**Session: Jan-May 2024**

Engineering Physics Project Report

**Topic:** **Pariscope**

**Batch: P5(B)**

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***ACKNOWLEDGEMENT***

This project titled “**PARISCOPE”** wouldn’t have been possible without the kind support of the group members. We would like to extend our sincere thanks to all of them. We would also like to acknowledge the crucial role played by Group Members, who proposed the idea for this project and cooperated with the group members to complete the assigned task on time.

We are highly indebted to our subject teacher Dr.Mahesh Dhonde , for the able guidance , constant supervision and the willingness to share her vast knowledge , which made us understand the project and it’s manifestations in greater depths . It was the valuable suggestions given by her that allowed this project to be completed on time.

***Certificate***

This is to certify that students of batch P-5(B), Medi-caps University, Indore have completed a project work titled ‘ **PARISCOPE**‘

It’s a bona fide piece of work under my supervision and guidance.

This project is a result of their own efforts and the original and genuine investigation about the subject matter and related data collection has been completed sincerely and satisfactorily.

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Introduction

A periscope is an optical instrument that allows an observer to see around, over, or through an object, obstacle, or condition that prevents direct line-of-sight observation. It works on the principle of reflection

A periscope typically has an outer case with mirrors at each end set parallel to each other at a 45° angle. Light from a distant object hits the top mirror and is then reflected at an angle of 90 degrees down the periscope tube. At the bottom of the periscope, the light hits another mirror and is then reflected.

A **periscope** is an instrument for observation over, around or through an object, obstacle or condition that prevents direct line-of-sight observation from an observer's current position.[[1][2]](#https://en.wikipedia.org/wiki/Periscope)

This form of periscope, with the addition of two simple lenses, served for observation purposes in the trenches during [World War I](https://en.wikipedia.org/wiki/World_War_I). Military personnel also use periscopes in some [gun turrets](https://en.wikipedia.org/wiki/Gun_turret) and in [armoured vehicles](https://en.wikipedia.org/wiki/Armored_car_(military)" \o "Armored car (military)).[[1]](#https://en.wikipedia.org/wiki/Periscope)

More complex periscopes using [prisms](https://en.wikipedia.org/wiki/Prism_(optics)) or advanced [fiber optics](https://en.wikipedia.org/wiki/Optical_fiber) instead of mirrors and providing magnification operate on [submarines](https://en.wikipedia.org/wiki/Submarine) and in various fields of science. The overall design of the classical submarine periscope is very simple: two telescopes pointed into each other. If the two telescopes have different individual magnification, the difference between them causes an overall magnification or reduction.

Objective

The objective of a periscope as an optical instrument is to enable observation or viewing of objects or scenes that are not directly visible to the observer due to obstacles, barriers, or the need for concealment. Here's a detailed breakdown of its objectives:

Overcoming obstacles: Periscopes are designed to allow observation over or around obstacles such as walls, fences, or other obstructions. By using mirrors or prisms to reflect light, they provide a clear line of sight to objects that would otherwise be obstructed from view.

Concealed viewing: Periscopes are often used in situations where direct observation would be impractical or risky, such as in military operations, surveillance, or wildlife observation. They allow observers to remain concealed while still being able to view their surroundings.

Compactness and portability: Periscopes are typically designed to be compact and portable, making them suitable for use in confined spaces or on-the-go situations. This enables users to carry and deploy them easily, whether in a vehicle, on foot, or in other environments.

Enhanced visibility: By utilizing mirrors or prisms, periscopes can sometimes offer improved visibility compared to direct line-of-sight observation. They can minimize distortion, glare, or other factors that may affect visibility, providing clearer and more detailed views of distant objects or scenes.

Overall, the objective of a periscope as an optical instrument is to provide a versatile and effective solution for viewing objects or scenes in situations where direct observation is challenging or impractical.

**Significanse**

The significance of a periscope lies in its ability to provide enhanced visibility and observation capabilities in situations where direct line-of-sight viewing is challenging or impossible. Some key aspects of its significance include:

Enhanced Observation: Periscopes allow users to see objects or scenes that are obstructed by obstacles such as walls, fences, or terrain features. This capability is particularly valuable in military operations, surveillance, and navigation.

Concealed Viewing: Periscopes enable concealed or covert observation, allowing users to remain hidden while still being able to observe their surroundings. This is essential for tasks requiring stealth or discretion, such as reconnaissance or wildlife observation.

Safety and Security: In environments where visibility is limited or hazardous, such as submarines or hazardous material handling facilities, periscopes provide a safe means of observation without exposing individuals to potential risks.

Versatility: Periscopes can be adapted for various purposes and environments, from military and industrial applications to recreational activities like birdwatching or exploring confined spaces.

Historical and Cultural Importance: Periscopes have played significant roles in military history and innovation, influencing tactics, technologies, and strategies. They are also iconic symbols of exploration and discovery, capturing the imagination of people around the world.

Overall, the significance of a periscope lies in its ability to extend human vision beyond its natural limitations, enabling observation, exploration, and discovery in diverse contexts and environments.

**Uses Of Periscope**

Other than viewing objects that are not in the direct line of sight, the following are various other uses of the periscope:

* It is used in submarines to determine the distance of a torpedo and helps in deciding the right time for the attack.
* It is used in a nuclear reactor to observe the chemical reactions that are taking place.
* In military periscopes are used to observe from their hiding position. The main disadvantage of a periscope is that it can be used by one person at a time.
* Tanks and armoured vehicles use the periscope to inspect the surroundings.

Requirement

To create a simple periscope using cardboard, you'll need the following materials:

Two small mirrors (preferably square or rectangular)

Cardboard tube or sturdy cardboard sheets

Box cutter or scissors

Ruler

Glue or tape

Optional: Decorative materials (paint, markers, stickers, etc.)

Here's a step-by-step procedure to make a cardboard periscope:

Procedure

Prepare the Mirrors:

If your mirrors are not already the right size, use a ruler and a box cutter to carefully cut them to fit inside the cardboard tube.

Cut Cardboard Pieces:

Cut the cardboard tube into two equal-length pieces. These will serve as the main sections of the periscope.

Cut two smaller rectangular pieces of cardboard to serve as the top and bottom of the periscope.

Assemble the Base:

Glue or tape one of the smaller cardboard pieces to the bottom of one of the cardboard tube pieces. This will serve as the base of the periscope.

Place one of the mirrors on top of the base, angled at a 45-degree angle.

Construct the Viewing Section:

Attach the second mirror to the top of the other cardboard tube piece, also angled at a 45-degree angle.

Glue or tape the second smaller cardboard piece to the top of the tube, covering the mirror.

Join the Sections:

Connect the two cardboard tube pieces together to form an L-shape, with the mirrors facing each other.

Ensure that the mirrors are aligned properly so that they reflect light between them.

Secure and Finish:

Use glue or tape to secure the joints and reinforce the structure of the periscope.

Optionally, decorate the cardboard periscope with paint, markers, or other decorative materials.

Test and Adjust:

Hold the periscope up to your eyes and look through it while pointing the other end towards an object. You should be able to see a reflection of the object in the mirrors.

If the image is blurry or distorted, adjust the position of the mirrors until the reflection is clear.

Once you've completed these steps, your cardboard periscope should be ready for use! You can experiment with different sizes, shapes, and angles to optimize its performance.

**Flowchart**

Here's a simplified flowchart representing the procedure for making a cardboard periscope:

Start

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Prepare Materials

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Cut Cardboard Pieces

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Assemble Base

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Attach Mirrors

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Construct Viewing Section

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Join Sections

|

Secure and Finish

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Test and Adjust

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End

Execution summary

The executive summary of a periscope involves its function, construction, and applications:

Function: A periscope is an optical instrument used for observation in situations where direct line-of-sight viewing is obstructed or impractical. It typically consists of a tube with mirrors or prisms that reflect light, allowing the observer to see objects that are not in their direct line of sight.

Construction: Periscopes are constructed using materials such as mirrors, prisms, and a sturdy frame typically made of metal or fiberglass. The mirrors or prisms are arranged inside the tube at precise angles to reflect light and provide a clear view of the surrounding environment.

Applications: Periscopes have a wide range of applications, including military use in submarines and armored vehicles for surveillance and navigation. They are also used in civilian settings for activities such as birdwatching, wildlife observation, and home improvement projects where visibility is limited.

Overall, periscopes serve as valuable tools for enhancing visibility and enabling observation in various environments and situations.

**Conclusion**

periscopes serve as invaluable tools for enhancing observation and visibility in a variety of situations. Whether used for military surveillance, navigating hazardous environments, or exploring confined spaces, periscopes provide users with the ability to see beyond obstacles and around corners. Their significance lies in their versatility, enabling concealed viewing, enhancing safety, and contributing to historical and cultural narratives. As symbols of innovation and exploration, periscopes continue to play important roles in both practical applications and our collective imagination Future work

Future work in the realm of periscopes could focus on several areas of advancement and innovation:

Technological Integration: Explore opportunities to integrate advanced technologies such as digital imaging, augmented reality (AR), or thermal imaging into periscope systems to enhance observation capabilities and provide additional features such as real-time data overlay or night vision.

Miniaturization and Portability: Develop compact and lightweight periscope designs for use in handheld devices, unmanned aerial vehicles (UAVs), or wearable technology, enabling convenient and mobile observation in various environments.

Materials and Manufacturing: Investigate new materials and manufacturing techniques to enhance the durability, performance, and cost-effectiveness of periscope components, such as lightweight alloys, composite materials, or additive manufacturing processes.

Environmental Adaptability: Design periscopes capable of operating in extreme environments, such as underwater, in low-light conditions, or in harsh weather conditions, to expand their utility for military, exploration, and research applications.

Collaborative and Networked Systems: Explore the potential for networking multiple periscope units together to create distributed observation networks, enabling collaborative surveillance, data sharing, and coordinated responses in dynamic environments.

Education and Outreach: Promote STEM education and public awareness by developing educational resources, DIY kits, or outreach programs that introduce students and the general public to the principles of optics, engineering, and innovation through hands-on exploration of periscope technology.

By focusing on these areas of future work, researchers, engineers, and innovators can continue to push the boundaries of periscope technology, unlocking new possibilities for observation, exploration, and discovery in the years to come.

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