SNS COLLEGE OF ENGINEERING

AN AUTONOMOUS INSTITUTION

Department of Mechanical Engineering

Smart Load: Real-Time Tilt & Load Optimization

Project Guide

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AP/Mechanical

Team Members

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4. Sushil Ram M

CATEGORY

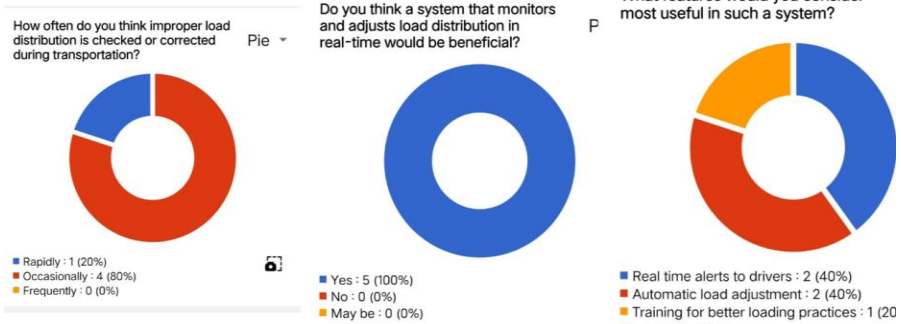
Innovation Industry Vertical

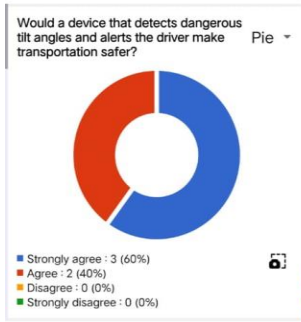
Automobile industries

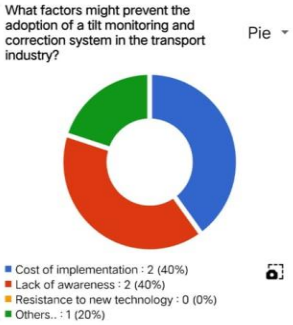
Innovation Technology

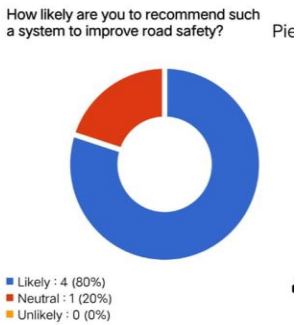
Robotics & Automatiion

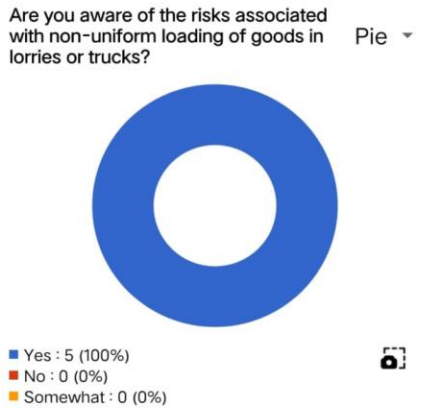
EMPATHY CHART

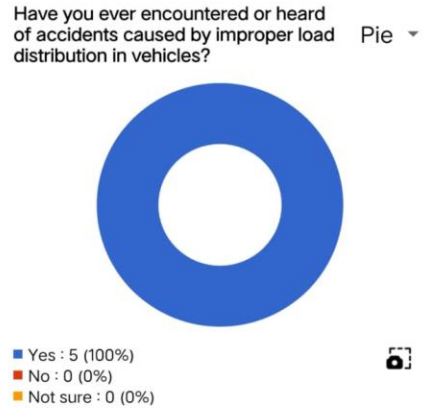


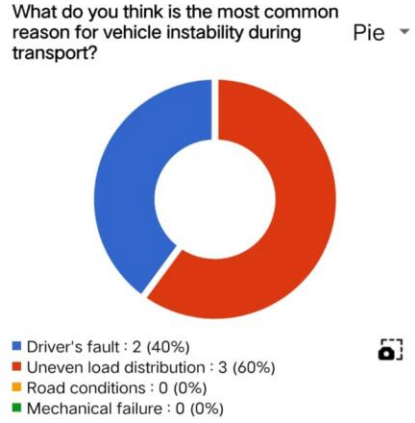


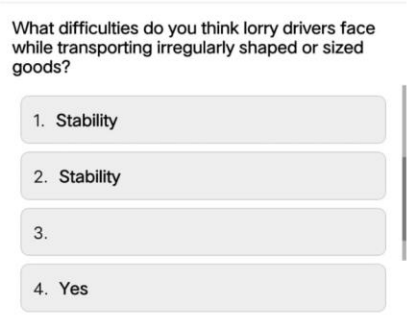








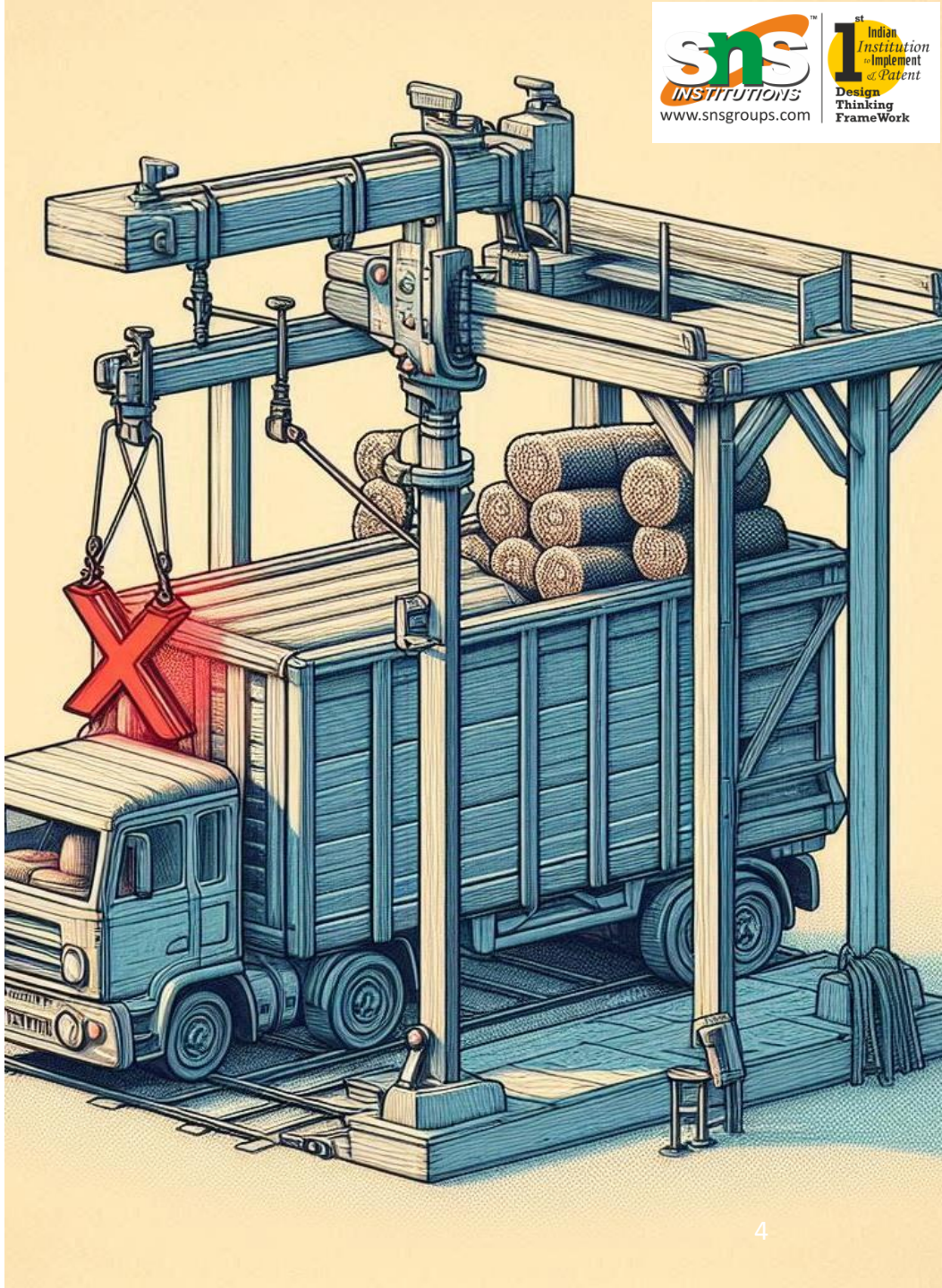




EMPATHY

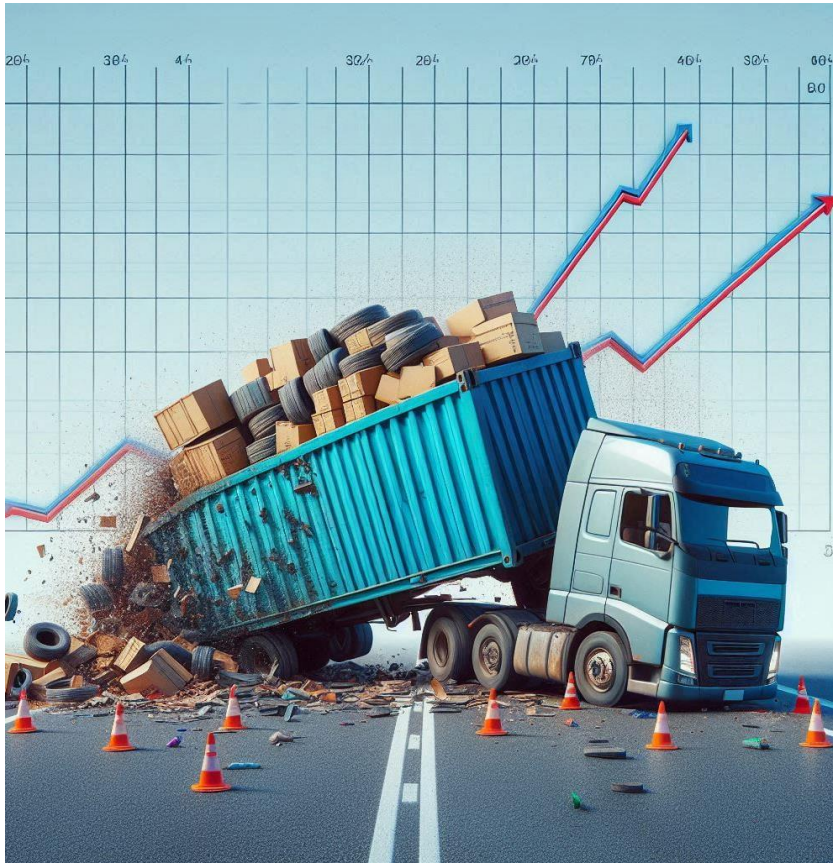
Challenges Faced by Drivers and Loading Personnel

- **Key Challenge:** Non-uniform load distribution often causes vehicle instability.
- **Real-World Impact:** Drivers experience difficulty in controlling the vehicle, especially during turns, sudden stops, or uneven road conditions.
- **Safety Concerns:** Load imbalance increases the risk of accidents, including tipping, wear and tear, and driver fatigue.



EMPATHY

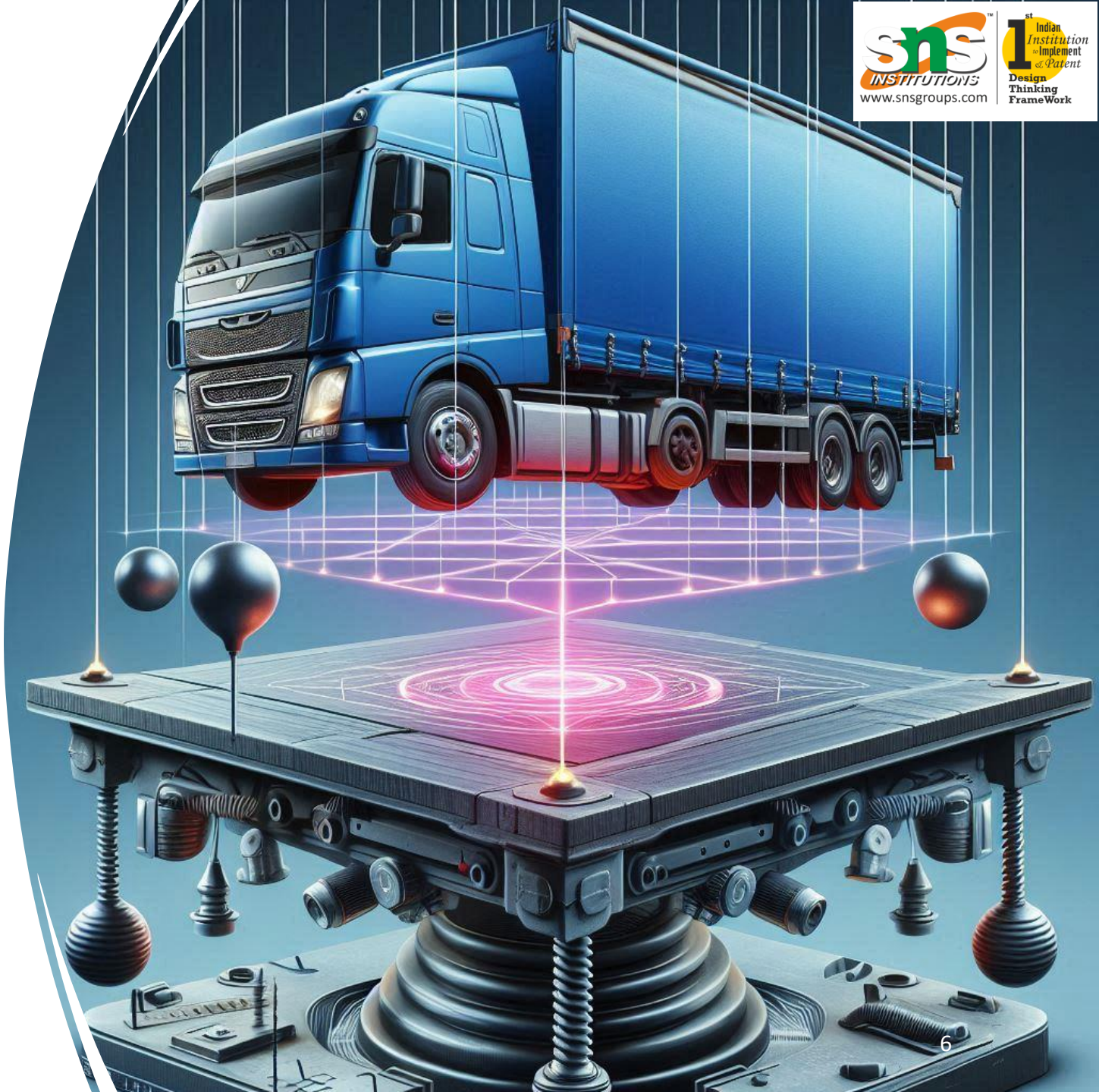
- *Impact of Load Imbalance on Transport Safety*
- **Vehicle Instability:** Uneven load distribution affects the vehicle's center of gravity, leading to dangerous swerving and tipping.
- **Increased Risk of Accidents:** Imbalanced loads contribute to higher accident rates, especially in adverse weather or when the driver is fatigued.
- **Damage to Goods:** Irregularly loaded goods are more likely to be damaged during transit.



EMPATHY

Current Safety Measures and Their Limitations

- **Existing Tools:** Most drivers rely on basic manual checks or minimal load distribution tools.
- **Ineffectiveness of Current Systems:** Limited real-time feedback on load imbalance and no automation to correct it during transit.
- **Need for Improvement:** A more advanced system is required to ensure safety and optimize load distribution in real-time.



DEFINE

- *Challenges of Uneven Load Distribution in Transport*
- **Core Issue:** Transporting non-uniform goods leads to improper load distribution, making the vehicle unstable.
- **Driver Impact:** Drivers struggle with maintaining control, especially during turns or sudden stops, due to shifting cargo.
- **Safety Risk:** Uneven load increases the likelihood of accidents, cargo damage, and vehicle wear and tear.

IDEATE

Innovative Ideas to Address Load Imbalance

- **Smart Load Balancing System:** Utilize sensors and actuators to adjust load distribution in real-time, ensuring stability during transit.
- **Automated Loading Technology:** Develop a system that automates the loading process, ensuring even and secure distribution of goods.
- **Load Monitoring System:** Continuously monitor load distribution with sensors, alerting the driver if an imbalance is detected.

IDEATE

Enhancing Safety and Efficiency Through Technology

- **Training Programs:** Establish comprehensive training for drivers and loading personnel to teach proper loading techniques and the importance of balanced distribution.
- **Automated Tilt Switch:** A device that detects and alerts the driver when the vehicle tilts beyond a safe angle due to load imbalance.
- **Collaboration with Industry Partners:** Partner with vehicle manufacturers to integrate these technologies into new models for enhanced safety and efficiency.

PROTOTYPE

LIST OF COMPONENTS

- **Buzzer** – 2 nos
- **LED Light** – 2 nos
- **Arduino** – 1
- **MPU 3050 (Gyroscope & Accelerometer)** – 1
- **Connecting Wire**

PROTOTYPE ESTIMATION COST

	PRICE
• Buzzer – 2	60
• LED Light – 2	15
• Arduino – 1	550
• MPU 3050 (Gyroscope & Accelerometer) – 1	450
• Connecting Wires	60

GROSS TOTAL:- 1135

WORK CHART

Work Description	01.12.2023 - 15.12.2023	16.12.2023 - 31.12.2023	1.1.2024 - 15.1.2024	16.1.2024 - 31.1.2024
Zeroth Review	4.12.2023	-	-	-
Empathy & Define	-	17.12.2023	-	-
Ideate	-	18.12.2023	-	-
First Review	-	19.12.2023	-	-
Prototype	-	-	13.1.2024	
Second Review	-	-		18.1.2024
Test		-		
Third Review		-		
Report & PPT				

Thank You