Design of Manual Clutch Control System
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ABSTRACT
Many technologies have been introduced in automobile industries in modern days to develop high bird vehicle. This work proposes design and fabrication of manual clutch control system in economic level cars. The purpose of clutch is to engage and disengage the flywheel in this the new extra part going to be implemented to make the clutch in half clutch mode. This was the complete manual project no sensor or other expensive material was used for the fabrication this is the economic level project this is the simple project which will be useful for the beginners and also for the experienced drivers.

KEY WORDS: Manual Clutch Control, Half Clutch, Aluminium, CAD Modelling

1. INTRODUCTION
The idea have referred by way of many journals like seize and Operation as a method LUK has taken on the assignment of working out the idea of the take hold of of operation, including the dynamics, and of making improvements to it from the pedal to transmission input. This will compare the character load transferring accessories, how the force away efficiency is increased by way of tuned interaction, how the actuation drive can also be diminished and minimize actuation drive (Sundhar, 2011). Design of centrifugal seize in alternative process. The centrifugal grab presents many benefits in motor and engine force functions. Utilising the centrifugal snatch enables the determination of normal torque motors for going for walks hundreds rather than the decision of high torque motors for commencing hundreds. The purpose of this undertaking is to be describing the torque carrying capability at exceptional speed which utilising in transmitting power. The entire work founded on traditional design with free rode lining, using shaft, spring, shoe, spider, cover plate, driven shaft. The detail design for various speeds is made in the centrifugal take hold of to prefer an working range of pace under which the applying is designed for torque transmission. On this project the design calculation are labored out analytically. Along with this we have presented a compliant grasp (Chandru, 2006). Complicated design of grasp idea seize is made from polypropylene material and there is no any person connecting constituents. It has rigid body design for the reason that revolute joints are replaced by means of bendy segment. The knowledge vigour retailer in flexible section can change springs and reduction in revolute joints reduces concern with backlash and put on. The compliant grasp involves inflexible physique mechanism via dimensional synthesis by way of graphical method. A mechanism is evaluated and synthesized designated drive-deflection relationship. In lots of applications, compliant mechanism can keep or even enhance efficiency relative to conventional inflexible body designs. It's price benefitted. Additionally traditional grasp is high priced as an alternative than compliant snatch (Rajesh, 2008). Thermodynamic characterizations of clutch wet clutches that handle the gearshifts in automatic transmission undergo extreme thermal stresses due to the incidence of significant temperature gradients for the period of engagement. To correctly design wet clutches, higher items to simulate the engagement approach are wanted. This work offers a finite detail model for simulating moist take hold of of engagements. The whole friction coefficient was once used to explain the extraordinary lubrication regimes that a moist clutch engagement undergoes. The mannequin also involves provision for drive torque that realistically simulates the engine torque of a automobile. The results of the simulations are effectually verified by means of evaluation with laboratory experiments on a checking out specially designed to accommodate the pressure torque, protecting a extensive variety of average engagements. (Marshal, 2006) analysis of the influence of to the car remedy at the present time individuals has far more requisites in auto performance together with vigour, financial system and protection, mainly the car comfort. Trip remedy and using alleviation are the two elements in study of vehicle remedy. The analysis of car running alleviation customarily focuses on the pedal, using atmosphere and the seat. Amongst them, exceptional of snatch pedal is immediately regarding the security efficiency of the car, as it’s a automobile safety phase which separate or mix grasp and engine through trampling clutch pedal. To be able to furnish a extra at ease and less difficult running take hold of, the primary job is to analyse the foremost reasons influencing the seize (Satish, 2011).

Characterization and metal evaluation of grasp having achieved foremost results in areas such as postural alleviation and force, vehicle ergonomists have begun dedicating effort in contemporary years closer to the gain knowledge of human motion in and around the automobile. More talents concerning human movement strategies and movement comfort would be most useful towards the definition of accelerated design directions for vehicles. This paper grants an analysis of vehicle grasp pedal actuation. The learn addresses the connection between the subjectively perceived relief and the mechanical and postural quantities. The reciprocate clutch is designed define the seize disengagement process as summarised in drive and acceleration knowledge had been measured at the snatch pedal and subjective responses had been accumulated from the scan subjects. This authorized a statistical correlation evaluation throughout all pairings of mechanical data versus subjective knowledge, and between all
pairings of postural information and subjective response. This paper presents the results of the drive and postural perspective evaluation. The outcome of the evaluation of the pedal acceleration information will be the field of separate, future paper. The evaluation described in the following sections represents a first step towards defining design guidelines and maybe a “grasp meter” gadget (Ranjith, 2010). Simple mechanism of clutch the seize is a push type grasp. When the pedal is depressed, the self-aligning unlock bearing is triggered to slip on a consultant urgent the centre of the diaphragm spring. The diaphragm spring is warped and the drive having pressed the stress plate is launched, causing the flywheel, take hold of disk and strain plate to be disengaged from each and every different, and the transmission of power force is interrupted. The motion point of the clutch is located at the tip of each diaphragm spring fingers, which press the strain plate towards the grasp disc. (Gopinaath, 2007) The take hold of is a mechanical device, which is used to connect or disconnects the source of vigour from the rest components of the power transmission process on the will of operator. The seize can connect or disconnect the driving shaft and driven shaft. An automobile seize can allow the engine to run without riding the vehicle. This is desirable when the engine is to be began or stopped, or when the gears to be shifted. Grab is a mechanism for transmitting rotation, which can be engaged and disengaged. The grab connects the two shafts so that they are able to both be locked collectively and spin on the same pace (engaged), or be decoupled and spin at special speeds (disengaged). Depending on the orientation, speeds, material, torque produced and ultimately using the whole gadget, different varieties of clutches are used. The grab in itself is a mechanism, which employs specific configurations. The friction clutch is an main element of any automobile computer (Giribaabu, 2014). Grasp quandary and troubleshooting this chapter explains easy methods to diagnose and service clutches. Take hold of problems and their factors are identified. Strategies performed with the grab in position, reminiscent of grab adjustment, are covered. Primary repair and replacement strategies, which require seize elimination, are also defined. This was only researched good in regards to the crisis in seize (Pravalikaa, 2009).

Analysis of grasp via FEA. This present day people have way more specifications in car performance together with power, economic climate and security, above all the automobile relief. Trip alleviation and driving relief are the two aspects in study of vehicle relief the analysis of automobile operating alleviation mostly focuses on the pedal, driving atmosphere and the seat. Amongst them, pleasant of snatch pedal is instantly involving the security efficiency of the automobile, as it is a automobile security section which separate or combine seize and engine with the aid of trampling snatch pedal. So as to furnish a more secure and simpler operating grab, the first job is to analyse the foremost reasons influencing the snatch (Deasikan, 2008). Pedal force and pedal motion stroke are the major explanations influencing grab manipulation. Main motives effecting pedal force and pedal stroke are diameter of each clutch primary cylinder and sub-cylinder, leverage ratio of clutch pedal and take hold of parameters. Pedal force is definitely the force performing on the pedal by means of feet; joint pedal drive is the major characteristics evaluating pedal remedy. Pedal movement stroke contains setting apart stroke and combining stroke. Separating stroke is the travel form high limiting role to clutch keeping apart point, whilst combining stroke is the pedal travel type backside limiting position to combing point. (Dhaas, 2011) The grab is a mechanical gadget, which is used to attach or disconnects the source of energy from the remaining components of the vigor transmission approach on the will of operator. The seize can connect or disconnect the riding shaft and pushed shaft. An automotive grab can permit the engine to run without driving the car. That is fascinating when the engine is to be began or stopped, or when the gears to be shifted. Snatch is a mechanism for transmitting rotation, which can also be engaged and disengaged. The snatch connects the two shafts in order that they can both be locked collectively and spin on the same speed (engaged), or be decoupled and spin at special speeds (disengaged) (Sudharson, 2008). The clutch movement mechanism depending on the orientation, speeds, fabric, torque produced and subsequently the usage of the entire device, different kinds of clutches are used. The clutch in itself is a mechanism, which employs exceptional configurations. The friction clutch is an foremost element of any automotive laptop. It's a link between engine and transmission process which conducts vigour, in form of torque, from engine to the gear assembly. When auto is started from standstill grab is engaged to switch torque to the transmission; and when vehicle is in movement seize is first disengaged of the power to enable for equipment determination and however engaged smoothly to power the vehicle. As a rule there are two types of clutches situated on form of contact (Muhindhar, 2008). Material analysis of snatch SF-BU is a excessive efficiency, excessive friction, non-steel composite fabric containing a excessive percentage of aramid fibre. It can be considered an substitute to sintered metallic materials and presents many advantages, it'll with stand high vigour inputs, is compatible for each dry and oil-immersed purposes. It isn't abrasive to the counter fabric, is silent in operation, it'll with stand excessive pressures. The damage expense is low even at excessive temperatures, is on hand in thicknesses from 0.6 mm to 5mm. Similar to SF001 however even higher Kevlar composition, as a way to enhance friction homes. Functions: heavy car clutches, clutch buttons, trucks clutches, friction gaskets, car clutches (Ezil Aapthan, 2012).
2. MATERIALS & METHODS

Aluminium roller which will not gain the rust so no maintenance freely rolls front and back, manual switch is used to move the roller towards the clutch gap, tension spring will be convenient to push the roller front, rods are used to Connect the material.

<table>
<thead>
<tr>
<th>Sno</th>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Density</td>
<td>2.7g/cm³</td>
</tr>
<tr>
<td>2</td>
<td>Melting point</td>
<td>Approx 580</td>
</tr>
<tr>
<td>3</td>
<td>Young’s modules</td>
<td>68-72 gpa</td>
</tr>
<tr>
<td>4</td>
<td>Poisson’s ratio</td>
<td>0.33</td>
</tr>
<tr>
<td>5</td>
<td>Tensile strength</td>
<td>70-360 mpa</td>
</tr>
<tr>
<td>6</td>
<td>Hardiness</td>
<td>30-100 HV</td>
</tr>
<tr>
<td>7</td>
<td>Yield strength</td>
<td>30-286 Mpa</td>
</tr>
<tr>
<td>8</td>
<td>Compressive strength</td>
<td>30-286 Mpa</td>
</tr>
<tr>
<td>9</td>
<td>Elongation</td>
<td>2-41 %</td>
</tr>
</tbody>
</table>

The above table explains the physical and mechanical properties and uses of the aluminium.

Figure 1(a). Schematic representation of load acting

Figure 1(b). Schematic representation of tensional load

The above diagram explains the compression, tension, torsion, and bending movement of the spring. In this project the spring is used to push and pull the roller also this is very simple mechanism.

Figure 2. Force versus stroke

The above diagram explains the graphical and the static property of the spring. The manual push rod (switch) will be connected to the shaft from the shaft the spring is attached to the mini shaft which contains roller. When the driver starts the car before applying the first gear he will press clutch fully and switch will be pulled up the spring will be released and attached to the top end of the clutch pedal when the driver releases the pedal after applying the first gear the roller will be slowly rolls down when the clutch comes to the half clutch position there will be a gap the roller will be struck in that gap. Now the car will be moves but not off the diver can concentrates in break is enough. After the process completed the switch will be pulled down the roller will be come back to its position. In the full clutch position this was the same process used in reverse.

Figure 3. Roller is in released position

In the above the manual switch pushes up by the driver. So the spring was pushed the pedal rod.
CAD: The clutch pedal and the roller is completely designed in the catia and also the spring tension and the mechanical properties of the shaft is completely checked in the catia software the software is easy to handle and it is user friendly.

**Design of modified clutch:**

![Figure 4: The roller is in engaged position](image)

The above diagram explains that the driver slowly releases the pedal the clutch pedal comes up. The roller moves down behind the pedal and struck into the gap during the half clutch mode.

![Figure 5: The clutch after engaged position](image)

The above diagram explains that when the driver push down the manual switch the roller comes down and locks.

**Clutch:** The purpose of clutch is to engage and disengage the fly wheel but some extra modification have been made on that so the shape of the clutch may be differs but the size and breath may be not differs.

**Future Applications:** The manual clutch control system is used in traffic to avoid the leg pain in traffic then in u turns to avoid the more concentration on clutch then it is used in slopes and downs in case of easy to move backward or forward more useful for the reverse operation Useful to the beginners and also for the experienced drivers No leg pain occurs when this system activates. Less space contains for setting the roller shaft and spring Low cost requires for the set up No maintenance.

3. **RESULTS**

In this work a numerical analysis to evaluate the influence of the temperature on the static load–deflection curve of a cushion spring in an automotive dry-clutch system was proposed. The analysis emphasizes that the temperature influences the cushion spring characteristic in two ways. In fact, by increasing the temperature, the material stiffness decreases and this is highlighted by a reduction in the curve slope. Conversely, the thermal load induces a pre-stress effect and these results in a nonzero reaction force before compression starts. The comparison of the load–deflection curves calculated at different temperatures proves that the superposition of the two effects generates for the considered cushion spring an intersection of all curves at a particular point. Since the cushion spring load–deflection curve accounts for the main contribution to the clutch transmissibility characteristic.

4. **CONCLUSION**

This will be very useful to our environment if this system implemented in four wheelers the engine life will increased this system can also be implemented in in the heavy duty vehicles there is no disadvantages in this system. The catia is a best design for this project and this will be very useful.
REFERENCES


