

National Transcontinental Railway Power House at Transcona.

The N.T.R. Commission, in building the large general locomotive and car repair shops at Transcona, Man., decided that the best interests of the railway, in economy, efficiency and reliability, could be served by the erection of a modern central power plant in which all steam and electrical apparatus of sufficient capacity to supply the present demands should be located. The power house is therefore one of the group of buildings described in general in Canadian Railway and Marine World for Feb., 1912. The power house is equipped throughout with the best apparatus that money could purchase, and with the care shown in the design and selection of equipment the plant is at least the equal of any in Canada, as well as being one of the largest railway repair shop power plants on the continent.

All the main buildings comprising the shops face on a central midway, which is 1,200 ft. long, and extends through the shop grounds from the locomotive house to the public highway. The buildings in which locomotive repairs are made are those at the south end of the midway and adjacent to the locomotive house, whereas the car repair buildings are on the north end of the midway and alongside the street leading to Winnipeg. The power house occupies a central position between these two groups and is on the west side of the midway. This central location is excellent for an efficient and economical distribution of steam, air, water, and electric power to the various buildings for all purposes. The necessity of possible future extension has been anticipated, and in consequence this building, in common with the others of the repair plant, may be largely extended with a minimum expense.

The power house is of very similar construction and appearance to that of all the other buildings of the plant, being concrete below window sills and local white brick above, while the roof trusses, crane tracks and coal handling and storage plants are supported on steel columns. The outside dimension of the structure is 110 by 155 ft., with the narrow frontage on the midway, and is divided by a brick fire wall into a 59 by 150 ft. engine room and a 45 by 150 ft. boiler room, the latter being on the south side of the building. The pump pit is a part of the engine room and is 16 ft. wide by 8 ft. deep, extending along the fire brick wall the entire length of the building.

The general arrangement and construction of the 59 by 150 ft. engine room is shown in one of the accompanying illustrations. It will be observed that the roof is carried on nine trusses, supported on steel columns from the side and fire walls. The design is such that with the central skylights in the roof, and large windows around three sides of the room, almost perfect natural illumination is obtained. The walls, ceiling and steel work are painted white, which aids in the illumination of the room. Ventilation is obtained through all windows and skylight ventilators. The roof is spanned by a 10 ton hand operated travelling crane, capable of handling any of the heavier parts of the engine room equipment.

The pump pit and boiler room floors are of concrete, while that of the engine room proper has a finish of maple laid on a false floor secured to sleepers bedded in bituminous concrete.

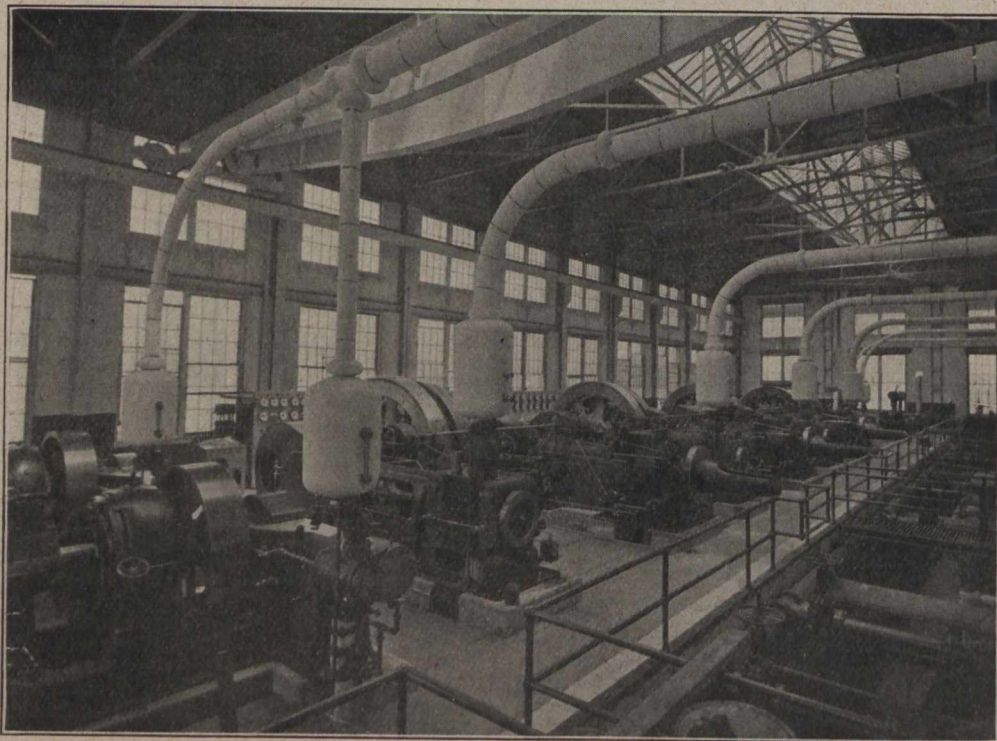
On account of the nature of the ground on which this plant was erected, it was necessary to carry the foundations for all the machinery to an average depth of 12 ft., all foundations being of solid concrete built on a reinforced slab or mat.

All auxiliary apparatus and most of the

steam, air and water piping are concentrated in the pump pit mentioned previously, this leaving that portion of the power house above the floor practically clear.

The boiler room contains the entire steam generating equipment for power and heating of the locomotive and car shops, access between this and the engine room being only through fire doors. In this room are also located the coal storage bins and coal ash handling apparatus. A special track for coal supply cars runs along the south side of the power house. The 200 by 11 ft. reinforced concrete chimney is entirely independent of the building and a few feet west of it.

The generating apparatus in the engine room consists of 9 units with a total normal capacity of 2,030 k.w. divided as follows:—1,600 k.w. alternating current and 430 k.w. direct current. The generators were manufactured and installed by the Canadian General Electric Co., and the Goldie & McCulloch Co. supplied and installed all engines.



View of Engine Room, from South West Corner.

The standards adopted by the N.T.R. Mechanical Engineer for the various types of apparatus and supplies are as follows:—

High pressure steam	150 lbs. per sq. in.
Back pressure for steam heating	5 " " "
Service water pressure	60 " " "
Fire protection water pressure	175 " " "
Hydraulic pressure (for tools)	1,500 " " "
Air pressure	120 " " "
Alternating current motor	3 phase 60 cycle 550 volts.
Direct current variable speed motor	220 volts.
Cooper Hewitt and incandescent lights	220 volts a.c.
Yard lighting system	7.5 amp. series arcs.

In order to designate the various piping systems the following standard colors have been used:—

High pressure steam pipes	White.
Return steam pipe	Blue.
Low pressure exhaust for heating	Buff.
Fire service	Red.
Air line	Green.
Hydraulic piping	Brown.
General water supply	Black.

The units supplying the electrical power are divided as follows:—Three 500 k.w., a.c. 600 volt 60 cycle 150 r.p.m. generators each direct connected to a horizontal 21 by 30, 34 by 30 in. cross compound noncondensing Corliss steam engine. One 250 k.w., a.c. 600

volt 60 cycle 150 r.p.m. generator direct connected to a horizontal 18 by 30 in. simple Corliss steam engine. One 150 k.w., d.c. compound wound 250 volt 150 r.p.m., generator direct connected to 14 by 30 in. horizontal simple Corliss steam engine. Two k.w., d.c. compound wound 125 volt 275 r.p.m. exciter generators direct connected to horizontal 11 by 12 in. high speed simple engines. One auxiliary 150 k.w. motor generator set consisting of a 225 h.p. 900 r.p.m. induction motor direct connected to a 150 k.w. d.c. 250 volt compound wound inter-pole generator. All apparatus is noncondensing, on account of all the exhaust steam from the engine, compressor, and other auxiliary devices being required in the low pressure steam system of the shops.

The switchboard controlling these generators was manufactured and installed by the Canadian Westinghouse Co., and consists of 21 blue Vermont marble panels 7 ft. 8 ins. high, and 2 ins. thick, the entire board being 52 ft. long. There are 7 generator panels, 1 a.c. totality panel, 1 d.c. feeder, 1 a.c. general lighting, 1 arc lighting, and 10 a.c. feeder panels, the only special appa-

ratus on the switchboard being the motor operated rheostats with which each of the generator panels is supplied. As all the power and light distribution is underground the necessary cables pass through 38 ducts in the east and west walls to the various buildings. The conductors between all generators and switchboards are rubber insulated, lead covered cables, run in iron conduits from the oil switches to generator terminals; all feeder circuits to the various buildings are paper insulated and lead covered, run in fibre or tile conduit.

There is at present 2,560 k.w. in motor and lighting load connected to this power plant, and this amount will be increased to approximately 4,060 k.w. when the car shops are fully equipped. The low load factor common in this type of shops, still gives the power plant a reasonable margin for emergencies.

The artificial lighting of both the engine and boiler rooms is performed by Cooper Hewitt type H mercury vapor lamps for general illumination, and incandescent lamps in the pump pit, pipe tunnel, and in