

## EXPERIMENTAL ANALYSIS OF DUAL SI ENGINE (BELOW 100CC) WITH SUPERCHARGER USING A50 FUEL CELLS AND DESIGN

<sup>1</sup>RAHUL KUMAR SHARMA, <sup>1</sup>MANOJ  
SHARMA, <sup>1</sup>SUMEET SINGH, <sup>2</sup>ASHISH JAIN

<sup>1</sup>Department of Automobile Engineering, Chhotubhai  
Gopalbhai Patel Institute of  
Engineering, Gujarat, India

<sup>2</sup>Department of Automobile Engineering, GIDC  
College of Engineering, Gujarat, India

### ABSTRACT

There are abounding inventions aimed at accretion the achievement of centralized agitation engines. In general,- applied engines are consistently compromised by barter offs amid altered backdrop such as efficiency, weight, power, heat, response, bankrupt emissions, or noise. If ability increases ability is consistently decreases. Presently, booze is -to-be actual for use in automobiles as an accession to petroleum based fuels. The capital acumen for advocating booze is that it can be manufactured

from accustomed articles or decay materials, compared

- gasoline, which is produced from

with

non renewable accustomed resources.

Some methods and components are useful for

increasing achievement of engine. One such method

is the use of supercharger in I.C. Engine. It is known

that the ability outputs of an engine increases with the

increase in bulk of air or admixture in the

cylinder and supercharger plays an important role in

increasing the bulk or air. Till now supercharger is

being auspiciously active in abundant engines but its

use with abate engine is still beneath development.

Thus, this activity employing a supercharger

in baby engine with accommodation of about 100cc acclimated in two wheeler bike. In contempo years, the motor car industry aims at the baby sized and top ability body engine, while downsizing (small admeasurement and weight saving) and barometer the advance in ammunition consumption, and cleanization.

**INDEX TERMS:** Supercharging supercharged engine, Ability accession and two achievement engine.

### 1. INTRODUCTION TO SUPERCHARGING

It is accepted actuality that the ability achievement of an engine increases with an access in bulk of air or admixture in the butt at the alpha of compression achievement because it allows the afire of added abundance of fuel. The bulk of air induced per assemblage time can be added by accretion engine acceleration or accretion air body during assimilation stroke. The access in engine acceleration requires adamant and able-bodied engine as the apathy bulk increases rapidly with an increases speed. The

engine abrasion and address endless as well access and volumetric ability and avalanche with accretion acceleration of engine. Therefore this is not possible. Now accession adjustment in which we accept to access the assimilation burden is alleged supercharging. Equipment acclimated for this is alleged Supercharger. The ability achievement is as well be added by accretion the compression ratio, but is as well not adorable as it access the best butt pressure. The bulk of access in best Burden in aeon with added compression arrangement is beneath than the bulk of access in beggarly able burden in case of supercharged engine.

Figure1. Supercharger Therefore added ability can be acquired by supercharger compared with by accretion the compression arrangement for accustomed best aeon pressure. In accession to this the bulk of accretion best temperature is as well low in supercharger engine and this aftereffect in lower thermal loads. In the unsupercharged car engine, if a agent is fatigued by the abutting rod to the basal of the cylinder, a admixture of petrol and air enters the butt via the

© 2017, IRJEMS || PAGE 1

International Research Journal of Engineering and Management Studies (IRJEMS)

Volume: 01 Issue: 01 | Nov -2017  
[www.irjems.com](http://www.irjems.com)

inlet valve and manifold, from the carburetor. This allegation is aeroembolism by the agent during the advancement travel, and is assuredly afire by the atom plug

and burning, exerts a burden on the agent on its 'work' stroke. Now this allegation which was 'drawn in' by the agent can alter in admeasurement for a bulk of reasons. The agent affective down the butt does not draw in

the charge. It permits it to Enter by accepting out of the way.

## 2. DIFFERENT METHODS OF IMPROVING ENGINE PERFORMANCE

The assorted methods which can be active for advance of achievement of an engine are:

1. Increasing acceleration of the engine,
2. Use of college compression ratio,
3. Utilization of bankrupt gas energy,
4. Use of two achievement cycle.
5. Improving volumetric ability of the engine,
6. Increasing the allegation density.

## 3. DIFFERENCE BETWEEN SUPERCHARGER & TURBOCHARGER

Figure 2: Supercharger & Turbocharger Unlike the

turbochargers that crave air-conditioned down time, or warm

up time, the supercharger is accessible to go if you

are. At 2000 rpm, accession is already accessible with a

supercharger. When it comes to fuel efficiency,

superchargers in actuality affectionate of advice to advance your

mileage. The acumen for bigger breadth is the actuality that

you do not accept to drive the engine at full

Throttle due to accessible boost. However, anytime

you drive aggressively, ammunition ability will suffer.

Installation of a supercharger usually takes about 6 to

8 hours. If you are mechanically absorbed and there is

no acid or adjustment required. Superchargers also

tend to endure best than turbo chargers because they

do - not require much maintenance and have a

self contained oil supply. Superchargers accord you

instant accession on appeal and crave actual low

maintenance. With accession accessible at 2000 rpm, you don't accept to watch the

other guy alpha jump canyon you for long. This bureaucracy is ideal if you accept a rear caster drive car with lots of appliance to spare, again the petty ability it steals from the engine is able-bodied compensated for.

#### 4. OBJECTIVE OF SUPERCHARGING

Supercharging is a action which helps to access the assimilation burden of centralized agitation engine. Engines aloft the atmosphere pressure. The capital article of supercharging is to access the air allegation per aeon and admittance the afire of a beyond bulk of ammunition and appropriately access the ability achievement of the engine. It is adopted to accomplish the afterward requirements:

1) To afflicted aftereffect of top attitudes

2) To abate the weight of engine per kW

3) To abate the admeasurement of the engine to fit into bound space

4) To access the ability of an absolute if the greater ability appeal occurs.

#### 5. WORKING OF SUPERCHARGER

A Individual Cylinder, two stroke, petrol engine is acclimated for the purpose of experimentation. The engine is again accompanying to a braiding anchor dynamometer.

Cooling baptize is broadcast alone to the braiding anchor bearing. Necessary accoutrement are fabricated to admeasurement the breeze ante of ammunition and air abounding into the engine cylinder. The agreement plan appear the engine achievement accessory is done in these afterward steps. The acceleration was adapted at burke or accelerator wire absorbed to a screw.

Before starting of the test, the engine was run for 20 account to get stabilization and thereafter stabilization aeon of 20 account was accustomed in consecutive testing.

1. Performance and discharge appraisal of the engine if fuelled with gasoline

2. Performance and discharge appraisal of the supercharged engine with gasoline fuel

© 2017, IRJEMS || PAGE 2

International Research Journal of Engineering and Management Studies (IRJEMS)

Volume: 01 Issue: 01 | Nov -2017  
[www.irjems.com](http://www.irjems.com)

3. Performance and discharge appraisal of the supercharged engine with gasoline booze blend. Figure 3: Sectional View of Supercharger The bulk on the engine is assorted from no bulk to 10, 15 and 18 kg

of load. The acceleration was kept affiliated for the readings to be- taken. The readings were taken at the acceleration of 700 2200 rpm respectively. Booze in 10 percent is alloyed with the gasoline so as to abbreviate animadversion and convalescent emissions. Afterward account were taken for anniversary bulk and affiliated acceleration of the engine. Time in abnormal for 10 cc ammunition consumption

Manometer account in mm to admeasurement the air breeze Bankrupt gas temperature

Percentage of HC, CO of the bankrupt Anchor ability and torque of the engine

Thermal ability Volumetric efficiency

Brake Specific Activity Afire Figure 4: Supercharger affiliated to an Engine

## 6. TECHNICAL SPECIFICATIONS OF ENGINE

Item Technical Data

Type Two achievement individual Cylinder

Model Suzuki

Make Max 100

Bore x Achievement 50 mm x 50 mm

Compression arrangement 6.7:1

Max. Ability 7.8bhp@5500 rpm

Intake arrangement Reed valve

Lubrication Suzuki CCI

Ignition blazon PEI(Electronic)

Method of Cooling Air

## 7. RESULTS AND DISCUSSION

Figure 5: bulk vs anchor specific ammunition afire Figure 6: at 18kg bulk anchor specific ammunition consumption

Figure 7: Indicated thermal ability vs rpm

Figure 8: automated ability vs rpm

Figure 9: Anchor ability vs rpm

Figure 10: anchor thermal ability vs anchor power

## 8. CONCLUSION

1. Automated ability increases 11.2 – 19.5% with supercharged engine- .

2. Anchor ability increases about 2 5% with rpm appliance booze alloy supercharged engine.

3. Knocking will be accent at top speed, but can be minimized by appliance altered allotment of ethanol, by appliance calefaction exchanger ,air cooling & some modification in by itself aspirated engine, supercharged appliance get influences in all acreage of centralized agitation engine by access added ability from accustomed admeasurement of the engine.

4. With access in bulk anchor specific ammunition afire decreases for both engine with & after supercharger.

5. Brake specific ammunition afire with supercharged engine increases by 28% with access in rpm.

6. Literature analysis shows accident of automated ability to drive the supercharger at low speed.

7. Performance of supercharged engine will be abnormally afflicted by huge bulk of thermal losses and increases beggarly able pressure.

### ACKNOWLEDGEMENT

We would like to sciencerly accede the encourageous efforts of our adroitness associates & convention Chhotubhai Gopalbhai Patel Convention of Technology, Bardoli. We aswell wish to extend our ardent

acknowledgment all my accompany for their amicableness and their moral support.

### REFERENCES

[3] E. Codan, C. Mathey, 'Emissions – A new Challenge for Turbocharging', paper no. 245, 25th CIMAC Congress, Vienna 2007.

[4] The Engineering Society For Advancing Mobility Land Sea Air and - Space. Supercharger Testing Standard SAE, 2005 08.

[5] Chang Sik Lee, Ki Hyung Lee, Dong Hyun Whang, Seo Won Choi and HaengMuk Cho "Supercharging performance of a gasoline engine with a supercharger" International Journal, vol II, No. 5, 556~564, 1997.

[6] J. Navratil, M. Polasek, O. Vitek, J. Macek, P. Baumruk, "Simulation- of supercharged and turbocharged small spark ignition- engine", J. Middle Eur. Constr. Des. Car (2003) 27 3.

[7] YutaNiva, Tomo KazuNaruta, Yuji Akiyama "Reasearch and development of electric supercharger for mini vehicle" electric machine and system, 2008, ICEMS 2008.

[8] Guzzella, L., Wenger, U., and Martin, R. "IC Engine Downsizing and PressureWave

Economy", SAE Technical Paper 2000-01 1019, 2000, doi:10.4271/2000 01 1019, SuperchargingforFuel

[9] Milburn, S., "Introducing a High Efficiency Variable Positive Displacement Automotive

Supercharger", SAE Technical Paper 940845, 1994,

doi:10.4271/940845.

[10] Jae Il Bae, Sin ChulBae, "Study Of Engine

Down Sizing Using A Mechanical Supercharger", Journal of mechanical science and technology(KSME- international journal) vol 19, no 12,pp 2321.

