WORLD OF ENGINEERING IDEATION

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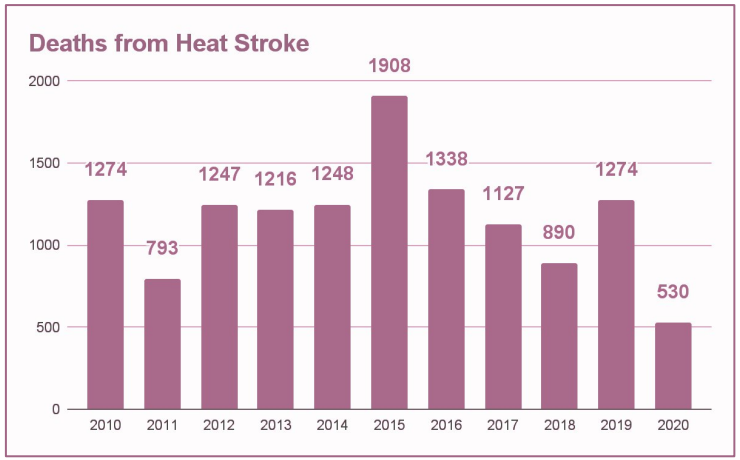
PROBLEM STATEMENT

Due to poor cooling facilities, people from all backgrounds are at risk for health problems during periods of **excessive heat**. In a collaborative effort as a team, our initiative develops designated places for individuals who are **susceptible to heat strokes** or need a **cool environment** while engaging in an outdoor activity, lowering risks, boosting well-being, and fostering productivity.

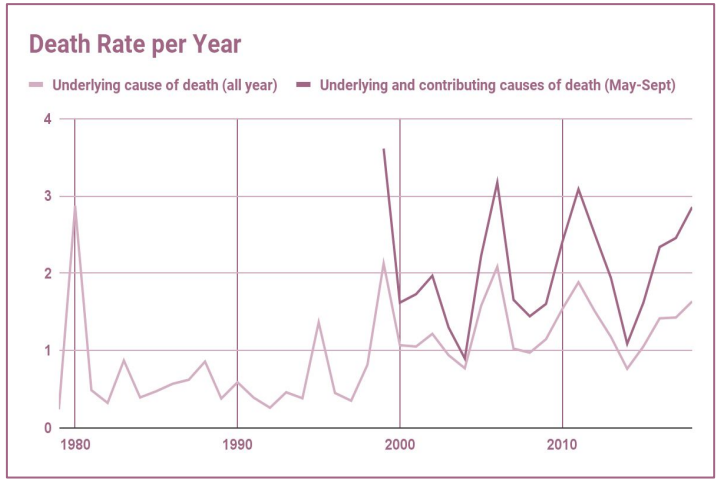
SOCIETAL IMPORTANCE

SOCIAL IMPACT

- Health and Safety
- Harsh working conditions in broad daylight hours.
- Heat-related cardiovascular disease accounted for about one-fourth of the heat-related deaths recorded since 1999. The death rate for this specific cause ranged from 0.08 deaths per million people in 2004 to 1.08 deaths per million people in 1999.
- Heat stroke results in more than 5000 deaths per year.



ECONOMIC IMPACT



- Shade requirements, breaks, etc. It is incredibly tough to work for long hours in hot conditions, as per an interview with construction workers at IITGN.
- The TOI claims that excessive heat had a negative influence on labour hours. Due to heat exposure, Indians missed over 167.2 billion hours of potential work in 2021. This represents a loss of 5.4% of the country's GDP.
- In 2030, it is anticipated that 5% of working hours, or about 43 million and 9 million jobs, respectively, will be lost.

INTERACTION WITH CONSTRUCTION WORKERS

LINK TO THE INTERACTION

IS IT WORTH SOLVING?

It is only a non-trivial solution if we are able to create a solution that is cost effective compared to, say, ACs using cheaper alternatives like chemicals.
The solution is more environmentally friendly and explores the reusability of materials.

Scientific: Effective in comparison to non-advanced cooling techniques like a damp towel.
It is a problem/solution worth investigating because of portability.
Lack of knowledge of scientific methods to prevent and treat heat strokes.

Our approach prevents abrupt temperature changes by properly cooling the body and bringing it back to normal.
By 2050, we will cross the survivability limit for withstanding heat and so it is imminent that we create an effective solution.

EXISTING SOLUTIONS

There are numerous products in the market with cooling qualities that can also be used as portable cooling agents.These goods could be a priceless source of project inspiration.We can comprehend the technologies at our disposal, pinpoint design issues, come up with creative fixes, investigate unique applications, and take integration with other technologies into consideration by looking at these solutions.

Existing Solutions

Cooling vests, Wicking shirts

MOTIVE - Promotes sweat-wicking and provides a cool and comfortable experience in hot weather.
MATERIALS USED - Nylon, polyurethane, mesh, polyester, EVA foam and more.
MECHANISM - Frozen inserts or specialized materials to absorb and dissipate heat from the body.
DISADVANTAGE - Limited duration, requires refreezing and adds weight and bulk to the vest.

Coleman instant cabin

MOTIVE - Provides a quick and easy-to-set-up shelter for camping and outdoor activities
MATERIALS USED - Polyester, Polye, Aluminium, Fibreglass.
MECHANISM - Consists of an electric fan that helps to circulate the air and keeps the tent cool.
DISADVANTAGE - Requires more setup, can be heavy and becomes bulky when packed.

Cooling hats

MOTIVE - Draws heat away from the body and provides a cooling sensation.
MATERIALS USED - Hot materials like polyester, nylon, mesh, are highly absorbent.
MECHANISM - When the heat is soaked in water or the built-in reservoir or pockets are filled, the water slowly evaporates, and provides a cooling sensation.
DISADVANTAGE- Dependent on the water temperature and becomes heavier when water is added.

COMPONENTS INVOLVED

MATERIAL OF THE ASSEMBLY

Materials of the assembly should be such that it allows portability,and compressibility. A porous material that could retain moisture.
Materials such as mesh fabric, bamboo fabric, UPF fabric would serve the purpose.

COOLING BY NATURAL PROCESSES

For a person at risk of heat stroke, moisture content must be kept in reserve right away. Since those who are susceptible to it do not sweat, a little mist of water would promote evaporation and gradually lower body temperature.

ASSEMBLY STRUCTURE

To separate the cool inside environment from the outside environment, insulation walls would be present.

SENSORS FOR AUTOMATION

The amount of water to sprinkle can be determined by measuring it with temperature and humidity control sensors.

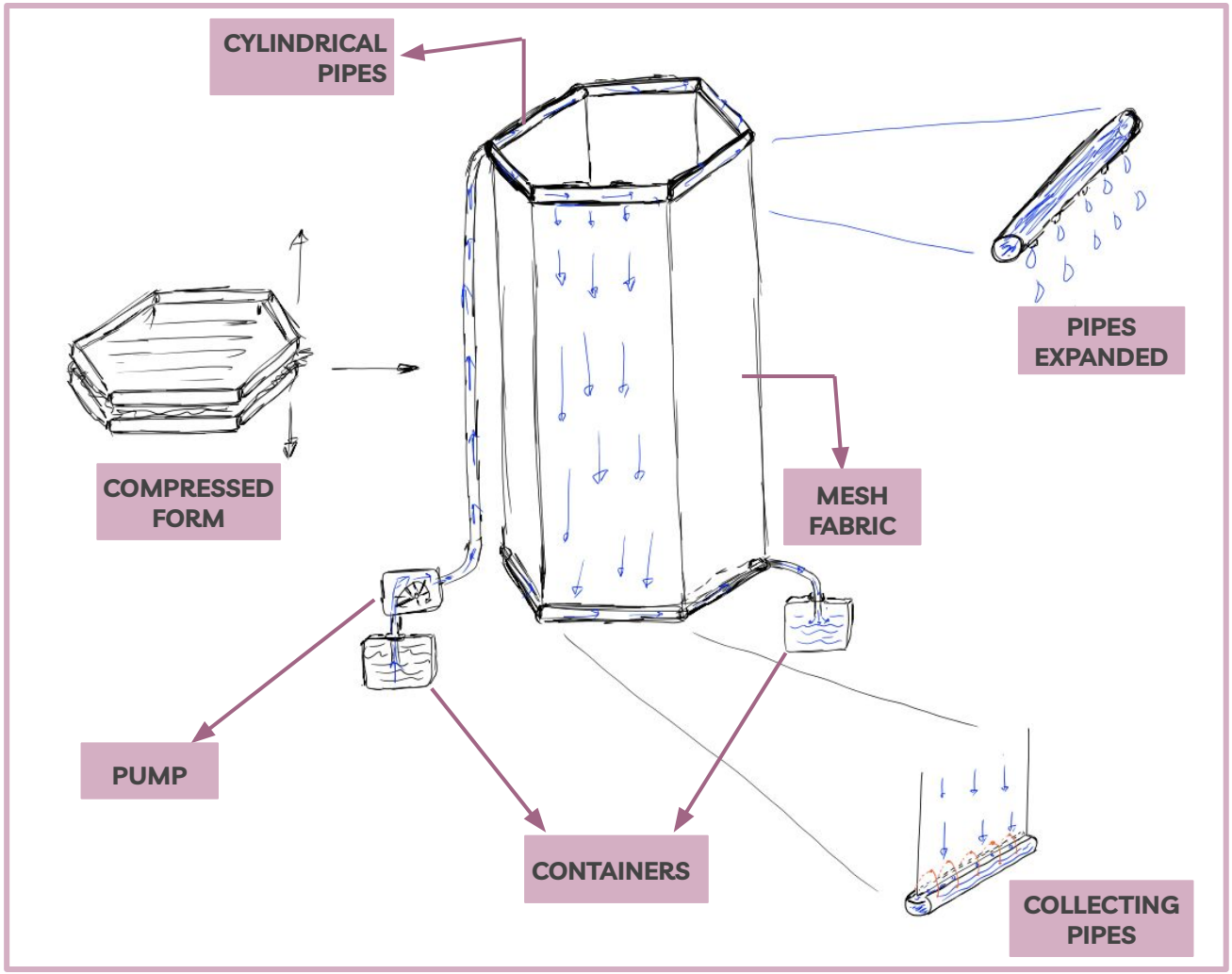
COOLING BY ENDOTHERMIC REACTION

Heat can be absorbed by reactions like the dissolving of ammonium nitrate in water. Solar energy may readily be used to cycle through such a process.

COOLING BY MECHANICAL PROCESS

Shape memory alloys like NiTiNOL when bent and re-stretched can be employed as a heat pump.

PROBABLE STRUCTURE OF THE ASSEMBLY



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Work Distribution

Broad Problem Statement

Sahil, Pranav, Jinil,
Tapananshu, Vraj, Deepak

Existing solutions

Purva, Shrinivas, Shreel,
Rituraj, Kandarp, Pawan

Societal Importance

Yash, Aayush, Abhimanyu,
Bhavik, Vidhi, Heer

Components

Nihar, Guntas, Gaurav,
Hitesh, Mumuksh

Why it is worth solving?

Aadya, Nishi, Diya,
Aditya, Anmol

Slide Designers

Guntas, Gaurav, Aditya,
Pawan, Sumeet, Shaurya

THANK YOU!