

O T T A W A

March 23rd, 1942.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1190.

Examination of Defective Steel
in 3.7 Anti-Aircraft Gun.



BUREAU OF MINES
DIVISION OF METALLIC MINERALS
—
ORE DRESSING AND
METALLURGICAL LABORATORIES

CANADA
DEPARTMENT
OF
MINES AND RESOURCES
MINES AND GEOLOGY BRANCH

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Origin of Request:

Analysis Requisition No. O.T. 176, covering this work, was issued on March 16th, 1942, by R. Boulton, of the Inspection Board of the United Kingdom and Canada, 58 Lyon Street, Ottawa, Ontario. It was requested that the cause of the defects apparent in the samples submitted be determined. This material is used in the top carriage assembly-platform for the breech mechanism.

Description of Material:

Two broken tensile pieces and two broken impact pieces were submitted with a round plate. Casual inspection showed that in testing the specimens had split. The round plate had flaked away at one spot on machining.

Nature of Fissures in Steel:

Figure 1.



Unetched surface, X200, showing seam of slag inclusions.

The above photomicrograph (Figure 1) illustrates very clearly that seams of slag are present in the metal.

Impact Tests:

Rolling direction was determined on the round plate by macro-etching in 1:1 HCl.

Impact Tests.

	<u>Izod impact, foot-pounds</u>
Bar cut parallel to rolling direction -	72, 63, 72; aver. 69.
Bar cut transverse to " "	- 43, 37, 46; aver. 42.

Conclusions:

Fissures present in the steel coincide with seams of slag.

Impact tests when taken parallel and transverse to rolling direction are sensitive indicators of the presence of elongated inclusions.

Ingot condition prior to rolling should have been more carefully controlled.

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