SKYSCRAP

TECHNICAL MAGAZINE

DEPARTMENT OF CIVIL ENGINEERING

Meghnad Saha Institute of Technology

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VISION OF THE DEPARTMENT

To be a center of excellence in Civil Engineering keeping pace with rapidly changing technologies and global needs.

MISSION OF THE DEPARTMENT

M1: To provide quality education in Civil Engineering through effective teaching learning process in a congenial academic environment.

M2: To serve the nation by providing professional Civil Engineering expertise.

M3: To promote research capability and innovative ideas in budding Engineers to address different emerging issues in Civil Engineering.

M4: To impart soft skills, leadership qualities and professional ethics amongst the young Engineers to handle real life projects with holistic concern for the society.

HOD'S MESSAGE

As the Head of the Civil Engineering Department, I am honored to present Volume 1 of SKYSCRAP, a departmental magazine of the Civil Engineering Department, Meghnad Saha Institute of Technology.

Civil Engineering is a discipline that plays a crucial role in the development of society, and I am proud to lead a department that strives to produce competent professionals who can contribute to the betterment of our world.

Our department is committed to providing quality education to our students, enabling them to acquire the knowledge and skills necessary to become successful engineers. We have a team of highly qualified and dedicated faculty who are passionate about teaching and are always ready to guide and mentor our students.

We encourage our students to participate in various extracurricular activities, which not only help them to develop their leadership and teamwork skills but also promote their overall growth and development.

At the Department of Civil Engineering, we strongly believe in the importance of research and innovation. We have state-of-the-art laboratories and facilities, and we encourage our faculty and students to engage in research and development activities. We believe that our research will contribute to solving some of the world's most pressing problems.

I congratulate the editorial team and hope that the readers will enjoy the insight into the world of Civil Engineering. I wish you all a happy reading.

EDITORIAL COMMITTEE

MAYUKH SEN (B.Tech 3RD YEAR)

BHAWNA SINGH (B.Tech 3RD YEAR)

EDITORIAL

It gives us immense pleasure to announce the first edition of our magazine SKYSCRAP of the Civil Engineering Department, Meghnad Saha Institute of Technology. We are proud and hopeful that the magazine would surely unfold the most innovative ideas of the students and the faculty members of our organization.

The magazine is to be viewed as a launch pad for the students' creative urges to blossom naturally. As the saying goes, the mind as a parachute works best when opened. This humble initiative is to set the bored and budding minds free allowing them to roam freely in the domain of imagination and experience. The enthusiastic work of our young writers and experienced faculty members are undoubtedly sufficient to hold the interest and admiration of the readers. We believe that success depends on the power to observe, perceive and explore. We are sure that the hard work, positive attitude, continued relentless efforts and inventive ideas exhibited by our students to bring excellence to this treasure of collection would surely stir the mind of the readers. It is a fine thing to have the ability but the ability to discover ability in others is the true test. We are thankful to all the magazine team members who dipped in the turbulent water of the magazine and sailed it to the shore of publication. We heartily wish all the readers our best wishes and hope this magazine will enjoy your critical acclaim and prove itself best.

Contents

No one person can shape the life of another. Your success and happiness depends upon your own self. Think for yourself and have a plan of life.

Sir M Visvesvaraya

WHAT IS WATERSHED MANAGEMENT

Tree cover has been depleted, soil erosion has increased, water table has gone down, severity of drought increased and ecological degradation of drylands is greater than few decades ago. Degradation of environment in drylands is basically attributable to the increasing biotic pressure on the fragile ecosystem in the absence of appropriate management practices to augment and conserve the land and water resources.

There are outstanding examples of success at Religon Sidhi and Adgaon in Maharashtra, Kabbalnal and Mittemari in Karnataka and Jhabue in Madhya Pradesh, all of which show that dryland agriculture can be remunerative. It is in this context that watershed management assumes significance.

A Watershed can be defined as an independent hydrological unit. It is a drainage basin or catchment area of a particular stream or river. In simple terms, it refers to the entire upstream topography around a defined drainage channel which feeds water to the lands below. A watershed may vary from a few hectares to several thousands of hectares.

In other words, watershed is drainage area on land surface from which runoff from precipitation reach a particular point called common outlet. Simply, it is a land surface bounded by a divide which contributes runoff to a common outlet.

Watershed is a continuous area whose runoff water drains to a common point, so that it facilitates water harvesting and moisture concentration. A river basin is the largest watershed that can be imagined but for the purpose of dryland agricultural development the areas chosen are usually around smaller streams and are denoted as mini or micro-watersheds of about 500 ha, equivalent to more or less the average area of a village.

Watershed development refers to conservation, regeneration and judicious use of all the resources—natural (land, water, plants and animals) and human within a particular watershed. Watershed management tries to bring about the best possible balance in the environment between natural resources and human and other living beings.

Watershed management is a holistic approach which aims at optimising the use of land, water and vegetation in an area to deviates drought, moderate floods, prevent soil erosion, improve water availability and increase fuel, fodder and agricultural production on a sustained basis.

In the past, a number of approaches such as farm-family approach, component-wise approach and community approach have been suggested for translating the watershed approach into development programmes.

But, it was realised that development of dryland requires a holistic approach for overall improvement in the natural resource base and development of land based on crop suitability. Watershed programmes look simple but are often quite complex.

Limited success of watershed programme indicates that it was mainly due to

Rooftop rainwater harvesting is a sustainable method of collecting and storing rainwater for various purposes such as irrigation, toilet flushing, and laundry. This system is becoming increasingly popular due to its potential to conserve water resources, reduce water bills, and improve water security. However, the water quality of the harvested rainwater is an important consideration in the management of rooftop rainwater harvesting systems.

The quality of the harvested rainwater is influenced by several factors such as the type of roof material, the location of the collection system, and the surrounding environment. For example, metal roofs are less likely to contaminate the rainwater compared to asphalt roofs, which can release chemicals and pollutants into the rainwater. Additionally, the surrounding environment can also affect the water quality, for example, areas close to industrial and commercial activities are more likely to have contaminated rainwater.

To ensure the water quality of the harvested rainwater, several measures should be taken in the management of rooftop rainwater harvesting systems. These include:

Regular inspection and maintenance of the roof and collection system to ensure that they are free of any contaminants or pollutants.

Use of first flush diverters to flush out any initial pollutants from the roof before they enter the collection system.

Filtration of the harvested rainwater using appropriate filtration systems such as sand filters, activated carbon filters, and UV sterilizers.

Regular monitoring of the water quality to ensure that it meets the required standards for the intended use.

Proper storage of the harvested rainwater in clean and covered containers to prevent contamination.

Regular cleaning of the collection and storage systems to maintain their efficiency and prevent the growth of algae and other contaminants.

In conclusion, the water quality of the harvested rainwater is an important consideration in the management of rooftop rainwater harvesting systems. By taking appropriate measures to ensure the quality of the harvested rainwater, the system can be used safely and sustainably for various purposes. Regular inspection, maintenance, and monitoring of the system can help to ensure that the water quality meets the required standards and contributes to the conservation of water resources.

Aveek Ray

Assistant Professor

CONCEPT OF WATERSHED MANAGEMENT

As the entire process of agricultural development depends on status of water resources, watershed with distinct hydrological boundary is considered ideal for planning developmental programmes.

Planning and design of soil and water conservation structures such as bunds, waterways, overflow structures, water harvesting structures etc. and carried out considering the expected runoff. Thus, it

is essential to have various developmental programmes on watershed basis in conjunction with basic soil and water conservation measures. The developmental activities need to be taken up from ridge line to outlet point.

Watershed management programme in drylands is aimed at optimising the integrated use of land, water, vegetation in an area for providing an answer to alleviate drought, moderate floods, prevent soil erosion, improve water availability and increase food, fodder, fuel and fibre on sustained basis.

In watershed management, more specifically, soil conservation is enmeshed with crop management and alternate land use systems and allied agricultural activities such as animal husbandry, pisciculture, sericulture etc. for increasing and stabilising farm production and income.

Objectives of Watershed Management:

The term watershed management is nearly synonymous with soil and water conservation with the difference that emphasis is on flood protection and sediment control besides maximising crop production.

The basic objective of watershed management is thus meeting the problems of land and water use, not in terms of any one resource but on the basis that all the resources are interdependent and must, therefore, be considered together.

The watershed aims, ultimately, at improving standards of living of common people in the basin by increasing their earning capacity, by offering facilities such as electricity, drinking water, irrigation water, and freedom from fears of floods, droughts etc.

The overall objectives of watershed development programmes may be outlined as:

1. Recognition of watersheds as a unit for development and efficient use of land according their land capabilities for production.

2. Flood control through small multipurpose reservoirs and other water storage structures at the head water of streams and in problem areas.

3. Adequate water supply for domestic, agricultural and industrial needs.

4. Abatement of organic, inorganic and soil pollution.

5. Efficient use of natural resources for improving agriculture and allied occupation so as to improve socio-economic conditions of the local residents.

6. Expansion of recreation facilities such as picnic and camping sites.

Rounak Isor

Technical Assistant

ARSENIC REMOVAL FROM GROUNDWATER BY COAGULATION PROCESS

Groundwater is one of the major water source available on our planet. But with the presence of many contaminants, the percentage of pure groundwater availability is decreasing day by day.

Arsenic is such a toxic pollutant present in natural waters like surface and sub subsurface water sources. The presence of arsenic is becoming a greater threat to the survival of human beings and other useful micro-organisms. There are various technologies are available to remove arsenic from groundwater. Like

coagulation, lime softening, ion exchange, reverse osmosis and membrane techniques. Coagulation is one such technology, which is a more effective treatment technique to remove arsenic from groundwater.

World Health Organization (WHO) reduce the permissible limit of arsenic from 0.05mg/l to 0.01mg/l. The serious health effects caused by the presence of arsenic led the WHO to take this precautionary measure. Coagulation is a common process to treat industrial and domestic wastewater in order to remove the suspended particles from the water.

Coagulation is a chemical water treatment technique typically applied between sedimentation and filtration stages to improve the efficiency of the treatment process. Coagulation is a process used to neutralize the pollutant charges by forming the floc (gelatinous mass). The floc trap all the particles thus forms a mass large enough to settle or trapped in the filter. Aluminum chloride, ferric chloride, aluminum sulfate, bentonite clay are few coagulants used in the coagulation process.

Apparatus Required:

1. Jar test apparatus

Reagents:

1. Ferric Chloride ($FeCl_3$)

Project Implementation:

1. Use the conventional jar test apparatus for this experiment.
2. Collect the groundwater sample and find the initial arsenic concentration (mg/l) present in the sample.
3. Fill each beaker with the groundwater sample (1 litre) and place them in the jar test apparatus assembly.
4. Add 60mg coagulant (Ferric Chloride) in each beaker.
5. Now, turn on the jar test apparatus and the sample should be rapidly mixed at 100 rpm for the first 1 minute.
6. After that reduce speed to 40rpm for the next 20 minutes and turn off equipment.
7. Allow the sample to settle down for the 30minutes.
8. Now, take out the 100ml sample from each beaker and find the remaining arsenic concentration in the sample.
9. Compare the initial and final values of arsenic concentration to know the reduction in arsenic concentration.
10. Repeat the above procedure with different values of ferric chloride (70mg/l, 80mg/l, 50mg/l and 40mg/l) to find the optimum dosage of coagulant.

Advantages:

1. Simple in operation.
2. Cost effective.

3. Best treatment process to remove many kinds of pollutants.
4. Enhances the filtration process.
5. High efficiency.

Conclusion:

With this wide range of applications coagulation technique proven to be the effective treatment process for the removal of arsenic from groundwater.

Dr Biswajit Thakur

Associate Professor

WHAT IS A STORM WATER MANAGEMENT PLAN

It's no secret that mankind has a significant impact on the environment, especially in construction. Reshaping the land affects local ecosystems and more. And even after a project has been completed, it will continue to clash with nature.

One of the ways this occurs is through the flow of storm water and melted ice or snow. Whatever water contacts, and the rate of contact, are two primary considerations during any construction project. And a stormwater management plan is an essential part of any project.

What is a Storm water Management Plan (SWMP)? In simplest terms, it's a plan that helps reduce pollution and contamination during construction projects by controlling runoff of rainwater or melted snow into streets, lawns, rivers, and other sites.

We're here to answer any questions you may have regarding that exact subject.

Why it's Essential to Manage Storm water?

Whenever we develop the land, we are disrupting nature. That's not exactly a surprise, but one of the factors we cannot overlook is how disrupting the land affects storm water flow.

The fact that the shape of the land disrupts the natural flow of water and its ability to soak into the ground is nothing to take lightly. Limiting and impeding these abilities can create various problems for the surrounding ecosystem and infrastructure, but it's not the only issue.

Contamination of water runoff is just as, if not more, pressing as the flow. Regardless of whatever is in the way, water will find a way to continue its flow to a natural body of water. As it rolls over rooftops, sidewalks, and other imperviable surfaces, any harsh chemicals in these places will pollute the water.

If those chemicals reach local natural water bodies, they can harm and potentially kill any plant or wildlife within or even nearby. And because those water bodies may be a source of drinking water, nearby people are at high risk.

Even the smallest construction projects are bound to create some significant water runoff problems. These are a few examples of why every construction project is responsible for eliminating its impact on rainwater from beginning to completion and after that.

Below you will find a list of the problems storm water runoff can create:

- **Pollution:** As water flows over the top of the surfaces in place, it will collect chemicals on top.

Construction sites are the host of countless harmful substances that can cause severe damages if they enter a natural body of water. The ecosystems within will suffer, and it can even cause contamination of drinking water.

- **Erosion:** As the water flows off impervious surfaces, it will find new paths. When water moves over land, it never has before. It can cause deterioration that may also be detrimental to ecosystems and the local community.
- **Flooding:** Without proper management in place, runoff storm water will overflow drainage ditches, sewer systems, and storm drains. In any case, the excess flow of water is likely to lead to flooding.
- **Turbidity:** If the water makes its way to the ground that can absorb it, it too may be in excess. When this occurs, it can cause turbidity or muddiness, ruining nearby land.
- **Infrastructure Damage:** Flooding, erosion, pollution, and turbidity can wreak havoc on the local infrastructure. It's not uncommon for a construction site without storm water management plans in place to damage or even destroy it.

What's the Difference between SWPPP and SWMP?

Your involvement with construction projects likely has you dealing with a Storm Water Pollution Prevention Plan (SWPPP). However, you should not confuse an SWPPP with an SWMP, even if they relate to each other in many ways.

The fundamental difference between the two is that an **SWPPP is temporary while an SWMP is permanent**. The SWPPP is intended to solve any potential issues regarding the flow and quality of storm water during a project's construction. Simultaneously, the SWMP is a permanent solution dealing with the matter once the project reaches completion.

The plan you develop requires a few critical bits of information. The necessary details regarding the size, location, and primary point of contact include all the required details. Other than that, you also need to fill in the details of any streams or tributaries, lakes, water tables, and major rivers that the site is nearby and may impact.

As with an SWPPP, the SWMP requires you to detail any methods by which you intend to manage the flow and quality of water runoff using minimum control measures and Best Management Practices, or BMP's. After completion, the plan must be submitted and reviewed for approval to obtain a National Pollution Discharge Elimination System permit.

Water Quality

We might have mentioned pollution already, but it's essential to keep in mind that these systems do more than ensure the excess water flow is under control. Even if the water is directed in the proper location, it likely isn't clean. Remember, it's carrying along with any debris or

chemicals that it can collect along the way. Therefore protection of water quality is just as crucial to the process as any other.

Filtration of pollutants is critical to ensure drinking water and local ecosystem sources of drinking water are not contaminated.

How filtration is achieved is ultimately dependent on the system in use. MS4's, for example, put filters into use throughout the system to prevent any chemicals or debris from following the water to its final destination. On the other hand, bio filtration swales use biological filters such as grass to perform the same task.

What System Do I Need?

During the 1990s, the Environmental Protection Agency amended the Clean Water Act. Under this act, a national two-phase program is in effect to deal with water pollution caused by runoff storm water.

Phase one of the program is in place to deal with storm water discharges, while phase two regards smaller Municipal Separate Storm Sewer Systems (MS4s). In short, this act determines what systems you must put in place to deal with runoff.

Exactly how you manage storm water to satiate the Clean Water Act is dependent on a few factors. It's tempting to believe that because there are already MS4's in place, all you need to do is tap into them.

However, these systems can only handle so much. An excess of water runoff can quickly lead to flooding or damage to the infrastructure, which is why there is a limit to how much water you can direct to them. That means you likely must come up with additional ways to manage storm water.

Susmita Bakshi
Assistant Professor

WHAT IS INTELLIGENT TRANSPORT SYSTEM AND HOW IT WORKS?

With the conception of smart city transmuting cities into digital societies, making the life of its citizens easy in every facet, Intelligent Transport System becomes the indispensable component among all. In any city mobility is a key concern; be it going to school, college and office or for any other purpose citizens use transport system to travel within the city. Leveraging citizens with an Intelligent Transport System can save their time and make the city even smarter. Intelligent Transport System (ITS) aims to achieve traffic efficiency by minimizing traffic problems. It enriches users with prior information about traffic, local convenience real-time running information, seat availability etc. which reduces travel time of commuters as well as enhances their safety and comfort.

The application of ITS is widely accepted and used in many countries today. The use is not just limited to traffic congestion control and information, but also for road safety and efficient infrastructure usage. Because of its endless possibilities, ITS has now become a multidisciplinary conjunctive field of work and thus many organizations around the world have developed solutions for providing ITS applications to meet the need.

One such example is the city of Glasgow. In the city, Intelligent Transport System gives regular information to the daily commuters about public buses, timings, seat availability, the current location of the bus, time taken to reach a particular

destination, next location of the bus and the density of passengers inside the bus.

Iain Langlands, GIS and Data Manager, Glasgow City Council explains, bus operators in the city have the sensors in their buses. So, if the bus is going to be early to the next bus stop the bus is temporarily and very slightly is slowed down at the red light little longer than it should be to make sure the bus is on time and do not ahead of the schedule". The system has been designed so smartly that passengers and even drivers are unaware of the delay as they are very little delays.

Application areas of Intelligent Transport System:

The entire application of ITS is based on data collection, analysis and using the results of the analysis in the operations, control and research concepts for traffic management where location plays an important role.

Here sensors, information processors, communication systems, roadside messages, GPS updates and automated traffic prioritization signals play an imperative role in the application of:

1- Advanced Traffic Management System

2- Advanced Traveler Information System

3- Advanced Vehicle Control system

4- Advanced Public Transportation System

5- Advanced Rural Transportation Systems

6- Advanced Commercial Vehicles Operations system

How Intelligent Transport System works?

Traffic Management Centre (TMC) is the vital unit of ITS. It is mainly a technical system administered by the transportation authority. Here all data is collected and analyzed for further operations and control management of the traffic in real time or information about local transportation vehicle.

Well-organized and proficient operations of Traffic Management Centre depends on automatized data collection with precise location information than analysis of that data to generate accurate information and then transmitting it back to travelers. Let's understand the entire process in a more detailed way.

Data collection: Strategic planning needs precise, extensive and prompt data collection with real-time observation. So the data here is collected via varied hardware devices that lay the base of further ITS functions. These devices are Automatic Vehicle Identifiers, GPS based automatic vehicle locators, sensors, camera etc. The hardware mainly records the data like traffic count, surveillance, travel speed and travel time, location, vehicle weight, delays etc. These hardware devices are connected to the servers generally located at data collection centre which stores large amounts of data for further analysis.

Data Transmission: Rapid and real-time information communication is the Key to proficiency in ITS implementation so this aspect of ITS consists of the transmission of collected data from the field to TMC and then sending back that analyzed information from TMC to travelers. Traffic-related announcements are communicated to the travelers through internet, SMS or onboard units of Vehicle. Other methods of communications are dedicated short-range communications (DSRC) using radio and Continuous Air

Interface Long and Medium Range (CAILM) using cellular connectivity and infra-red links.

Data Analysis: The data that has been collected and received at TMC is processed further in various steps. These steps are error rectification, data cleaning, data synthesis, and adaptive logical analysis. Inconsistencies in data are identified with specialized software and rectified. After that data is further altered and pooled for analysis. This mended collective data is analyzed further to predict traffic scenario which is available to deliver appropriate information to users.

Traveler Information: Travel Advisory Systems (TAS) is used to inform transportation updates to the traveling user. The system delivers real-time information like travel time, travel speed, delay, accidents on roads, change in route, diversions, work zone conditions etc. This information is delivered by a wide range of electronic devices like variable message signs, highway advisory radio, internet, SMS, automated cell.

With urbanization expanding with speedy stride, number of vehicles on road is also increasing. Combination of both in return puts enormous pressure on cities to maintain a better traffic system so that the city keeps on moving without any hassle. For the purpose application of Intelligent Transport System is the only solution. ITS is a win-win situation for both citizens and city administrators where it provides safety and comfort to citizens and easy maintenance and surveillance to city administrators.

Saurav Pal

Assistant Professor

USE OF REMOTE SENSING FOR IRRIGATION WATER ALLOTMENT

Remote sensing is a rapidly growing technology with the potential to revolutionize the way water is allocated for irrigation purposes. This report details the use of remote sensing for irrigation water allotment and the benefits that it provides over traditional methods. Remote sensing allows for the real-time monitoring of crop conditions and soil moisture levels, allowing for a more accurate allocation of water resources. This results in improved crop yields, reduced water waste, and a more efficient use of resources. The report also provides an overview of the technology and its applications in the irrigation sector, as well as the potential challenges and limitations associated with its use.

Introduction:

Irrigation water allotment is the process of determining the amount of water needed to be supplied to crops, based on the crop type, soil moisture levels, and weather conditions. The traditional methods of irrigation water allotment are time-consuming and rely on manual measurements, which can be inaccurate. Remote sensing provides an alternative solution by using satellite imagery and other remote sensing technologies to gather information about the crops and soil conditions in real-time.

Technology and Applications:

Remote sensing technology uses satellite imagery and other data to gather information about the crops and soil conditions. This information is used to monitor crop health, soil moisture levels, and other critical parameters that are essential for the effective allocation of

water resources. The data can be processed to generate detailed maps and reports, which can be used to determine the precise amount of water needed for each crop.

Remote sensing has numerous applications in the irrigation sector, including:

Crop health monitoring: remote sensing technology can be used to monitor crop health, including the presence of pests, diseases, and other stress factors that may impact crop yields.

Soil moisture monitoring: remote sensing allows for the real-time monitoring of soil moisture levels, which is critical for determining the amount of water needed for each crop.

Water use efficiency: remote sensing technology can be used to track the amount of water used by crops, which can help to improve water use efficiency and reduce water waste.

Benefits of Remote Sensing for Irrigation Water Allotment:

Improved crop yields: remote sensing technology provides accurate, real-time information about crop conditions, allowing for the precise allocation of water resources. This results in improved crop yields and higher profits for farmers.

Reduced water waste: remote sensing technology helps to reduce water waste by providing precise information about water needs, which helps to avoid over-irrigation.

Efficient use of resources: remote sensing technology provides real-time information about crop and soil conditions, which allows for a more efficient use of resources, including water, fertilizer, and other inputs.

Challenges and Limitations:

Cost: remote sensing technology can be expensive to implement, particularly for small-scale farmers.

Data processing: the vast amount of data generated by remote sensing technology can be challenging to process and interpret, requiring specialized skills and software.

Infrastructure: remote sensing technology requires a stable and reliable infrastructure, including access to high-speed internet and satellite imagery.

Conclusion:

Remote sensing technology has the potential to revolutionize the way water is allocated for irrigation purposes, providing improved crop yields, reduced water waste, and a more efficient use of resources. The benefits of remote sensing for irrigation water allotment are clear, but there are also challenges and limitations associated with its use. The cost of implementation and the need for specialized skills and software can be significant barriers for small-scale farmers, but the long-term benefits make remote sensing a worthwhile investment for the future of sustainable agriculture.

Priyabrata Guha

Assistant Professor

CREATIVE CORNER

CANVAS

			
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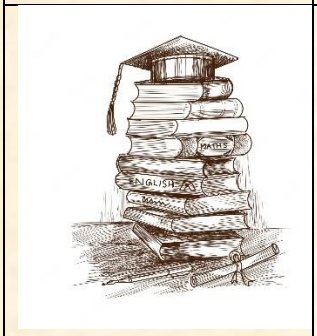		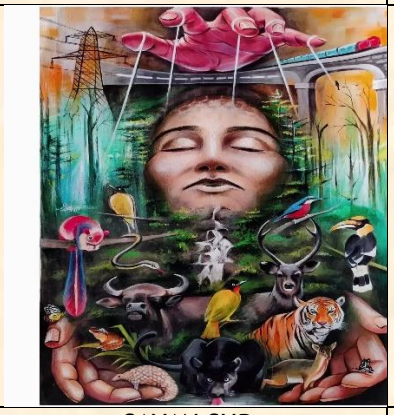	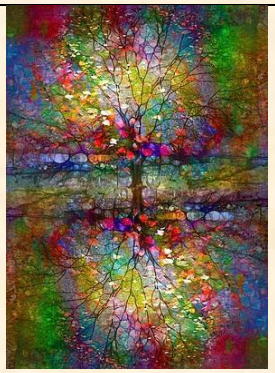
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			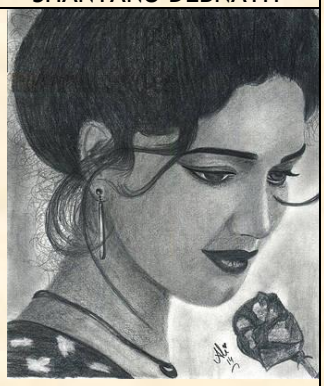
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Some of the important IS Codes for Reference:

- IS 383 : 2016 – COARSE and FINE AGGREGATE for CONCRETE - SPECIFICATION
- IS 456 : 2000 -- PLAIN and REINFORCED CONCRETE - CODE of PRACTICE
- IS 800 : 2007 -- GENERAL CONSTRUCTION in STEEL - CODE of PRACTICE
- IS 875 (Part 1 - 5) – CODE of PRACTICE for DESIGN LOADS (OTHER THAN EARTHQUAKE) for BUILDINGS and STRUCTURES
- IS 1201 – 1220 : 1978 -- METHODS for TESTING TAR and BITUMINOUS MATERIALS
- IS 1343 : 2012 -- CODE of PRACTICE for PRESTRESSED CONCRETE
- IS 1622 : 1981 -- METHODS of SAMPLING and MICROBIOLOGICAL EXAMINATION of WATER
- IS 1893 (Part 1) : 2016 -- CRITERIA for EARTHQUAKE RESISTANT DESIGN of STRUCTURES -- GENERAL PROVISIONS and BUILDINGS
- IS 2386 (Part 1, 4 & 16) -- METHODS of TEST for AGGREGATES for CONCRETE
- IS 2502 : 1963 -- CODE of PRACTICE for BENDING and FIXING of BARS for CONCRETE REINFORCEMENT
- IS 2720 -- METHODS of TEST for SOILS
- IS 2911 – (Part 1 - 4) -- DESIGN and CONSTRUCTION of PILE FOUNDATIONS — CODE of PRACTICE
- IS 3025 -- METHODS of SAMPLING and TEST (PHYSICAL and CHEMICAL) for WATER and WASTEWATER
- IS 4986 : 2002 -- INSTALLATION of RAINGAUGE (NON-RECORDING TYPE) and MEASUREMENT of RAIN -- CODE of PRACTICE
- IS 4987 : 1994 -- RECOMMENDATIONS for ESTABLISHING NETWORK of RAINGAUGE STATIONS
- IS 5225 : 1992 -- METEOROLOGY - RAINGAUGE, NON-RECORDING - SPECIFICATION
- IS 6403 : 1981 -- CODE of PRACTICE for DETERMINATION of BREAKING CAPACITY of SHALLOW FOUNDATIONS
- IS 6512 : 1984 -- CRITERIA for DESIGN of SOLID GRAVITY DAMS
- IS 8009 – (Part 1 - 2) -- CODE of PRACTICE for CALCULATION of SETTLEMENTS of FOUNDATIONS
- IS 10262 : 2019 – RECOMMENDED GUIDELINES for CONCRETE MIX DESIGN
- IS 10500 : 2012 – DRINKING WATER — SPECIFICATION
- IS 13920 : 2016 -- DUCTILE DETAILING of REINFORCED CONCRETE STRUCTURES SUBJECTED to SEISMIC FORCES - CODE of PRACTICE