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O T T A W A

May 18, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1861.

(Further to Report of)
(Investigation No. 1840,)
(dated April 17, 1945.)

Corrosion Resistance of Identity Chains and Discs.

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Background:

On April 17, 1945, Report of Investigation No. 1840, on the above subject, was submitted to Wing Cmdr. P.W. Webb, Director of Inter-Service Research and Development (Clothing and Equipment), Department of National Defence, 299 Bank Street, Ottawa, Ontario. In that investigation it was found that the chains and discs submitted corroded badly in the Salt Spray Corrosion Test and that the chromium content of the chains was considerably below the minimum allowed by specification.

A letter dated April 21, 1945, File No. DIRD(P)-105-7, was received requesting that a Salt Spray Corrosion Test be performed on a similar chain coated by the "Coloron" process used by the Stanley Manufacturing Company Limited, of Toronto. It was further requested that four additional chains be analysed for chromium to determine whether the ones investigated earlier were merely an isolated case.

Tests Performed:

The following tests were performed:

1. The "stainless" steel coated by the "Coloron" process and an accompanying monel disc were submitted to the action of spray from a 20 per cent salt (sodium chloride) solution at a temperature of 95° F. for 8 days.
2. The four chains which were submitted were analysed for chromium.

1. Salt Spray Corrosion Test.

- After 16 hours: Small specks of rust were visible on a considerable number of links in the chain.
- After 40 hours: More links were corroded. Some corrosion product from the monel metal was visible.
- After 8 days: After slight shaking the chain broke, liberating the disc. The test was discontinued.

The condition of the chain and disc at the end of the test is shown in Figure 1.

2. Chromium Content of Chains.

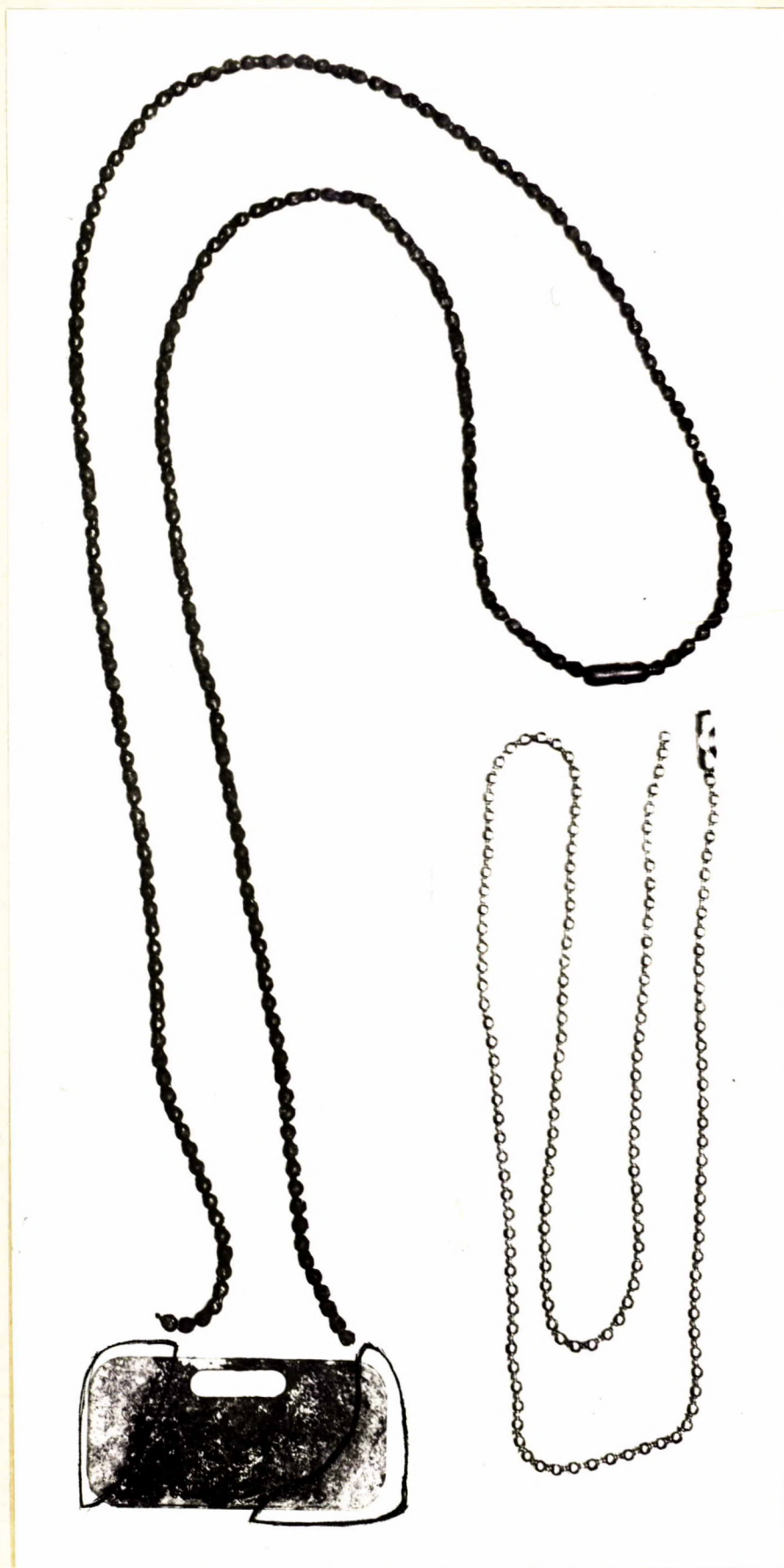
The chromium content of the chains was as follows:

<u>Chain No.</u>		<u>Chromium, per cent</u>
1.	-	16.25
2.	-	15.87
3.	-	15.10
4.	-	16.53

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(Tests Performed, cont'd) -

Figure 1.



(a)

(b)

(a) Chain coated by the Coloren process, and monel disc, after 8 days in the Salt Spray Corrosion Test.

Considerable monel corrosion product was visible in the encircled areas. The dark area on the disc was covered with rust from the chain.

(b) Uncoated, uncorroded chain included for comparison with the coated, corroded chain.

Conclusions:

1. Though better than the uncoated chains which were tested previously, the chain coated by the "Coloron" process had poor resistance to corrosion in the salt spray.

2. The four chains which were analysed contained less chromium than allowed by the specification, i.e., less than 17.0 per cent.

Recommendation:

It is suggested that chains coated by the "Coloron" process, such as the one submitted for this investigation, should not be used for the Armed Forces, especially under warm, humid conditions.

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