

## *Batch NO.8*

# Structural Health Monitoring for Metro Rail Networks

Keeping metro rail networks running safely and efficiently is critical for urban transportation. This presentation will provide a comprehensive overview of a structural health monitoring system to identify issues, track maintenance, and ensure reliable service.



# Business Opportunity

## Increased Ridership

As cities grow, demand for public transit will rise, driving the need for advanced monitoring systems to maintain infrastructure.

## Cost Savings

Proactive monitoring can catch issues early, reducing expensive repairs and downtime.

# Monitoring System Architecture

1

## Sensors

Collect real-time data on structural integrity, vibration, and environmental factors.

2

## Communications

Transmit sensor data securely to centralized data processing platforms.

3

## Analytics

Apply machine learning models to identify anomalies and predict maintenance needs.





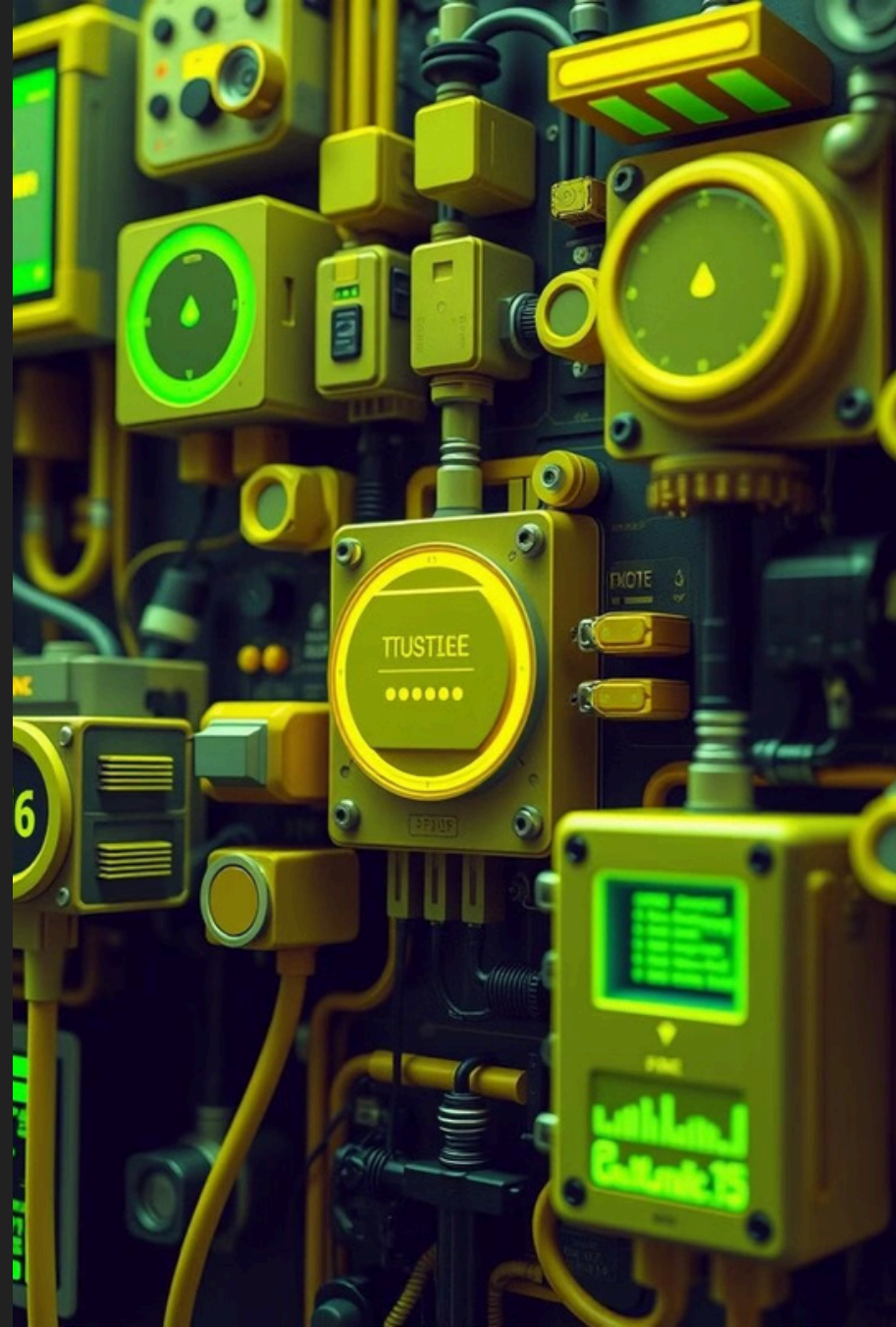
# Key Components and Technologies

## Sensor Networks

**1** Deploy sensors across rail lines to continuously monitor structural integrity.

**2** **Data Aggregation**  
Collect sensor data and integrate with maintenance records and inspections.

**3** **Analytics Engine**  
Use AI and machine learning to identify patterns and predict issues.



# Dashboard Design

## Visualize Issues

Display the location and severity of structural problems on a GIS-enabled map.

## Maintenance Tracking

Track repair and inspection status to ensure timely resolution of identified issues.

# Data Collection and Processing

## Sensor Networks

Deploy a dense network of sensors to monitor track, bridges, tunnels, and stations.

## Data Ingestion

Aggregate sensor data with maintenance records, inspection reports, and other relevant information.

## Advanced Analytics

Apply AI and machine learning to identify patterns, predict issues, and optimize maintenance.







# Reporting and Analytics



## Performance Insights

Generate reports on system performance, asset condition, and maintenance effectiveness.



## Predictive Maintenance

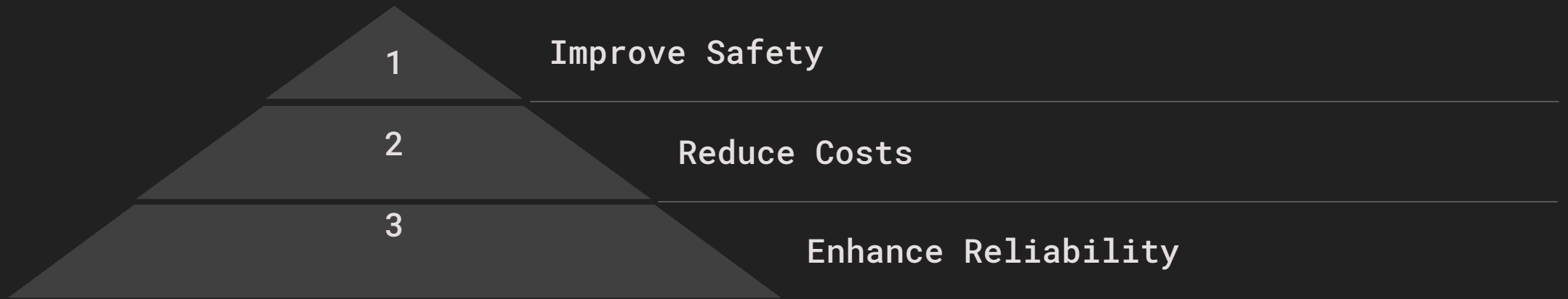
Use predictive analytics to anticipate issues and schedule proactive repairs.



## Geospatial Mapping

Visualize the location and severity of structural problems across the entire network.

# Conclusion and Next Steps



By implementing a comprehensive structural health monitoring system, metro rail operators can improve safety, reduce maintenance costs, and ensure reliable service for growing ridership. Next steps include pilot deployments, stakeholder engagement, and identifying funding sources.