

A photograph of a warehouse interior. In the foreground, there are several stacks of brown cardboard boxes. In the middle ground, a wooden pallet is being moved by a forklift. In the background, a worker wearing a hard hat and safety vest is operating the forklift. The warehouse has high ceilings and metal shelving units.

# SIERA.AI

WHITE PAPER

## **Driving Change: Revolutionizing Material Handling Vehicle Safety with AI Technology**

### **Forklift Impact Monitoring**

SIERA.AI is a leading provider of a technology platform that uses AI to make material handling safer and smarter. Our Safety Solutions Use AI technologies such as Vision, Machine Learning and Analytics to prevent accidents in manufacturing facility, warehouse and distribution centers. Our solution ranges from compliance to monitoring to preventative safety and can be retrofitted on existing material handling equipment, thus extending their productivity and safety.

Our AI-based, automated safety solutions include Digital Inspection/Checklist for capturing and monitoring OSHA compliance. Our safety monitoring technology detects impacts set to the G-Force that the operator determines critical for their environment. Our pedestrian detection technology detects, tracks and alerts any movement that can lead up to an incident. It includes near-miss compilations. All Information is captured into SIERA.AI's graphics-based online telemetry dashboard for notifications, reports, critical diagnostic, predictive, and prescriptive analytics.

SIERA.AI provides comprehensive safety for material handling for customers in manufacturing, logistics, distribution, retail, food/beverage vertical market segments. SIERA.AI features Fortune 500 enterprise clients that operate national fleets of material handling equipment be it forklifts, loaders, pallet trucks etc.

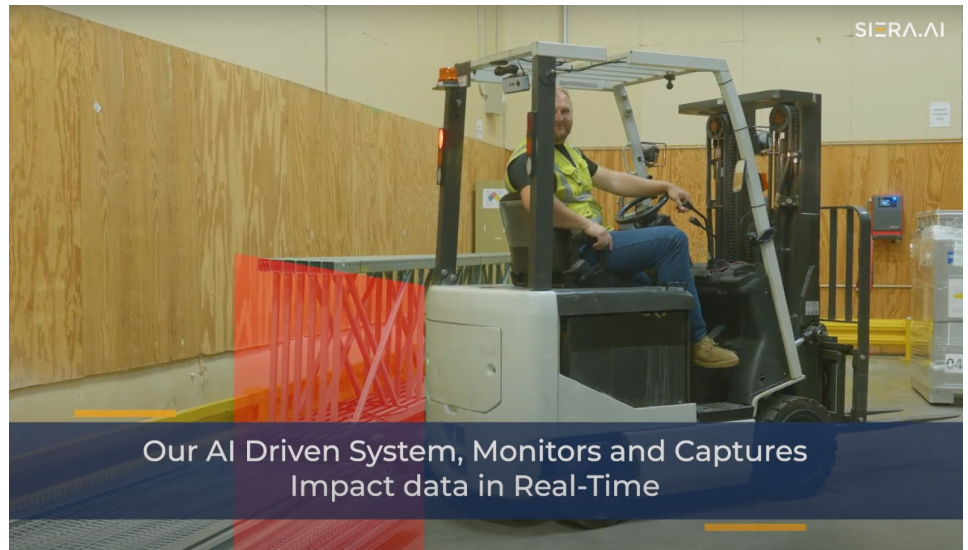
SIERA.AI is easy to install, operate and features the best management interface in the industry to manage worksites and administer machines and operators. It can be scaled from a local site to national level. SIERA.AI solutions work on equipment from all leading suppliers and actively sold by a direct sales team and partners who resell and support our solutions.

SIERA.AI is venture backed by prominent investors in AI and has offices located in Austin, TX, San Francisco, CA, Raleigh, NC. Contact Siera.AI for a presentation and demonstration today or visit [www.siera.ai](http://www.siera.ai) to learn more about our product and client success stories.

SIERA.AI provides comprehensive safety for material handling for Fortune500 enterprise clients that operate national fleets of material handling equipment. SIERA.AI has offices located in Austin, TX, San Francisco, CA, Raleigh, NC. Visit [Siera.AI](http://Siera.AI) to learn more about us.

## Impact Monitoring

The SIERA.AI Impact Monitoring technology detects low, medium, and high impacts set to the G-Force that the customer determines critical for their environment. This will also allow the customer to determine their electronic notification if/when an incident arises. What sets the SIERA.AI technology apart are near misses, or a hit.



Forklift impact monitoring is the process of recording and measuring individual forklift impacts to track when an impact happened, who was involved, and the severity of an impact. As a result, forklift impact detection helps lower accidents by increasing the accountability of operators when an accident happens. Very often in the rush to meet quotas, forklift operators bump into objects like racks (while backing up) or damage dock doors (while loading and unloading trucks). However, results and productivity are negatively impacted if a forklift is down or had an accident. Capturing impacts in real-time and recording the results in a digital format, provides insights in order to make adjustments within the facility or even potential training for an operator. It's an effective way to reduce damage and operating expenses.

## Benefits of Impact Monitoring

- Measure safety across your fleet
- Increase operator accountability
- Improve training for errant drivers
- Understand source of damages

## Types of Impacts

### Near Miss Tracking

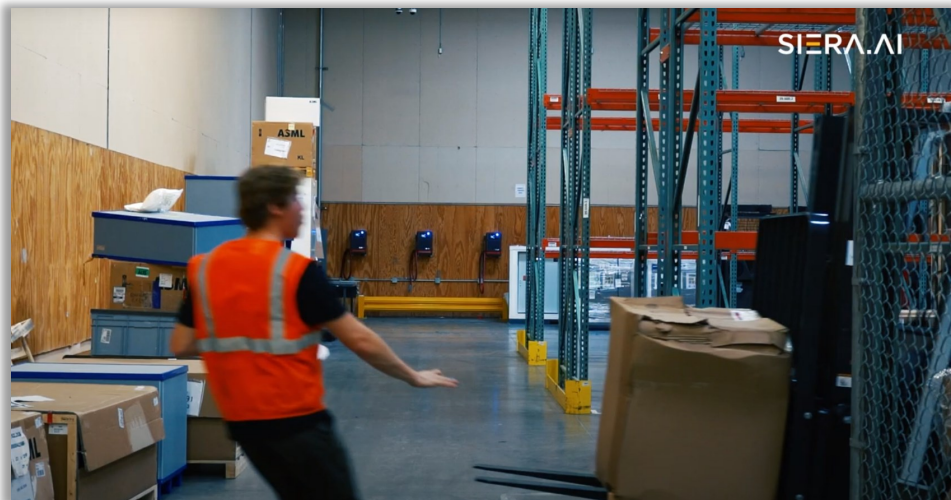
This is again a unique feature to SIERA.AI's forklift safety system. The 'Near Miss', 'Near Hit' or 'Almost an Accident'. A forklift near hit is the silent preparation or the silent motion and practice before a forklift accident. It has a high propensity for forklift accidents. A forklift near hit may include another piece of equipment such a forklift, the facility itself, the customer product, or a pedestrian.

Near miss data tracks each near hit by every forklift that has the SIERA.AI Forklift Safety System. The best part is that the system is driven by AI machine learning technology and knows the difference between a person and an object. This is critical if you want to know what is at risk. For instance, in 2023 SIERA.AI tracked for its clients a total of **234,119** near miss pedestrians and **366,292** near miss objects. This mission critical data is your guide to identifying and repairing the high-risk areas within the facility. This fix can avoid an area from maturing to a full-blown impact that can cause injury or death.

The information in the telemetry Dashboard will also tell you the distance of the near hit. So, let's say for instance, the forklift near hit was 5.59 feet. That's for one near hit. You can view other reports and analyze the distance on those. Analyze the similarities or differences to identify what change you need to make to avoid further development of an accident site. Gain further insights with the forklift near hit because the camera just took a picture. You know the object, you know the distance, you know where the incident occurred and making change is the final step.

### High, Medium and Low Impacts

High impacts are when two objects or an object and a person collide without hesitation or minimal hesitation. This always results in an accident with damages to the objects and severe injuries or death if a person or persons are involved. This is where high impact forklift safety is most critical. G-Force is an important measurement for high impact forklift safety. Based on the type of environment and the products that need to be moved, most safety managers will have a slightly different G-Force threshold for what is a high impact. Here's how it works: 1G equals 22 mph. If two pieces of equipment hit each other at 1G, what is the damage level? If it's 6G, then is that a high enough impact to be considered 'high'. Some facilities will say yes, and some facilities will say no, it needs to be a 7 or maybe an 8. This is left up to the safety manager.



## Tracking and Reporting in a Real-Time Telemetry Dashboard

Now that you know impacts are occurring, the forklift safety system measures and tracks impacts. As the driver of a SIERA.AI device mounted equipment with Impact Detection begins their day, the system will track any impacts regardless of 'where' in the facility. Even those quiet corners are tracked due to the AI machine learning that our forklift safety system uses. This allows for free-flowing movement...no tape, no transmitters installed on the racking system or RFID tags. It is all AI machine learning technology. As any type of impact occurs, the system will measure it based on the individual settings. If it reaches or exceeds the G-Force, then the system will send out a notification in real-time. If it is not, then all you need to do is watch the Dashboard as the system will report impacts in real time.

The screenshot shows the SIERA.AI Dashboard interface. At the top, there are navigation tabs for 'Home', 'Reports', 'Inspection Reports', 'Incident Reports', and 'Unauthorized Access'. Below the tabs, there are filters for 'Worksite' (set to 'All') and 'Date Range' (from 'Sep 01 2022' to 'Mar 05 2024'). A 'MORE FILTERS' button is also present. The main content is a table with the following columns: Worksite, Asset Type, Incident By, Asset Name, Date, Time, Incident Type, and Actions. The table contains several rows of incident data, including impacts and near-misses.

Worksite	Asset Type	Incident By	Asset Name	Date, Time	Incident Type	Actions
<input type="checkbox"/> Austin	Full-time Employee	Unauthorized	#2441	Mar-21-2023, 12:11 PM CST	Impact <span style="color: green;">EAS</span>	
<input type="checkbox"/> Austin	Full-time Employee	#2441	#2441	Mar-21-2023, 12:05 PM CST	Impact <span style="color: green;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Frank Zappa	Demo Forklift	Mar-07-2023, 01:16 PM CST	Impact <span style="color: red;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Unauthorized	Demo Forklift	Mar-07-2023, 01:14 PM CST	Impact <span style="color: red;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Unauthorized	Demo Forklift	Nov-17-2022, 11:16 AM CST	Impact <span style="color: green;">EAS</span>	
<input type="checkbox"/> DBS Demo Site	Electric Forklift	Frank Zappa	Hyster DBS	Oct-12-2022, 04:24 AM CST	Near-Miss <span style="color: red;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Zach Holiday	Demo S3 Forklift	Oct-10-2022, 10:11 AM CST	Near-Miss <span style="color: orange;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Zach Holiday	Demo S3 Forklift	Oct-10-2022, 10:11 AM CST	Near-Miss <span style="color: orange;">EAS</span>	
<input type="checkbox"/> Austin	Electric Forklift	Zach Holiday	Demo S3 Forklift	Oct-10-2022, 10:10 AM CST	Near-Miss <span style="color: orange;">EAS</span>	

At the bottom of the dashboard, there is a footer that reads: 'Proudly Built in Austin, TX. Copyright 2024. Stocked Robotics, Inc. dba SIERA.AI'. There is also a 'Rows Per Page' dropdown set to 10 and a 'Showing 0 - 10 of 35' indicator.

The screenshot shows an 'Asset Near Miss Report' for an incident on October 12, 2022, at 04:24:39 PM CST. The report is divided into a 'Summary' section and a 'Details' section. The 'Summary' section includes the following information:

- Obstacle Type:** PEDESTRIAN
- Worksite:** DBS Demo Site
- Date | Time | Timezone:** October 12, 2022 | 04:24:39 PM | CST
- Asset Name:** Hyster DBS
- Incident By:** Frank Zappa

The 'Details' section shows:

- Camera View:** CAMERA REAR
- Distance:** 152mm

The report is labeled as 'Page 1' in the top right corner.



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