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Numerical Investigation of Heat Transfer in Triangular Plate	Mr. Sudhir Singh Rajput	Mechanical	IJTSRD- ISSN: 2455-6470, Volume-8 Issue-2	2023-24	ISSN: 2456-6470	https://www.ijtsrd.com	https://www.ijtsrd.com/other-scientific-research-area/other/64247/numerical-investigation-of-heat-transfer-in-triangular-plate/sudhir-kumar-sahu	UGC care
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A Case Study On Solid-Waste Management In Bilaspur City, Chhattisgarh, India	Mr. Manish Nayak	CIVIL	Educational Administration: Theory and Practice, 29(4), 3251-3256	2023-24	ISSN 2148-2403	https://www.ijerph.com	https://www.ijerph.com/article/view/7886	Scopus journal
A Case Study On Solid-Waste Management In Bilaspur City, Chhattisgarh, India	Mr. Karanish Chandrahar	CIVIL	Educational Administration: Theory and Practice, 29(4), 3251-3256	2023-24	ISSN: 2148-2403	https://www.ijerph.com	https://www.ijerph.com/article/view/7886	Scopus journal
Study Of Physicochemical Analysis Of Drinking Water Sources Of Selected Villages Of Raipur District	Dr. Manish Sakthocha	CIVIL	Educational Administration: Theory and Practice, 29(4), 3268-3273	2023-24	ISSN 2148-2403	https://www.ijerph.com	https://www.ijerph.com/article/view/7890	Scopus journal



Numerical Investigation of Heat Transfer in Triangular Plate

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ABSTRACT

The primary aim of these investigations was to explore the characteristics of flow and heat transfer under varying Rayleigh numbers and aspect ratios. The results obtained through Computational Fluid Dynamics (CFD) simulations, presented graphically in the form of heat flow and stream-functions, reveal that the nature of heat transfer is influenced by both the Rayleigh number and aspect ratio. Moreover, the study validates the strong dependence of the Nusselt number on the Rayleigh number, aspect ratio, and enclosure parameters. The CFD simulations effectively capture the boundary conditions of the natural convection problems under consideration.

Solutions are derived for a range of Rayleigh numbers, maintaining a constant Prandtl number ($Pr = 0.70$) at an aspect ratio of 1. The Pressure-Velocity Coupling Method, coupled with the Non-Iterative Time Advancement (NITA) scheme, is employed to effectively solve the problem. The distribution of temperature and stream function is analysed as a function of thermal and geometrical output parameters for the specific problem at hand. The investigation involves a two-stage approach to discern variations in results stemming from different computational approaches.

KEYWORDS: CFD (Computational Fluid Dynamic), Ra: (Rayleigh Number), AR: (Aspect Ratio)

INTRODUCTION

Natural convection is a heat transfer phenomenon that occurs spontaneously due to density differences in a fluid, either liquid or gas. When a region of a fluid is heated, it becomes less dense, causing it to rise, and cooler, denser fluid descends to replace it. This movement creates a convective flow that transfers heat without the need for an external force such as a pump or fan.

Key Characteristics of Natural Convection:

- **Driven by Temperature Differences:** Natural convection is primarily driven by variations in temperature within a fluid.
- **Gravity-Dependent:** The force of gravity plays a crucial role in natural convection, causing the buoyancy effect that leads to fluid movement.
- **Occurs in Enclosed Spaces:** It is often observed in enclosed spaces, where fluid motion is constrained

The extensive study of natural convection flow and heat transfer within rectangular enclosures has been

driven by its versatile applications. In vertical orientations, these enclosures serve as effective insulation for building doors and windows, the air conditioning compartments of trains, industrial furnaces, chimneys, and various heat transfer equipment. Alternatively, when positioned at an incline, these enclosures find utility in skylights, roof windows, solar collector storage, and numerous other solar applications.

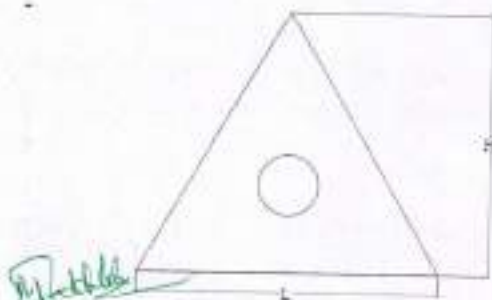


Fig. 1. Triangular enclosed vertical lamina

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PERFORMANCE EVALUATION OF A FLAT PLATE LOUVERED FIN HEAT EXCHANGER AND ANALYSIS OF CONDENSER

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Abstract: Flat Heat Exchanger* investigates the efficiency of louvered fin heat exchangers in comparison to traditional plate fin heat exchangers for various heat transfer applications. The research highlights the importance of optimizing louver angles and Reynolds numbers for enhanced heat transfer. Using MATLAB for theoretical analysis, the study calculates Colburn j -factors and f -factors across different louver angles and Reynolds numbers. These theoretical values are then compared to results obtained from numerical simulations conducted using ANSYS FLUENT. The findings reveal that louvered fin heat exchangers exhibit significantly improved heat transfer rates, particularly at lower Reynolds numbers. The study identifies a louver angle of 23 degrees as optimal for maximizing heat transfer performance. However, at higher Reynolds numbers and louvered angles beyond 23 degrees, overall heat transfer efficiency diminishes due to a decrease in the Colburn j -factor. This research contributes valuable insights into the design and operation of louvered fin heat exchangers, offering guidance for more effective and efficient heat recovery systems across various industrial sectors. Your research employs a combination of CAD modeling and CFD analysis to evaluate and compare the performance of air-cooled finned-tube condenser designs using different refrigerants. The use of aluminum fins and the selection of appropriate turbulence models are crucial aspects of your study. Your findings can provide insights into optimizing the design and refrigerant selection for air conditioning systems to enhance their efficiency and heat rejection capabilities.

Keywords: Colburn j -factor, Friction factor, Heat exchanger, Heat transfer, Louvered angles, CFD, Condensers, Refrigerant, ANSYS, R134a

INTRODUCTION:

Heat exchangers are crucial devices for transferring thermal energy between fluids or between fluids and solid surfaces at different temperatures, providing essential cooling and heating services in various applications. To enhance heat transfer efficiency within these devices, secondary structures known as fins are often added to their primary surfaces, considering the allowable pressure drop range. Fins come in various shapes, including rectangular, triangular, wavy, offset strip, perforated, and louvered types, and find commercial use in industries such as air conditioning, heating, power generation, automotive, and food. Recent advancements have introduced nanofluids to heat exchangers, demonstrating improved heat transfer in free, forced, and mixed convection [1-6].

The design of finned heat exchangers, showing that they outperform finless counterparts, especially at varying air velocities and flow rates. Similarly conducted experimental and numerical analyses, confirming the superiority of finned tube heat exchangers in terms of overall heat transfer efficiency. Meanwhile, analyses of heat exchangers in real-world applications,

Water Hammer Analysis in Long Pipelines

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ABSTRACT

Ca Hydraulic transient is a factor to be considered during structural design of water conveyance system. The most common hazardous situation is the uncontrolled pump trip due to power failure. Therefore, surge analysis is important for a water delivery project having long pipeline. Customized software WH 2.7 is used to solve the problem of surge in pipeline. Method of characteristics is widely used mathematical scheme for solving the phenomenon because of higher accuracy. The partial differential equations may be transformed by the method of characteristics into total differential equations. The later equations may then be integrated to yield finite differential equations which are conveniently handled numerically. This paper describes the problem of water hammer in long pipeline of lift irrigation scheme. The pumping station of lift irrigation scheme is located on riverbank and is to lift the water to the reservoir located at distance of 5.5 km through 1300mm diameter and 11/8 mm thickness mild steel pipeline. Three vertical turbine pumps each having capacity of delivering 0.937 m³/s (total discharge capacity 2.8 m³/s) and 43.24 m total head to irrigate the command area of 3300 ha. Continuous number of trials led to select combination of one air vessel of capacity 50 m³ and 10 Air Valves. Studies carried out helped to foresee advent conditions like column separation well in advance before implementation. This way it helps to finalize piping system incorporating anti surge devices like air vessel and air valves to keep the pipeline safe from water hammer due to power failure to the pumps and hence reliable operation for long run.

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KEYWORDS: Water hammer, Vertical turbine pumps, Method of characteristics, Air vessel and Air valves

INTRODUCTION

Long pumping water supply lines are subjected to water hammer whenever there is a sudden pump stoppage, pump startup or valve closure. Whenever system changes from one steady state condition to another there is a transient change in flow and pressures as the system settles to the final steady state condition. The magnitude of surge pressures or water hammer and the time duration of this condition depends on the flow rate, velocity, pipeline material and the system boundary condition's such as reservoirs, pumps, air valves, control valves and changes in pipeline diameter. The phenomenon of water hammer is generally ignored in the area of water supply schemes. This is due to the difficulty in carrying out a comprehensive analysis which considers all the system components and their interaction. It is common practice for designers to

simply add a nominal pressure increase to allow for water hammer. This approach can be too conservative and unnecessarily costly and, in some cases, there have been system failures due to inadequate water hammer protection being provided. The undertaking of a water hammer analysis and selection of anti-surge devices should be an integral part during the design phase. There are water hammer programs available which can assist designers in identifying potential water hammer problems and helps in the selection of anti-surge. This paper deals with surge analysis in long pipelines used for lift irrigation schemes with emphasis on use of different safety devices to mitigate water hammer pressures. Author use the customized software WH 2.7 to solve the problem of water hammer in long pipeline.



INVESTIGATIONS ON THE MECHANICAL PROPERTIES OF COMPOSITE MATERIALS REINFORCED WITH NATURAL FI- BRES

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Abstract

Natural Fibres are the abundantly found fibres which are very cheap and can be found in almost every part of India. They can be used to reinforce the epoxy to increase the strength and hardness and can affect their mechanical properties or we can say enhance it so their applications and uses thus can be increased to a level where they can be used efficiently and cheaply. Here we are using natural fibres of jute and coconut as they are available in large quantity and are very cheap. Coconut coir which is natural fibre is thrown away in waste and is a waste product which can be used to reinforce the epoxy, which can impact its mechanical properties and so, the jute fibres. In this paper, the coconut coir and jute fibre will be used to see the impact they made on the mechanical properties of the Lapox L-12 mixed with the hardener K-12. The fibres will be first treated with the NaOH solution and will be kept soaked in it for 24hrs. and the samples then created will be tested for the mechanical properties like Tensile Strength, compressive strength, hardness, etc. Thus, the result achieved from the above will show the effect natural fibres made in reinforcing the epoxy material and what effect they do on the properties of the epoxy material.

Keywords: Natural Fibre, Hardness, Lapox L-12, Hardener K-12, Tensile Strength, Compressive Strength.

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1. INTRODUCTION

In today's fast-paced world, optimizing material properties and environmental sustainability is crucial. Natural and eco-friendly materials offer cost benefits and ease of handling, as well as being abundant.

Composite materials consist of a resin/matrix and a fiber, used historically and in modern applications like household appliances and automobiles. They offer a balance of strength, weight, and cost, outperforming plastics and metals in many cases.



“ITEMIZATION OF HARMONIC USING PASSIVE SHUNT FILTER WITH THE FLEXIBLE AC TRANSMISSION SYSTEM DEVICES”

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Introduction

Flexible AC Transmission Systems (FACTS)

In the past few years the demand for electrical energy has increased significantly and as a result energy transmission systems are facing power-transmission limitation crisis. The limitations occur due to keeping a balance between maintaining stability and supplying the allowed level of voltage. As a result of this the practical operation capacity of the system is far less than the real capacity. This results in non-optimal operation of the energy transmission systems. One among the solutions to this problem of increasing power transmission capacity is construction of new transmission lines. This is not feasible both economically and practically. Due to the developing semiconductor industry and its applications in power systems, the concept of FACTS is offered, to enhance the real capacity of transmission lines without having to construct any new transmission lines. The major drawback in using thyristor switches is that the control for turn-off capability is not possible. Hence in a cycle, switching more than once is not possible. [3]

After the invention of IGBT and GTO which are semiconductor devices with controlled turn-off capability the transmission system was revolutionized. This development resulted in the use of VSCs in the field of energy transmission. The advantage of this is the generation and absorption of reactive power without the use of devices like capacitor or reactor. All FACTS equipment designed by Voltage Source Converters is known as FACTS new generation devices. The approach of engineers towards planning and operation of power

ADVANCED FUZZY LOGIC TECHNIQUE FOR SOLAR BASED MPPT CONTROL

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Abstract— After using conventional energy sources, the use of renewable energy systems has become increasingly important. These non-conventional energy sources are environmentally benign and nearly limitless. The availability of reasonably priced and efficient photovoltaic modules has led to a significant surge in the use of solar PV among all renewable energy technologies. These days, renewable energy is one of the features that is widely used, particularly when using photovoltaic (PV) panels, as they offer clean, limitless, and simple energy usage. Finding a PV panel's Maximum Power Point (MPP) is the key to using it as efficiently as possible. In order to get the most value, you must to calculate how to keep the system running at the MPP. This method is called the process of Maximum Power Point Tracking (MPPT).

Keywords: Solar Panel, computational efficiency, MPPT, Fuzzy Logic.

I. INTRODUCTION

Global energy consumption has increased dramatically as a result of the expanding human population. Fuel is produced using solar energy without harming the environment. It doesn't cause global warming or deplete the planet's resources. An apparatus that generates electricity from solar radiation is a solar panel. It consists of multiple solar cells connected in parallel and series. Every day, more people are using solar panels. Now that the solar panel is constructed, sunlight is all that is required to generate energy. Using solar panels is a common way to counteract the rising cost of electricity due to their economic value. Despite being around for a while, solar energy technology is currently being used more than ever.

Solar energy produces fuel without causing pollution to the environment. It doesn't deplete the resources of the planet or contribute to global warming. A solar panel is a device that uses solar energy to create electricity. It is made up of several solar cells connected in series and parallel. The use of solar panels has increased daily. Given that the solar panel has been built, all that's needed to produce energy is sunlight. A common strategy to combat the rising cost of electricity is to use solar panels because of their economic value. Although solar energy technology has been around for a while, it is being used more than ever today. Its capacity to be renewable is one of the primary causes of its growing use continuously than human being

can consume. age. The Earth will always receive more energy from the sun.

The maximum voltage or current that a PV module can have under certain circumstances in order to produce its maximum power output is determined by the MPPT method. It can be divided into intelligent methods like fuzzy logic control and neural networks, and conventional methods like P&O and INC. These techniques are popular because they are easy to use. However, there are two problems with the P&O method's performance. The literature has distinguished between two types of power oscillation: divergence of the MPP under rapid atmospheric change and power oscillation at the maximum power point (MPP) [5, 6]. Another issue with the INC method when quick tracking of the maximum power is required is power oscillation at the MPP. The I-V and P-V properties of solar cells change nonlinearly in response to variations in radiation and temperature. Because of this, PV systems must always be operated at their maximum power point in order to be used effectively. The performance of conventional PO and IC is dependent on the step size. Therefore, selecting the appropriate step size has its limitations. Furthermore, because PI controllers have fixed gains and fuzzy controls have cumulative errors calculated using integral calculus, it is difficult to expect satisfactory performance when utilising MPPT control with fuzzy control and PI controller has fixed gain and fuzzy control has cumulative error by an integral calculus.

This paper proposes the Fuzzy PI MPPT control method, which enhances the cumulative error and activity response characteristic. The proposed Fuzzy PI MPPT method compares with traditional methods by analysing control parameters related to changing radiation conditions.

II. REVIEW WORK

Even so, the Solar System has already been the subject of numerous paintings. The power system has been a hot topic in recent years, and numerous grid schemes have been put forth. The scarcity of fossil fuels has led to a sharp increase in the demand for renewable energy over time. Additionally, there is a strong interest in renewable energy sources due to the need for pollution-free green energy. The most abundant and natural renewable energy source to meet the world's rapidly growing energy needs is solar energy [1]. For effective implementation, the solar PV array's maximum power must be monitored. The literature contains a wide range of algorithms for tracking the maximum power produced by solar panels. This work presents perturbation

Assessment of the potential of rice husk ash (RHA) as a supplementary material in binary blended cement for road pavement applications

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ABSTRACT

The current study explores the feasibility of using rice husk ash (RHA) as an additive in PPC (Portland Pozzolana Cement) concrete for rigid road pavement. The research investigates the impact of RHA on concrete's strength parameters, specifically tensile, split tensile and compressive strengths. The conventional mix design method is applied for the controlled concrete, serving as baseline for designing mixes with varying percentage of RHA as a replacement for cement. The study examines five replacement levels: 5%, 7.5%, 10%, 12.5%, and 15%. Various curing durations are tested, including 3 days, 7 days, 28 days, and 56 days. The primary focus is to determine the optimal quantity of RHA as a cement replacement through experimental analysis. Key findings reveal that for compressive strength, the optimal replacement level is 10% RHA, while for flexural strength, the optimal replacement level is 5% RHA. These results underscore the potential of RHA to enhance concrete performance in road pavement applications when used judiciously as a partial substitute for cement.

Key words: Concrete, Rice Husk Ash, Cement, Mix design, Flexural strength, Compressive strength

Introduction

India, the second-largest global rice producer, faces a substantial byproduct challenge in the form of rice husk, amounting to nearly 22% of the annual 90 million metric tons of rice paddy produced between 2011 and 2022. While the husk serves as a valuable fuel source due to its significant calorific value, contributing to approximately 20 million MT of husk each year, the combustion process generates up to 5 million MT (25% of husk) of rice husk ash (RHA). RHA, primarily composed of silica, finds common usage as tundish powder in steelmaking for insula-

tion. However, the scale of RHA utilization remains uncertain, with a potential dumping issue evident in landfills. This highlights the need for effective strategies to manage and maximize the utilization of RHA, given its valuable composition and potential environmental impact. High demand for natural resources is increased construction activities due to urbanization and the problem of waste disposal lead to spotlighting the light on the viability of using agro-industrial wastes in the making of concrete. As per Rice Husk Ash market research report, the global production of husked rice is 482 million metric tons. The annual production of RHA reported is 20 mil-

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Optimize Biosorption Potential of *Micrococcus luteus* on Arsenic, Lead, and Mercury obtained from Coal mine

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ABSTRACT

The main aim of the study was to find the metal biosorption capability of arsenic, lead, and mercury-resistant bacteria *Micrococcus luteus* isolated from heavy metal-contaminated soil of Mand coalfield Raigarh. Bacteria were screened for multiple heavy metal resistance capabilities through enumeration on LB agar containing 300 ppm $Pb(NO_3)_2$, $NaAsO_2$, and $HgCl_2$ separately. *M. luteus* showed high biosorption ability against $Pb(II)$ (95.21%), $As(III)$ (90.23%), and $Hg(II)$ (80.67%), analyzed using ICP-MS. The effect of pH, temperature, and metal concentrations on the biosorption potential was also determined. The optimum condition of lead, arsenic, and mercury at pH 4.30, 4.80 and 5.0 respectively, the temperature at 37°C and metal concentration $As(III)$ (260 mM/L), $Hg(II)$ (240 mM/L), and $Pb(II)$ (340 mM/L) by *M. luteus* was studied. The present study indicates that *M. luteus* removes arsenic, lead, and mercury competently from soil contaminated with heavy metals, and therefore further research should explore to remediation of soil contaminated with heavy metals.

Keywords: *Micrococcus luteus*, Biosorption, Heavy Metal, Resistance, Remediation.

Highlights

- *Micrococcus luteus* demonstrated resistance to lead, arsenic, and mercury.
- *Micrococcus luteus* exhibited a high biosorption capacity of 95.21% for lead (300 ppm) as measured by ICP-MS.
- The optimal pH levels for the bioremediation of lead, arsenic, and mercury were found to be 4.30, 4.80, and 5.0, respectively.
- The optimal concentrations for the bioremediation of $As(III)$ (260 mM/L), $Hg(II)$ (240 mM/L), and $Pb(II)$ (340 mM/L) were determined.

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INTRODUCTION

The industrial revolution is continuously increasing human activity in mining and agriculture areas and contaminating air, soil, and water with heavy metals. The toxicity of these substances can affect humans as well as the high density of heavy metals, which are difficult to remediate (Puyen et al., 2012). For example, a geochemical study presented a very high concentration of lead isotopic ratio and heavy metals like Cr, Cu, V, Zn, and Mn in the Gevra opencast coal mine in Korba, Chhattisgarh (Das et al., 2018).

Heavy metals are a collection of factors with metallic residences that encompass transition metals (Mafi and Greiner, 2021). A number of them are critical cofactors for various enzymes, while others are not crucial. The primary group includes hint elements whose concentration is regulated by interaction with binding proteins because they represent capacity threads to cellular characteristics. The second group is non-critical metals that make potent toxins and affect the properties of cells. (González and Ghneim, 2021) Mercury, cadmium, arsenic, and lead are highly toxic heavy metals for living beings present in the environment, as per the Environmental Protection Agency and the United States Agency for Toxic Substances and Disease Registry (Goyer, 2004). Four of these metals, arsenic (As), are ranked 1 due to acute poisoning, lead (Pb) is ranked 2, and cadmium is ranked 7 among the top 20 heavy metals listed by the US Agency for Toxic Substances and Disease Registry. (Flora et al., 2011) Previous findings are significant and demand immediate measures. Health and Environmental Impact of Coal Mining in Chhattisgarh reveals that large-scale mining, coal-fired power plants and associated industries have inflicted lasting negative impacts on the population living for generations in the

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Raigarh region of Chhattisgarh. Their environmental physical and mental health have been compromised, as revealed in the study of village populations, through exposure to worrisomely high levels of Stoxic heavy metals found in air, water, soil and sediment samples. Therefore, bioremediation of mercury, lead, and arsenic is a major goal of the study in the paper. Heavy metals such as lead (323 ppm/kg), arsenic (15 ppm/kg), and mercury (14 ppm/kg) were analyzed in a soil sample from Mand Coalfield Raigarh (Rinchin et al., 2017). The permissible limit of heavy metal in the soil (mg/kg) is Hg (30), Cd (6), Zn (600), As (3), Mn (20), Pb (500), Cu (270), Ni (75), Cr (150) (Shirkhanloo et al., 2015).

Arsenic (As) is a poisonous metalloid present in varied concentrations in the environment. (Bhattacharya P, 2009) Arsenic accumulation in field soils and in the food chain through the rice plant can cause kidney cancer, lung cancer, skin cancer, hyperkeratosis, neurological disorders, and muscular weakness. The toxicity of arsenic depends on oxidation states (+5, +3, +2, +1, and -3) capable of mobilizing under various environmental





A Case Study On Solid-Waste Management In Bilaspur City, Chhattisgarh, India

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ABSTRACT

Now days, Solid Waste Management (SWM) has become the most discussed and inevitable issue in almost all government municipal bodies of India. The discipline involved in the control of the generation, collection, storage, transfer, processing, and disposal of solid waste (Organic and non-organic waste) can be referred to as solid waste management. This SWM involves lot of resources of every civic bodies and still very few in country are able to manage the system effectively. Under the "Swatchha Bharat Mission" an Indian government initiative, it was urge to every corporation to activity participate. But still lot of work is needed to carry out in this area. As case study Bilaspur Municipal Corporation's (Chhattisgarh) solid waste management practices are represented. In detail data is collect from the authority of Bilaspur Municipal Corporation for study the existing scenario of all eight zones during the year 2020-21. After critical analysis some remedies are suggested for improving the current SWM situation. Environmental Impact Assessment (EIA) is strongly recommended to authority to check pollution level and other health issue due to improper SWM.

I-INTRODUCTION

The issue of municipal solid waste management (MSWM) in major urban areas has gained attention in India particularly during the most recent decade. Waste management includes the collection, transportation, processing, recycling or disposal and monitoring of waste materials. It identifies with declined materials delivered by human movement, and is by and large attempted to lessen their impact on wellbeing, condition or style [1,2]. The essential wellsprings of urban solid waste incorporate waste created in local, institutional, commercial, recreational and civil administrations. The local wastes are high in amounts and differ with time and season. It is for the most part involved organic and inorganic constituents. Presently a day the amount of organic waste is diminishing and the nature of metals, paper and plastics is expanding, demonstrating that there is developing inclination for utilization of bundled nourishment lately in current society [3,4]. The present arrangement of solid waste management in India lacks proper implementation as far as treatment strategies and procedures are concerned. Unlawful dumping is a major issue of noteworthy worries as to human wellbeing, security, and personal satisfaction when all is said in done urban social orders. A poor collection and disposal practice is another issue. It draws in and advances locales for the reproducing bugs, rodents and pathogens that can cause and transmit different ailments in the public eye [5,6].

II- STUDY AREA - BILASPUR CITY

Bilaspur is a city in Chhattisgarh, situated 110 km north of the state capital, Raipur. It is located on the bank of the river "Arpa" which begins from the high slopes of the Maikal-Range of Central-India. With a populace of 467,946, it is the second-biggest city after Raipur city. Bilaspur city is the business center of north east Chhattisgarh area. It is likewise a significant city for the Indian railways, as it is the head-quarter of south-east-central railway-zone and the central station of south eastern coalfields ltd. Bilaspur city is partitioned in

[Signature]



Study Of Physiochemical Analysis Of Drinking Water Sources Of Selected Villages Of Raipur District

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ABSTRACT

Water quality is affected by natural processes and human activities in the water environment. Poor water quality in developing countries causes diarrhea, stomach flu, cholera, typhus, skin rashes, kidney disease, high blood pressure, heart disease, cancer, blood etc and therefore it is important to test the water supplied from different sources. There is a need to develop a regular water quality monitoring system to analysis the water supplied from different sources and systems specially in rural area. In this study, ten villages nearby the college campus of Raipur Institute of technology, Raipur in Chhattisgarh have been selected to test drinking water samples collected from Tubewell Water Supply (TWS) and Public Water Supply (PWS) and physiochemical analysis has been conducted from the samples collected from different locations.

Keywords – Ground water source, water quality, rural water supply, Physiochemical characteristics.

1. Introduction

Clean water is more essential for everyone's life. Two major sources of drinking water are ground water and surface water. There are many high-tech water purification systems. But for the huge majority of the population in the developing world who live in rural areas. Water must be tested and care of drinking water must be taken in rural areas. IS-10500 has set standards for drinking water with a revised edition of IS 10500:2012 as a Standard for Drinking Water Quality Control. It is very important to increase awareness about clean water and drinking water should be checked regularly. The growth of literature and data the research work based on water quality and water pollution studies has been truly enormous in the last few years. Montoya et al., (2023) conducted a critical review on odour measurement and prediction of sea water intrusion pattern recognition supported by unsupervised learning. Tian and Wu (2019) supported the need for rapid development of water quality assessment methods. They emphasize a better understanding of water quality either through a simple numerical figure or through a more complex interpretation of water quality characteristics. Li and Liu (2019); Deshpandey (2018) and Winter and Reddy (2019) emphasized on sensor-based technology to monitor quality of water. Long et al. (2018) investigated the effects of dry and wet seasons and land use on water quality in a karst system of Mexico and believed that water-rock interactions, hydrology, and land cover were more important factors on water quality than land use. N. Sakai et al. (2015) used atomic absorption Spectrometer to detect the presence of metals in water sample. Akter et al. (2016) used a weighted arithmetic WQI method to provide information on water quality in rural Bangladesh. These WQIs convert a large number of variables into digital numbers and are useful in understanding water quality.

