AUTOMATIC DRAINAGE WATER PUMP MONITORING AND CONTROL SYSTEM USING PLC AND SCADA

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***Abstract*- In this research paper the proposed concept is to replace the manual work in drainage cleaning by automated system. Now-a-days even though automation plays a vital role in all industrial applications in the proper disposal of sewages from industries and commercials are still a challenging task. Drainage pipes are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockages in the drainage pipes. To overcome this problem and to save human life we implement a design "Automatic drainage water pump monitoring and control system using PLC and SCADA". The PLC and SCADA were the emerging tools for solving real time problems and we designed our project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages, clearance of gaseous substance by means of absorb and store in the separate way where the toxic and non-toxic gases are treated separately and monitor the disposal in frequent manner.**

***Index Terms*- PLC, SCADA, drainage water pump**

I. INTRODUCTION

Automatic Drainage Water Pump Monitoring and Control System Using PLC and SCADA proposed to overcome the real time problems. With the continued expansion of industries, the problem of sewage water must be urgently resolved due to the increasing sewage problems from industries of the surrounding environment. The waste and gases produced from the industries are very harmful to human beings and to the environment. Our proposed system is to monitor and control the drainage level using PLC and SCADA technique. PLC is the major controlling unit and the drainage level is monitor by supervisory control and data acquisition technique (SCADA). It is the eminent software to visualize the operation of our system. In this system we used compressor, exhauster, gas sensor, IR sensor, stepper motor, filtering plates and pressure valve.

II. LITERATURE SURVEY

JIANG Jing and ZHANG Xuesong [1], Campus sewage treatment based on program logic control. Technology Sewage from our campus was needed to treat urgently due the effect of sewage on the environment becoming more and more seriously. This paper proposes a method of sequencing batch reactor activated sludge process to meet the needs of campus. Therefore, the method is so complicated that only automatic control part was realized. Strength of sequencing batch reactor activated sludge process was played. PLC controller from Mitsubishi FX2N series was used in the automatic control system of sewage treatment. But, the deposited sludge of the drainage system has not discussed.

Akio Goto and Kazuyuki Yamasaki [2], A new wastewater treatment technology for mixed acid drainage containing fluorine. A new environment friendly wastewater treatment technology was developed for the treatment of mixed acid drainage containing fluorine. The ordinary wastewater system using "slaked lime" is ineffective at removing fluorine; besides it cannot decompose "hard-type surfactants" in the wastewater, so the amount of generated sludge and the quality of treated wastewater are not at the satisfactory level. This newly developed wastewater system uses microorganism's and calcium carbonate to treat the industrial wastewater that contains strong chemicals such as acids, bases, and hydrogen peroxide. By changing the structure and construction of the treatment tanks, it is possible to treat calcium

carbonate and microorganisms at the same time and decompose hard-type surfactants. But, uses of microorganisms produced the toxic gases and non-toxic gases. These gasses are affecting on the drainage cleaners like as human beings.

WU JingCHEN, Guo jie [3], Design of coal mine underground drainage pump monitoring and controlling system based on PLC and touch screen. In this system undertakes the important task of draining all the inflow produced during the process of production in underground coal mine, hence it is important equipment in mine production. In this paper, according to the practical underground work situations of a mine, a set of monitoring and control system of underground drainage pump based on PLC of Siemens S7-200 series and 10-inch touch screen of Delta DOP-B series was designed. collects the operation parameters of underground drainage pump and displays them, automatically controls the startup and shutdown of drainage pump, monitors the water mark of shaft sump, and gives alarms in case of too high water level. It operates reliably and has high cost performance, thus enjoying bright prospect for promotion. But in this system any problem to rise on the operating time only intimates the alarm signal. It does not given to the problem solving procedure

Yin Haling Xu Zuxin[4], Wireless Real-time System for Monitoring the Storage of Urban Storm Drainage. For the purpose of abating overflow pollution from storm pumping discharge, a real-time monitoring system for storm drainage storage was developed, based on pipe storage model, ultrasonic sensors, wireless communication and web based geographic information system. The monitoring system has been applied into Caohejing drainage system, Shanghai, a separate drainage system with dry-weather pollution entry into storm pipes. It demonstrates added storm drainage on the basis of terminal drainage water elevation of 2.6m, the current critical condition to operate storm pumps. The real-time monitoring system lays foundation for development of real-time control system of the study area. But in this system defined only for the monitor of the drainage system. It does not defined how to control the drainage water.

Wang Juan[5], Wireless Real-time Observation System for Water Level of Urban Drainage. Real-time water level observation in urban drainage is essential of control rainwater or sewage storage so as to reduce overflow pollution. To achieve real-time data accessing, wireless communication and ultrasonic water level gauge are integrated to design the observation system. A developed wireless real-time observation system for Caohejing drainage system in Shanghai, with the area of 3.74 km2, is presented to show how to control storm drainage so as to reduce dry weather pump discharging, which also displays reliability of the system.

III. HARDWARE DISCRIPTION

Automatic drainage water pump monitoring and control system consists of compressor, gas exhauster, pressure valve, stepper motor, level sensors. This system is utilized in industries, hospitals, etc. The gas sensor is a device that detects the presence of gases in the drainage pipe area, often as a part of a safety system. The toxic and non-toxic gases were separated. Using the gas exhauster the gases were exhausted. The pressure sensor and the level sensor activated simultaneously to check the water level and the pressure created inside the pipe. When the pressure exceeded the certain limit the pressure valve opens. If the water level is high the compressor operates

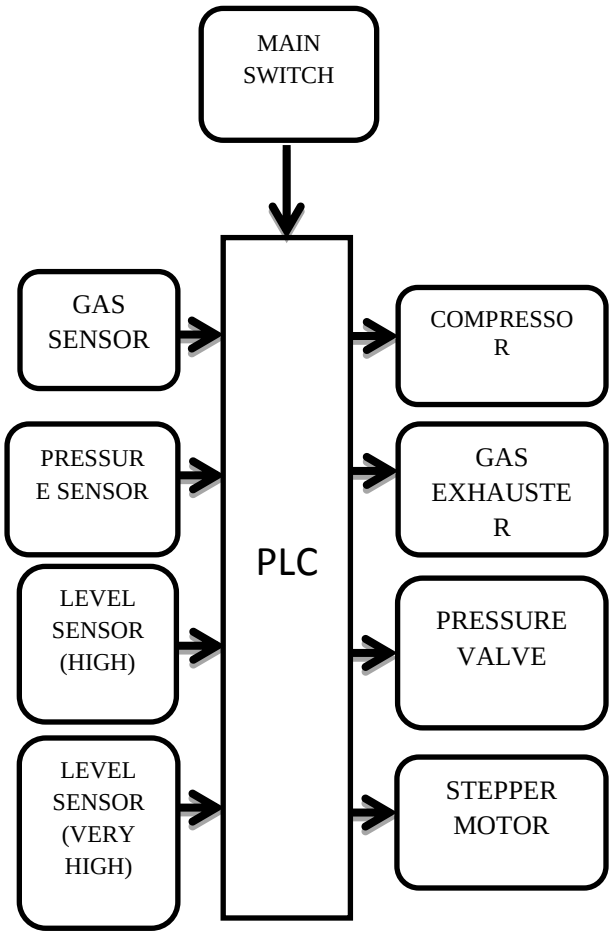

Fig.1 Block diagram for automatic drainage water pump monitoring and control system using PLC

with minimum pressure. When it activates at the extreme level the compressor operates in maximum pressure. Sledges present in the drainage water can be removed by filtration process. Aluminum or the metal plates are the two plates which are placed which are in the filtration process. The plates are arranged in the opposite manner. The controlling action of the plates is done with the help of the stepper motor.

IV. SIMULATION DIAGRAM

When the power supply unit is normally close condition, mc switch gets on and also the stepper motor gets rotating. In this project, water level sensor is used to operate the compressor valve. The simulated output of this project is shown with the help of the above mentioned software. When the

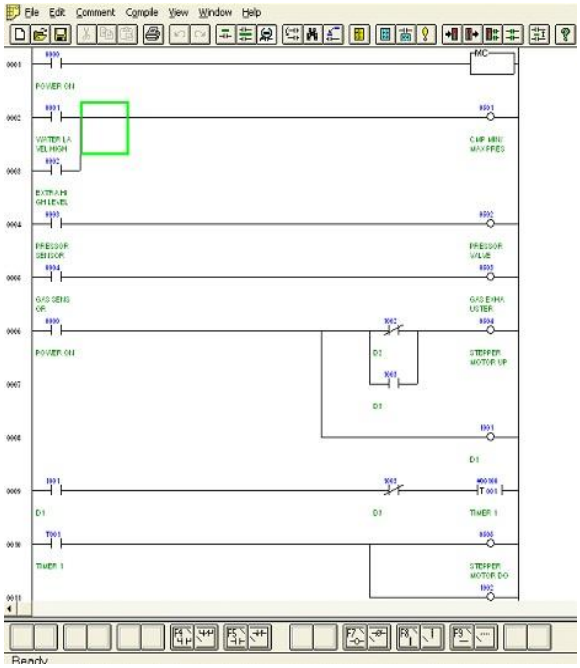

Fig.2 Ladder diagram

power is in ON the sensor senses then relevant parameters and the output is given to the PLC kit. The ON and OFF operation is controlled with the sensor operation and each and every parameters are controlled with the relevant condition. When the power is switched on the stepper motor is also switched on and the relevant action is undertaken with the use of stepper motor. Initially medium level water sensor gets the signal normally close then the signal given to compressor then operates in minimum pressure. Then the high level water sensor gets the signal normally close then the signal to given maximum pressure to operate in the compressor. Pressure sensor gets the signal normally close and that signal is given to the pressure valve is get open. If the pressure of sewage water exceeds certain pressure valve gets operated. Gas sensor gets the signal normally close and that signal is given by gas exhauster gets open. It's is the condition the tank is open or not. The filtering plates are operate based on the normally close signal to given the Stepper motor. The heart of the proposed system is operated by stepper motor connected plates. The operation is similar to MCB (miniature circuit breaker) each switches are operated with the sensor operation.

V. CONCLUSION

PLC controller from Siemens were used in the treatment system of drainage wastewater control by the stepper motor, compressor, gas exhauster,

pressure valve and the liquid level, flow and other analog variables to achieve automatic control of sewage waste water treatment. Drainage from industries is treated through this project to meet the national emission standards, with stable operation, low cost and good effect. Drainage wastewater control is treated by this method to irrigate plants, clean toilets, etc. Not only to solve water shortage problem in industries, but also to generate good economic and environmental benefits.

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BIOGRAPHIES

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