International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 02 | February - 2024 SJIF Rating: 8.176 ISSN: 2582-3930

DYNAMIC INTEGRATION OF BICYCLE DESIGN

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ABSTRACT

Bicycles have been an essential mode of transportation and a source of recreation for centuries. In recent years, the field of bicycle design has seen a paradigm shift with the introduction of dynamic integration. This innovative approach focuses on seamlessly combining various elements of design to enhance both performance and user experience, setting a new standard for the cycling industry.

Cycling also offers a reduced consumption of fossil fuels, less air or noise pollution, and much reduced traffic congestion. These lead to less financial cost to the user as well as to society at large. In Bicycles by using simple pedaling travelling longer distances is difficult, on an average a normal person can travel 10-15 km by using bicycle, but usingthe contemporary ways i.e., mounting an I.C engine on bicycle one can travel longer distance. A motorized bicycle is a bicycle with an attached motor and conveyance, usedeither to power the vehicle unassisted, or to assist with pedaling. Since it always retainsboth pedals and a discrete connected drive for rider-powered motive force

In this demonstration a 2-stroke I.C engine is mounted on a bicycle, it create low pollution when equate to motor bikes. The engine is mounted at the middle of the bicycle and by using the chain the engine is associated to the rear wheel. By using thesekind motorized bicycles we have serious prospect to decrease the pollution and traffic (because it occupies less space than motor bikes), and human efforts bicycles and increases the health of human.

Key words: Two Stroke Engine, Bicycle, Eco-Friendly, Human Effort.

1. INTRODUCTION

In current trends utilization of a motor cycle for little and various purposes is outcome in using of fuels in addition than necessary. Which in turn is effecting environment adversely up to some extent. To avoid such undesired affect, a bi-cycle would be the best option for such small moderate distances. But at-times while riding bicycle uphill, there comes the need of more

Man power to ride atop. The person while riding bicycle uphill has to use more force and hence gets exhausted i.e. by pedaling more. The force essential is high and it has to be reduced by some form of energy. Hence there is a need to develop a bicycle powered by some energy. The energy used for this requirement should be an Ecofriendly. Hence an engine which is operated on fuel smolders can be used and the fuel mixtures being eco-friendly should be used.

The motorized bicycles are already used in some other developed countries such as Australia, Canada, France, Greece, Russia, United kingdom's, and United States. The legal definition and status of motorized bicycles using internal combustion engines differs from nation to nation, and in some cases, on local rules and regulations. Such as In Greece, riding a motorbike or motorized bicycle with a gasoline motor under 49 cc is permitted for persons over 16 years old and does not in need of a permit.

2. PROBLEM STATEMENT

The wealth of India relies to a large scoped on the wheels of transport. The specter of economy ruin due to depleted oil reserves has changed the interest of scientist and research work towards alternative fuels for motor vehicle. The share of petrol consumed by motor-cyclesis relatively more when compared to other mode of consumption. Among this, the usage of motor-cycles for pity issues is relatively note worthy.

The discharge consists of dangerous gases like CO, HC, NOx, which give rise for pollution. The emission of these gases has to be controlled by some other techniques that control these excretions and the best method can be by growing motorized bi-cycles which combust fuels only when mandatory

3. ASSEMBLING

3.1. Installation of Crankshaft Bearing in Crankcase

Begin assembly by working on crankcase. In most two stroke IC engines, crankshaft is hold up only on one conclude by bearing. If removed crankshaft's help bearing from crankcase, need to put back before can renew. In most cases, bearing consists of ball bearing with seal built into it.

To install bearing, place into hole in crankcase. Bearing will usually fit hard into hole. To fully seat bearing, usually have to tap into hole. A seal driver can be used to tap bearing into place. Deep socket of correct size will work also. When tapping on bearing, on every occasion tap on outer race region. Never tap on inner race; tapping inner race can disfigure bearing.

Frequently engine will have metal retaining ring that fits into groove right beyond bearing. Even though bearing may fit hardly in hole, retaining ring may still be important. Aluminum crankcase will swell when gets very warm. If no retaining ring, bearing could work free. So recall to insert retaining ring once bearing in place. Can make use of pair snap ring pliers to pull ends ring with each other when inserting into groove

3.2. Installation of Crankshaft

Now that bearing for crankshaft in place, can set crankshaft can now examine clearance attach rod bearing. To findout clearance, would calculate outside diameter of post on crankshaft and inner diameter connecting rod. Won't be able to check clearance by installing connecting rod and using fillergauge because most two stroke connecting rods one piece. Gauging plastic would smudge when pushed one piece connecting rod onto post. Therefore it must measure inside and outside diameters to find clearance.

After confirmed proper clearance for rod bearing, fit other end crankshaft through its bearing in crankcase. Push in crankshaft until all the way opposite bearing.

3.3. Attaching Piston to Connecting Rod

After examine clearance of rod bearing and installed crankshaft, can be transformed into piston and attach rod assembly. First stage in place assembly back jointly is to attach piston to top connecting rod. First insert terminate connecting rod into piston so holes for wrist pin line up. With holes line up, slide in wrist pin to fasten connecting rod to piston. Wire retainers used to stop wrist pin from move smoothly out of piston. Wire retainer fits into a groove on every hole on either side piston just past end of wrist pin. Can install wire retainers with needle nose pliers. If don't install retainers, pin could effortlessly copout piston and into cylinder wall, bring about severe harmto cylinder.

3.4. Setting up Piston Ring End Gap

Must inspect and modify end gap on each piston ring so can put rings on piston. Plan of action is identical to one used on four stroke. Place ring into bare cylinder (without piston) and quantify end gap with feeler gauge. Fine-Tune end gap as needed by filing ring towards lower position with either special ring filing tool or standard fine file.

3.5. Installation of Piston rings on Piston

Once rearranged end gap for each ring, place rings on piston. Since two stroke pistons and rings entirely small, can very likely rollout ring by hand as place on piston. If not, use expander tool.

Since oil and fuel ordinarily mixed in two stroke, crankcase as a general rule won't have oil reservoir. So won't generally find oil control ring on piston two stroke engine. Since piston naturally small, may only find one compression ring. Single compression ring frequently all that's needed to continue effective seal. Once compression ring in place, prepared to install piston rod gathering in cylinderpot.

3.6. Installation of Piston and Connecting Rod Assembly

With four stroke, piston commonly installed from top cylinder. In two stroke, ought to installed from lowest part because cylinder head part of cylinder bore and cannot be spliten up.

Installing piston in two stroke very simple: piston pushed up into place from bottom cylinder. In two stroke, bottom of cylinder usually narrow. Narrow makes installing piston uncomplicated. With four stroke, need tool to squeeze rings. With two stroke, taper make a move as built in ring compressor.Taper means cylinder will be broad enough to receive both piston and rings. As youpush piston uphill, lessen taper will squeeze rings to fit cylinder. To make sure piston will slide comfortably into cylinder, should first coat external surface of piston with oil.

3.7. Fastening the Cylinder to Crankcase

Fasten whole cylinder assembly to crankcase accompanied by bolts. First place cylinder gasket into place on peak of crankcase. Once gasket is placed, insert end connecting rod via top crankcase, and skate over post on crankshaft. Be conscious that piston and rod must be positioned a certain way in cylinder when fix connecting rod to crankshaft. With typical two stroke, skirt of piston cut away more on one side than

other. Skirt cut to allow clearance for balance weight on crankshaft. Need to revolve piston in cylinder so cut away bit between crankshaft and internal side of connecting rod. If don't orient piston accurately, attach mistaken side rod to crankshaft, balance weight will strike piston skirt as crankshaft turns.

Once connecting rod appropriately attached to crankshaft, cylinder pot can be bolted to crankcase. As attach cylinder pot, ensure holes in gasket and pot remain lined up with mounting holes on crankcase. Once every single item in place, insert retaining bolts into holes and make more secure to real torque specifications.

3.8. Mount the Blower Housing Bracket to Crankcase

Majority interior engine components come together. Turn to outerside components. Begin with bracket for blower housing. On classic two stroke, blower housing mounted on bracket that devoted to crankcase. Generally bracket carrying towards to crankcase underneath flywheel. If bracket mounted less than flywheel, must install earlier to flywheel. Recall to secure bolts to real torque specifications.

3.9. Installation of Flywheel

Now can locate the flywheel. Flywheel key generally used to protect flywheel from rotating on conclusion of crankshaft. To make sure flywheel correctly installed, must place flywheel key in aperature on endof crankshaft. Make use of small hammer, softly tap key into slot to make definite key is properly seated. Can line up key with slot in interior side flywheel. At the end slide flywheel over crankshaftinto place.

Formerly flywheel in place, can install flywheel hold on to nut. Can use usual wrench to snug down retaining nut, then secure to formal torque descriptions. In many occasions, need to use flywheel container to retain flywheel from turning as completely secure retaining nut.

3.10. Installation of Ignition Module

At one point installed flywheel, can fix ignition structure. Many engines will use electronic ignition system ascend near outer border of flywheel. To install, would directly bolt ignition module into place. On few engines, no adaptations require to be made to position module. Are some engines where will have to set air gap in the time of installation. Would need to set air gap using normal paper or plastic air gap gauge.

3.11. Installation of Motor's Back Plate and Fuel Tank

Next step in reassembly to install motor's back plate. On most small engines, back plate used to seal side of crankcase. Back plate usually made of plastic or aluminum. Since crankshaft in two stroke typically supported only on one end, back plate won't usually contain crankshaft bearing.

In some engines, back plate has additional function. Used to hold fuel tank in place. Fuel tank placed into position on top of engine and back plate then installed. Once plate's four bolts are tightened, plate holds fuel tank in place.

3.12. Installation of Carburetor and Reed Valve Assembly

Another function of back plate in some engines to hold reed valve. Valve acts as check in intakeport of engine. On sample engine, reed valve attached to inner side of back plate. On other engines, reed valve may be mounted directly under carburetor.

As in most two stroke, carburetor in sample engine attached directly to back plate of engine.When attaching carburetor, don't forget to install gasket usually located between carburetor andback plate.

If engine has reed valve directly under carburetor, make sure valve is in place beforeinstalling carburetor. Once have installed carburetor, attach fuel line that runs from fuel tank through back plate. Fuel line will carry fuel to carburetor.

3.13. Installation of Air Cleaner

Figure 1 Engine mounted on bi-cycle

Once carburetor in place can install air cleaner element and housing in most cases, air cleaner will mount directly over carburetor.

3.14. Installation of Muffler

Next install muffler assembly. Purpose muffler to reduce noise exhaust gases leaving engine. Muffler attached to engine's exhaust port. In sample engine, muffler held in place by three retaining bolts. Simply place muffler in proper location and line up holes for retaining bolts. Insert bolts and tighten.

3.15. Installation of Recoil Start and Blower Housing

At this point, reassembly about complete. Next must install blower housing. In most engines, blower housing contains engine's pull start mechanism. When rewind starter installed, tabs called pulley tangs are bent over assembly to hold it in place. Pulley can thus rotate without getting out of position underneath housing. Pulley has to stay aligned with eyelet or hole in blower housing through which rope must pass. Outside blower housing, end of rope would be knotted into pull starter grip. Spring, like the rope, has one end attached to pulley. Spring attempting to uncoil within housing turns pulley and retracts rope. Grip acts as brake on retracting rope.

After attaching spring onto pulley, can begin winding spring into housing. Use rewind starter tool to wind pulley counterclockwise until spring wound tightly.

Careful not to wind in spring too far. If free end slips into housing, spring will uncoil and you'll have to begin processof winding spring up all over again.

When spring wound appropriately, lock free end into tapered retaining slot or separate retainer within blower housing.

Spring, pulley, and inside of housing should have been cleaned thoroughly before started reassembly.

Some technicians will straighten spring to allow easier installation and restore tension to spring.

Rewind starter tool can be made out of square wooden dowel or piece metalstock.

Once finished winding spring, can install rope. Before installing rope, inspect it. Replace if frayed. If you're reusing old rope, consider burning pulley end of rope with match to slightly melt end and prevent from unraveling.

When do this, melted matter at end rope may run together and cause end to swell. To keep this from happening, wipe end of rope with waste cloth while burned end still hot.

Figure 2 Exhaust system

On almost all two stroke engines, blower housing is mounted over flywheel. In most cases, housing fastened to crankcase with series retaining screws.

To install housing on engine, would place blower housing over flywheel area and insert and tighten screws holding it in place.

3.16. Installation of Spark Plug

Now that engine completely reassembled, can install spark plug. Because most cylinder heads or pots made of aluminum, threaded areas can be easily damaged. To lessen possibility damage,start spark plug into hole by turning with fingers. Once spark plug threaded, spark plug socket and ratchet can be used to tighten, and torque wrench used to insure reaches torque specifications.

4. MOUNTING OF 2S I.C ENGINE ON TO A BICYCLE

4.1. Mounting Engine to your Bicycle

The engine mounts in the bike frame "V" above the peddle wheel sprocket. Consider using Masking or Duct Tape on the front down-tube & seat tube of your bicycle to protect the paint finish while test fitting the engine to your donor bike.

If the distance between the two bars exceeds the engine mounting span then additional spacers or welded brackets are required.

Chain Wheel Sprocket Installation

The Drive Chain Sprocket has a 36.9 mm dia. center hole and mounts on axel hub on the left side of the rear wheel against the spokes dish side in. The sprocket must fit over the hub in a perpendicular plane with the axle. This insures that your rear chain sprocket spins true with the rear bike wheel.

Applying thread adhesive and equal tightening of the sprocket bolts:

This keeps the chain sprocket true with axle and free from wobble while spinning. With bike upside down spin wheel and check sprocket for wobble. The chain can jump off the sprocket if the sprocket installation is done incorrectly.

For kit sprocket installation, locate sprocket on axel hub with curved side next to spokes, shiny side in.

If not pre sliced, cut the rubber isolator to the center, in order to fit INSIDE the spokes and around axle. Install the split steel retainer plates next to the rubber isolator and insert 9 bolts.

Secure with 9 bolts compressing the chain sprocket to the spokes. Note: Rubber isolators may be needed on both sides of sprocket for chain alignment on some non-coaster brake bikes.

The Chain Sprocket on the Wheel must align

within 1/2 cm to the Chain Sprocket on the Engine.

The wheel chain sprocket is mounted with teeth-out and dish-in next to spokes.

The drive chain can be easily shortened to the correct length. Special tools are required to remove and replace the master link when shortening the chain by removing links. Ideally, both your pedal drive chain and your engine drive chain should have the same tension.

Remove left rear cover plate from engine. This is the plate next to and under the clutch swing arm.

Use supplied spark-plug wrench to turn engine crankshaft sprocket to feed chain around it. material and may fracture.

Fit chain, measure and remove excess links to assure proper length. Proper length is when top side of drive chain has ¼ inch to ½ inch deflection with the bottom side of the chain loop tight.

1. Chain tension adjustments can be made by moving rear wheel. If both chains can be made to have equal tension then installing the idler assembly will not be necessary. Mount the chain idler on the wheel strut if the engine drive chain cannot be made as tight as the pedal chain.

4.2. Ignition Coil and Engine Kill Switch Installation

1. Mount CD ignition coil on bike frame, close enough to attach coil wire to spark plug. Mount as far away from exhaust pipe as possible to avoid heat damage to semiconductors in CDI module.
2. Attach CD ignition coil wires to same identical color coded wires coming from engine.
3. Install Engine Kill Switch on the handlebar or use kill switch on left hand grip. Attach kill switch wire to white wire coming from engine. This will ground ignition and stop the engine when the red button on the kill switch is activated.
4. Route all wires away from engine exhaust heat. You may secure wires with a plastic zip ties (not provided).

4.3. Clutch Cable Installation and Adjustment

1. Install clutch lever to left side of handlebar and attach cable end to lever.
2. Squirt oil down the cable sleeve: Route clutch cable through the ball-mount on motor with the big spring around the cable jacket and ahead of the ball mount. The big spring serves as a cableheat shield.
3. Insert cable wire through small spring and route through clutch arm and attach brass cable-end and screw. Adjust cable tension to allow very slight play in lever. Handlebar clutch lever or twist clutch must be in the released or outward position to complete this operation.

4.4. Carburetor and Throttle Installation

Be sure to check carb. Air cleaner attach screws for tightness before installing engine. Air cleaner screws coming loose and entering engine is not covered by warranty.

The small stop on the cable wire slides through the long groove of the carburetor brass cylinder slide.

It held in a slot at the end of the cylinder. The spring is placed inside the cylinder slide and is compressedwhen the throttle is twisted.

The spring then forces the throttle to return. For this to work properly the throttle must twist freely on the handlebar in both directions prior to the cable being installed.

1. Install twist grip throttle on right side of handlebar end. On some bike handle bars it may be necessary to ream out the handle ID to fit the bar so that the throttle will twist freely.
2. After installing cable inside the carburetor mount it on engine intake tube and tighten clamp screw. Mount carburetor as level as possible.

4.5. Fuel Tank Installation

1. Attach fuel petcock to tank. Use Teflon tape to seal threads. Careful not to strip threads.
2. Mount tank on bike top crossover frame with two supplied brackets and nuts.

5. ADVANTAGES

- Cheaper than any car/motorcycle
- Way easier than pedaling
- Easy to work on
- Easy to maintain

6. RESULTS AND DISCUSSIONS

Dynamic integration in bicycle design represents a transformative shift that goes beyond aesthetics, focusing on the synergy between form and function.

This approach not only pushes the boundaries of innovation but also sets a new standard for

performance, comfort, and sustainability in the cycling industry.

As technology continues to advance, we can expect even more exciting developments in the dynamic integration of bicycle design, shaping the future of cycling for enthusiasts and commuters alike In the end a two stroke petrol engine to the bicycle along with speedometer, shock absorber, clutch cable, acceleration cable etc. are come together to the bicycle

Figure 3 Final 2S Engine fitted bicycle

. The motorized bicycle is slight weight and settled less space compared to and also gives additional mileage when compared to motor bikes. These are the main lead of the motorized bicycle. It gives result expected

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