# SEVAK

-The IoT based project for the safety of sanitation workers

# PROBLEM STATEMENT

- The sewage system is an important component of the urban infrastructure.It is considered to be a city's lifeline where millions of people live.The process of maintaining the drainage system is an arduous task and puts the people working in it at risk.Manual monitoring and cleaning of drainage is necessary but it leads to accidental death of workers when they inhale poisonous gases during working.The gases present in these waste lines such as methane and carbon monoxide is harmful and can cause serious fatalities to the life of a drainage worker.Most of the drainage workers will not know the amount of gas present in the waste lines,which is one of the main causes for the many number of accidental deaths and infections.

# SOLUTION

- As of now, no safety or precautionary measure is taken to protect the health and well-being of those brave workers who willingly clean the underground drainages.
- We intend to make a low cost , affordable and wearable device that not only monitors the health conditions of the workers, but also the environment in which they work.
- We will make use of the different sensors available in the market to implement the same.
- In the case of an emergency, an alert is immediately sent to  the concerned authorities.
- Thus we are able to ,by a large extent ,ensure the safety of the sanitation workers.

# FEATURES

MONITORING THE HEALTH OF THE WORKER

- Fall Detection
  Senses the change in altitude and determine whether a fall has occurred. If so, an alert is sent to the nearby hospital and authorities for immediate medical assistance,

- Monitoring of pulse rate
  Detects any abnormal change in heart and send alert if needed.

- Monitoring temperature of the person/worker

# FEATURES

MONITORING THE ENVIRONMENT

- Detection of toxic gases
  The gas sensors monitor the concentration of various gases. Any change in the level is immediately sensed and an alert is sent if the level of toxic gases is high.

- Flow rate monitoring
  Using a flow sensor, real time flow rate information is gathered.

- Level Sensing
  The real time information from the level sensor can be used to determine how deep it is inside.

- Temperature Sensing

# ADDED FEATURES

- Emergency Button
  The person can press this button in case of emergency.

- Obstacle detection using ultrasonic sensors.
  It helps in easy navigation.

- GPS tracking and monitoring the location of each worker

# HARDWARE AND SOFTWARE

- Gas sensors
- Pressure sensor- DSP310
- HC-05 Bluetooth module
- Temperature sensor(LM35)
- Flow sensor
- Level sensor
- Pulse sensor
- Arduino
- Blynk app
- Arduino IDE
- GPS module

# FUTURE SCOPE

- The proposed methodology helps to prevent the sudden accident of workers .
- The smart safety device is  less costlier and the information can be transferred to both the concerned department and emergency department.
- The smart device can be implemented across the world.
- The future work may be implemented in the form of an android application which is connected to the smart safety device that provides the complete health data of the worker  and the condition of the drainage system.
- A system to detect where the blockage is in the drain can be developed later which can be incorporated to the android application.

# ECONOMIC PERSPECTIVE

Occupational injury and illness are matters of health, but they are also matters of economics, since they stem from work, and work is an economic activity.

Recent survey data from 500 organizations found that 73% of employers believe health and safety requirements benefit their business as a whole, while 64% reported they save money in the long term.

Hence, from the above data ,it is evident that our product being a health and safety monitoring equipment would lead to great deal of economic gain in favour of the organisations that hire sanitation workers

# CONCLUSION

Our product "sevak" is a health and safety monitor device that can save the lives of hundreds of sanitation workers all over the country who risks their lives everyday for a better,clean and disease free society.

The contribution of these workers play a huge role in the development of our country as well as in our daily lives.Thus, it is our responsibility as the citizens to take care of their needs and help protect their lives.