

SCRAMBLER: A TYPE OF MOTORCYCLE

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Abstract: In the present scenario motorcycle become major need for travelling. There are various types of motorcycles available in the market. This paper revolves around a specific type of Motorcycle known as Scrambler. Today in the custom bike scene, a scrambler is a healthy mix of a (retro/old) bike with a higher than average riding height and shocks, and dual-purpose tires, stripped down to the bare essentials. Back in the day, there were no dirt bikes, you had to build your own out of a regular road bike, and that's how the scrambler genre was born.

We wanted to create or build a motorcycle which could be categorized into Scrambler type Motorcycle. We have used a Royal Enfield Classic 500 as a Base motorcycle. Keeping the frame of the motorcycle stock, changes in components have been done to improve its performance and we have made it lighter. All the Customizations done on the bike helps it to tackle on both off-road and on-road conditions.

The current market for such motorcycles is increasing and we want give a detailed review of these Motorcycles.

1. INTRODUCTION

The Scrambler motorcycle is a type of bike which isn't easy to place in a box. So, to give the scrambler bike a clear explanation isn't easy either. But one thing is for sure – it's a bike built for off-road and street use. Scramblers may seem like a new fad, but they've actually been around for a really long time. The scramblers you see becoming so popular now are a kind of "2.0 version" of the scrambler, a style resurrected from its heyday during the 1960's and earlier. Scrambler race courses meant that the bikes had to be able to transition seamlessly from road to widely varying terrain, then back to road again. To make the bikes suitable for these all-terrain races, bikes were stripped down to shave weight for speed, given taller suspensions, fitted with spoked wheels and knobby tires, and high exhaust pipes for ground clearance. But let's not forget, every aspect of a scrambler's look is done for a reason. Clocks are generally small and close to the handlebars. The handlebars themselves are wider and braced across their width, Headlamps are smaller and mounted on shorter brackets. Exhausts tend to be high level, seats shorter and sometimes thicker, whilst wheels are invariably spoked on aluminum rims.

2. METHODOLOGY

Scrambler motorcycles were first intended for American use. However, its use also became popular in Europe. These motorcycles have been continuously modified since it has been created up until 1968. Interestingly, the very first version was 250cc while the second was 350cc. Starting 1968, the third version of the scrambler motorcycle with 450cc was already out on the market. The original scrambler motorcycles would look a lot like café racers, in which club racers in the early 20th century would modify the standard motorcycles to be able to cater to extreme racing conditions. In fact, café races would also mean that riders drive through mud, fields, streams, and other off-road tracks. The first scrambler motorcycles include bikes that come with "Desmo" cylinder heads, in which technical alternations continued until the year 1974. After that time, the production of the scrambler motorcycles has ceased. While they did not offer speed, these motorcycles had excellent frames and a rugged engine that served its purpose well, in addition to its great visuals, its centre riding position was also very popular, making it a delightful motorcycle to ride at the time. It came in bright colours, as well as a chrome gas tank, which added a more stylish appeal. It was also considered a balanced motorcycle with its American and European characteristics. [1]

We have used a Royal Enfield as our base model. These modern scramblers have morphed into something else. To be a scrambler in the classic sense of the term a street bike needs more than a high pipe and some dual sport tires. It needs to be light weight otherwise it's not as much fun to play around with. It needs to be stripped down and at least look like it could be repaired off-road with a simple tool kit. Only the RE fills the bill, especially because it's inexpensive compared to other bikes available in market, hence we chose the Royal Enfield as it is one of the most sold bikes in India.

The changes done are as follows:

1 Tires

The stock bike uses MRF zapper tires. We have upgraded the tires to CEAT Gripp. With usage, a new bike tyre eventually wears out, and tends to slip or skid when on the road. The ride is no more completely safe, and the rider has to be cautious when riding on an old tyre. With CEAT Gripp, the rider's safety will never be compromised, even if the tyre is old. A technological revolution, Gripp provides Everlasting Grip, and holds the road as firmly as a new tyre would, even when it has become old. The tread of Gripp tires is made up of two compound layers which provides strong traction on both wet and dry surfaces. These tires provide a wobble free and comfortable ride. We kept the rim sizes stock but these tires have knobby thread pattern which increase the ground clearance of the bike.

2 Fork-Gators

Fork gaiters are a motorcycle accessory. They protect the bare metal of the front fork tubes from damage by stones, bugs, dust and other debris. The fork Gators give out an aesthetic look to the Motorcycle. They are of great advantage for bikes used in off-road trailing and in dusty conditions.

3 Handlebar

We replaced the stock handlebars with Motocross type handlebars or RD type bars easily available in market. The handlebars themselves are wider and braced across their width. This type of handlebar is being used in the motocross and off-road motorcycles. There are tubular bars along with a

cross-brace to prevent torsion or over twisting. This new handlebar helps to reduce vibration caused on the hands of the rider and give better handling under all road conditions.

3 Fuel-tank

The fuel tank of Classic 500 is on 13.5 litres. The circumference of the tank is much larger than what is required on an off-road spec motorcycle. We decide to use Electra tank because it is slimmer in shape and also doesn't varies much in capacity. Instead of customizing a newer tank, we opted for other model of royal Enfield tank cause the fittings are same and they are easily available and also cheaper than the whole process of making a new tank. The fuel tank of Electra has a capacity of 13 litres. Also the Royal Enfield DNA stays intact. The slimmer tank is useful to grip your thighs. Also on off road patches our legs stay closer to the bike which improves the handling of the bike.

4 Air filter

The purpose of the air filter is to shield the engine from dust and debris in air and improve airflow. It is also designed to enhance acceleration and raise the horsepower of the motorcycle. A motorcycle requires air to fuel its fire in the engine.

There are three main types of filters for motorcycles: paper filters, foam-filters, and cotton filters. We have use Cotton type Air filters because, Cotton air filters are actually made of cotton fabric which is strong, breathing material and fine enough to filter the air really well. They are used in all the performance bikes because it allows for the best air filtration and that too at a very rapid rate which allows for better performance of the machines.

5 Custom Seat

For vibrations and discomfort there are two major reasons we found. First is seat and second is handle. Both combines to create problem with sitting posture. Despite the fact that seats comes with springs it is not comfortable. Springs pushes back while riding which gives backpain. We designed a seat which was well cushioned and Also comfortable for short riders despite increase ground clearance. Our seat has narrow saddles, which enable greater leg extension. Narrow saddles

actually make it easier to touch pavement. We also changed the subframe to accommodate newer seat.

6 Headlight Grill

Headlight grill or cover is a small accessory but useful for off road purposes. Headlight covers are aftermarket modifications made from a variety of materials (e.g., metal, polycarbonate, ABS plastic or self-adhesive vinyl film). We made a custom headlight grill from Stainless steel. It is applied over the headlight of a bike in order to protect the lenses from stone chips, bug splatters, pedestrians and minor abrasions.

7 Rear Shock Absorbers

Shock absorbers are pump-like devices which keep your vehicle's tyres in contact with the road surface by controlling the rebound of its suspension springs. Royal Enfield classic 500 uses a twin gas charged shock absorbers at the rear. However if a shock has to react very rapidly to an up and down motion the hydraulic oil can start to foam. This foam causes the shock to lose some of its control. The purpose of the gas in the shock is to keep the oil under pressure so it is less likely to foam. This makes the ride feel hard. A shock absorber dampens or slows down this motion and keeps the spring under control. It makes the ride much more comfortable and a lot safer. Regular shocks offer good control with a focus on a comfortable ride. Hence we used Gabriel Rear shock Absorbers. These shock absorbers have longer travel suspension that will be able to dampen the effects of rough off-road riding situations.

8 Exhaust

We have changed our stock Silencer so that we could attain a sporty look and also increase the ground clearance. We used a Megaphone exhaust which is made of stainless steel and it is highly durable and strong material. There are mainly three types of silencers namely; Glasswool, ceramic wool and free flow silencer. We opted for Ceramic wool silencer because they are more durable than glass wool and it has a higher thermal insulation capacity.

9 Custom Battery Box

The stock bike and storage boxes for switches and tool kits. We removed the boxes to reduce weight. We made a cylindrical box for the battery and electricals. This box uses lesser space and also reduces the overall weight of bike by removing unwanted weight.

10 Body panels

The bike was reduced to minimum body panels. All the extra weight was removed and both front and rear fenders were made from mild steel and given aluminium polish. The newer fenders are shorter and lighter than stock Fenders and this gives the bike a overall stripped appearance.

With the help of these customization we were able to build a Scrambler out of a Classic 500. The overall seat height of the bike is 780mm which is less compared to stock seat height of 800mm. The ground clearance has increased a lot which will help in off road areas. The current ground clearance of the bike is 255mm which more than the stock Ground clearance of 135mm.

3. DISCUSSION

We have researched about the sales of scrambler motorcycles in India and also about the royal Enfield sales in India. Best scrambler bikes available in the market:

- Ducati Scrambler (9.93 lacs)
- Indian ftr 1200 Scrambler (15.49 lacs)
- Triumph scrambler xe (10.73 lacs)
- BMW RnineT Scrambler (15.40 lacs)

But all these bikes come with a heavy price tag which only a few could afford. the prices vary from 6lacs to 24 lacs. The main purpose of our project is to build a scrambler bike considering economical and environmental factors. [2]

Here are some reasons as to why you should own a scrambler

Perfect Adventure Bike: The Scrambler motorcycle is a great bike to own if you are a rider who loves to go on fun rides. Its vintage style and torquey engine make for the perfect beginner adventure bike. These bikes can race through fields, mud, dirt and

on roads. Wherever you want to go for an adventure the scrambler will handle any terrain.

Take On and Off-Road: With the Scrambler, there is no need to own both a street bike and a dirt bike. This bike can race through the road and go off-road as well. Its small size makes it easy and more comfortable for the rider to transition between road and dirt in any scenario. Keep in mind it is still a street bike so the weight can be a factor but gravel, service and fire road cruising its a blast!

Comfortable Riding Position: Although you can take the scrambler on both street and off-road, the bike is not made like the angular, more purpose-built dual-sport machines. The Scramblers have a more comfortable riding position than any other dual sports bike. Its high and wide handlebars encourage a confident and broad-chested posture that's comfortable and gives you great visibility plus when you stand up the handles are right where they should be. The low seat is also easy to hop over and makes the bike feel more welcoming.

Fun to Ride: The Scrambler motorcycle actually checks a lot of the boxes for the way most people ride. The majority of motorcycle riders own bikes because they want something that will allow them to commute to work/school, run errands, take rides with friends on weekends, get away to the beach or mountains etc. This bike is fun to ride and will allow them to do all of those things and more. The Scramblers delivers a combination of style and fun at a reasonable cost for all motorcycle enthusiasts to enjoy. The Scrambler has become one of the best selling motorcycles in the Powersports industry because of its great vintage style and overall fun rides.

3.1 MARKET SURVEY

The global off-road motorcycle market has the potential to grow by 124.95 thousand units during 2020-2024, and the market's growth momentum will accelerate throughout the forecast period. This report provides a detailed analysis of the market by geography (APAC, Europe, MEA, North America, and South America) and application (recreational and defense). Also, the report analyzes the market's competitive landscape and offers information on several market vendors including Benelli QJSrl,

BMW AG, Ducati Motor Holding Spa, Honda Motor Co. Ltd., Kawasaki Heavy Industries Ltd., KTM AG, Piaggio & C Spa, Suzuki Motor Corp., Triumph Motorcycles Ltd., and Yamaha Motor Co. Ltd. [3]

Royal Enfield is running hitting record sales year after year, expanding the global distribution, image and customer base, while keeping live one of the oldest line-up actually in the World. They have been able to generate values remaining "old" in a World driven by youth. Royal Enfield recent years sales score is impressive, having benefit from the boom of Indian market, where Royal Enfield is – by far – the leader in the mid-engine size motorcycles, with sales grew up from 469.741 sales in the 2012 to a record – the sixth in a row – of 846.000 in the 2018. The development of Indian market has been the priority for many years and just recently the brand dedicated attention to the rest of the global market, aiming to create a more global brand and differentiate the risk, actually fully dependent by the domestic market trends. The limit of being fully dependent by a single market was shown clearly by the 2019 result. In fact, due to the first decline of Indian market in years, TVS global sales fell down a huge 18% at 716.000 units. Indeed the 2019 confirm the fear regarding the too high correlation between the company performance and the domestic market. After years of growth, India is losing considerable as two-wheels domestic market, hitting the Royal Enfield performance, despite an outstanding growth of the international business. Sales in India deteriorated by 19.2% and considering this market represents the 97% of total sales, the performance in other markets was not able to minimize the lost. In the other markets, the trend was positive growing in all regions: +22% in ASIA (China, Japan, Korea, Taiwan), +16.7% in North America (US, Canada and Mexico) and +82% in Europe, with sales booming in the United Kingdom (+221%), actually the second best market in the World, and in all markets, including Germany (+73%), France (+82%), Italy (+24%), Spain (+59). Although the almost negative market trend, Royal Enfield is fast growing in South America as well, with Argentina +269% and Colombia +40%. [4]

We have concluded that Scrambler motorcycles are back in market and the market for them is increasing. People usually build their own

scrambler motorcycle. Royal Enfield is one of the fastest growing company around the world and we have decided to use it cause building a scrambler through a consumer point of view is efficient only when using royal enfields. Royal enfield are the best options to be used for converting a bike into scrambler.

Conclusion

Now that we have reached the end of the discussion, we hope that we have shed some light on what a scrambler motorcycle is, considering that it has resurfaced in the last decade. It might be difficult to understand at first, but with the detailed description that we have provided, we hope that you will be able to distinguish it apart from other popular motorcycles today. We have build a Scrambler with all the required points. Today, scrambler motorcycles are very popular, especially in the customized bike scene. More and more manufacturers are catching on with the craze, as well. Several motorcycle companies are not releasing great-looking scrambler models that you buy right away, even off the showroom floor. So we have built one bike which can be affordable comparing with rest of the scramblers in market and surely increase the grin-factor.

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