



Performance of Centrifugal Pump in Turbine Mode

Stefan Tiang*

Department of Mechanical Engineering, University of California, Irvine, USA

DESCRIPTION

Rural electrification means to make available electricity to rural and remote areas. Electrification of high terrain rural areas is a challenging task. It is important for overall socio economic development of any country that the overall living standards of the population are raised. Pump as Turbine (PAT), its advantages and disadvantages are presented. The solar power potential is estimated to be about 748990 MW (68.33%), wind power 302251 MW (27.58%) and other sources about 4%. The electricity generated annually is about 2700 TWH. The potential of hydroelectric power generation in India is estimated to be 1,45,000 MW and about 26% of the total hydroelectric potential has been exploited in India.

Hydropower generation falls in the category of renewable source as it uses flowing water for generation of electricity and the water is not consumed and remains available for other utilities. A typical hydropower generating station usually consists of a dam built across a river that creates an artificial reservoir, and a generating station where mechanical to electric energy conversion takes place. The collected water falls through a dam and is conveyed into a large wheel called a turbine. The turbine converts hydraulic energy of water into mechanical energy which drives the generator. Electricity generated is then transmitted to consumers through transmission lines (grid supply), the water flow passed through the turbine is connected to flow into the streams or rivers.

Hence advantages of hydropower generation include clean, inflation free, low cost renewable energy production etc. The

hydropower plant set up involves high capital investment but there is very little recurring cost and so there is small long term expenditure. The cost of electricity generation is much less when compared to coal fired or gas fired electricity generating plants.

Large hydropower generation plants have disadvantages as it requires resettlement and rehabilitation of the people, involves loss of valuable land by submergence and longer payback periods. It is true that large hydropower plants are economical but may not be a practical technology option as it may involve social, political or environmental concerns.

CONCLUSION

Centrifugal pump are mainly available as radial discharge, mixed flow and axial flow units. The construction of a centrifugal pump is similar to a Francis turbine that both have an impeller surrounded in a casing. However Francis turbines have guide vanes which are absent in a centrifugal pump. In a radial discharge mono block centrifugal pump water moves into the pump in axial direction from the eye of the impeller, passes the impeller and comes out from the volute casing at the pump discharge. The same pump when used as hydro turbine gets water into from the casing which then moves in radial direction and leaves out in the axial direction through the eye of the impeller. In reverse mode water enters to the volute casing inward in radial direction and leaves axially. Energy of the fluid is transferred to the impeller, which rotates the impeller of the pump. The rotation of impeller in pump mode and reverse pump mode (PAT) is opposite.

Correspondence to: Stefan Tiang, Department of Mechanical Engineering, University of California, Irvine, USA, E-mail: stiang@uci.edu

Received: 02-Sep-2022, Manuscript No. JAME-22-18497; **Editor assigned:** 05-Sep-2022, Pre QC No. JAME-22-18497 (PQ); **Reviewed:** 20-Sep-2022, QC No JAME-22-18497; **Revised:** 26-Sep-2022, Manuscript No. JAME-22-18497 (R); **Published:** 04-Oct-2022, DOI: 10.35248/2168-9873.22.11.435.

Citation: Tiang S (2022) Performance of Centrifugal Pump in Turbine Mode. J Appl Mech Eng. 11:435.

Copyright: © 2022 Tiang S. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.