

O T T A W A

November 5th, 1941.

R E P O R T

of the

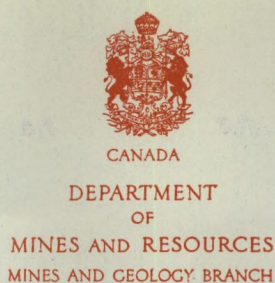
ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1113.

Examination of Two Austenitic Manganese
Steels.

REPORT OF THE DOWNEY LABORATORY ON THE ANALYSIS OF TWO AUSTENITIC MANGANESE STEELS. THE ANALYSIS WAS MADE BY THE DOWNEY LABORATORY, OTTAWA, ON NOVEMBER 5, 1941. THE ANALYSIS WAS MADE BY THE DOWNEY LABORATORY, OTTAWA, ON NOVEMBER 5, 1941. THE ANALYSIS WAS MADE BY THE DOWNEY LABORATORY, OTTAWA, ON NOVEMBER 5, 1941.

BUREAU OF MINES
DIVISION OF METALLIC MINERALS
—
ORE DRESSING AND
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Source of Material and Object of Investigation:

On October 24th, 1941, two samples of austenitic manganese steel were received from the Sorel Steel Foundries Limited, Sorel, Quebec. On November 3rd, 1941, a telegram was sent to the company, requesting advice on examination required on these steels. In reply to our telegram the company requested a chemical analysis and a microscopic examination.

Chemical Analysis:

The following results of chemical analysis were obtained:

Sample No.	C, %	Mn, %	Si, %	S, %	P, %	Cr, %
1.	1.10	12.00	0.54	0.012	0.058	0.13
2.	0.99	12.20	0.74	0.011	0.000	0.12

Microscopic Examination:

Figures 1 and 2 are photomicrographs at x100 magnification of Steels Nos. 1 and 2 respectively, in the unetched condition. Both steels contain a large number of cavities and the inclusion content is fairly high. It is apparent that Steel No. 1 (Figure 3) was not heat-treated. Figure 4 shows the coarse-grained structure of Steel No. 2.

Figure 1.

Figure 2.

X100, unetched.
STEEL NO. 1.

X100, unetched.
STEEL NO. 2.

(Continued on next page)

(Microscopic Examination, cont'd) -

Figure 3.

Figure 4.

X100, etched
in 2 per cent Nital.

STEEL NO. 1.

X100, etched in
2 per cent Nital.

STEEL NO. 2.

Discussion of Results:

The composition of the steels is within the limits for austenitic manganese steel as specified by the A. S. T. M., except for the carbon content of Steel No. 2.

Both steels are fairly dirty and contain a large number of cavities. The low sulphur and phosphorus and the high silicon and manganese contents indicate that apart from the high inclusion content the steels were properly made. The porous condition is considered to have been caused by entrapped gases. The coarse grain size of Steel No. 2 indicates that this steel was poured from a fairly high temperature.

- Page 4 -

Conclusions:

The defects observed in these steels would lower their physical properties and consequently the life of the castings would be reduced.

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