

Provided cheap raw materials can be obtained, pig iron can be produced in a blast furnace much cheaper than in an electric furnace; but to produce economically the blast furnace must be of modern design and produce not less than 250 tons of pig iron per day, and should under the best conditions produce as much as 500 tons per day. The efficiency and economy of the blast furnace depends upon its large output, and can only be commercially successful when a market for a large output is available.

For the success of such a plant, cheap ore, cheap coke, and cheap limestone in large quantities are essential. As regards cheap ore suitable for blast-furnace purposes, the Parapara deposits should be able to supply this, but at present there seems no probability of obtaining large supplies of good coking coal at a price which would enable pig iron to be produced for export in competition with Australia or other iron-producing countries. With coke even at £2 10s. per ton, assuming it could be obtained for this, the cost of producing pig iron would be such that when the cost of freight to destination was added it could not compete with other pig iron in the Eastern markets.

The total demand in New Zealand for pig iron before the war was approximately 10,000 tons per annum, and for finished steel about 140,000 tons. Of this 140,000 tons about 25,000 tons were rails, about 20,000 tons galvanized and black sheets and plates, about 14,000 wire, and about 25,000 tons bars, bolts, and rods, and the remainder miscellaneous products, many of them manufactured articles such as pipes, tanks, &c.

If it were possible to roll rails, plates, and sheets, and bars and rods, in one mill, the possibility of starting a works to supply the colony might be seriously considered; but one mill would be required for rails, another for plates and sheets, another for bars and rods, and another for wire; and it would be necessary to start three or four works, each practically a separate industry, to convert the steel produced at the original works into the final finished products.

The electric furnace can, on the other hand, be worked economically with small units; and, although it is very doubtful if it can ever compete with a modern blast furnace and steel plant in the production of steel rails and other classes of cheap finished steel products on a large scale, in cases where the blast furnace is not possible it may be able to produce cheaper than pig iron or steel can be imported.

CONCLUSIONS AND RECOMMENDATIONS.

The conditions in New Zealand are such that a blast furnace and modern steel plant are not at present feasible; but if power, coke, coal, and limestone are obtainable at reasonable prices, small quantities of pig iron and steel may be produced to partially meet the local requirements, and this will form the basis for building up a larger industry when the demand has increased sufficiently to justify expansion on a larger scale, should further investigation show that suitable raw materials are available.

Both pig iron and steel of satisfactory quality, containing little titanium, can be produced from titaniferous ironsands in the electric furnace, but the Snyder furnace is not suitable for the production of pig iron.

In my opinion you will be justified in starting the manufacture of pig iron in the electric furnaces, provided power, coke, coal, and lime can be obtained at a price which will enable pig iron to be produced at about £5 10s. to £5 15s. per ton as the basis of costs given in this report.

Subject to the above, I recommend—

- (1.) The erection of an electric-furnace plant, specially designed for the production of pig iron, to produce 10,000 tons of pig iron per annum, and that a foundry be attached for the manufacture of castings to meet local requirements.
- (2.) That later on, but not at first, a steel furnace be erected to produce steel either entirely from scrap or partially from scrap and partially from pig iron produced from the iron-sands.
- (3.) That when the steel furnace is erected a small mill to roll rods and small bars, and possibly small steel sections, be installed, or alternatively hammers or a forging-press, whichever is considered most likely to meet the special conditions.

Yours faithfully,

p.p. EDWARD RILEY AND HARBORD:

F. W. HARBORD.

The High Commissioner for New Zealand, 413-416 Strand, W.C. 2.