"SAMVED" HACKATHON 2026

TITLE PAGE

- **Problem Statement ID –** PS-004

- **Problem Statement Title-** Safety & Assistance for Sanitation Workers

- **Theme-** Smart Safety Hand Band For Sanitation Workers

- **Team ID-** MITVPU_SAMVED_RAKSHAK

- **Team Name-** RAKSHAK

Smart Safety Hand Band For Sanitation Workers

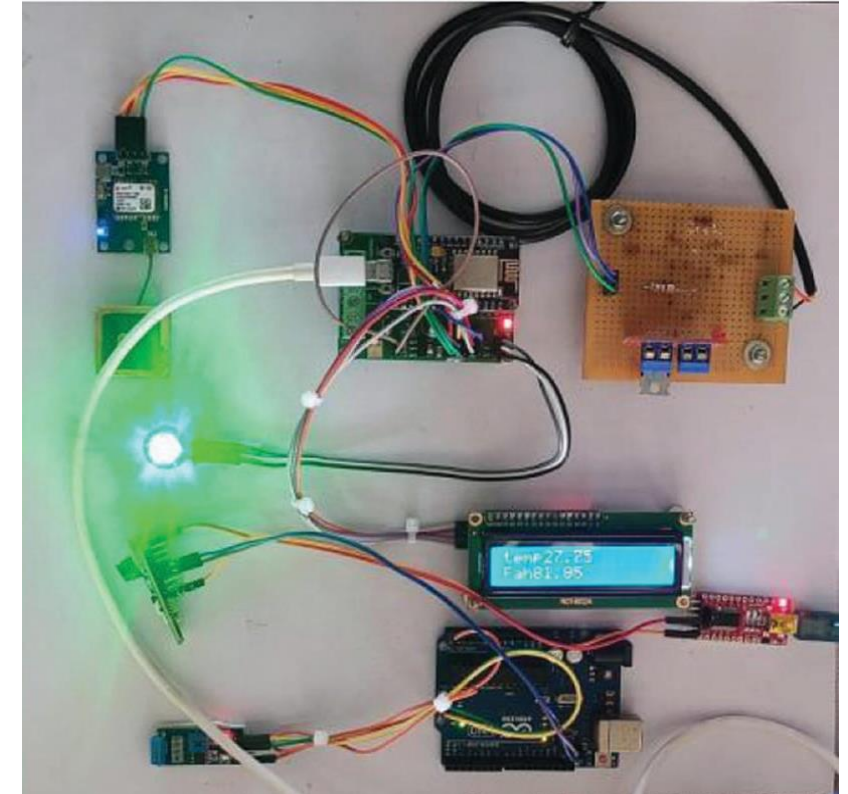## ❖ Proposed Solution

➢ **Wearable safety band for hazardous sewer environments**

- Integrated SOS emergency button

- Real-time health monitoring

  (Heart rate & Body temperature)

- Live sewer temperature and toxic gas detection

- Instant alerts to supervisors and emergency teams

- Compact, low-cost, and worker-friendly design

RAKSHAK

➤ **Hardware & Technologies Used**

- Microcontroller: ESP32 / Arduino

- Sensors:

1. Heartbeat (MAX30100),
2. Temperature (DS18B20),
3. Gas Sensors (MQ Series)

- Communication: GSM / LoRa / Bluetooth

- Alert System: Buzzer, vibration & mobile/cloud notification

Flow: **Sensors → Controller → Risk Analysis → Alert / SOS → Authority**

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➢ Technically feasible using existing IoT components

- Low-cost and scalable for large workforce deployment

- Challenges: Harsh environment & sensor accuracy

- Solutions: Waterproof casing, calibration & threshold-based alerts

- Can be adopted by municipalities and sanitation departments

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➢ **Drastically reduces risk of fatalities and accidents**

- Ensures real-time worker safety and monitoring

- Social Impact: Protects dignity and lives of sanitation workers

- Economic Impact: Reduces medical and compensation costs

- Environmental Impact: Prevents unattended sewer hazards

- WHO – Occupational Safety for Sanitation Workers https://www.who.int
  - IoT-Based Monitoring and Alert System for Sewage Worker's Safety

    https://pmc.ncbi.nlm.nih.gov/articles/PMC6103782/

  - Smart Safety Monitoring System for Sewage Workers (IJSRSET)

    https://ijsrset.com

  - Alerting and Detection of Toxic Gases in Sewage using IoT (IJRASET)

    https://www.ijraset.com

  - MAX30100 Heart Rate Sensor Datasheet – Analog Devices

    https://www.analog.com/en/products/max30100.html

  - MQ Series Gas Sensor Datasheets

    https://www.sparkfun.com/datasheets/Sensors/Biometric/MQ-135.pdf

THANKYOU