"PURIFICATION OF INDUSTRIAL WASTE WATER ALONG WITH POWER GENERATION"

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ABSTRACT: This is a standard water treatment test for the presence of organic pollutants. Moreover, a number of physical and chemical parameters (which defines the water quality) such as Ph, DO (dissolved Solids), total Solids, inorganic trace elements are quite large that also needs to be monitored for proper assessment of water quality.

Keywords:14" Copper cylinder with iron base, 300W Water Heater, Water level indicating Teflon tube with Valves, Temperature gauge, Pressure Gauge, Pressure relief valve, Water inlet outlet pipes, Turbine, Dynamo, LED's , Nozzle

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1. INTRODUCTION:

India, being a rapidly growing economy, has to resolve massive environmental problems. The direct consequences of the process of development and the range of issues categorized as environmental problems include industrial pollution (i.e. pollution of air, water and soil) vehicular emission, hospital waste and domestic sewage disposal etc.
Water pollution has emerged as one of the gravest environmental threats to India. In India, every year, approximately, 50,000 million liters of waste water both industrial and domestic, is generated in urban areas. The govt. of India is spending millions of dollars every year on water pollution control. According to rough estimates, Indian government has spent nearly 4450 million USD till now on various schemes in India, like the Ganga action plan and Jamuna action plan to control water pollution in rivers. But the results are below satisfaction.
Water quality and pollution level are generally measured in terms of concentration or load – the rate of occurrence of a substance in an aqueous solution. BOD (Biochemical oxygen demand) measures the strength of an organic waste in terms of the amount of oxygen consumed (by the microorganism in water) in breaking it down.

A significant number of industries (for example, Livestock, Oil Refineries, Coal & Lignite, Chemical industries, Distilleries, Manmade fiber, Paints & Dye, Leather, Textiles, Paper, Fertilizers, Milk & Milk Products) in India are producing water pollution above MINAS by several times. These industries do not exist in isolation from each other, rather are inter dependent. This inter dependence arises from the fact that the output of an industry is generally required as an input by another industry. Though some industries do not produce pollution directly but these industries produce pollution indirectly in a significant way.

Water Consumption for Various Purposes
The water furnished to a city can be classified according to its ultimate use or end. The uses are:
1. Domestic use
2. Industrial use
3. Public use
4. Commercial use
5. Loss and waste

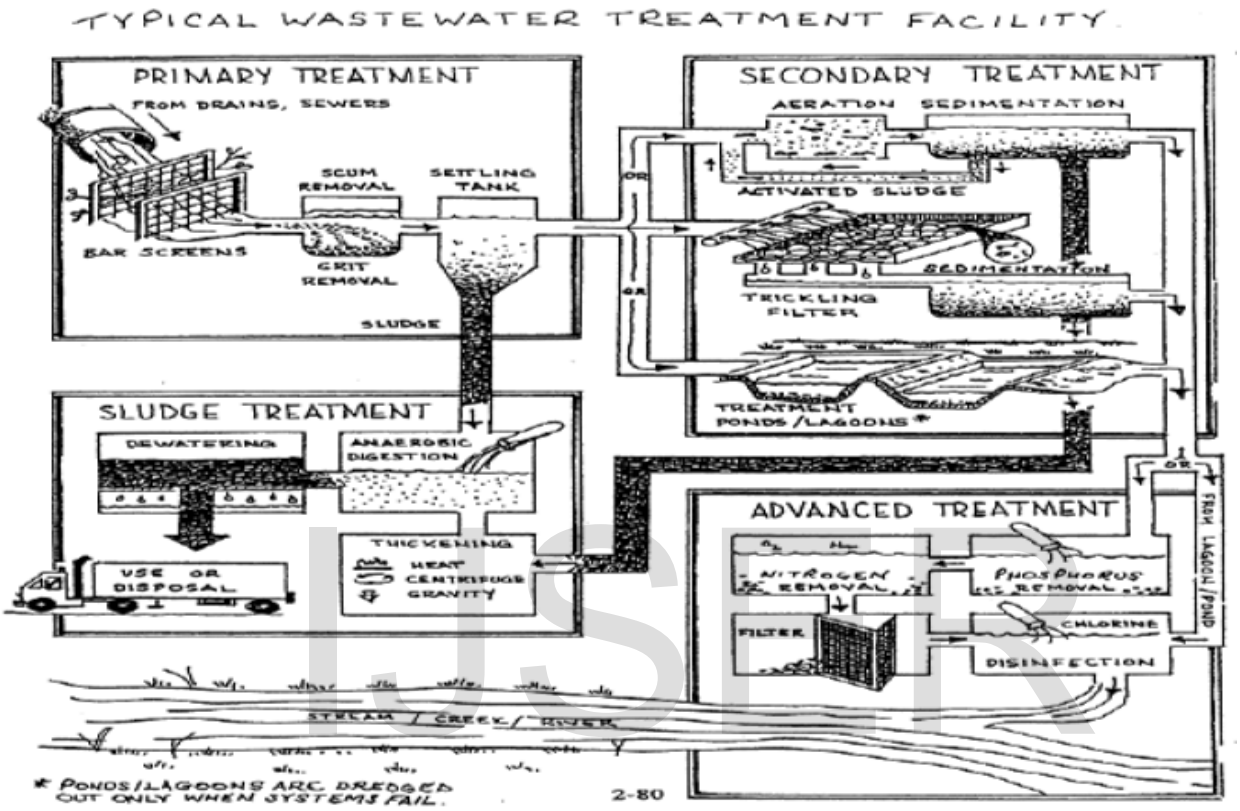
Uses	Liters per capita /day	Total %
Domestic	300	44
Industrial use	160	24
Public use	60	9
Commercial use	100	15
Loss and waste	50	8
total	670	100

Consumption of water in the year 2001

LITERATURE SURVEY

History
Wastewater is not just sewage. All the water used in the home that goes down the drains or into the sewage collection system is wastewater. This includes water from baths, showers, sinks, dishwashers, washing machines, and toilets. Small businesses and industries often contribute large amounts of wastewater to sewage collection systems; others operate their own wastewater treatment systems. In combined municipal sewage systems, water from storm drains is also added to the municipal wastewater stream. The

average American contributes 265-568 liters (66 to 192 gallons) of wastewater each day. Wastewater is about 99 percent water by weight and is generally referred to as influent as it enters the wastewater treatment facility. “Domestic wastewater” is wastewater that comes primarily from individuals, and does not generally include industrial or agricultural wastewater. At wastewater treatment plants, this flow is treated before it is allowed to be returned to the environment, lakes, or streams. There are no holidays for wastewater treatment, and most plants operate 24 hours per day every day of the week. Wastewater treatment plants operate at a critical point of the water cycle, helping nature defend water from excessive pollution. Most treatment plants have primary treatment (physical removal of floatable and settle able solids) and secondary treatment (the biological removal of dissolved solids).



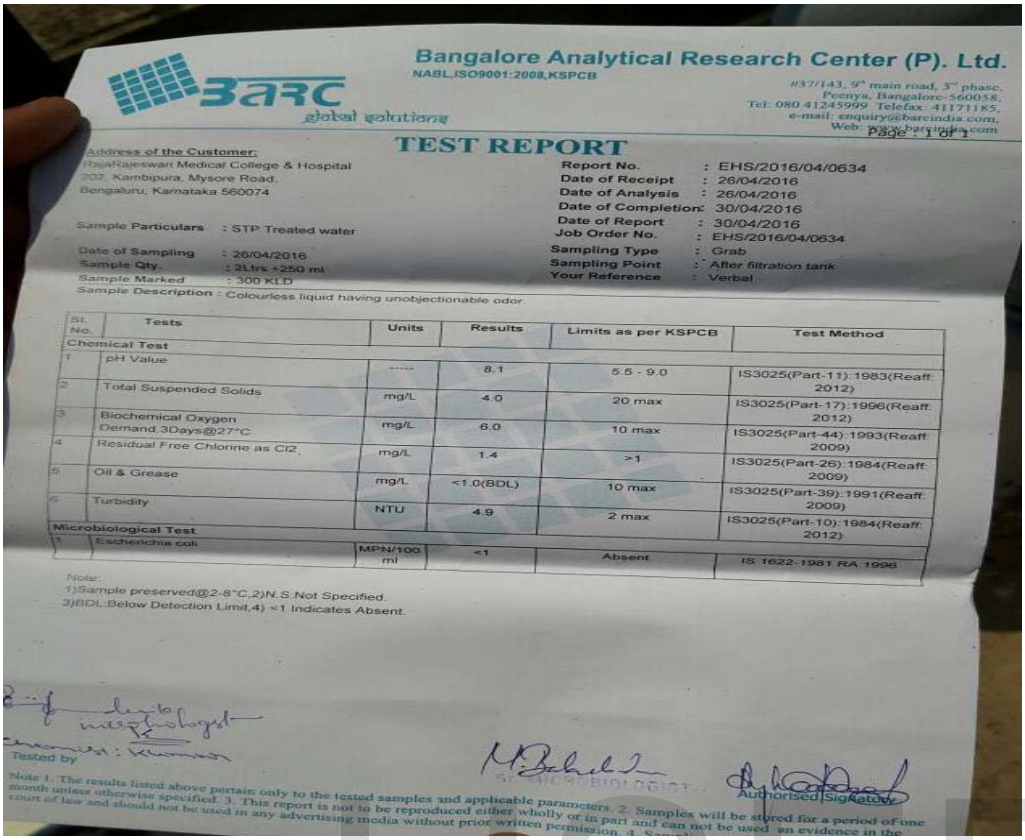
Subjects
Science (Physical Science, Physics)
Primary treatment involves:
1. screening- to remove large objects, such as stones or sticks that could plug lines or block tank inlets.
2. grit chamber- slows down the flow to allow grit to fall out
3. sedimentation tank (settling tank or clarifier) settle able solids settle out and are pumped away, while oils float to the top and are skimmed off
Secondary treatment typically utilizes biological treatment processes, in which microorganisms convert nonsettleable solids to settle able solids. Sedimentation typically follows, allowing the settle able solids to settle out. Three options include:
1. Activated Sludge- The most common option uses microorganisms in the treatment process to break down organic material with aeration and agitation, then allows solids to settle out. Bacteria-containing “activated sludge” is continually recirculated back to the aeration basin to increase the rate of organic decomposition.
2. Trickling Filters- These are beds of coarse media (often stones or plastic) 3-10 ft. deep. Wastewater is sprayed into the air (aeration), then allowed to trickle through the media. Microorganisms attached to and growing on the media, break down organic material in the wastewater. Trickling filters drain at the bottom; the wastewater is collected and then undergoes sedimentation.
3. Lagoons- These are slow, cheap, and relatively inefficient, but can be used for various types of wastewater. They rely on the interaction of sunlight, algae, microorganisms, and oxygen (sometimes aerated).
After primary and secondary treatment, municipal wastewater is usually disinfected using chlorine (or other disinfecting compounds, or occasionally ozone or ultraviolet light). An increasing number of wastewater facilities also employ tertiary treatment, often using advanced treatment methods. Tertiary treatment may include processes to remove nutrients such as nitrogen and phosphorus, and carbon adsorption to remove chemicals. These processes can be physical, biological, or chemical.
Settled solids (sludge) from primary treatment and secondary treatment settling tanks are given further treatment and undergo several options for disposal.

Terms

biochemical oxygen demand (BOD): a laboratory measurement of wastewater that is one of the main indicators of the quantity of pollutants present; a parameter used to measure the amount of oxygen that will be consumed by microorganisms during the biological reaction of oxygen with organic material

municipal: of or relating to a municipality (city, town, etc.). Municipal wastewater is primarily domestic wastewater**.**
primary treatment: the first stage of wastewater treatment that removes settle able or floating solids only; generally, removes 40% of the suspended solids and 30-40% of the BOD in the wastewater
secondary treatment: a type of wastewater treatment used to convert dissolved and suspended pollutants into a form that can be removed, producing a relatively highly treated effluent. Secondary treatment normally utilizes biological treatment processes (activated sludge, trickling filters, etc.) followed by settling tanks and will remove approximately 85% of the BOD and TSS in wastewater. Secondary treatment for municipal wastewater is the minimum level of treatment required by the Clean Water Act.
sedimentation: the process used in both primary and secondary wastewater treatment, that takes place when gravity pulls particles to the bottom of a tank (also called settling).
settling tank (sedimentation tank or clarifier): a vessel in which solids settle out of water by gravity during wastewater or drinking water treatment processes.
sludge: any solid, semisolid, or liquid waste that settles to the bottom of sedimentation tanks (in wastewater treatment plants or drinking water treatment plants) or septic tanks
tertiary treatment: any level of treatment beyond secondary treatment, which could include filtration, nutrient removal (removal of nitrogen and phosphorus) and removal of toxic chemicals or metals; also called “advanced treatment” when nutrient removal is included
total suspended solids (TSS): a laboratory measurement of the quantity of suspended solids present in wastewater that is one of the main indicators of the quantity of pollutants present
trickling filter process: a biological treatment process that uses coarse media (usually rock or plastic) contained in a tank that serves as a surface on which microbiological growth occurs. Wastewater trickles over the media and microorganisms remove the pollutants (BOD and TSS).

TEST REPORT



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TEST REPORT

Page 1 of 1

Address of the Customer:
RajaRajeswari Medical College & Hospital
202, Kambipura, Mysore Road,
Bengaluru, Karnataka 560074

Report No. : EHS/2016/04/0634
Date of Receipt : 26/04/2016
Date of Analysis : 26/04/2016
Date of Completion: 30/04/2016
Date of Report : 30/04/2016
Job Order No. : EHS/2016/04/0634
Sampling Type : Grab
Sampling Point : After filtration tank
Your Reference : Verbal

Sample Particulars : STP Treated water
Date of Sampling : 26/04/2016
Sample Qty. : 2Ltrs +250 ml
Sample Marked : 300 KLD
Sample Description : Colourless liquid having unobjectionable odor.

Sl. No.	Tests	Units	Results	Limits as per KSPCB	Test Method
Chemical Test					
1	pH Value	-----	8.1	5.5 - 9.0	IS3025(Part-11):1983(Reaff: 2012)
2	Total Suspended Solids	mg/L	4.0	20 max	IS3025(Part-17):1996(Reaff: 2012)
3	Biochemical Oxygen Demand,3Days@27°C	mg/L	6.0	10 max	IS3025(Part-44):1993(Reaff: 2009)
4	Residual Free Chlorine as Cl2	mg/L	1.4	>1	IS3025(Part-26):1984(Reaff: 2009)
5	Oil & Grease	mg/L	<1.0(BDL)	10 max	IS3025(Part-39):1991(Reaff: 2009)
6	Turbidity	NTU	4.9	2 max	IS3025(Part-10):1984(Reaff: 2012)
Microbiological Test					
1	Escherichia coli	MPN/100 ml	<1	Absent	IS 1622-1981 RA 1996

Note:
1)Sample preserved@2-8°C,2)N.S:Not Specified.
3)BDL:Below Detection Limit,4) <1 Indicates Absent.

Tested by

Authorised Signatory

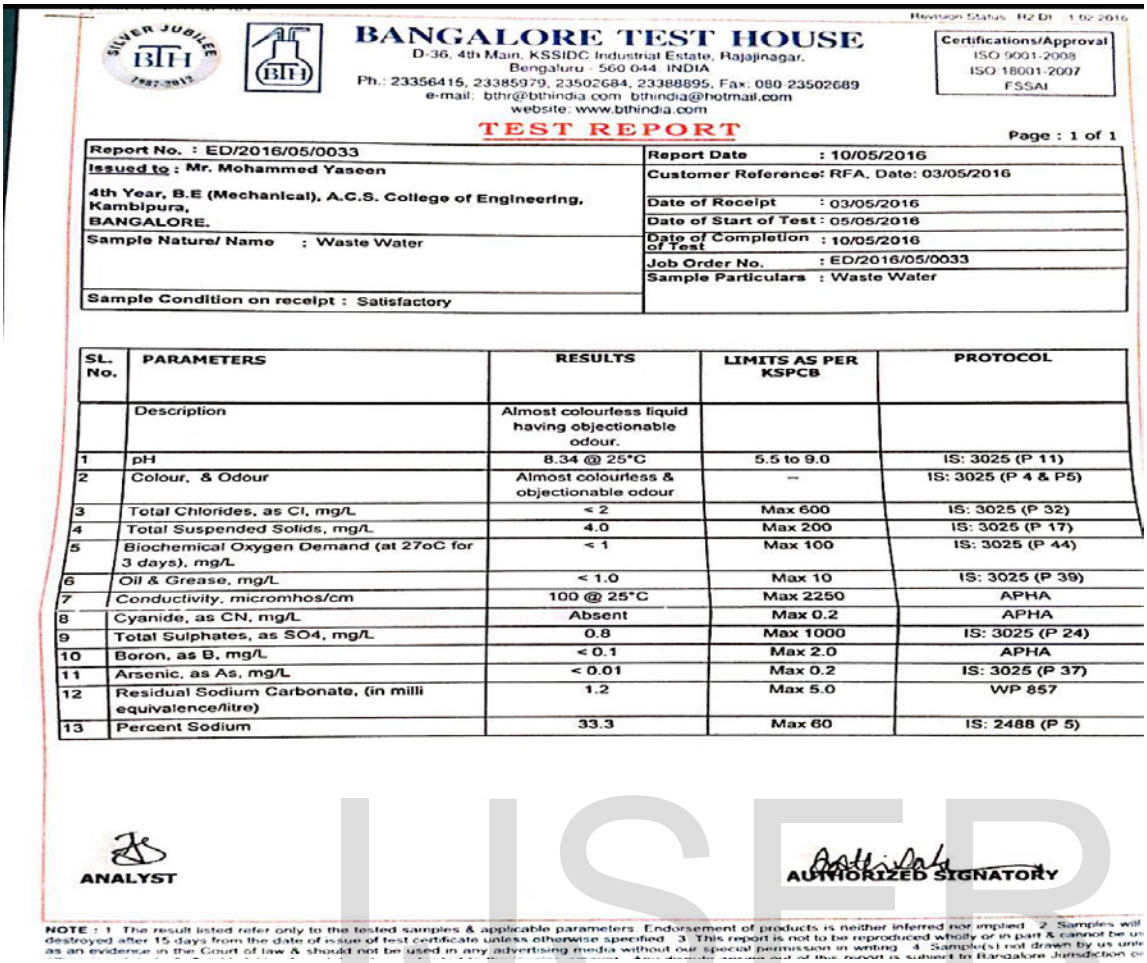
Note 1. The results listed above pertain only to the tested samples and applicable parameters. 2. Samples will be stored for a period of one month unless otherwise specified. 3. This report is not to be reproduced either wholly or in part and can not be used as evidence in the court of law and should not be used in any advertising media without prior written permission. 4. Sam

CUSTOMIZATION

Customization of system to achieve all the basic needs to the user by creating an entirely unique design. Imagine a village with water and electric problems how it can manage the environment conditions nowadays, hence by using this project we can avoid the problems of water and electricity where it is needed.

In this project no need for 3 to 4 steps it is quite simple and portable with effective results. Comparing the reports of both methods we can conclude this project can help in many different conditions in today's world.

TEST REPORT OF OBTAINED WATER



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website: www.bthindia.com

Certifications/Approval
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ISO 18001-2007
FSSAI

TEST REPORT

Page : 1 of 1

Report No. : ED/2016/05/0033	Report Date : 10/05/2016
Issued to : Mr. Mohammed Yaseen	Customer Reference: RFA, Date: 03/05/2016
4th Year, B.E (Mechanical), A.C.S. College of Engineering, Kambipura, BANGALORE.	Date of Receipt : 03/05/2016
	Date of Start of Test : 05/05/2016
Sample Nature/ Name : Waste Water	Date of Completion of Test : 10/05/2016
	Job Order No. : ED/2016/05/0033
Sample Condition on receipt : Satisfactory	Sample Particulars : Waste Water

SL. No.	PARAMETERS	RESULTS	LIMITS AS PER KSPCB	PROTOCOL
	Description	Almost colourless liquid having objectionable odour.		
1	pH	8.34 @ 25°C	5.5 to 9.0	IS: 3025 (P 11)
2	Colour, & Odour	Almost colourless & objectionable odour	--	IS: 3025 (P 4 & P5)
3	Total Chlorides, as Cl, mg/L	< 2	Max 600	IS: 3025 (P 32)
4	Total Suspended Solids, mg/L	4.0	Max 200	IS: 3025 (P 17)
5	Biochemical Oxygen Demand (at 27oC for 3 days), mg/L	< 1	Max 100	IS: 3025 (P 44)
6	Oil & Grease, mg/L	< 1.0	Max 10	IS: 3025 (P 39)
7	Conductivity, micromhos/cm	100 @ 25°C	Max 2250	APHA
8	Cyanide, as CN, mg/L	Absent	Max 0.2	APHA
9	Total Sulphates, as SO4, mg/L	0.8	Max 1000	IS: 3025 (P 24)
10	Boron, as B, mg/L	< 0.1	Max 2.0	APHA
11	Arsenic, as As, mg/L	< 0.01	Max 0.2	IS: 3025 (P 37)
12	Residual Sodium Carbonate, (in milli equivalence/litre)	1.2	Max 5.0	WP 857
13	Percent Sodium	33.3	Max 60	IS: 2488 (P 5)

ANALYST

AUTHORIZED SIGNATORY

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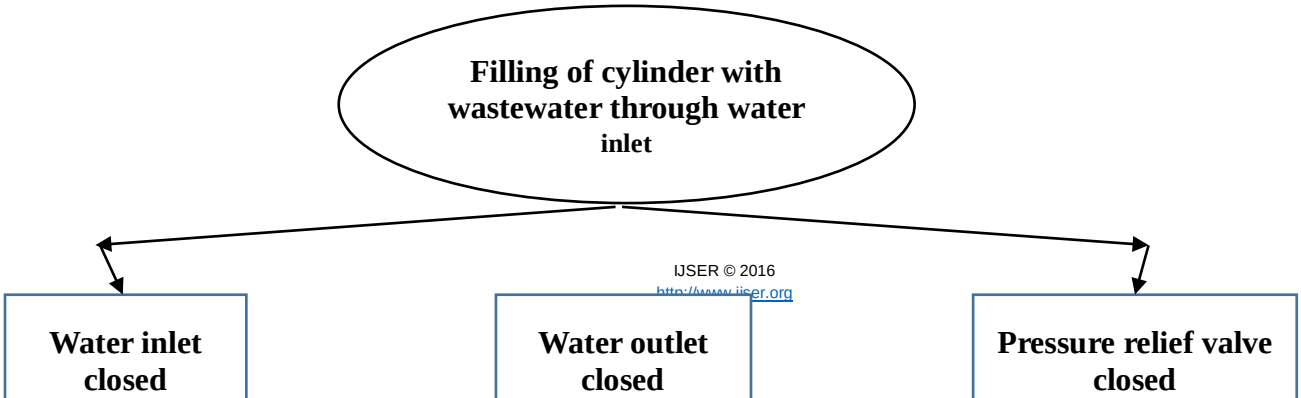
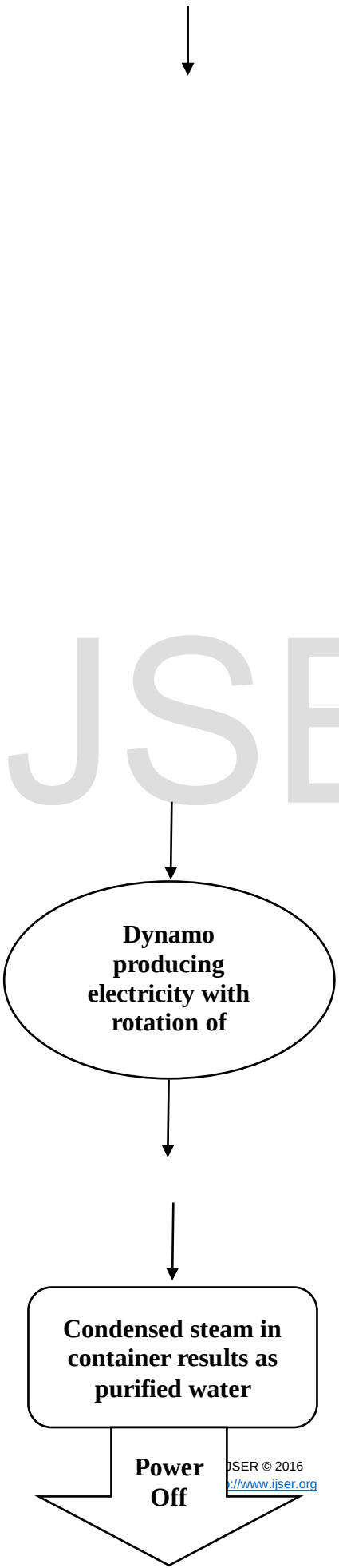
4. WORKING METHODOLOGY

FLOW CHART

WORKING METHODOLOG

FLOW CHART





WORKING PROCEDURE

- Water is heated in copper cylinder to its boiling point.
- The water heated steam is enclosed in the cylinder without any leakage.
- Steam is enclosed till the required pressure (15-20 kgf/cm^2) is obtained.
- The steam is released through pressure relief valve.
- Released steam hits the turbine blade which is enclosed in glass chamber.
- The steam which is evaporated is condensed in glass chamber, hence water is collected in separate container.
- Turbine is connected to dynamo, as the steam turbine rotates dynamo generates the electricity.
- Dynamo is a device which converts mechanical energy into electrical energy

This figure describes the working of this project

5. ADVANTAGES & APPLICATIONS

Advantages

- The process is short and simple
- Maintenance free
- Accurate and instant working
- Low cost
- Portable

- Water recycling is a critical element for managing our water resources.
- Water recycling can reduce and pre vent pollution.

Applications

This project mainly targeted to obtained water,

• The obtained water can use by same industry by recycling the industry work & for domestic use.

• Many farmers use wastewater for irrigation which effects the crops, hence obtained water is perfectly suitable for irrigation.

• Water pollution & soil erosion can be minimized through this phenomenon.

• Obtained power can be used to run same process, to run machines, to glow the lights etc., in several manners.

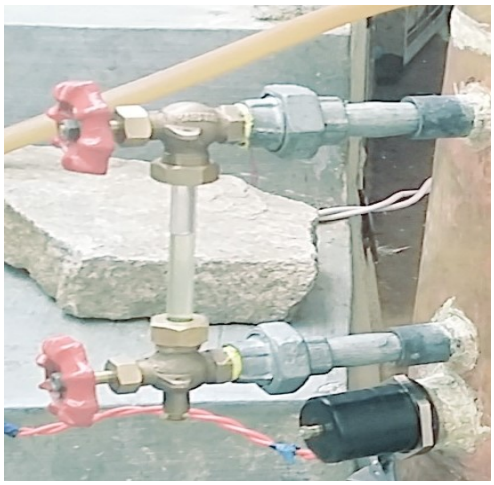
• Further treatment on obtained water will be suitable for drinking purpose

MATERIALS USED IN PROJECT

- **14" Copper cylinder with iron base**

- **300W Water Heater**

- **Water level indicating Teflon tube with Valves**



- **Temperature gauge**

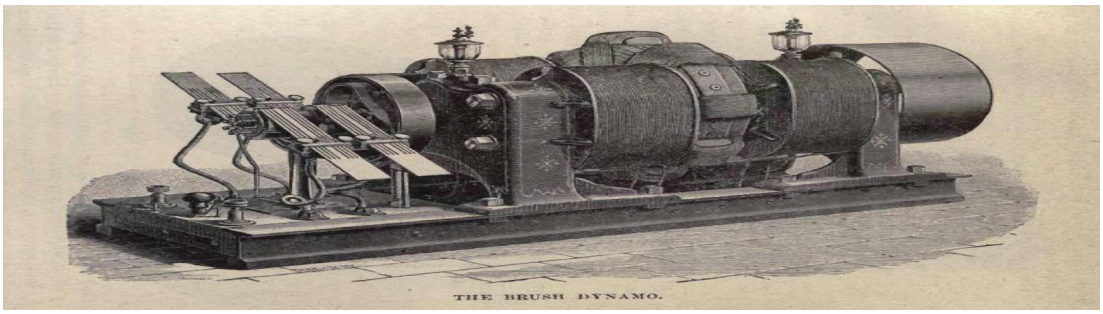
- **Pressure Gauge**

- **Pressure relief valve**

- **Water inlet outlet pipes**

- **Turbine**

- **Dynamo**



- **LED‘s**



- **Nozzle**

- **WATER USED**

- **WATER DIFFERENCE**

BEFORE **AFTER**

Acknowledgment: I would like to express my deepest appreciation to all those who provided me the possibility to complete this project. A special gratitude I give to our final year project manager, Prof. Sandeep G.R, Mtech, Prof. Sunilraj B.A , Mtech of ACS college of engineering whose contribution in stimulating suggestions and encouragement.

Furthermore I would also like to acknowledge with much appreciation the crucial thanks to my father Gulzar Ahmed.

CONCLUSION

Parameters	Water Before Process	Water After Process
Color & odour	Brownish with objection smell	Colorless with objectionable smell
pH	7.86 at 25*c	8.34 at 25*c
Chlorides , as Cl in mg/L	64	< 2
Solids, in mg/L	529.83	4.0
Biochemical Oxygen Demand (BOD)	1,869	< 1
Oil & Grease, mg/L	27.5	1.0
Cyanide, as CN in mg/L	0.1	Absent
Sulphate, as SO4 mg/L	1000	0.8
Conductivity, micro/cm	2478	100 at 25*c
Boron as B mg/L	20	< 0.1
Arsenic as As mg/L	10	< 0.01
Residual Sodium Carbonate (mill equivalence/L)	425	1.2
Percent Sodium	80	33.3

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BIODATA

SYED AZEEZ MOINUDDIN CURRENTLY PURSUING B.E FINAL YEAR IN MECHANICAL BRANCH , IN ACS COLLEGE OF ENGINEERING, MYSORE ROAD BANGALURU

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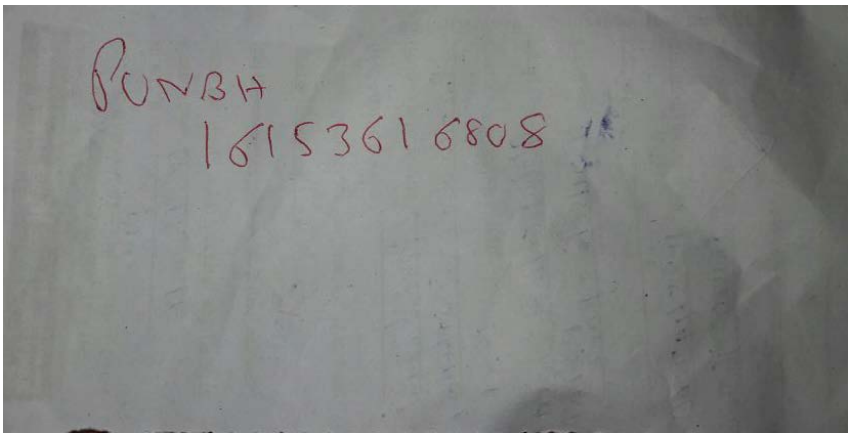
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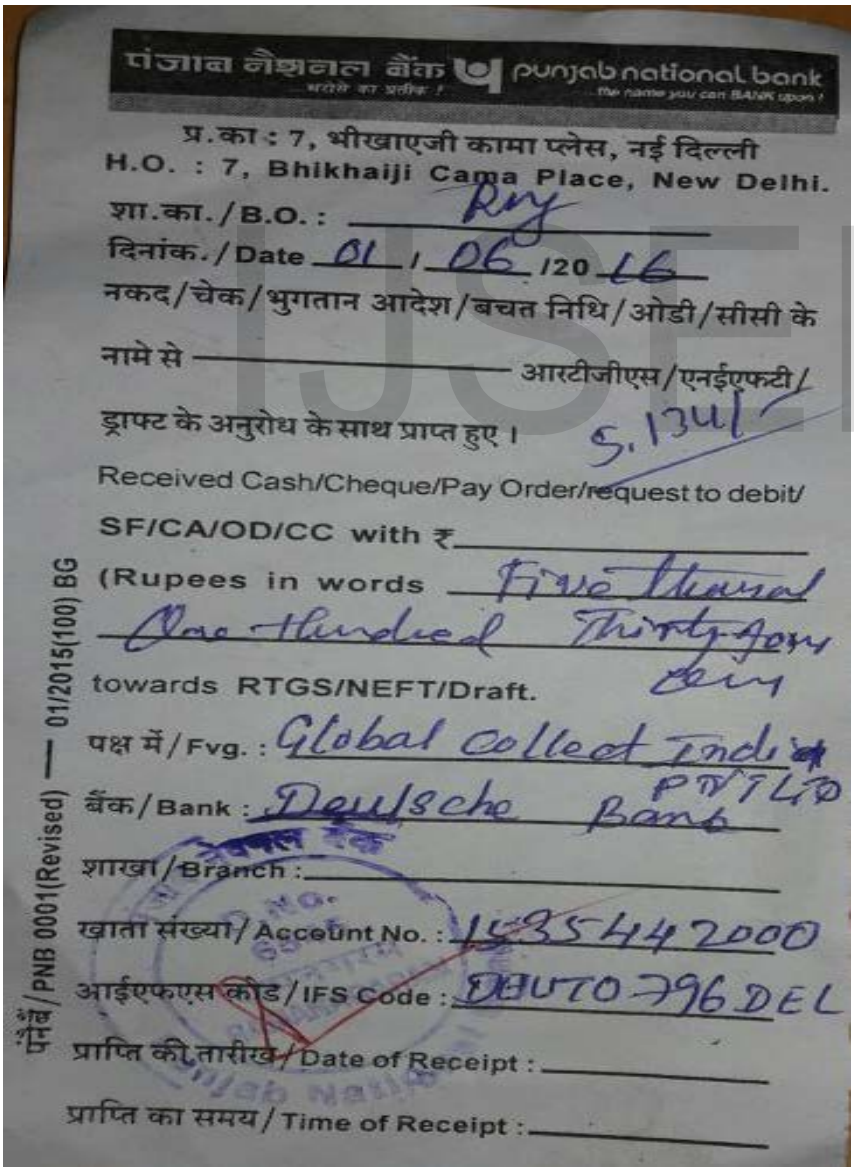
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