



**DEPARTMENT OF MECHANICAL ENGINEERING**  
**SOCIETAL IMPACT PROJECTS**

## **1. TEMPERATURE DISTRIBUTION INSIDE A CRASH HELMET**

### **INTRODUCTION**

It is a fact that India has one of the highest rates of motorcycle injuries. More importantly, about 76% sustain head injuries, which is 25 times higher than that in any developed countries. Statistically, 40% of those killed and injured on Indian roads are motorcyclists.

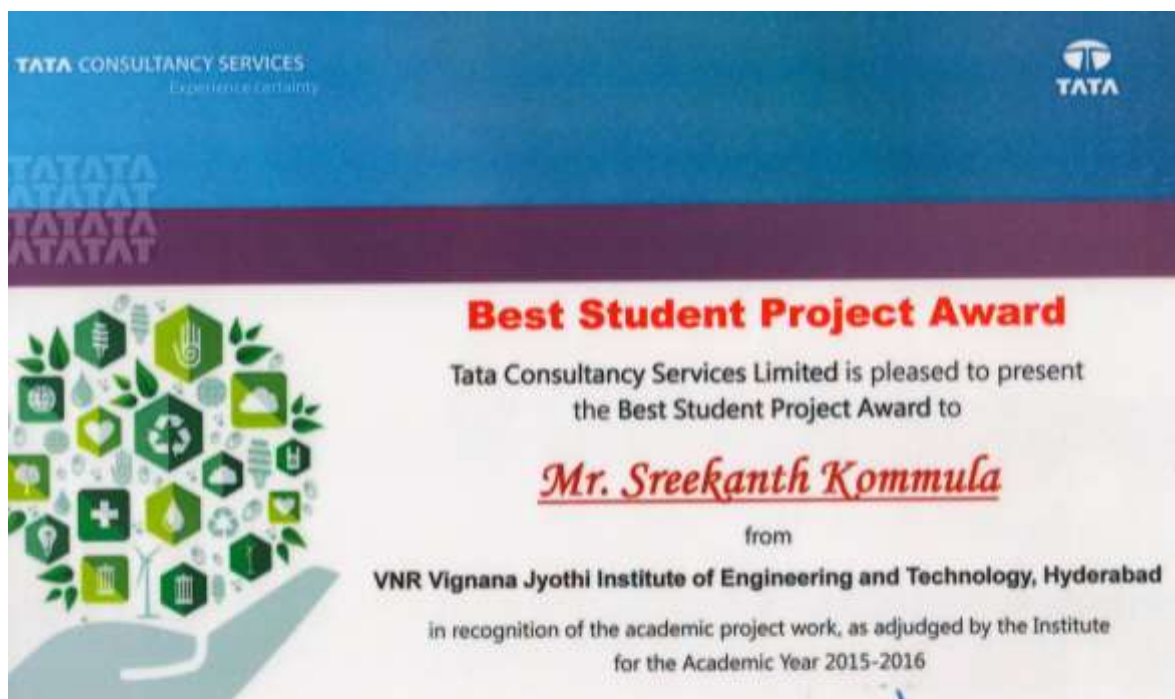
It is known fact that wearing a helmet brings down the severity of brain injury, skull fractures and neurological disabilities after an accident. The risk of death is nearly 2.5 times more among riders without helmets. Wearing helmets not only saves lives but reduces health care costs. However, people in general avoid it. Less than 50% usage is observed.

The primary reason why people avoid the use of helmets is heat concentration that results in sweating, suffocation and subsequent irritation. There is utmost need to map the temperature distribution inside the helmet in different conditions, so as to develop ways to mitigate it.

In this regard, thermocouples and various other temperature measuring devices were used to measure temperatures and map them on the area of average of human head. The rise in temperature inside the helmet was found to be high and very discomforting.

Another major reason for heat concentration and discomfort while using helmet is caused by ill-fitting helmets, owing to standardisation of helmet sizes globally. Mass customisation for perfect sizing pertaining to the demand can be introduced with the latest 3D printing technologies.

In this regard, a full scale helmet has been designed using CATIA V5R18 designing software and 3D printed using MakerBot Replicator Z18 3D Printer. The material used for printing is Poly Lactic Acid (PLA), which is a thermosetting plastic.



SNIPPETS

Student leaders stage dharna

**Vizag agitation:** A large number of students staged a dharna at Gate 7 of the Taty police station on Monday night demanding release of 28 students, who were arrested by the police, while demonstrating at the Cell sector's official residence on Friday night demanding lifts in the main hills and other amenities. AP leaders Pratiksha and Neha conducted a non-press dharna at the Of-fof-fof residence on Friday night, along with the best-student students from Andhra University, demanding lifts in scholarship to Rs. 3,000. Protesters raised slogans against the government and the Andhra University management. Later, they tried to enter the Collector but they were not allowed. The Taty Town Circle Inspector H. Venkata Rao led a force of police personnel and arrested 28 students, including two girl students. Resisting strongly in the streets, Andhra University students in hand-to-hand struggle with the police officers on Saturday. The police later released all the arrested students on

AC HELMET TO BEAT THE HEAT

Product features

- Built for the industry - heavy metal, steel, mixing, cement, construction
- Keeps the user comfortable and productive
- Maintains 20°C to 25°C
- Unbreakable UV glass for eye protection
- 250 gms of additional weight only
- Recommended by doctors for its positive effects
- Each AC helmet costs Rs. 7,000



Process, Sreekanth Kommula, AC helmet development



Protective AC helmet under test



A worker using work wearing AC helmet

Y-ANALYSIS PAPER

**Vizag agitation:** There is temperature taking a toll on health activities of the people. In what would be the condition of industry workers and people in high temperature? Struck by the same thought, the three young entrepreneurs got the reaction in the winter weather. Snow and knock led down to come up with such

Plastic air-conditioned helmet. The product aims to give a new sense of life to work done by creating their productivity in mixing construction steel plants and other sectors. An ongoing project by Sreekanth Kommula, Anand Kumar and Sreekanth Kaundinya conceived the design of innovation to get transformed into a portable and lightweight helmet. The AC helmet will be used in the construction industry where workers have to work in high temperature. The AC helmet got the recognition under the Start-Up India campaign in the Government of India's initiative.

launched two models of the product, which runs for one-and-a-half hour with battery while the other one goes on for eight hours, and 25-year-old Kaundinya (founder, IIT of Jaipur) has set up a stall at International Innovation Fair 2017 in Vizag. Initially, an innovation-based project was funded and supported by VCB Y-Startup India Institute of Entrepreneurship Technology Hyderabad. As things went in favor of the three engineering graduates, the Ministry of MSME in collaboration with National Institute of Design (NID), Ahmedabad, India has also offered US\$ 50,000 to develop the project into a viable

product for design and use under the mentorship of India School of Business (ISB), Hyderabad, India. According to several studies, high temperatures are hurting the productivity of the workers following which the industries bear the brunt of financial crisis, he says. Other, 7.4 per cent in the average drop in productivity for every 1°C rise in temperature above 20°C according to a study by Massachusetts Institute of Technology.

International Institute for Global Health study estimates that India would see a GDP loss of \$300 billion by 2050 due to increasing heat conditions and the implications on workers' productivity. In 2016, the India's GDP was valued at \$704 billion. It was also proved by researchers that increase in heat conduct rate from 22°C to 28°C, where maximum productivity is witnessed. In this context, Anand Kumar has come up with AC helmet designed for the industry, heavy metal, steel, mixing, cement and construction. Other features of the product are large for wear, comfortable and productive, maintains 20°C to 25°C, ultraviolet UV glass for

eye protection and recommended by doctors for its positive effects. It is also part of the IITB innovation, a flagship programme of AP Innovation Society (APIS) in collaboration with Tata University. "We have sold about 25 units, photos comprising the Govt of Andhra Pradesh, from Andhra Pradesh through for market feedback and received good response. We are presently in process of making them to extend to mass manufacturing capabilities," says Kaundinya.



Anand Kumar, Sreekanth Kommula and Kausthub Kaundinya along with Ajayesh Rajan, IIS Secretary

FOR A BETTER WORLD

THREE YOUNGSTERS HAVE DEVELOPED AN AIR-CONDITIONED HELMET TO KEEP INDUSTRIAL WORKERS SAFE FROM THE HEAT

**SHWETA WATSON**  
DECCAN CHRONICLE

**✓** If you are a fan of Iron Man, you must have heard of his personal assistant and a highly advanced computerized A.I. Jarvis (Stands for Just A Rather Very Intelligent System). However, have you heard of Jarvis (Just A Rather Safe Helmet)? Three 22-year-olds and Mechanical Engineering graduates from Vignana Jyothi Institute of Management (VJM) in the city - Kausthub Kaundinya, Srikanth Kommula and Anand Kumar - are the ones behind this unique air-conditioned helmet.

Talking about how the idea came about, Kausthub says, "We were working on several projects at V-Hub at our college. As engineering students, we wanted to do something for people," he says, adding, "The summer of 2015, I travelled 30 kms in and fro to my college every day. That's when I realised that I should develop an air-conditioned helmet not just for myself but for many others who were suffering too. Soon, I happened to read about how industrial workers have a harder time working at extreme temperatures and develop heat-related illnesses. So we started working on this project. We also plan to develop such helmets for riders and the traffic police in the future."

However, it was quite a challenge for them to get the technicalities right. "Our design is completely unique. The cooling system runs on a thermoelectric process and the helmet is just 250 gms heavier than a normal helmet. So it's small and light," says Anand. The trio have already sold samples to three industries: Suvarna Cements in Hyderabad, Jayem Automotives in Coimbatore and DS group in Noida. "Each helmet is priced at

nearly ₹7,500. Right now, we have one employee working with us. After we sell 50 more helmets in a month, we will be getting into mass production once we receive inputs from industries," says Kausthub. While Srikanth looks after the technical and design aspects of the project, Kausthub manages the marketing and investments and Anand takes care of production and procurement of materials. So, how did the three of them meet? "Back when we were in college, we took part in a national-level competition called Go-Kart Challenge. We had fabricated a vehicle together and have been together since then," reveals Srikanth.

విద్యార్థుల్లో ప్రతిభను వెలికి తీయడమే లక్ష్యం

**నవతెలంగాణ - ఉండవీటి**  
విద్యార్థులలో దాగివున్న ప్రతిభను వెలికితీయడమే లక్ష్యం అనే ఛందోమాసం ప్రారంభం చేసింది తెలంగాణ ప్రభుత్వం. ఈ సందర్భంగా ఆయన మాట్లాడుతూ విద్యార్థుల అభివృద్ధి, వారిలో దాగి ఉన్న ప్రతిభను వెలికి తీస్తే అభ్యుదయం సాధ్యమవుతుంది. ఈ కార్యక్రమంలో ప్రీన్సిపాల్ డాక్టర్ సి.కె.నాయుడు, డీ.ఎం.ఎల్ విభాగం అధిపతి డాక్టర్ పార్వతారెడ్డి, మెకానికల్ ఇంజనీరింగ్ విభాగం అధిపతి దుర్గావసారం తదితరులు పాల్గొన్నారు.



విద్యార్థుల ప్రతిభను వెలికితీయడమే లక్ష్యం



# చల్లచల్లటి.. హెల్మెట్

ద్విచక్ర వాహనాల్లో వెళ్ళేప్పుడే కాదు.. గనులు, కర్మాగారాలు, నావికాదళం.. ఇలా చాలా చోట్ల హెల్మెట్లు దరిస్తారు. రక్షణ మాట అటుంచితే.. కొన్నిసార్లు మిర్ర వేడెక్కిపోతుంది. అదే చల్లచల్లటి ఏసీ హెల్మెట్ అయితే.. తలకు హాయిగా ఉంటుంది. సరిగ్గా అలాంటి ఐడియానే వచ్చింది ఈ ముగ్గురు మిత్రులకు. కౌన్సిల్ కౌండిన్గ్, ఆనంద్ కుమార్, శ్రీకాంత్ కౌముల హైదరాబాద్ లో జార్ ఇన్సొవేషన్స్ స్టార్టప్ నెలకొల్పి.. ఏసీ హెల్మెట్లను తయారు చేస్తున్నారు. కౌన్సిల్ మాటల్లో ఆ విశేషాలు..

నిత్య జీవితంలో ప్రజలు ఎదుర్కొనే ఏదో ఒక సమస్యను పరిష్కారం చూపించే.. ఆవిష్కరణ చేయాలన్న పట్టుదలతో మిత్రులంతా ఆలోచించేవాళ్ళం. అప్పుడే నేను హైదరాబాద్ లోని విఎన్ఆర్ విజ్ఞానా జ్యోతి కళాశాలలో చదివేవాణ్ణి. ఇంటి నుంచి రానుపోను అరవై కిలోమీటర్లు వెళ్ళాల్సి వచ్చేది. వేసవిలో హెల్మెట్ పెట్టుకున్నప్పుడల్లా చెమటలు పట్టేవి. నాకే ఇలాగుంటే.. గంటల తరబడి ఎండలో నిల్చునే క్రూపిక్ కానిస్టేబుళ్ళు.. గనులు, టవన నిర్మాణ కార్మికులు, ఇనుము-ఉత్పత్తి పరిశ్రమల్లో పనిచేసే వాళ్ళ ఎలా బతిస్తున్నారు? అనిపించింది. అప్పుడు తట్టిన ఆలోచనే ఏసీ హెల్మెట్.



ముగ్గురు మిత్రులు కలిసి..

నాతోపాటు సహ విద్యార్థులైన ఆనంద్ కుమార్, శ్రీకాంత్ లలిసి.. జార్ ఇన్సొవేషన్స్ ప్రాజెక్టు పనులు మొదలుపెట్టాం. మా కళాశాల యాజమాన్యానికి ఈ ఆలోచన వచ్చింది. ఐదు లక్షల రూపాయలు ప్రోత్సాహక నిధులు అందించారు. కళాశాలలో బెస్ట్ ప్రాజెక్టు అవార్డు వచ్చింది. టెసిఎస్ నుంచి బంగారు పతకం అందుకున్నాం. అంతర్జాతీయ ఆవిష్కరణల సదస్సులో గుర్తింపు లభించింది. ఇండియన్ సొసైటీ ఫర్ టెక్నికల్ ఎడ్యుకేషన్ సంస్థ బెస్ట్ ఇన్సొవేషన్ అవార్డు వరించింది. గెడ్ ఇండర్ రింగ్ అంతర్జాతీయ పోటీల్లో మన దేశం నుంచి ఎంపికైన ఏకైక సంస్థ మాచే! సిఐఐ సంస్థ నుంచి మరో రెండు అవార్డులు రావడంతో ఆత్మవిశ్వాసం వచ్చింది. ముందుగా పరిశ్రమల్లో వాడేందుకు హెల్మెట్లను తయారు చేయాలనుకున్నాం. పాతిక సంస్థల ఉద్యోగులకు అందజేశాం. అందులో భారత నావికాదళం కూడా ఉంది. ఉద్యోగులు, కార్మికుల నుంచి సానుకూల స్పందన వచ్చింది. లోటుపాట్లను సవరించి మా హెల్మెట్ లోకి రీసుకొచ్చేందుకు సన్నాహాలు చేస్తున్నాం. తొలిదశలో తీవ్రమైన ఎండల్లో విదులు నిర్వహించే క్రూపిక్ కానిస్టేబుళ్ళకు అందించాలని నిర్ణయించాం.

### ఏంటి హెల్మెట్ ప్రత్యేకత..

దీని బరువు 250 గ్రాములు. శిరోస్థును దరించడం సులువు. వాతావరణం చల్లగా ఉంటే వేడిని కలుగజేస్తుంది. వేడిగా ఉన్నప్పుడు చల్లటి గాలిని ఇస్తుంది. డల్కో ఎలక్ట్రిక్ కూలింగ్ ప్రక్రియలో పనిచేస్తుంది. హెల్మెట్ లోని ప్యాకు.. బయటను గాలిని తీసుకుని లోపలున్న కూలింగ్ సిస్టమ్ ద్వారా చల్లబరుస్తుంది. ఆ చల్లటి గాలిని నాలుగు మార్గాల ద్వారా హెల్మెట్ లోపలికి పంపిస్తుంది. ఎలక్ట్రిక్ కార్లలో వాడే ఆటోమొబైల్ గ్రేడ్ బ్యాటరీని దీనికి ఆమర్చాం. ఒక్కసారి ఛార్జి చేసుకుంటే రోజుం పేద నుంచి ఎనిమిది గంటల వరకు పనిచేస్తుంది. ఈ హెల్మెట్ లో కళ్ళెదులను కూడా ఆమర్చాం. అతిరీల లోహిత కిరణాలను వైతం అడ్డుకుంటాయివి. ఎలక్ట్రిక్ హెల్మెట్ దరించడం వల్ల తలకు ఇన్ ఫెక్షన్లు రావని వైద్యుల పరీక్షల్లోనూ తేలింది.

 **VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY**

CREATING SOCIAL IMPACT AS A STUDENT OF **MECHANICAL ENGINEERING** THROUGH B.TECH PROJECT



**FILED PATENT ON AIR CONDITIONED HELMET**

## 2.DESIGN OF NEW LOCKING MECHANISM FOR FIXING WHEELS TO AN AUTOMOBILE

### INTRODUCTION

This new locking mechanism consists of an axial hub and the wheel gets fixed through radial studs. With small Allen key we can fix or remove the wheel from an automobile easily. As per the requirements of the mechanism, the rim design also has to be modified.

This highly efficient wheel design system significantly reduces the human effort and time required to change the wheels for Automobiles. The effort required is in the range of 0.1% – 0.2% when compared to existing method.

Wheel fixing and removal based on this mechanism is not available in the market. The automotive industry in India is one of the largest automotive markets in the world. It is one of the fastest growing markets globally. The most popular products in the retail spare parts market is wheel fixing system with rim. We see a huge market potential for our solution. It brings revolution in the automobile industry in wheel design.



[www.vnrvjiet.ac.in](http://www.vnrvjiet.ac.in)

**CREATING SOCIAL IMPACT AS A STUDENT OF MECHANICAL ENGINEERING THROUGH B.TECH PROJECT**

**DESIGN OF NEW LOCKING MECHANISM FOR FIXING WHEELS TO AN AUTOMOBILE**



**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY**  
(UGC Autonomous, Accredited by NBA & NAAC with 'A' Grade)  
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## **3.DESIGN AND FABRICATION OF ATMOSPHERIC WATER GENERATOR**

### **INTRODUCTION**

Water scarcity is one of the burning issues of today's world. Though water covers more than two third (about 70%) of the Earth's surface but still fresh water which can be used for remains scarce (only about 2.5%). The acute problem of water shortage, is mainly faced by the countries with long coastlines and the island nations, which do not have adequate fresh water sources like rivers and ponds. Hence there is an immediate need to find methods to generate water in order to meet their water security needs.

This project aims to solve this problem. In the coastal areas the relative humidity is quite high (around 70-80%). So, the air in coastal areas can be used to meet the water needs of people by using a dehumidifier unit. Further the solar insolation is quite high in these areas round the year. This can be used to provide necessary power to the dehumidifier unit. Thus drinking water can be obtained from the atmosphere by harnessing solar energy. Such a device is called Atmospheric Water Generator.

The device uses Peltier Refrigeration instead of conventional vapor compression refrigeration due to its simplicity and passivity. Since there are no refrigerants it doesn't cause any problem to the environment. The main product consists of 4 Peltier Modules with 4 Cold Sinks. As a part of project a portable prototype of Atmospheric water generator is fabricated with 1 Peltier Module and One Cold Sink. In order to estimate the performance of the device ANSYS simulation is done at various atmospheric conditions and mapped with Metrological data of India to find optimum locations for the installation on the device.



**VNR VIGNANA JYOTHI  
INSTITUTE OF ENGINEERING & TECHNOLOGY**  
(An Autonomous Institution)

### **Production of Water from Atmospheric Air**



**Creating SOCIAL IMPACT as a Student  
of Mechanical Engineering through B.Tech Project**