



Introduction

The 600kW Hydro generator at Parteen Weir on the River Shannon was constructed by the Electricity Supply Board to produce additional electricity by harnessing the continuous flow of the water the Board is statutorily bound to release through the weir into the original river channel.

The output from this generator will replace the equivalent amount of electricity generated at oil-fired power stations, saving some 1,500 tons of fuel oil each year.

The electricity is supplied direct to the local 10kV network, thus eliminating transmission losses.

Technical Information

In connection with the original Shannon Hydro-electric scheme a weir was constructed on the River Shannon at Parteen Villa (see fig. 1). This weir diverts the normal flow of the river into the Headrace Canal leading to Ardnacrusha Power Station. Having passed through the turbines there, the water flows on through the Tailrace to rejoin the original river channel just above Limerick. Floods are allowed to pass down the original river channel by opening sluice-gates in Parteen Weir. In addition, the Board is under a statutory obligation to discharge a minimum flow of water at all times into the original river channel. This minimum rate of flow is 10 cubic metres per second under normal circumstances; in very exceptional circumstances a lower amount may be permitted. About 0.5 cu.m/sec. is discharged through the fish-pass at Parteen Weir, and the remaining 9.5 cu.m/sec. is spilled by partly opening one of the sluice-gates. The average difference between upstream and down-stream water levels at the weir is about 7.5 metres.

Making due allowance for the efficiencies of turbine and generator, a flow of 9.5 cu.m/sec. across a head of 7.5 m would be capable of generating about 600 kW (0.6 MW) of electricity, and as there is a statutory obligation to maintain the minimum rate of discharge, this output would be available at all times, except when it might be necessary to carry out inspection or maintenance of the turbine and generator. The possibility of hydro-electric generation at Parteen Weir has, therefore, been examined on a number of occasions. The recent oil crises gave rise to a re-examination, upon which the present scheme is based.

Economics

The 600 kW generator at Parteen Weir will have an annual output of five million kWH, which will be supplied direct to the local 10 kV distribution net-work, thus eliminating transmission losses. This will replace the equivalent amount of electricity generated at oil-fired power stations, with an annual saving of about 1,500 tons of fuel oil which is a worthwhile contribution to the national Energy Conservation Policy.

The inherent security of supply and the total absence of environmental or ecological pollution make this hydro scheme a most attractive one.

Description of Installation

Fig. 1 is a general plan of Parteen Weir. There are six large sluice-gates for discharging floods, and the fish-pass is situated on the left (Eastern) bank of the river. The new turbine is also located adjacent to the Eastern embankment as shown on Fig. 1. Details of the installation are shown in Figs. 2 and 3.

The inlet to the turbine passes through the existing upstream wing-wall of the weir, under the floor of the fish-pass. It is provided with fish screens (for which dam-beams will be substituted if it is necessary to dewater the installation). The turbine is situated in a pit, sunk between the upstream and downstream wing-walls.

The outlet from the turbine passes through the existing downstream wing-wall of the weir to emerge in close proximity to the lower end of the fish-pass. The outlet also will be provided with a fish-screen, for which dam-beams will be substituted if dewatering is necessary.

The turbine is a vertical-shaft fixed blade propellor type running at 273 r.p.m. Water quantity is regulated by adjustable guide vanes.

The generator is an induction type machine mounted directly on the turbine shaft, so that speed regulation is automatically maintained in step with E.S.B. system frequency without the use of a governor.

Fig. 4 shows a summary of technical and financial information.



The Generator with associated Switch panels.

A view of the Generator House with the fish pass in the foreground.

Technical/Financial Data

Mean Head	7.50 metres
Mean Flow	9.50 m ³ /sec.
Turbine Output	600 kW
Annual Generation	5,000,000 kW/Hrs
Cost per kW installed	£700
Fuel Oil saving per year	1,500 Tons
Cost per kW/Hr. of Generation (Incl. Capital Charges)	1.71p for first 15 yrs. 0.36p thereafter

Fig. 4.

