

## Review on Kinetic Energy Recovery System

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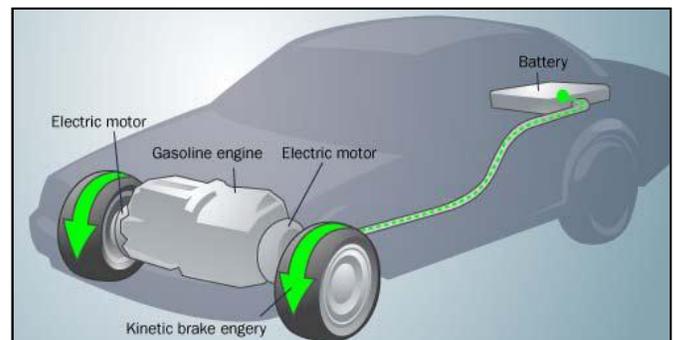
**Abstract**— Natural resources conservation has become a demand in today's world, chiefly within the new technology. In several of the rolling applications most energy is lost during retardation or braking. This drawback has been fastened with the introduction of regenerative braking. K.E. Recovery Systems (K.E.R.S.) may be a style of regenerative braking system that has totally different approaches to store and employ the lost energy. This paper offers a concept of a regulator primarily based mechanical regenerative braking system (R.B.S.) conception by showing the applying of constant on a bicycle to enhance the performance and/or potency of the bicycle. so taking this time of read of such K.E.R.S. application supported the principle of R.B.S. on a bicycle are often seen as somebody's power generator. By keeping this time, the electricity generated are often employed in day to day life like charging your sensible phone. The ever increasing energy demand and accrued alertness of individuals towards the physiological condition in developing countries like Asian country, area unit a number of the driving forces for the event of such humanly supercharged machines. regulator rotor style is that the key of researching and developing regulator energy storage system. so this paper presents a literature report reviewing the human power regulator motor furthermore because the regulator style.

**Keywords**—Alternator, Battery, Brake, Flywheel, KERS. Transmission, kinetic energy,

### I. INTRODUCTION

The system for recovery of mechanical energy may be instead known as as mechanical energy Recovery System. This setup could be a basic model of regenerative braking during which the energy is hold on. There ar 2 sorts for the storage of energy in regenerative braking. Either the noninheritable energy from the wheels are often hold on within the chemical kind as in batteries or it may be hold on in an exceedingly regulator. These devices that store the energy ar known as as reservoirs. Regenerative braking is that the thought that's obtaining a lot of in style in hybrid and electrical vehicles. the only prodigious functions of those hybrid and energy vehicles ar to conserve the energy the maximum amount as potential. thus the giants in automotive producing sectors like Benz, Porsche and Ferrari have devised a replacement technique known as regenerative braking.

This regenerative braking system harnesses the energy that gets lost throughout the braking. This energy are often either used in real time as a lift once hold on in regulator or it may be hold on for future use within the battery. Generators and alternators should be accustomed harness the energy during this braking system. A regenerative brake could be a mechanism that reduces vehicle speed by changing a number of its mechanical energy into another helpful variety of energy - electrical phenomenon. This captured energy is then hold on for future use or fed into an influence system to be used by different vehicles.



### II. PROBLEM STATEMENT

In the age of technology, economical systems area unit most wanted whether or not or not it's environmentally, automatically, or electrically. once the system performs at its most with no wasted effort or expense the system is taken into account to be at 100 % potency. the matter lies with system's wasted energy, associate inevitable development of the second law of natural philosophy creating 100 % potency not possible within the planet. but engineers and scientists perpetually improve systems to succeed in as shut excellent potency as doable in an exceedingly large form of fields like automotive, aerospace, locomotive to call a number of. The performance of a moving object isn't solely measured by its acceleration capabilities however additionally by retardation. The K.E. equation is outlined as  $KE = \frac{1}{2}mv^2$  wherever KE is that the K.E., m is that the mass and v is that the rate at any instant.

That means with double the mass is doubled and with double the speed it's quadrupled. In tradition braking systems of car the K.E. is transferred to heat through friction and lost to the setting. This braking energy is taken into account wasted energy and contains a formidable impact on the full mechanical potency of the system.

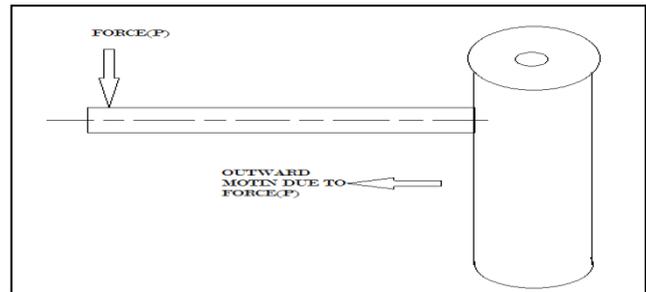
The wasted energy within the decelerating of associate object affects the patron and industrial markets alike. The 3 main modes of wheeled transportation, planes, trains, and cars, all use friction braking to slow the several vessel to a stop. the quantity of recycled energy from harnessing the lost K.E. thanks to braking would be huge. As alittle example In the big apple town there area unit quite forty six,000 taxis within the streets on any given day . forward that regarding 1/2 them area unit Ford Crown Victoria with a mass of 1734 metric weight unit (3822 lbs), neglecting the mass of the driving force and passengers and that they all have stop at the same time at a rate of eleven.2 m/s (25 mph) simply before stopping then the just one occasion total K.E. controlled by each Crown Victoria taxi in the big apple town would be  $KE=23,000[(1734)\times 11.22]=2.5\times 10^9$ Joules. this can be cherish 694.4 kWh (kilowatt hours), that consistent with the USA Energy info Administration, was virtually 3 quarters of the typical quantity of energy to power one home for a month in 2015 that mean a awfully abundant of quantity energy is will wasted throughout braking

### III. PROBLEM SOLUTION

While it's not possible totally recover each joule lost in stopping plenty, K.E. Recovery Systems (KERS) or just regenerative brakes, are capability to store a little of the full lost K.E. to be reused once more once required. There ar 2 completely different ways of storing the K.E. in a very regenerative brake: electrically in a very battery or automatically in a very regulator. every technique has their own blessings still as limitations but electrically storing is a smaller amount economical as a result of the K.E. changes its state from energy whereas a regulator stores the energy automatically. however in our project we tend to do the mixture of each we tend to victimization he regulator and generator regulator used for to rotate generator we tend to maintain the gear quantitative relation 1:27 after we ironed the pedal the regulator as well as a gear shaft and regulator can keep spinning at a high angular rate even up to the brake pedal is free. The regulator currently will hold on current into the battery by victimization the generator. and provides it as per the necessity

### IV. METHODOLOGY

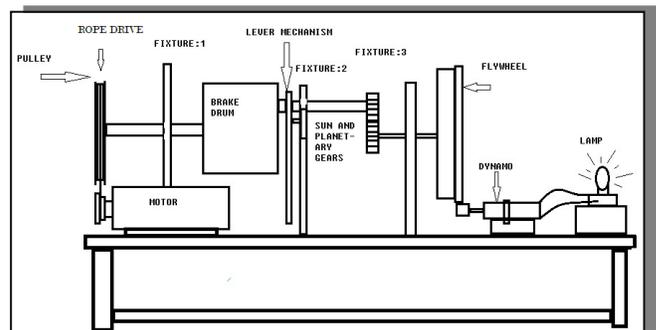
*How It Will Be Work*



**Fig. FBD of braking mechanism**

When force (P) is applied at the tip of the spherical bar the sq. rod tends to man forward as additional movement of the rod ends up in contact of the roller brakes with the inner boundary of the cylinder. because the force will increase, the braking force conjointly will increase and thus brakes square measure applied on the drum. This ends up in retardation of the cylinder. because the cylinder and therefore the roller brakes comes to bear, a number of rotating or the KE of the cylinder is transferred to the roller brakes and from the roller brakes through ball bearing assembly to the gear and forward. whereas some a part of the KE is lost within the sort of heat because of the friction between the brake and therefore the drum. once force p is faraway from the bar or say once braking isn't needed the braking mechanism involves its initial position because of the spring force performing from the opposite aspect of the sq. bar.

### V. DESIGN OF PROJECT



**Fig. Schematic Diagram of KERS**

Kinetic energy recovery system or KERS works on the basic principal of physics that states, 'Energy can neither be created nor destroyed but it can be endlessly converted from one form to another' It involves storing the energy during Deceleration and using it as applicable. Mechanical system captures braking energy and uses it to turn a small flywheel. This flywheel is further connected to a generator which converts the lost KE into useful energy (i.e. Electricity). A motor (6000 rpm) is used as a power source for transferring energy to the brake drum through pulley. This tends the brake drum to rotate at a high speed. When to retard or stop the drum, brake is applied at the inner periphery of the drum. A lever mechanism is used to apply brakes. When brakes are to be applied mechanical force is applied at the end of the lever. This forces the single shoe brake to come in contact with the drum and retard its speed. When the shoe brakes comes in contact to the inner side of the drum, the KE of the drum is transferred to the brake which tends it to rotate thus recovering the lost KE. This KE is transferred to a flywheel by a sun and planetary gear arrangement. A dynamo generator is connected to the flywheel. When the flywheel rotates, it transfers the KE to the generator, thus generating electricity. The electricity thus generated is stored in a storage unit such as batteries.

#### VI. WORKING PRINCIPLE

Kinetic energy recovery system or KERS works on the fundamental principal of physics that states, 'Energy will neither be created nor destroyed however it is endlessly regenerate from one type to another' It involves storing the energy throughout swiftness and mistreatment it as applicable. Mechanical system captures braking energy and uses it to show a little regulator. This regulator is additional connected to a generator that converts the lost KE into helpful energy (i.e. Electricity). A motor (6000 rpm) is employed as an influence supply for transferring energy to the cylinder through machine. This tends the cylinder to rotate at a high speed. once to retard or stop the drum, brake is applied at the inner bound of the drum. A lever mechanism is employed to use brakes. once brakes square measure to be applied mechanical force is applied at the tip of the lever. This forces the one shoe brake to come back in touch with the drum and retard its speed. once the shoe brakes comes in touch to the inner aspect of the drum, the KE of the drum is transferred to the brake that tends it to rotate therefore convalescent the lost KE. This KE is transferred to a regulator by a sun and gear wheel arrangement. A generator generator is connected to the regulator.

Once the regulator rotates, it transfers the KE to the generator, therefore generating electricity. The electricity therefore generated is hold on in a very storage unit like batteries.

#### VII. FUTURE SCOPE

The simplicity of energy transfer during this mechanical KERS system makes it superior to the electrical KERS system. Mechanical hybrids are a lot of powerful, a lot of economical, and cheaper than electrical hybrids. within the future, vehicles are rather more fuel economical than the cars of nowadays. regulator K.E. recovery system technology is unquestionably sensible as a result of several automotive firms are trying into victimisation the system in average everyday cars. Volvo in partnership with Flybrid, formally declared that they will develop and turn out a vehicle that uses the regulator primarily based K.E. recovery system. With improvement in technology, KERS will certainly become even a lot of economical and cheap. the most drive which is able to launch flywheel-based K.E. recovery systems into the automotive trade is that the low value as compared with totally hybrid vehicles. Any vehicle can be designed and fitted with a flywheel-based K.E. recovery system, however the world most littered with this technology would be any vehicle with a start-stop cycle of driving. This technology has already been tested in FLYBUS (a regulator hybrid system developed for buses).

#### VIII. CONCLUSIONS

The review realize that the KERS system utilized in the vehicles satisfies the aim of saving a section of the energy lost throughout braking. additionally it is operated at heat vary and is economical as compared to standard braking system. The results from a number of the take a look at conducted show that around half-hour of the energy delivered is recovered by the system. KERS system incorporates a wide scope for any development and therefore the energy savings. the employment of a lot of economical systems could lead on to very large savings within the economy of any country. Here we have a tendency to ar terminal that the subject KERS got a good scope in engineering field to attenuate the energy loss. As currently a day's energy conservation is incredibly necessary factor. Here we have a tendency to enforced KERS system in an exceedingly automotive with an attractive and disengaging clutch mechanism for gaining way more potency. As several sexual union components are gift great amount of friction loss is found during this system which may be improved.

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Boost is reduced thanks to friction. unceasingly variable transmission is enforced to the current system which might prove in forceful improvement in energy transmissions.

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