



International Journal of Advance Engineering and Research Development

Technophilia-2018.

Volume 5, Special Issue 04, Feb.-2018 (UGC Approved)

Hydraulic Ram Pump

Mr. Arude Harshal¹, Mr. Bhojane Akshay², Mr. Dhamale Abhimanyu³, Mr. Walunj Akshay⁴, Mr. Shinde Sachin⁵

¹Mechanical Engineering, Jaihind Polytechnic, Kuran Maharashtra, India.

²Mechanical Engineering, Jaihind Polytechnic, Kuran Maharashtra, India.

³Mechanical Engineering, Jaihind Polytechnic, Kuran Maharashtra, India.

⁴Mechanical Engineering, Jaihind Polytechnic, Kuran Maharashtra, India.

⁵Mechanical Engineering, Jaihind Polytechnic, Kuran Maharashtra, India.

Abstract -In today's world water is of a great concern to the human beings because we can't survive without it. Hydraulic ram can be one of the solutions to this problem of a mankind. Mostly in India where villages are situated far away from the water source it is not possible to the people living there to go miles away carrying away the buckets of water. Especially at those places this pump has a much utility because it is cheap, without electricity and easy to maintain. As it requires no external energy other than kinetic energy of flowing water it can be considered as a pump which uses Renewable energy. Though the pump is in use since long time, it is not seen in common forms for lots of its performance limitations. This type of pump is truly a blessing to the rural areas, farmers and middle class for its zero running cost. The paper after study the literature available, aims to present generalized design methodology for hydraulic ram pump (HYDRAM) covering design parameters, design procedure along with the mathematical relationship used for the design work.

Keywords- Hydraulic Ram Pump, cyclic water pump, Hydram

INTRODUCTION

It takes in water at one "hydraulic head" and delivers the water at a higher hydraulic head and lower flow rate. The hydraulic ram is used in remote areas especially hilly areas and in the villages which are located at the greater heights from altitude. In this situation, the ram is often useful, since it requires no outside source of power other than the kinetic energy of flowing water. The operation of a hydram is intermittent due to the cyclic opening and closing of the waste and delivery valves. The closure of the waste valve creates a high pressure rise in the drive-pipe and this occurs very fastly within fraction of seconds. An air chamber is required to transform the high intermittent pumped flow into a continuous stream of flow. The air valve allow air into the hydram to replace the air absorbed by the water due to the high pressure and which is mixed in the air chamber but this snifter valve does not have as much effect than the other two valves. Pumps are among the oldest of the machines. They were used in ancient Egypt, China, India, Greece and Rome. Today, pumps are the second most widely used in various industries.

LITERATURE REVIEW

1) **Seemin Sheikh, C C Handa and A P Ninawe** is studied that The availability and cost of electric power is a great concern to common man. Conventional energy is also a great concern for environment. Hence more attention of designers is diverted towards use of unconventional energy or other forms of energy than conventional energy. Water pump is a more utility item. Though the pump is in use since long, it is not seen in common forms for lots of its performance limitations. The paper after study the literature available aim to present generalised design methodology for hydraulic ram pump (HYDRAM) covering design parameters, design procedure along with the mathematical relationship used for the design work.

2) **Shuaibu Ndache MOHAMMED** is studied that the design and fabrication of a Hydraulic Ram Pump is undertaken. It is meant to lift water from a depth of 2m below the surface with no other external energy source required.

3) **Gaikwad.V.S, Gholap.M.V, Kadus.R.K, Gaikwad.M.S, Padekar.A.U, Mali.P.K** is described that, This project report is about designing a Recycled hydro electric power plant by using hydraulic ram pump to transfer tailrace water from turbine to water source which is situated at higher height, which used as supply water for electricity generation.

This pump uses kinetic energy of flowing water for its working means it doesn't require external energy sources. The hydraulic ram pump is believed to be the suitable and efficient application for the given conditions based on the calculations performed. For the first step of designing, all the related problems are listed and understood. Then, the specifications, criteria and evaluation of the solutions are developed. This including choosing the most suitable operational working principals for the hydraulic ram pump (hydram), turbine generator, outline of the theoretical background behind the operation and its details calculations, which are being referred to the concept and theory entitles to Fluid Mechanics.

4) Sudipto Shekhor Mondol is studied that, A hydraulic ram is a pump in which the momentum of a driving stream of water undergoing a small head drop is used to pump a small portion of the stream to a head considerably greater than that of the supply. In the current study, a hydraulic ram was designed, manufactured and tested.

5) Rohan.D.Balgude, Swapnil.P.Rupanavar, Pradeep.S.Bagul. Asst Prof. Manoday.R.Ramteke describes that techniques and guidelines to successfully install the modern hydraulic ram pump. The proposed technique illustrates the methodology that can be used for the primary design considerations and applications in various ways. This Hydraulic ram pump plays an important role in areas which are not connected to national electricity grid, This method provides means of continuous water supply. Basic principle of working is ramming action of air inside pressure vessel.

ADVANTAGES

- Uses renewable energy sources.
- If properly designed, can be produced and maintained locally.
- Very effective in mountaneous areas

DIS-ADVANTAGES

- Water with height difference is needed
- More percentage water wastage.

CONCLUSION

Here we would like to conclude on a healthy and warm vote of thanks to all who have made this project a reality.

- 1) The hydraulic ram pump prototype of good quality and high performance was successfully fabricated and tested.
- 2) A weighted waste valve was designed and operated successfully.
- 3) It eliminates the need of retainer springs which are not available locally.
- 4) A proven and effective methodology to identify suitable sites for hydraulic ram use was evolved and tested.
- 5) A locally made was successfully developed and tested.

REFERENCES

- 1) Seemin Sheikh, C C Handa and A P Ninawe, ISSN 2278 – 0149 www.ijmerr.com, Vol. 2, No. 4, October 2013 © 2013 IJMERR. All Rights Reserved, http://www.ijmerr.com/v2n4/ijmerr_v2n4_20.pdf
- 2) Shuaibu Ndache MOHAMMED Leonardo Electronic Journal of Practices and Technoloogies ISSN1583-1078 , http://lejpt.academicdirect.org/A11/059_070.pdf, volume Issue 11, July-December 2007 p. 59-70
- 3) Gaikwad.V.S, Gholap.M.V, Kadus.R.K, Gaikwad.M.S, Padekar.A.U, Mali.P. , http://ijariie.com/AdminUploadPdf/Recycled_hydro_power_plant_using_hydraulic_ram_pump_ijariie4588.pdf , Vol-3 Issue-2 2017
- 4) Sudipto Shekhor Mondol Design, Manufacture and Test a Hydraulic Ram, https://www.researchgate.net/profile/Sudipto_Mondol/publication/317031378_Design_manufacture_and_test_a_hydraulic_ram/links/591fef0e0f7e9b99793c7043/Design-manufacture-and-test-a-hydraulic-ram.pdf
- 5) Rohan.D.Balgude, Swapnil.P.Rupanavar, Pradeep.S.Bagul, Asst Prof. Manoday.R. International Journal Of Engineering And Computer Science ISSN:2319-7242, Volume 4 Issue 5 May 2015, Page No. 11966-11971

