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MODIFICATION AND EVALUATION OF
A WATERWHEEL-OPERATED
PISTON PUMP

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MODIFICATION AND EVALUATION OF
A WATERWHEEL-OPERATED
PISTON PUMP

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ABSTRACT

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The study, "Modification and Evaluation of a Waterwheel-Operated Piston Pump" was conducted at Talino Beach, Indang, Cavite from February to March 1998. It specifically aimed to: (a) modify the developed waterwheel-operated piston pump that would suit rural conditions; (b) know the optimum operating condition of the pump, and (c) evaluate the efficiency of the machine in lifting water.

The modified waterwheel-operated piston pump consists of three main parts: (a) the wheel assembly which serves as the main source of power of the machine; (b) the chain and sprocket assembly which transmits the power to the pump; and (c) the pump assembly which provides the pumping action and pressure necessary to elevate the water.

The modified waterwheel-operated piston pump was evaluated at minimum velocity of water of 1.73 m/s and maximum velocity of water of 4.24 m/s. The maximum delivery was obtained at 4.24 m/s velocity of water with 22.22 liters per minute at a lift of 1.5 m (5 ft). On the other hand, the lowest delivery of 2.18 liters per minute was observed at 1.73 m/s velocity of water with a lift of 3.5 m (11.48 ft).

The highest and lowest efficiencies were observed at 4.24 m/s velocity of water with 1.5 m (5 ft) and 15.5 m (50.84 ft) lift; with values of 88% and 20.15 % respectively.

The efficiency decreased as the lift increased and it increased as the velocity of water increased. It was also observed that the lift increased as the velocity of water increased.

The modified waterwheel-operated piston pump was constructed from readily available materials with a total fabrication cost of ₱12,000.00 and a pumping cost per cubic meter of water of ₱6.48.

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MODIFICATION AND EVALUATION OF A WATERWHEEL- OPERATED PISTON PUMP^{1/}

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INTRODUCTION

Waterwheel is a mechanical device for tapping the energy of running or falling water by means of a set of paddles mounted around a wheel (Encyclopedia Britanica, 1986).

The waterwheel is a historical device of great importance in the ancient, medieval, and early modern worlds, because it effectively converts the linear motion of flowing water into useful rotary motion. In addition, the waterwheel is the direct forebear of the turbine engine. Waterwheel has been used for driving electric generators and for small water supply, sewage disposal, or irrigation system (Wood, 1976 as cited by De Sagun, 1997).