



Speed Control device

Student Award - Second

Master P Krishnakant **Calicut, Kerala**

Background

A young student of class eleven, Krishnakant (16 years) has made a speed governor, which restricts the speed of a vehicle to a predefined maximum limit by restricting fuel supply.

His father, a commerce postgraduate, works as a lecturer in Government Arts and Science College. His mother is on deputation as a research officer in the Directorate of Arecanut and Spices Board, Calicut. His younger sister is studying in eighth class.

Krishnakant refers to his childhood days as the 'good old days'. He was always fond of studies and had a keen interest in experimentation. He spent his time dismantling toys, studying their construction and then reassembling them back. He used to participate in elocution competitions and science exhibitions, and was always busy with books and hobby kits. His interests lie in electronics and automobiles.

While he was in class four, he joined an institute to do a 45-day preliminary course on electronics. The

minimum qualification for joining course was class tenth but he excelled in the entrance test and the interview, and was successful in securing admission.

There, started his formal love affair with electronics. Since then, he has been participating in science fairs and has developed many gadgets such as hydroelectric power plant, transistor radio, invisible intruder alarm, disco light, light activated switch, electronic bell, and others. For many of these innovations he has won prizes at various levels.

By the time he was in class seventh, he had started reading books on electronics and digital circuits. In 2004, after passing class eighth, he took a one-week workshop in designing from Regional Science Centre and Planetarium Here he learnt about fabrication and development of an idea from concept to product stage. He submitted a model at the end of this workshop and won first prize.

Genesis

In 2002-03, when Krishnakant was in his seventh class, he observed that number of road accidents

in Kerala was one of the highest in the country. Over-speeding or vehicles losing control were the main causes for these accidents. Kerala government thought about introducing legislation for buses and other heavy vehicles, to make use of speed governors mandatory.

Fuelled by his twin passion of electronics and automobiles, he set out to design a device to control vehicle speed. Existing commercial solutions, with average performance, costed a large amount of money making them financially unviable for state transport corporations and bus owners.

He wanted to come up with a better, more reliable yet far cheaper solution. First, he studied existing solutions in Calicut and then wrote a project report that was presented to the DST at Delhi and later on sent to TePP as a project proposal in January 2004. Meanwhile, when President of India visited Calicut to meet schoolchildren, he saw the innovation and suggested to forward it to NIF. Somehow, monetary support by TePP could not materialize but National institute of Technology, Calicut provided support from its internal discretionary fund and the project took off in July,

that same year. Guided by mentors, Dr. K.P. Ravindran and Dr LB Das from NIT, Calicut, he completed the project successfully in June 2005.

Innovation

Krishnakant's speed control device is a microprocessor-based system. The assembly consists of three basic units: a sensing unit, an electronic control unit or ECU and a solenoid valve. The sensor unit is installed on to the gearbox to monitor speed of the vehicle. The valve unit, consisting of a normally closed solenoid valve, is mounted on to the fuel line between fuel injection pump and fuel-filter in order to control fuel supply.

Apart from this, there are two warning units consisting of buzzer systems: the first buzzer rings to indicate to the driver about over speeding and the second buzzer rings when there is some fault with the speed control device.

A variable frequency square pulse, from the speed sensing circuitry, is given as input to the micro

controller. ECU controls the solenoid valve, which directly controls fuel flow in to the fuel injector. Currently such governors are designed for heavy diesel vehicles only.

On the road, when a driver over-speeds beyond a pre-

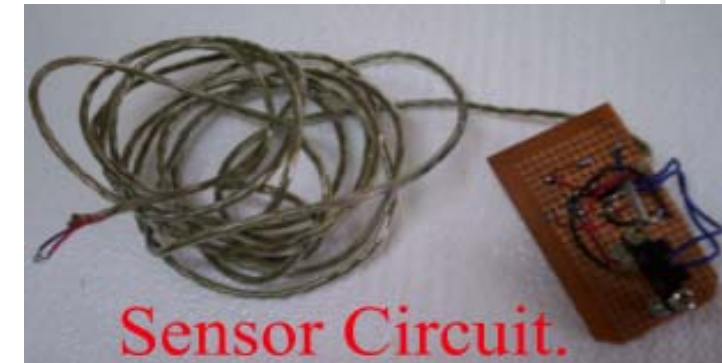
set limit, he gets a warning sound from buzzer unit. If he still persists, then microprocessor sets a trigger automatically to the valve unit in order to block fuel flow to the carburetor, bringing down the speed of vehicle.

In Krishnakant's innovation, an electronic solenoid valve is used, which has far greater precision and reliability than mechanical motor or actuator units fitted in conventional alternatives¹. If this unit is tampered, the vehicle does not move as the electronic solenoid closes automatically. The unit is also more compact, easy to fit into the vehicle and has only a few components' requirement.

In case of other existing speed control devices, fuel control is done indirectly, making the system more complex, costly and less reliable. However, in Krishnakant's innovation, the control of fuel is direct and reliable. He has himself filed patent for his speed-breaking device.

It cannot only reduce the speed like conventional products but can also, automatically, increase the speed when it falls to lower threshold of the band specified. On mass production, this device is estimated to cost less than Rs. 5,000, which is less than one-third the cost of conventional products.

¹ Mechanical Speed governor has been known in the art. Electronics speed governor are also available with different system. <http://www.safety-council.org/info/traffic/truckspeed.html#Anchor-Pu-37384>
<http://www.abcmotorsport.net/c38231/Car-Electronic-Speed-Controllers.html>



<http://www.araiindia.com/upload/whatsnew/StatusofSpeedLimiter310704->

The vehicle speed sensor is built into the speedometer and converts the transaxle gear revolutions into pulse signals, which are sent to ECM. <http://webhome.idirect.com/~trini/car/lim.html>

http://www.rct.net.au/PDF/Brochures/AusProTec/ELECTRONIC_VEHICLE_SPEED_LIMITERS_SBAP1204005.pdf,
<http://www.deltadesignsystems.co.uk/E6%20to%20E30.doc>

US Patent No 5803043 - Sep.8, 1998. US Patent No 4,558,415. Patent No: WO/2002/062610 - 15.08.2002. US Patent No: 3,774,715 0 - November 27, 1973.