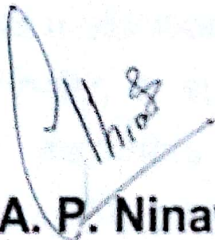


**K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING**

**Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
Session 2016-2017.**

CERTIFICATE

This is certify that, the project entitled “**DESIGN AND DEVELOPMENT OF VACUUM DAMPED RECOIL SYSTEM**” is bonafide work done under our guidance and is submitted by **Pankaj W. Wanjari** to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur for the partial fulfillment of requirement for the award of post-graduation degree, **Master of Technology (M. Tech.)** in **Mechanical Engineering Design (M.E.D.)** .



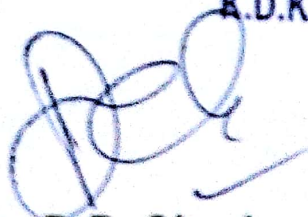
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ABSTRACT

One of the basic requirements for the artillery weapons is the damping of dynamical impulse loadings by the recoil system. Recoil subsystems, which are displaced during the recoiling process, have to be stopped and returned to the initial position, keeping the stability of weapon's position. Displacement position control as a consequence of the recoiling process is an indirect performance of the recoil system design. These performances are changing vs. time gradients more or less rigid, regarding forces or displacements making recoil characteristics more or less elastic.

The recoil mechanism is mainly used to absorb the recoil force during firing, and furthermore it can use compressed gas or springs to return the gun tube to its original position for artillery weapons. In other words, the recoil motion is the rearward movement of the gun during and after firing. The recoil motion is caused by the reaction of the projectile and the propellant gases. After recoil, the gun and connecting parts return to the original firing position. In recent years, the development trends of artillery weapons with recoil mechanisms focus on the vehicular integration. Therefore, a small volume, high recoil efficiency, and low cost of recoil mechanism are necessary. Conventional system spring mass dashpot / damper system are necessary used. But it takes more time for a gun to come to stationary state.

This thesis presents work on fabrication of vacuum damped recoil system. Vacuum damped recoil system has less moving parts and simple in construction. Will require very less time for acquiring stationary state and the size of vacuume damped system will be very small as compared to spring mass dashpot system.

CONCLUSION AND FUTURE SCOPE

8.1 CONCLUSION

Owing to the advancement of military views and scientific techniques, all countries in the world do their best to develop the war industry. One of the most important things is the development of guns, which are the backbone of the ground protection. A recoil mechanism can reduce the mass recoil force during firing, and push the gun body back to the original position after firing. Because the recoil mechanism was invented, the gun performance got unprecedented improvement. Therefore, the purpose of this project work is to develop the vacuum damped recoil system carried out. Results can provide a clear understanding for designing the mechanism or improving the performance of recoil ability. And some conclusions can be made as follows:

- Relation among displacement, recoil time and vacuum pressure can be interpreted as with the increase of displacement the time required to barrel to get initial position goes on increases.
- Similarly it also interpreted that with the increase of displacement of piston the vacuum generated in the cylinder goes on increases.
- Relations between displacement and force can be interpreted as with the increase of displacement the force required to the pull barrel goes on increases.
- This approach is helpful in formulate of mathematical relationship for use of vacuum damped recoil system.

In such a way the study of vacuum damped recoil system is completed.

8.2 FUTURE SCOPE

Instead of this project work the some more work will required to improve the efficiency and functionality of vacuum damped recoil system. The following are some points based on which the further future work can be done.

- Instead of single vacuum cylinder, two cylinders can be used to improve efficiency of system.
- The vacuum cylinder can be used by closing the both the port in such case the vacuum is developed in one portion and pressure in another portion. In such a system the force absorption may be increases and recoil length may be reduced. This system may itself work as recoil and counter recoil mechanism.
- The vacuum damped recoil system can be develop on the scale of actual artillery weapon recoil system to compare its functionality on actual war field.

REFERENCES