



INTERBOROUGH RAPID TRANSIT CO.'S 74TH ST. POWER HOUSE—30,000 K.W. CROSS-COMPOUND UNIT IN FOREGROUND, NEW TRIPLE COMPOUND UNIT IN CENTRE, AND OLD 5,000 K.W. ENGINE-DRIVEN UNITS IN REAR

The field current is first applied to all of the generators, and then the throttle valve of the high pressure turbine is partly opened. As soon as the high pressure rotor starts revolving, it will start the rotors of the low pressure turbines through the field current. All three then come up to speed together in correct phase with each other. They are then synchronized with the system and connected to it by closing a single circuit breaker.

The governing mechanism must not only control the unit as whole, but also each turbine operating separately. Some of the operations performed by the governors are as follows:—

If serious electrical trouble develops on the circuit of one of the generators of the low pressure turbines, a circuit breaker will disconnect this generator from the bus bars. Relieved of load, the turbine begins to speed up, but before its speed has increased 4%, its governor shuts off the steam supply from the high pressure turbine. This, of course, raises the back pressure of the high pressure turbine, and a back-pressure valve opens, allowing part of the exhaust from the high pressure turbine to pass into the atmosphere while the remainder goes into the other low pressure turbine.

In the meantime, the first low pressure turbine, being without steam, shuts down. When its speed reaches 3% below normal, the governor admits high pressure steam, and the turbine continues to operate at this speed until the switchboard operator either shuts it down or restores normal conditions.

Should the generator of the high pressure turbine be cut out of circuit, the governor cuts off practically all the steam to the entire system, leaving just a sufficient flow to maintain the speed of the high pressure turbine now without load. The speed of the two low pressure turbines decreases, and when the frequency drops 3%, the governor admits high pressure steam direct to the low pressure turbines, which then continue operating. The switchboard operator can now either restore matters to normal or shut down the high pressure turbine.

Each turbine also has an emergency stop which will operate automatically in case the governor fails and the turbine begins to race, or it can be tripped by the switch board operator.

When one of the turbines fails with the entire unit heavily loaded, the governors permit each of the remaining turbines to carry the maximum load of 30,000 k.w. This can be maintained for a half hour, which is regarded as sufficient time to get other generators into operation, and thus relieve the overloaded turbine.

The condenser equipment consists of two 25,000 sq. ft. surface condensers for each low pressure turbine. There are four circulating pumps, three Le Blanc air pumps and four condensate pumps. All of these pumps are turbine-driven (the air pumps directly and the others through gears), and all are so arranged that one or more can be put out of service without interfering with the operation of the condenser.

The steam consumption of the entire unit at its point of best efficiency is 10.7 lbs. per kilowatt-hour. The pressure turbine and one low pressure turbine, operating together, consume 12 lbs. of steam per k.w.h., and one low pressure turbine alone consumes 14.25 lbs. The total steam consumption at full load is 826,000 lbs. per hour.

LARGE STEEL INDUSTRY FOR TORONTO

ACCORDING to information given out by R. Home Smith, Toronto is to have a steel and metal plant on the site of British Forgings at Ashbridges Bay, with a capital of \$3,000,000. Mr. Smith said: "After much trouble and negotiating we have persuaded Messrs. Baldwins, of Swansea, Wales, to found a plant of steel sheets and other metal products, valued at between \$2,000,000 and \$3,000,000, on the site of the British Forgings. At the initial stages 2,000 men will be employed, and there is no reason to doubt that ultimately employment will be given 10,000 men."

EDMONTON PUBLIC UTILITIES IMPROVING

EDMONTON public utilities show a net surplus for May of \$2,345, compared with a net deficit for the same month last year of \$3,549. The net surplus for the five months (inclusive of the street railway deficit) amounts to \$62,233, against \$33,809 for the corresponding period of 1918. Net surpluses for the five months of the respective departments are as follows:—

	1919.	1918.
Electric light	\$ 66,056	\$54,131
Telephone	21,356	13,845
Waterworks	14,246	10,746
Total	\$101,659	\$78,724

The street railway deficit is \$39,425, as compared with \$44,914 last year, leaving, as already stated, a net surplus of \$62,233 on the combined utilities, as compared with \$33,809 in 1918.