# Centralized Web Enabled Tunnel Jam Monitoring & Controlling System using IR & RF Technology

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## *ABSTRACT*

**A tunnel is an underground passageway, completely enclosed except for openings for egress, commonly at each end. Some tunnels are aqueducts to supply water for consumption or for hydroelectric stations or are sewers. A tunnel project must start with a comprehensive investigation of ground conditions by collecting samples from boreholes and by other geophysical techniques. Some part of waste water pass through tunnel without any hurdles or obstacles like garbage , polythenes, dirt, sewage, chemicals, even cities are planned without considering the proper water management etc. but remaining waste water remained as it is in tunnel because there will be blocked. So our effort lies here itself to provide a perfect Solution to this by using Radiofrequency communication (RF Communication). we can detect choke up area in tunnel using Infrared sensors, when these sensors will be blocked they will generate a continuous high voltage pulse and the same pulse can be further given to RF transmitter from which a 'centralize server' with port programming will detect the blocked area using a web application, so our efforts are to pass the waste water through tunnel very easily.**

**To develop a system we require pairs of RF transmitter and receivers and their communication respectively. if any tunnel is choke up then the end user can detect the place in which area the tunnel is blocked. Either through GPRS or web application, hence the received information to workers & officers respectively so they can repair it immediately. This application we can implement in municipal corporations, in metropolitan cities (as we require modern civilization), pipelines carrying out canal water in irrigation dept, chemical plants, slurry excavege in sugar plants etc.**

**KEYWORDS: RFcommunication, Web-based application;RF transmitter;RF receivers;GPRS,SMS**

## I.  INTRODUCTION

The Software Requirements Specification (SRS) captures all the requirements in a single document. The Tunnel management and controlling system which is developed for the real time environment to provide from the tunnel jams, choke ups, blockages. The Tunnel Management and Controlling system is supposed to have the following features:-

The System Provides the solution that how to prevent from the blockages which is present at the movement. The system provides authentication checking facility to the users.

The System provides the facility whenever the blockages happen then it can be shown to the users through the graphical views. This system provides the exact location where the blockages are present and it retrieves the blockage area to the user through the SMS, GPRS, etc. This system provides the facility that where blockages are most probably happens that areas are already saved in the database which is at user side. This system gives the facilities that where the database is stored at the user side gives the exact position of the blockages and strictly action is taken by the user.

The features that are described in this document are used in the future phases of the software development cycle. The features described here meet the needs of all the users. The success criteria for the system are based in the level up to which the features described in this document are implemented in the system.

## II.  EXISTING SYSTEM

Now a days in existing system municipal corporation (like BMC, NMC etc.) uses mirror equipment tool to find the blockage are in tunnel. The range of the mirror equipment tool is up to 15 meter. With the help of mirror tool workers in Municipal Corporation can find area where the tunnel will be jammed and repair in 7-8 days and blockage will be repair in 24 hours. So it increases time and cost of existing system. So they require lot of time to find and repair it. If there will be overflow then it will be repair in 2 days. If they are not repaired in minimum time then pollution can be increased in cities and slum areas. Also different diseases, infections spread immediately in cities and slum areas.

So, in comparison to mirror tool Mumbai Municipal Corporation (BMC) launched Robodrazer Machine in September'2011.The cost of Robodrazer machine is seventeen lakhs. This machine will be used for digging purpose and for drainage cleaning. So more efforts and cost is required for the existing system

## III. PROPOSED SYSTEM

The users of the system will be Municipal Corporations and the administrators who maintain the

system. The Municipal Corporation who uses this system is assumed to have basic knowledge of the computers and Internet. The administrators of the system to have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system. The proper user interface, users manual, online help and the guide to install and maintain the system must be sufficient to educate the users on how to use the system without any problems. The languages that are used for coding the Web Enabled Tunnel Management and Monitoring System are Visual Basic .Net and MS SQL server. For sending sms through web, the Internet Information Services (IIS) Server 5 or above needs to be installed.

It will make use of the .Net framework 2.5 or above. Also will make use of the online references available for developing programs in VB.net, MS SQL connectivity. We also make use of Visual Studio 2005 or above. We make use of Internet Information server 5 or above.

- The system must be compatible with internet application.
- Web Enabled Tunnel management and monitoring system is connected to the Municipal Corporation's computer and is running all 24hours a day.
- Only one system that is server of Municipal Corporations have the rights of accessing this system.
- The location of tunnel jam is displayed by using the histogram and the histogram is associated with the system.
- The main objective to develop the system is to make the accurate & efficient decisions for different tasks at different time at different situations.

### 3.1 Relevance to computer standard and interfaces

This paper examines the location of tunnel jam and investigates the software components, standards and technologies needed to support its implementation. The work presented in this paper is relevant, in many aspects, to the general area of computer standards and interfaces. First, this paper discusses and makes use of Wireless and Internet communication protocols/standards including the Short Message Service (SMS) and Simple mail Transport Protocol (SMTP). It is important to note here that the study of these standards and their use are of great interest to a wide segment of "Computer Standards and Interfaces Journal" readers.

## IV. REQUIREMENT FOR SYSTEM

### 4.1. *Performance Requirements*

#### 4.1.1 Response Time

The Splash Page or Information page should be able to be downloaded within a minute using a 56K modem. The information is refreshed every two minutes. The access time for a mobile device should be less than a minute. The system shall respond to the member in not less than two seconds from the time of the request submitted.

#### 4.1.2. Administrator/User Response

The system shall take as less time as possible to provide service to the administrator or the User.

#### 4.1.3. Throughput

Only the tunnel which is block that tunnel location is provided using histogram. The user can only saw the location of tunnel jam after login.

#### 4.1.4. Capacity

The system is capable of handling the all area where tunnel is located in the city.

#### 4.1.5. Resource Utilization

The resources are modified according the user requirements and also according to the locations of tunnel.

### 4.2 *Security Requirements*

#### 4.2.1 Restricted Access

Software should be protected with maximal security. System is highly secured, as access to the system will be limited and secured login will be required for accessing.

#### 4.2.2 Maintainability

The system should be such that future maintenance and enhancement Time and efforts are reduced.

### 4.3 .Legal Requirements

#### 4.3.1 Licensing Requirements

The usage is restricted to only Municipal Corporation who is purchasing the Web Enabled Tunnel Management and monitoring System from User and signs the maintenance contract.

#### 4.3.2 Legal, Copyright, and Other Notices

Web Enabled Tunnel Management and Monitoring System is a trademark of Our Group and cannot be used without our permission.

### 4.3.3 Applicable Standards

The ISO 9001 guidelines for the documentation of computer based application systems will be followed.

### 4.4. Safety Requirements:

RF spectrum should not cross other spectrum.

### 4.5. External Interface Requirements

### 4.5.1 User Interfaces

Authentication, Controlling, Message sending, Status checking.

### 4.5.2 Hardware Interfaces

The IR Sensors, Transmitter and Receivers are used.

### 4.5.3 Software Interface

A firewall will be used with the server to prevent unauthorized access to the system

### 4.5.4 Communications Interfaces

The Web Enabled tunnel management and monitoring System will be connected to the World Wide Web.

### 4.6 Non functional Requirements

### 4.6.1. Usability

The system uses IR sensors, transmitter and receiver. The system also uses a web for sending a SMS. Since a user is familiar with the general usage of browsers and computer, no specific training is required. The system is user friendly and self-explanatory.

### 4.6.2 Reliability

The system has to be very reliable due to the importance of data and the damages incorrect or incomplete data can do.

### 4.6.3 Availability

The system is available 100% for the user and is used 24 hrs a day and 365 days a   year. The system shall be Operational 24 hours a day and 7 days a week.
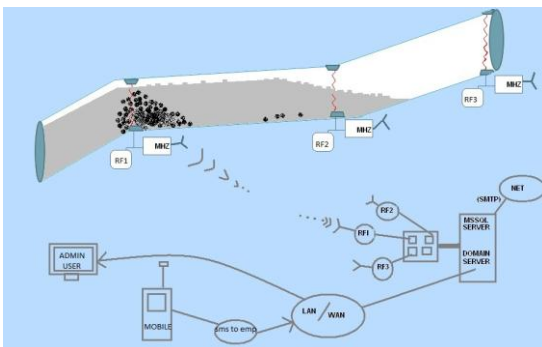
### V.    IMPLEMENTATION PLAN



Figure 1. How system will work?

The pictorial representation of  tunnel jam location is as shown in figure 1 .when the waste water passes through the underground tunnel it contains lots of hurdles, obstacles ,plastics, garbage etc so we fixed  IR sensors to tunnels at certain position where actually the tunnel  is jammed.

we can detect  choke up area in tunnel using Infrared sensors , when these sensors will be breaked they will generate a continuous high voltage pulse and the same pulse can be further given to RF transmitter from which a 'centralize server' with port programming will detect the blocked area using a web application. Then web server can detect the location and time of specific area. There after the workers who working in that area receives short SMS containing address and timing of particular area from administrative user where the tunnel is jammed then they can remove the blockages and then waste water passes through tunnel very easily.

The database of all workers containing name, address, phone no, employee id are stored in server database. So it will be easy for admin user to send message to particular workers who works in specific area and removes the blockages.
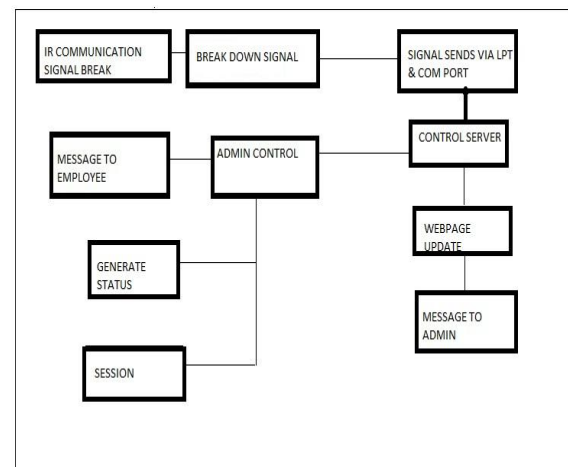
### VI.    ARCHITECTURE OF SYSTEM



Figure 2.Architecture of System

As shown in figure.2 with the help of radiofrequency (RF) communication we can detect blockage area in tunnel using infrared sensors. We fixed infrared sensors (IR) signal in tunnel at both ends of tunnel where exactly the blockage will occurred. When the blockage will occur in tunnel IR signal breaks from both corners of tunnel. Then RF transmitter sends these signals to RF receiver via LPT port. Control server finds the exact block where tunnel is jammed. Control server sends information to admin control where tunnel was blocked. We provide session to webpage, which were updated directly in few

minutes. Then the admin user can sends message to particular employees which were working in specific area. Employee can repair it immediately and gives feedback to admin user. At the time of blockage detection admin control generate status regarding blockage specifying amount of blockage in tunnel.

## VII. CONCLUSION

The development of the project has given us an excellent opportunity & experience to know how real life project works in its working environment & there is always some differences in studying software engineering theoretically & while setting applied practically. Some aspects during automating the system that were taken care of

1) The system should meet the user requirement
2) The system should be efficient enough in generating output in simplified manner.
3) The system database should be easy to maintain & upgrade easily.
4) The platform must be as simple as possible for maintenance issues.
5) It is always better to invest today on more sophisticated technology rather tomorrow spending of the system.

Keeping all this in mind we conclude the system being desired will be robust efficient in all respect & having a strong security features. The system therefore can be easily customized as per the changing user requirement of a later time without much effort. Thus achieving all the objectives of the proposed system successfully.

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