# *GTU INNOVATION COUNCIL*

**Frugal and Gandhian Engineering**

**Innovations: the unique strength of GTU Innovation Council**

The students and faculties of GTU are being encouraged and supported to design and develop products and services with more performance, from less material, less cost, less time, less environmental pollution and for the benefit of the four billion people, whose income levels are even less than two dollars a day. The concept of Gandhian Engineering & sciences /Frugal Engineering & sciences and innovation for “Creating more from less for More and More" is being insisted to focus on socio-technical needs of the country.

GTU has become the 1st such large scale university in the world to take a lead in this challenge. Mr Hiranmay Mahanta from Techpedia represented a team to benchmark such frugal/Gandhian innovations at various colleges at GTU including polytechnic. The study reveals that a huge potential of young students and researchers in these colleges can be tapped and from which meaningful solutions/products can be developed. A few labs of GTU colleges were visited to map the innovation quotient of the diploma students and it was revealed that a decent quality research trend is propelling the innovation agenda at even UG level. The key challenge is to protect the IPR of the corresponding innovators at various GTU colleges and look forward to either possible technology transfer or entrepreneurship modules development even at UG/Diploma level. GTU innovation council found a great deal of possibility in patenting such innovations at University and a low cost channel is being developed at GTU for filing 1000 patents for those frugal and efficient innovative projects/solutions for these students and faculties. Mr. Hiranmay Mahanta visited a few college labs in Mehshana Innovation Sankul like LCIT and similar colleges and found a great possibility in creating sustainable knowledge ecosystem fuelled by innovation in the coming days.

Present work from LCIT by Shaikh Shehbaj G is for New Innovative solar cooker called "Portable Solar cooker". This Project shows the analysis of portable solar cooker. Temperature was measured with the help of thermocouples as well as Suryamapi. The efficiency of the portable solar cooker is found to be higher than that of the conventional solar cooker. No tracking mechanism is required in this innovation. Concentration ratio is obtained up to 3. Students claim an advantage of flat as well as concentrating collector, which optimizes the efficiencies.

While many stepper based NC packages are available, in this project, drivers have been developed to drive the motor up to a specified distance and rotation. Using this machine developed by Chavda Bhupendrakumar P., Gambhva Govindbhai B, Suthar Sureshkumar R, Bihari Mahebilkhan M, Panchal Chiragbhai V, and guided by Prof. M. K. Modh and Prof. Y. L. Raol, human effort become very less as compared to manual operation. It can be used for cutting design, milling, drilling and reaming. Three axis movement of the cutting tool is the USP of the machine.

An attempt has been made to fabricate the Turbocharger for Two Wheelers in this project. The exhaust gas is used to rotate the turbine with blower arrangement. Exhaust gas is used to rotate the blower and this air is given to the ignition input supply. It is a low-cost system, which improves engine efficiency. Detonation is greatly reduced by use of this turbocharger. Turbocharger can be easily made by locally available material. The output can increase as much as 25% as compared to the output from conventional two stroke petrol engines.

Students have designed a multi nut remover system in approximate 2000~3000 INR. The ordinary spanner removes one nut in 60sec and multiunit remover removes the entire nut in 60sec. so time is saved. Multinut remover is the device which reduces the time and human effort. The device is very useful in H-Bag car. The function of Nut remover can be summed up "to provide the most effective spanner tools system" at low cost. Prof. M.K. Modh and Prof. V. K. Pandya guided this innovation.

LPG Refrigerator is designed to work up to a capacity of 125 Liters. It was found that a fall of temperature of -5 degree inside refrigerator could occur within a short time in testing. It is very handy as well as portable. Payback time is also good compared with conventional refrigerator. It can also be used in low temperature application like pharmaceutical industry, dairy industries, cold storage etc. Prof. A. B. Patel guided the student group led by Patel Birenkumar K and Patel Chintan D .

An improved solar Distillation method has been designed by Prof. D. M. Patel and a group of students. It can receive radiation from all sides and hence no tracking is required. Maximum distillate output of 4.2 Liter per day/meter square area can be achieved. The output can be increased up to 40% by varying parameters like using coal, fins, perforated plates etc.

We have not yet been able to explore all possible opportunities for improving access, affordability, sustainability, efficiency, productivity and competitiveness in the needy domain of socio-technical applications and for focusing on bottom of the pyramid of our society. These innovations are one more step in that direction. The students and faculties are being encouraged and supported to design and develop products and services with more

performance, from less material, less cost, less time, less environmental pollution and for the benefit of the four billion people, whose income levels are even less than two dollars a day.

The Innovative flexible arm designed by GTU students can be used to lift heavy materials. Loading and unloading of tools and parts are possible quite easily. USP of the device are-

(1) Versatility: One Flexible Arm Does All Your Tapping
(2) No need for additional tooling, since the necessary tooling is included in the system
(3) Multiple Operations: It can perform various operations like drilling, tapping, boring, screw tightening/loosening, welding.
(4) Can operate in 720°.
(5) cost effective

The aim of this project developed by GTU students is to reduce the burden on farmers and to spread maximum mass flow rate from the spray pump. Hence it has been named as the push operated spray pump. It costs less than Rs 6000. It can be used in hilly areas, home, and field, for the purpose of sprinkle of water, pesticides and other liquids. It can be easily handled by any unskilled person. This innovative product has been guided by Prof. H.N. Panchal along with Bhambi Vikaskumar P. as the team leader.

# *GTU INNOVATION COUNCIL*

Peddling washing machine is an innovative product designed by Prof. V. K. Pandya and his team. It is very useful in rural areas. It saves detergent and gallons of water. It is very easy to operate with less effect of chemicals on the women's hand. Physical exercise is also done while using the pedal. It is very cheap and compact as compared to other washing machines. It is non-polluting and saves electricity.

GTU Innovation Council is tapping the best innovations which have been developed by GTU students and faculties at various colleges and monitoring the ongoing research works by the Innovations Sankuls and GTU's Udisha Clubs at GTU colleges. To create awareness among students and researchers at GTU, the Council is developing modular programs so that a few hundred best innovations can be tried for patents, at PG, UG and Polytechnic levels. GTU Innovation Council will support such frugal and socially viable innovations to get patented for preserving credentials and IPR of the innovators. GTU Innovation Council will support the innovations with some novelty to enable the possibility of mind to market journey .This will lead innovation fuelled techno-entrepreneurship modules in GTU colleges.

- * * * *

***Appendix***

**PATENTS GRANTED TO INNOVATORS FROM DIFFERENT STATES OF INDIA BETWEEN 1976 and JULY, 2004 AT UNITED STATES PATENT & TRADEMARK OFFICE (Total patents granted to Indians at USPTO: 1819)**

| Sr. No. | State | No. of patents filed |
|---|---|---|
| **1.** | **Maharashtra** | **545** |
| 2. | Delhi | 226 |
| 3. | Karnataka | 251 |
| 4. | Andhra Pradesh | 176 |
| 5. | Uttar Pradesh | 166 |
| 6. | Tamil Nadu | 65 |
| 7. | West Bengal | 61 |
| **8.** | **Gujarat** | **51** |
| 9. | Kerala | 50 |
| 10. | Haryana | 45 |
| 11. | Himachal Pradesh | 22 |
| 12. | Goa | 17 |
| 13. | Madhya Pradesh | 12 |
| 14. | Others | 132 |