



CHAITANYA BHARATHI
INSTITUTE OF TECHNOLOGY (A)

Affiliated to Osmania University

HYDROELECTRIC POWER

HYDRAULIC ENGINEERING(20CEC14)

ASSIGNMENT-2



Submitted by:

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160121732002

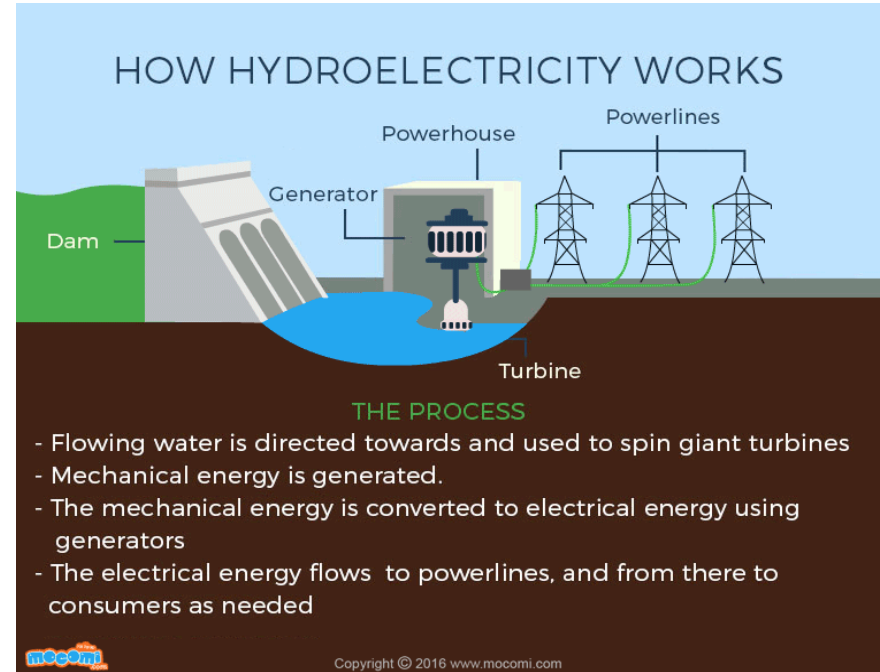
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Introduction to Hydro Electric Power

Hydroelectric power is a renewable source of energy that utilizes the power of flowing water to generate electricity.

It is one of the oldest and most widely used forms of renewable energy.

Hydroelectric power plants are usually located near rivers, dams, or other water bodies.

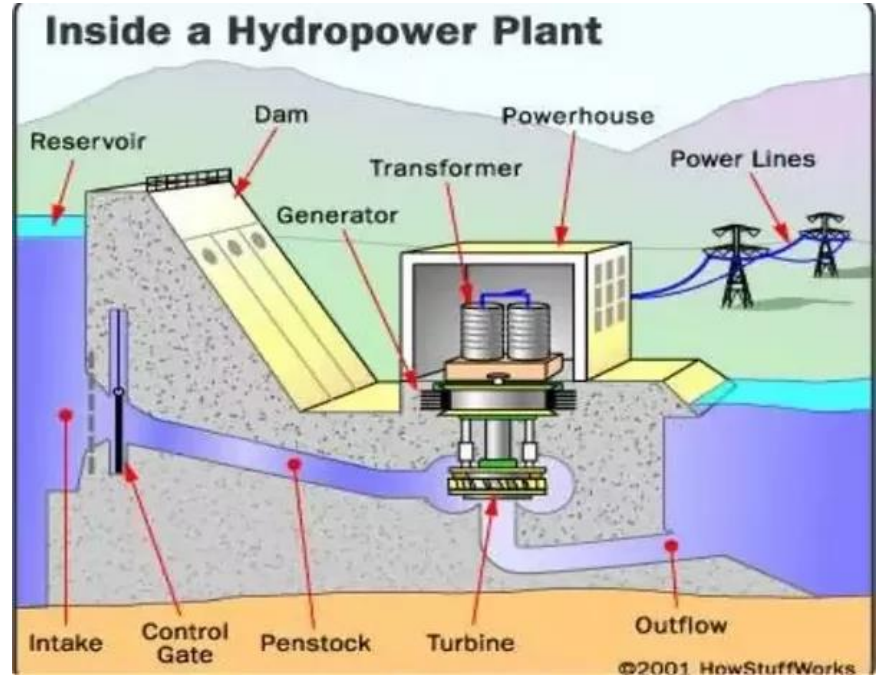


How Hydro Electric Power Works

Water from a river or reservoir is channeled through a dam and into a turbine.

The force of the water turns the turbine, which is connected to a generator.

As the turbine spins, it generates electricity through electromagnetic induction.

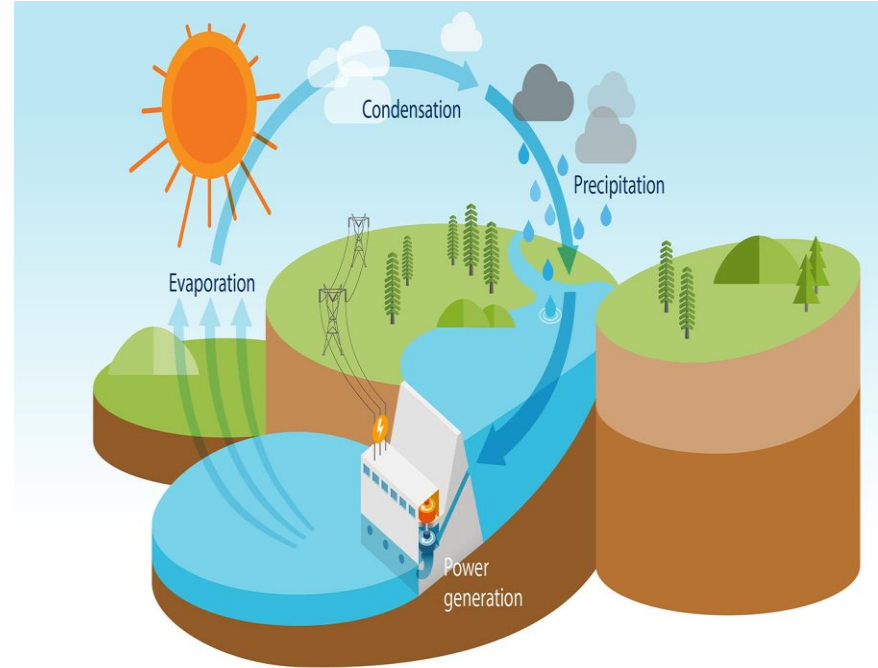


Advantages of Hydro Electric Power

It is a clean and sustainable source of energy, as it does not produce greenhouse gas emissions or air pollution.

Hydroelectric power plants provide a reliable and consistent source of electricity.

It can be used for various purposes, including electricity generation, irrigation, and flood control.

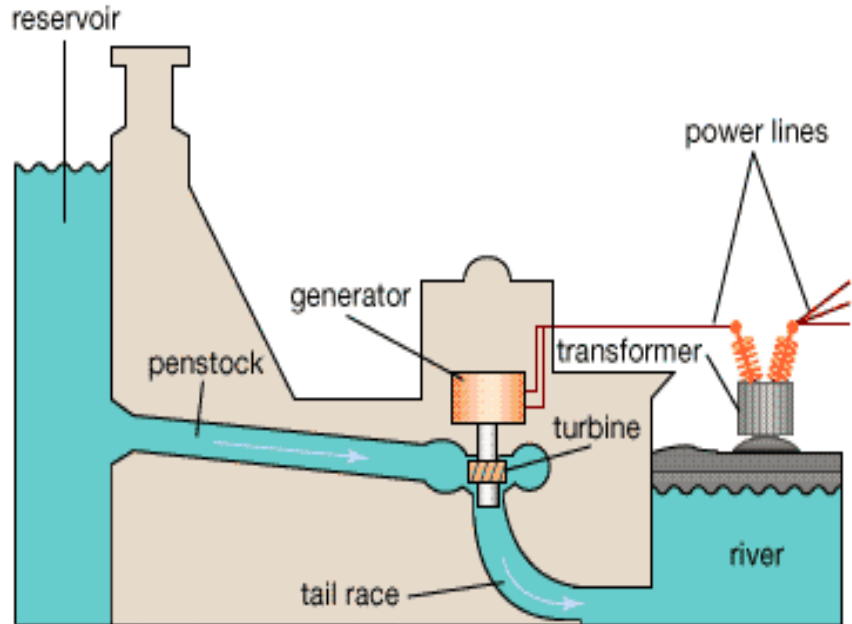


Utilization of Hydro Electric Power

Hydroelectric power provides electricity to millions of households and industries worldwide.

It plays a crucial role in meeting the energy demands of remote and rural areas.

Surplus hydroelectric power can be sold to neighboring regions or countries, promoting energy security and economic benefits.



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Conclusion

Hydroelectric power is a reliable, clean, and renewable source of energy.

Despite its environmental impacts, proper planning and management can ensure sustainable development of hydroelectric power.

Continued research and innovation will contribute to maximizing the potential of hydroelectric power generation.



THANK YOU!



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HYDRAULIC ENGINEERING ASSIGNMENT - II

TOPIC: Environmental Impacts of Hydraulic Hydraulic Turbines

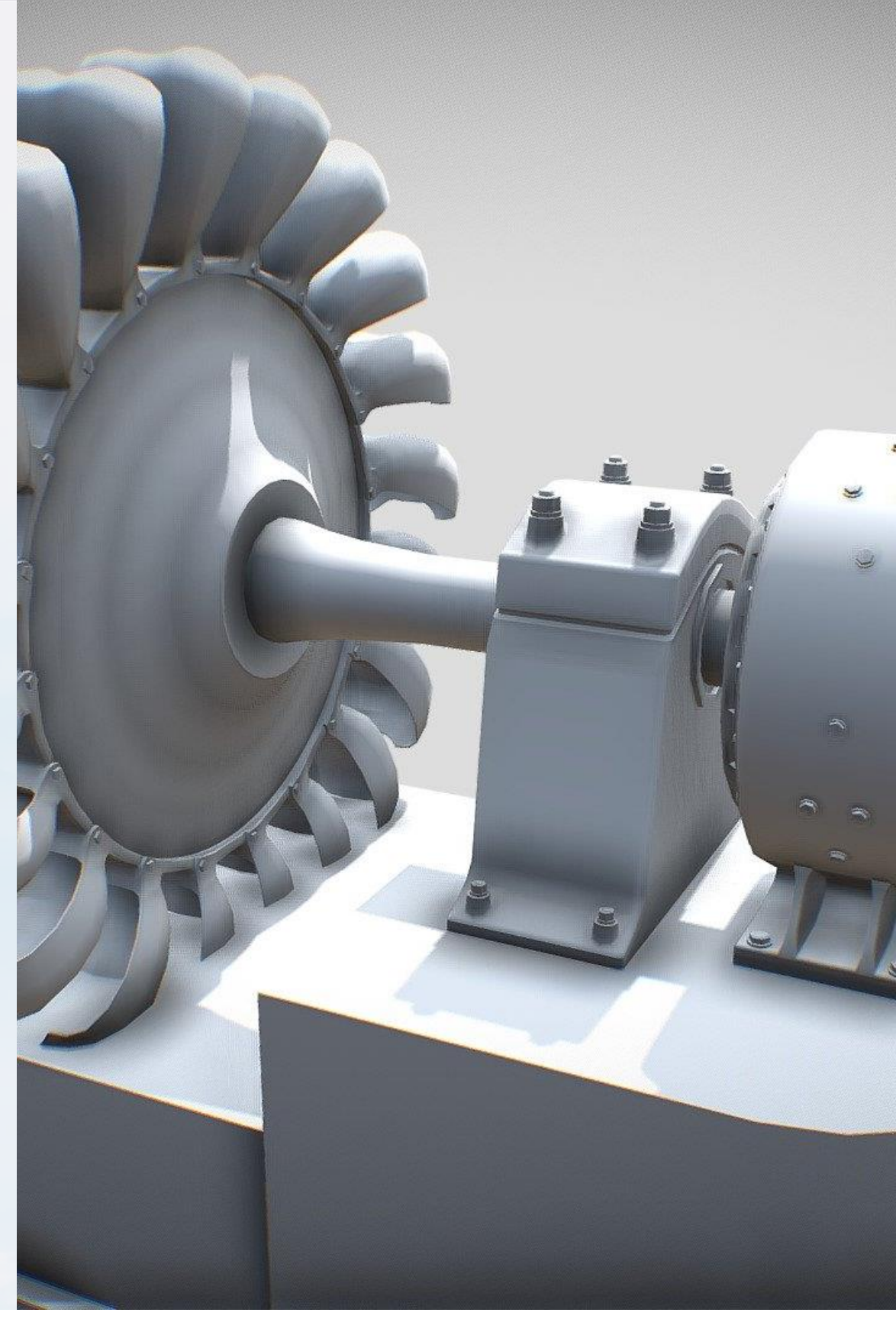
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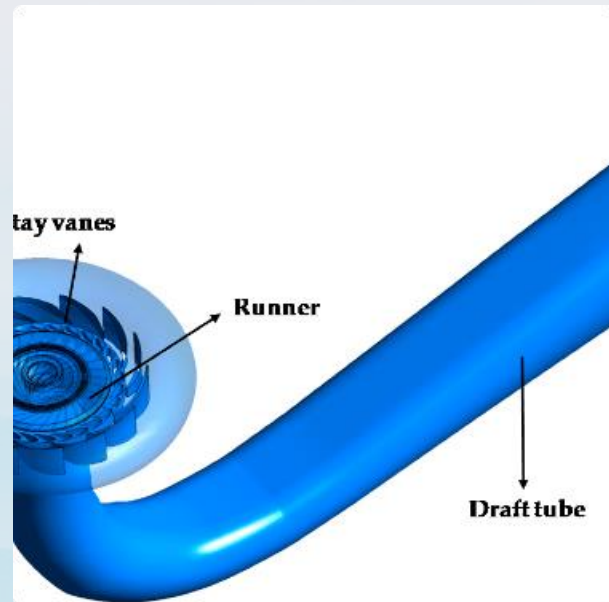
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Environmental Impacts of Impacts of Hydraulic Turbines

Hydraulic turbines generate electricity from the flow of water, but what are the environmental impacts of this technology? Let's explore the benefits and challenges of hydraulic turbines.



The Three Types of Hydraulic Turbines



Francis Turbine

A versatile turbine suitable for medium to medium to high head installations.



Pelton Turbine

Designed for high head, low flow installations.

Kaplan Turbine

Ideal for low head, high flow installations, installations, such as tidal sites.

The Problem: Fish Mortality

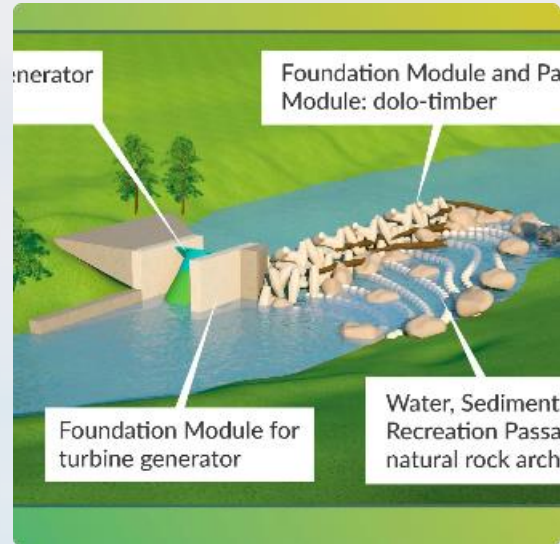
1 Fish get caught in turbines

Hydraulic turbines can cause a high rate of fish mortality, which impacts the ecosystem.

2 Development alters water patterns

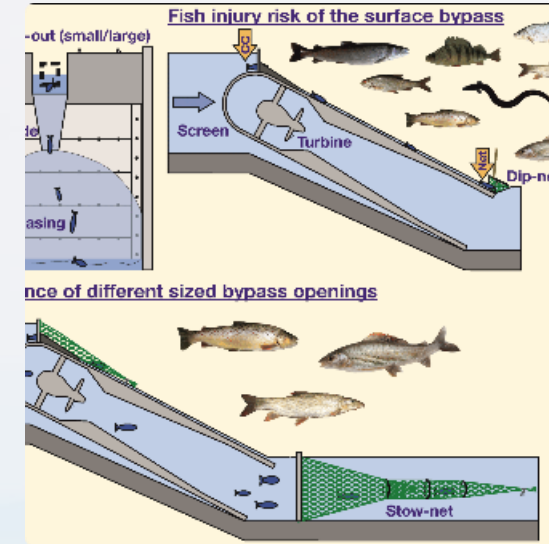
Construction of hydroelectric power plants can cause habitat loss and fragmentation, impacting fish migration.

Solution 1: Fish-Friendly Turbines



Variable Speed Turbines

Turbines that operate at variable speeds cause less damage to fish than fixed speed turbines.



Turbines with Fish Passages

Turbines with fish passages help fish migrate safely around the turbines.

Solution 2: Environmental Impact Assessments

Mitigating Impacts

Environmental impact assessments help to identify and mitigate the negative environmental impacts of hydraulic turbines.

Stakeholder Engagement

Engaging with stakeholders, such as local communities and NGOs, is essential for effective environmental impact assessments.

The Future of Hydraulic Turbines

1

Technology Advances

Advances in technology will lead to to more efficient and environmentally- environmentally-friendly hydraulic hydraulic turbines.

2

Rapidly Growing Renewable Renewable Energy Market

The global renewable energy market is market is expected to grow rapidly, rapidly, providing more opportunities opportunities for hydropower.

3

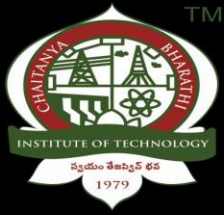
Government Regulations

Government regulations will continue continue to drive the adoption of environmentally-friendly hydraulic hydraulic turbines.

Conclusion

Hydraulic turbines have the potential to provide clean energy, but their impact on the environment must be considered. By implementing fish-friendly turbines and conducting thorough environmental impact assessments, we can minimize the negative impact and maximize the benefits of this important technology.





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44
years

Cavitation In Hydraulic Turbines

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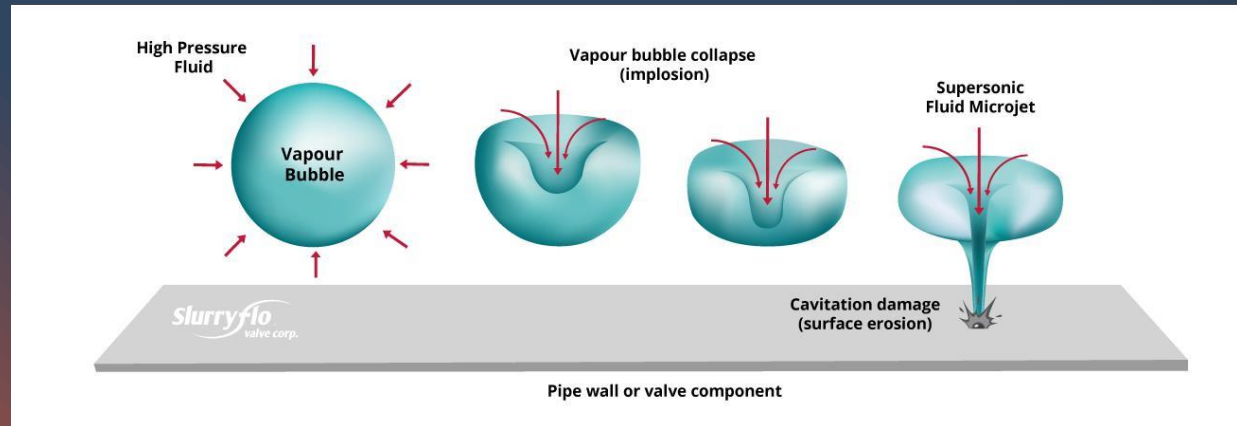
INTRODUCTION

- Cavitation is a phenomenon that occurs in hydraulic turbines.
- It is caused by the rapid formation and collapse of vapor bubbles in the flowing liquid.
- Cavitation can lead to decreased efficiency, increased maintenance costs, and potential damage to the turbine



Causes of Cavitation

- High flow velocities and pressure differences can lead to cavitation.
- Low-pressure regions within the turbine, such as at the leading edges of blades, are prone to cavitation.
- Water quality, temperature, and altitude can also affect cavitation in hydraulic turbines.



Effects of Cavitation on Turbine Performance

- Cavitation can cause erosion of turbine components, leading to reduced efficiency and increased maintenance.
- Noise and vibration levels can increase due to the collapse of vapor bubbles.
- Cavitation can result in a loss of power output and a decrease in turbine lifespan





Prevention and Mitigation of Cavitation

- Design modifications, such as optimizing blade profiles and using anti-cavitation coatings, can reduce cavitation.
- Increasing the pressure head at the turbine inlet can minimize the occurrence of cavitation.
- Proper maintenance practices, including cleaning and repair of damaged surfaces, can mitigate cavitation effects.

CONCLUSION

- Cavitation is a significant concern in hydraulic turbines, impacting performance and longevity.
- Detection, monitoring, prevention, and mitigation strategies are essential to minimize cavitation effects.
- Ongoing research and advancements in turbine design aim to further understand and address cavitation challenges



THANK YOU

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