiveness of proactive measures in addressing safety and efficiency concerns within warehouse operations.

By deploying advanced technologies such as Bilateral Collision Avoidance Systems and Location Positioning Systems, companies can identify and mitigate potential risks, optimize resource allocation, and enhance operational efficiency. These solutions not only addressed specific challenges such as forklift utilization and pedestrian safety but also fostered a safety-conscious culture through ongoing training and employee feedback. The outcomes demonstrate tangible improvements in safety, efficiency, and employee satisfaction, underscoring the importance of investing in innovative solutions to meet the evolving needs of warehouse environments. Overall, the case studies serve as compelling examples of how technology-driven approaches can drive positive outcomes and contribute to the success of warehouse operations.

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