

Design Components and Reliability Aspects of Municipal Waste Water and SEIG Based Micro Hydro Power Plant

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Abstract : This paper presents design aspects and probabilistic approach for generation reliability evaluation of an alternative resource: municipal waste water based micro hydro power generation system. Annual and daily flow duration curves have been obtained for design, installation, development, scientific analysis and reliability evaluation of the MHPP. The hydro potential of the waste water flowing through sewage system of the BHU campus has been determined to produce annual flow duration and daily flow duration curves by ordering the recorded water flows from maximum to minimum values. Design pressure, the roughness of the pipe's interior surface, method of joining, weight, ease of installation, accessibility to the sewage system, design life, maintenance, weather conditions, availability of material, related cost and likelihood of structural damage have been considered for design of a particular penstock for reliable operation of the MHPP. A MHPGS based on MWW and SEIG is designed, developed, and practically implemented to provide reliable electric energy to suitable load in the campus of the Banaras Hindu University, Varanasi, (UP), India. Generation reliability evaluation of the developed MHPP using Gaussian distribution approach, safety factor concept, peak load consideration and Simpson 1/3rd rule has presented in this paper.

Keywords : self excited induction generator, annual and daily flow duration curve, sewage system, municipal waste water, reliability evaluation, Gaussian distribution, Simpson 1/3rd rule

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