

Title : "Safety Solutions for Slippery Surfaces: Anti-Skid Mats in Aquatic Environments"

TeamSize : 5

Solution : Anti-skid mats

CHAPTER 1: ABSTRACT

Slipping hazards in and around water bodies pose significant risks to both humans and animals. Wet, uneven surfaces in riverbeds, lakesides, and other aquatic environments can lead to dangerous falls. Anti-skid mats offer an effective solution by providing stable, high-traction surfaces that reduce the likelihood of slips and falls. Constructed from durable materials, these mats are designed to withstand constant exposure to water and environmental elements. Their textured surfaces enhance friction, creating non-slip footing even when wet. Additionally, many anti-skid mats incorporate drainage features, allowing water to pass through and preventing the accumulation of slippery substances like algae and mud. This makes anti-skid mats invaluable in improving safety for humans in recreational and industrial settings, and for animals in wildlife conservation and agricultural areas. By providing reliable, non-slip surfaces, anti-skid mats significantly enhance safety around water bodies, making these environments safer and more accessible.



CHAPTER 2: DESIGN THINKING PROCESS

Stage 1: Empathize

Empathize stage is of 3 steps:

1. Observe
2. Immerse
3. Engage

1.Observe: In this stage we observed that collected water is easily the most common cause of a slip and fall accident. Water can collect on the floor in many ways. The same way it gets collected on banks of the rivers and lakes eliminating friction and leading to slipping.

2.Immerse: Our team of five members have immersed in this problem scenario and researched about the common and neglected problems in the issue of humans and animals slipping into water bodies.

3.Engage: We have also engaged in conversation to understand the user's troubles and hardships. For better understanding of the user's needs we have conducted interviews in which 90% of listening and 10% of asking was involved.



Stage 2: Define

This stage is about pausing to consider and identify what problem to tackle before jumping straight into development. This requires the team to pull together and make sense of the research findings from the empathize stage.

Define stage includes five steps:

1. Re-visit unknowns to align new knowledge: To know briefly about the particular problem scenario we have also visited other teams to get more information.

2. Distil research findings into artifacts: Here we have highlighted themes, defining moments and pain points in the experience. We made the data visual so that our data can be updated whenever it is required.

3. Start to tell a story: Rather than overwhelming people with lots of information in a meeting. We defined our problem statement in the chart and made it in a way such that people can understand the problem just by seeing it.

4. Generate problem statements, collaboratively: We defined where challenges exist to improve the user experience and create actionable, human-centered problem statements for each area to bridge the gap between research and design.

5. Record everything: We recorded all the insights, questions or ideas generated by users or our team members. So that they can be documented for future reference.



ANTI-SKID MAT

Stage 3: Ideation

In this stage we did individual ideation such as rapid fire, brain writing and group ideation such as speed mind mapping, reverse thinking. We have also listed out the worst possible ways that ensure heading integrity and to get the best possible solutions



Stage 4: Prototype

Illustration of the Prototype phase of the design process showing a pencil, wireframes on paper, and a ruler. The fourth phase of design thinking, where you identify the best possible solution. Prototype Flow has six steps.

1. A prototyping model starts with requirement analysis. So, we have gathered all the requirements of the model.
2. To proceed further we made a quick design of the model. However, it is not a complete design it gives a brief idea of the model to the user. This helped us in developing the prototype.
3. In the third step, we actually designed a prototype i.e., a small working model.

ANTI-SKID MAT

4. We represented our model to our faculty as well as other teams, to suggest strengths and weakness of the working model

5. We have also made some changes to our prototype according to the user's feedback's and suggestions.

6. After fulfilling all the user needs, we have developed a final prototype.

Stage 5: Test

The final stage of design thinking is a test. Once our final prototype is ready, it is thoroughly tested to see whether it is working or not.

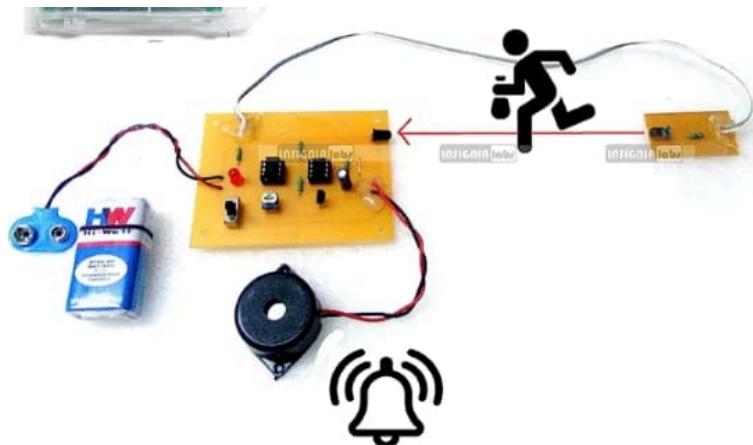


CHAPTER 3: PROCEDURE AND MATERIALS

MATERIALS REQUIRED:

1. TOUCH ALARM SENSOR:

The concept used for the touch-based alarm is using radiation signals. Radiation signals from mains wiring can travel a few meters of distance. These can be induced by the electromagnetic field in the human body also. This touch sensitive alarm is based on the generation of an AC hum signal.



2. MAT:

Anti-skid mats are layers of patterned rubber or plastic that are placed on the ground or on treacherous areas, such as stairs or ladders. Anti-skid (also called anti-slid and non-skid) materials can be used to keep large equipment and small devices from unwanted movement.



ANTI-SKID MAT

PROCEDURE:

1. Gather all the necessary stationary items to create a water body scenario.
2. The anti-skid mat is placed as the border of the water body.
3. All the parts of the touch alarm sensor are placed and the wire is attached to the mat's edge.
4. The prototype testing is observed.

MAKING OF ANTI-SKID MAT:

Step 1: Source your rubber sheet.

Step 2: Place your mat upside down on a flat surface.

Step 3: Cut your rubber slightly smaller than your mat.

Step 4: Stick your rubber sheet down using a glue gun or double-sided tape.

Step 5: Wait for glue (if used) to dry.

MAKING OF TOUCH ALARM SENSOR:

Step 1: Take the components required.

Step 2: Firstly solder 470 ohm resistor to collector of the transistor and then solder negative wire of LED to the 470 ohm resistor.

Step 3: Now solder battery clipper wire to the circuit. Solder +ve wire of battery clipper to the +ve of LED and connect -ve wire of the battery clipper to the emitter of the transistor.

Step 4: Connect 9V battery to the circuit and touch base wire of transistor and 470 ohm resistor wire as shown in the picture.

CHAPTER 4: CONCLUSION

The project aimed at designing and implementing an “Anti-Skid Mat” to provide friction and grip to living organisms around water bodies. The project consists of a plastic mat and IR Infrared Intruder Detector & Alarm sensor ,which rings when the pressure is applied on it. The sensor is placed at a certain point on the shore , if the living being crosses it then there is a high chance of falling into the water body. The project was successful in demonstrating the functionality of Anti-Skid Mat. Mat provided the grip and in case if the living organism crossed a certain point then the system was able to sense the presence of the living organism after a certain point on shore, which then produced a beep sound indicating the danger and alerting the people surrounded by. In conclusion, the project has shown the potential for using technology to improve safety around water bodies. Anti-Skid Mat can be highly recommended to reduce the accidents around water bodies such as slipping into water body due to less friction and can also useful in saving people from attempting suicides. The project can be further improved as per the need and safety and efficiency.

CHAPTER 5: REFERENCES

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