Design Thinking Framework

Quantum University

Project-1

S.no	Learners Name	Name of the Project Statement	Batch number	Project Milestone Submission	GitHub Link
1	**Akash Kumar Thakur**	**Structural health monitoring on metro rail networks**	**2**	**1st**	**https://github.com/Shubham-5323/Design-Thinking-Framework-Quantum-University-02-Project-1-health-monitoring-on-metro-rail-netwok**
2	**Mantasha Ali**				
3	**Aman Kumar Thakur**				
4	**Shubham Yadav**				

Task-1

Business Model Canvas

Designed via AltexSoft BMC Tool

Key Partnerships

- Metro rail operators and engineers.
- Government transportation agencies.
- Research institutions and universities specializing in structural health.
- Maintenance and repair service providers.
- Technology and sensor manufacturers.
- Data analytics and AI firms.

Key Activities

- Implementation of sensor-based monitoring systems.
- Regular data collection and real-time monitoring of structures
- Analysis and interpretation of structural health data using AI/ML.
- Proactive maintenance scheduling based on insights.
- Collaborative design thinking workshops to innovate monitoring approaches.
- Continuous improvement through feedback loops and user-centric testing.

Key Resources

- Advanced sensors and IoT technology.
- Skilled engineers and technicians.
- Robust data storage and analytics infrastructure.
- Financial investments and funding for R&D.
- Collaboration platforms for design thinking sessions.

Value Propositions

- Ensuring safety and reliability for commuters.
- Minimizing downtime through predictive maintenance.
- Reducing operational costs by identifying issues early.
- Compliance with government standards and regulations.
- Enhanced structural durability and life-cycle management.
- Facilitating sustainable transportation systems.

Customer Relationships

- Transparent communication regarding safety measures.
- User education campaigns about the benefits of monitoring systems.
- Proactive support and quick response to maintenance needs.
- Co-design with stakeholders to ensure alignment with user needs.

Channels

- Real-time dashboards for operators and engineers.
- Reports and insights shared with government bodies.
- Public awareness campaigns to highlight safety initiatives.
- Educational workshops for structural engineers and stakeholders.

Customer Segments

- Metro rail operators and authorities.
- Government infrastructure and transportation bodies.
- Commuters (indirect beneficiaries of safer systems).
- Maintenance contractors and service providers.

Cost Structure

- Initial setup costs for sensor systems and software.
- Maintenance and operational costs for monitoring equipment.
- Training programs for engineers and maintenance teams.
- Costs related to research and innovation (design thinking).
- Data storage and analytics platform expenses.

Revenue Streams

- Service fees from metro rail operators.
- Government grants or funding for infrastructure safety.
- Licensing fees for software and AI models.
- Value-added services like predictive analytics packages.

Task-2

MetroGuard +

- Dashboard
- Alerts
- Reports
- Map View
- Maintenance

ADMIN

- Settings
- User Management

Home > System Overview

System Overview

Structural health monitoring system for metro rail networks

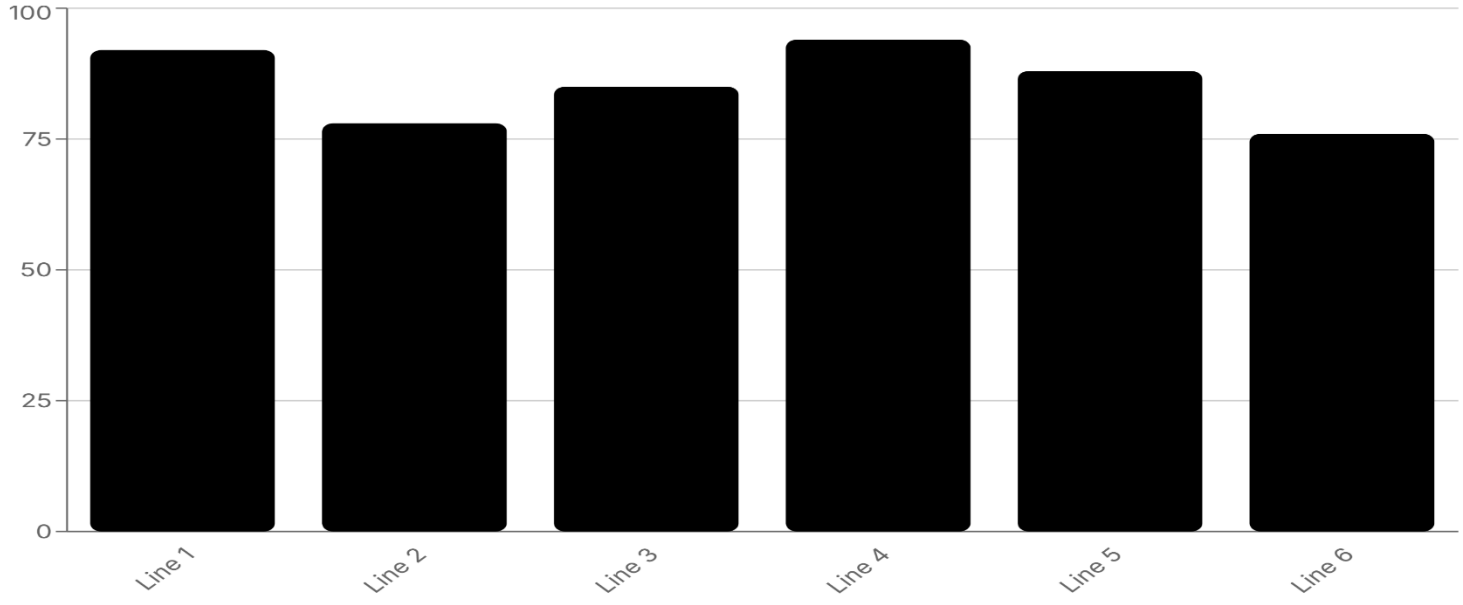
CRITICAL
12
Active critical issues requiring immediate attention
View All

WARNING
28
Warning issues that need monitoring
View All

HEALTHY
86%
Overall system health score across network
Details

SENSORS
1,248
Active sensors monitoring the infrastructure
Manage

System Performance



Critical Issues

Track Displacement	Line 2 - Station 14	Critical	Detected 2h ago
Structural Crack	Line 3 - Bridge 7	Critical	Detected 4h ago
Vibration Anomaly	Line 1 - Tunnel 9	Critical	Detected 6h ago
Water Infiltration	Line 5 - Station 3	Critical	Detected 12h ago

View All Issues

Monitoring Technologies

Vibration Sensors
Monitors structural vibrations to detect anomalies in rail infrastructure
Details

Strain Gauges
Measures deformation and stress in structural components
Details

Visual Monitoring
AI-powered cameras for crack detection and visual inspection
Details

Moisture Sensors
Detects water infiltration and humidity levels in structures
Details

Recent Maintenance Activities

Track Reinforcement
Line 2 - Station 12 • Completed 2 days ago >

Sensor Replacement
Line 4 - Bridge 3 • Completed 3 days ago >

Structural Inspection
Line 1 - Tunnel 5 • Completed 5 days ago >

View Maintenance History

System Admin
admin@metroguard.com

Task-3

	AWARENESS	CONSIDERATION	DECISION	RETENTION
ACTIONS	Customers notice issues and learn about your solution.	Researches vendors, compares solutions and features.	Decides to purchase and installs the system.	Continuously uses the system for maintenance insights.
TOUCHPOINTS	Marketing campaigns, industry events, educational materials.	Website, product demos, customer reviews, consultations.	Sales meetings, contracts, installation services.	Support teams, dashboards, updates, and subscriptions.
EXPERIENCE/ EMOTIONS	Curiosity about solving infrastructure challenges.	Excitement mixed with uncertainty about options.	Confidence in making the right investment.	Satisfaction and trust in the system's reliability.
PAIN POINTS	Lack of knowledge about monitoring technology.	Concerns over initial costs and technology reliability.	Worry about downtime during implementation.	Limited technical understanding or delayed support.
SOLUTIONS	Raise awareness through targeted campaigns and demos.	Provide cost-benefit analysis, free trials, and testimonials.	Ensure smooth installation and training sessions.	Offer proactive customer support and regular updates.