Engine of change

TECHNOLOGY: Automobiles could run on fuel of choice—LPG to petrol to diesel to biogas

By Samuel Abraham

As a student of mechanical engineering, Das Ajee Kamath made a wooden model of an engine he thought would revolutionise the automobile sector. But his friends at the National Institute of Technology, Durgapur, ridiculed him for trying to make a 'perpetual motion machine'. This was the scientific slang for quixotic inventions.

Kamath mulled over the concept, joined the merchant navy after a stint with Indian Petrochemicals Corporation in Maharashtra, all the while observing and learning the operations and maintenance of engines, power plants, boilers and turbines in ships. Waiting outside the marine engineer's office in Mumbai one day in 1999, he noticed the patents office next door and walked in.

Kamath, 38, now has the Indian patent for an 'apparatus adapted to perform as compressor, motor, pump and internal combustion engine'. An international preliminary examination report by the European Patent Office accepted his claims on the invention for its novelty, inventive step and industrial applicability. Kamath says he has had a positive feedback from the Central government's Department of Scientific and Industrial Research, Automotive Research Association of India and Tata Motors to make a working model. He is all praise for the Kerala State Industrial Development Corporation which sanctioned him Rs 5 lakh for developing a prototype.

Kamath has spent his life savings, nearly Rs 25 lakh, to make the prototype of his rotary variable compression ratio (RVCR) apparatus from workshops in Kochi. The time to turn the conceptual design into a practical one will depend on the success of the trial run and that alone would help him raise capital for his venture.

"The government and the industry have to help the individual develop the usable engine components and showcase it as a product. It is conceptually very strong," says Prof. Biju T. Kuzhiveli, head of the department of mechanical engineering, Viswajyothi College of Engineering and Technology in Muvattupuzha, Kerala, and consultant at Indian Institute of Science, Bangalore.

Conventional engines are designed to burn one particular fuel only. The choice of the fuel in an engine depends on the compression ratio. There is no way to effectively change the combustion ratio once the engine is designed. The advantage in Kamath's engine is that the degree of compression can be varied. This makes it possible to change the fuel from LPG to petrol to diesel to biogas.

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Reinventing the wheel: *Kamath*

"The higher degree of control on combustion parameters is a new dimension in internal-combustion engines. When it becomes successful, the RVCR technology will have far-reaching implications and revolutionise the automobile industry," says Dr Kuzhiveli, who has worked with the conversion of a Nissan Santra gasoline engine into a hydrogen fired engine during his tenure in the University of Quebec.

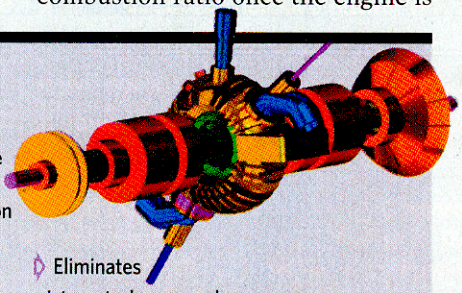
Dr Kuzhiveli says that Kamath's engine may need redesign and fine tuning before it becomes a successfully tested operational engine. "It may take years to mature to a shape of today's internal-combustion engines, which is the result of research and development of more than 100 years," he says. "But RVCR is the solution to the century-old unsolved problem of achieving variable compression ratio. The problem is elegantly solved."

In the contemporary engine, less than half the fuel is actually used to turn the wheels. The rest is lost in the engine's heat and exhaust. Kamath dared to challenge the assumptions that variable compression was impossible. After all, any invention is the sudden end of what other people consider quixotic. ■

BEHIND THE WHEEL

The 'engine' is like a syringe in the shape of a circular ring. The piston here rotates inside the hollow ring. There are two vanes (a fan-like structure) inside the chamber, and compression is achieved by keeping one constant and moving the other against it.

- The engine could run on fuel of choice
- Heavy flywheel and crank-connecting rod absent
- Suitable for small engines, low speed, single cylinder



- Eliminates piston-stroke reversal; saves energy
- Variable compression ratio possible by adjusting vane offsetting while engine is in operation

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