

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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## Boiler Critical Parameters Control

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**ABSTRACT:** Any form of pollution that can trace its immediate source to industrial practices is known as industrial pollution. Most of the pollution on the planet can be traced back to industries of some kind. In fact, the issue of industrial pollution has taken on grave importance for agencies trying to fight against environmental degradation. Countries facing sudden and rapid growth of such industries are finding it to be a serious problem which has to be brought under control immediately. Our project deals with measuring the industrial affected parameters and control

### I. INTRODUCTION

Industrial pollution takes on many faces. It contaminates many sources of drinking water, releases unwanted toxins into the air and reduces the quality of soil all over the world. Major environmental disasters have been caused due to industrial mishaps, which have yet to be brought under control. Below are few of the causes of industrial pollution that have resulted in environment degradation. This project considers two aspects of pollution: Dust / Smoke and Salt content.

**Air Pollution:** Air pollution has led to a steep increase in various illnesses and it continues to affect us on a daily basis. With so many small, mid and large scale industries coming up, air pollution has taken toll on the health of the people and the environment.

**Water Pollution:** The effects of industrial pollution are far reaching and liable to affect the eco-system for many years to come. Most industries require large amounts of water for their work. When involved in a series of processes, the water comes into contact with heavy metals, harmful chemicals, radioactive waste and even organic sludge. These are either dumped into open oceans or rivers. As a result, many of our water sources have high amount of industrial waste in them which seriously impacts the health of our eco-system. The same water is then used by farmers for irrigation purpose which affects the quality of food that is produced. This project analyses the existing system dust / smoke control in the industrial heaters and based on the criticality a control action will be initiated. Through MATLAB software, dust / smoke and discharge salt level are being monitored and controlled.

Air is the most vital constituent of environment for the sustenance of life on earth. Air forms nearly 80% of man's daily intake by weight. In pure air, the proportion of different constituents like oxygen, nitrogen and other gases is fixed and definite. It may be noted that air cannot be pure because some gases like sulphur dioxide, carbon monoxide, oxides of nitrogen, emission from volcanoes and swamps, salt spray, pollens from plants etc., are continuously added to the air by natural processes. Thus, air is polluted when its natural composition is disturbed either by natural or by man-made sources.

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## II. LITERATURE REVIEW

“Auld, D, A. L. (ed.), Economic Thinking and Pollution Problems. University of Toronto Press. 2015”

The purpose of this collection is to provide the student with an introduction to the way in which the discipline of economics tackles the problems posed in affluent societies by their various wastes products and ‘pollution economic introduces a student to aspects of price economics, The work includes a number of Canadian statements on pollution and its control in this country and gives the text of two recent pieces of legislation on the topic. The contributors politicians, businessmen, and professors explore the problem of pollutions and its control as each see it, and the volume as a whole should help encourages a greater awareness both of the difficulties in making the right public policies.

“MATLAB for Engineers by Holly Moore, Originally published: 2007”

For engineers introduces student the MATLAB coding languages developed out of Moore’s experience teaching MATLAB and other languages, the text meets students at their level of mathematical and computer sophistication. Starting with basic algebra, the book shows how MATLAB can be used to solve a wide range of engineering problems. Example drawn from concepts introduced in early chemistry and physics classes and freshman and sophomore engineering classes stick to a consistent problem solving methodology. Student reading the this text should have an additional reading materials for students with more advanced mathematical backgrounds.

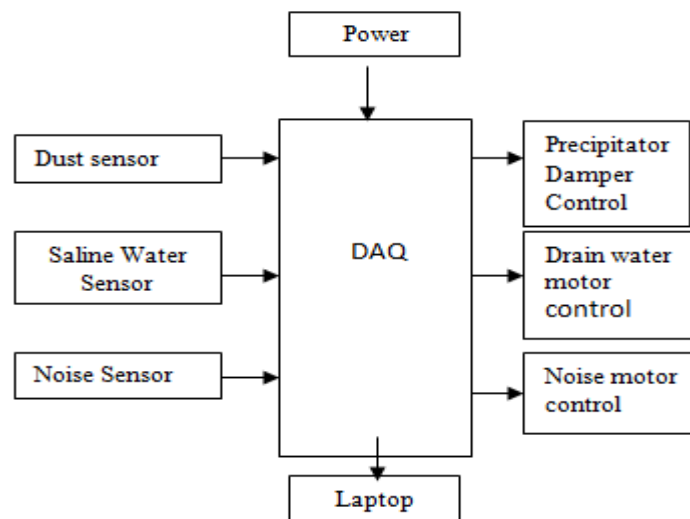
“Industrial Pollution Control: Issues and Techniques, Nancy J. Sell John Wiley & Sons, 1992”

This revised guide incorporates all the important information on pollution regulations generated since publication of the previous edition in 1981. This edition surveys the impacts of every type of pollution on health, plants, materials, and weather. It discussed how different types of pollution are produced, laws governing specific emissions and both existing and emerging air, water, and solid waste control techniques. Detailed sections zero in on processing methods, pollution production, and control methods in specific industries, including chemical, physical, and economic factors that inhibit better pollution control.

“Hand Book Of Petroleum Refining Processes, Robert A. Meyers, 20123”

Robert A. Meyers was manager of chemical process technology at TR and is now President of RAMTECH Limited. A resident of Redondo Beach, CA, Dr. Meyers is the inventor or co-inventor of a number of broadly used engineering process, and has managed projects in nearly every facet of the petroleum refining industries. He is a senior member of the American Institute of Chemical Engineers, a member of the American chemical society, and serves on the UCLA Chemistry department advisory board, his complete biography appears in who’s who in the world.

## III. WORKING PRINCIPLE



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In the proposed system the area will also be monitored for change in dust / smoke, salt in water level and noise pollution in motors. In case if these parameters crosses a pre-defined value the industry will be provided with automatic control. The dust particles at the outlet of the boiler is controlled by controlling the damper position. Dust / free carbon at the stack is measured using dust sensors. The signal ( 0 - 5 V DC ) is connected to DAQ-7 card The signal is converted into digital format and transmitted to MATLAB. After range calibration, the data is send to damper control. Based on the dust density, the damper is fully opened or closed upto 60 deg.The salt water to ground is controlled by starting the recycle water pump.Water conductivity at the CBD drain water is measured using conductivity sensors. The signal ( 0 - 5 V DC ) is connected to DAQ-7 card The signal is converted into digital format and transmitted to MATLAB. After range calibration, the data is compared with 250 micro Siemens. If the data is greater than 250, the recirculation pump is started. If the data is coming lesser than 250, the recirculation pump is stopped. The noise pollution is controlled by switching off the high noise motor. Noise at the motor is measured using noise sensors. The signal ( 0 or 5 V DC ) is connected to DAQ-7 card. The signal is converted into digital format and transmitted to MATLAB. If the noise level is less than 50 dB, the motor is allowed to run. If the noise level is greater than 50 dB, the motor is tripped

## IV. HARDWARE DESCRIPTION

**DUST SENSOR:** The optical dust sensor is designed to sense dust particles. An infrared emitting diode and a phototransistor are diagonally arranged into this device, to allow it to detect the reflected light of dust in air. It is especially effective in detecting very fine particles like cigarette smoke, and is commonly used in air purifier systems.

**Analog TDS Sensor** TDS (Total Dissolved Solids) indicates that how many milligrams of soluble solids dissolved in oneliters of water. In general, the higher the TDS value, the more soluble solids dissolved in water, andthe less clean the water is. Therefore, the TDS value can be used as one of the references reflecting the cleanliness of water.

**Noise Sensor:** Sound Sensor can detect the sound strength of the environment. The main component ofthe module is a simple microphone, which is based on the LM358 amplifier and an electrets microphone.

**IRF520 MOSFET Driver Module:** A direct current, or DC, motor is the most common type of motor. DC motors normally have just two leads, one positive and one negative. If we connect these two leads directly to a battery, the motor will rotate. If we switch the leads, the motor will rotate in the opposite direction.

**A diaphragm pump:** A diaphragm pump (also known as a Membrane pump) is a positive displacement pump that uses a combination of the reciprocating action of a rubber, thermoplastic or teflon diaphragm and suitable valves on either side of the diaphragm (check valve, butterfly valves, flap valves, or any other form of shut-off valves) to pump a fluid.

**EDAQ-07:** The measurement of a physical phenomenon, such as the temperature of a room, the intensity of a light source, or the force applied to an object, begins with a sensor. A sensor, also called a transducer, converts a physical phenomenon into a measurable electrical signal. Depending on the type of sensor, its electrical output can be a voltage, current, resistance, or another electrical attribute that varies over time. Some sensors may require additional components and circuitry to properly produce a signal that can accurately and safely be read by EDAQ-07 device.

## IV. PROPOSED SYSTEM

The issue of industrial pollution concerns every nation on the planet. As a result, many steps have been taken to seek permanent solutions to the problem. Better technology is being developed in this project for disposal of waste and recycling as much polluted water in the industries as possible. Dust control methods are being used to clean the air. Saving money in costs related to materials, operations, and pollution, or waste treatment and disposal;Using raw materials, staff resources, equipment, energy and water more efficiently Improving worker health and safety by improving air quality, decreasing the use of toxic substances, thereby decreasing personnel protective equipment requirements Decreasing regulatory requirements by eliminating the need for permits, hazardous waste manifests, monitoring and reporting and Improving community relations, company image and customer loyalty. Reduced ash, dust and smoke in boiler heater outlet.

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## V. CONCLUSION

Air filtration system describe a wide variety of equipment used to remove impurities from the air with a number of different filtration and purification schemes. Air filters cleanse, purify and reduce the overall number of particulates and other impurities present in an air source. Most industries require large amounts of water for their work. When involved in a series of process, the water comes into contact with heavy metals, harmful chemicals, radioactive waste and eve organic sludge.

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