

File

DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

FILE COPY

Ottawa, December 3, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2147.

Corrosion Resistance of Slide Fasteners When
Subjected to Salt Spray Conditions.

=====

(Copy No. 6.)

O T T A W A

December 3, 1946.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2147.

Corrosion Resistance of Slide Fasteners When
Subjected to Salt Spray Conditions.

=====

Background:

A letter (File No. DIRD (P) 105-40-1 (Res)), dated October 18, 1946, from Wing Commander J. M. Macoun, A/Director, Inter-Service Research and Development (Clothing and Equipment), Department of National Defence, Ottawa, Ontario, requested that a test be made to establish the behaviour of slide fasteners after subjection to salt spray. Samples of three types of slide fasteners were submitted to these Laboratories for test:

1. Green slide fastener with closed end stop.
2. Green slide fastener with open end stop.
3. Brown slide fastener with closed end stop.

Test Performed:

One sample of each type was exposed in a salt spray cabinet at 95° F., using a 20 per cent salt (sodium chloride) solution. The samples were suspended in a horizontal position front side facing up with slider at centre of slide fastener. One half of the fastener was left closed, the other half open. The pull tabs on the green samples were left in opposite positions. On the brown sample the pull tab was placed in the down position. The samples were exposed in this atmosphere for a total of fourteen days.

The samples were examined a number of times during the test and a log kept of the various changes in appearance.

Log of Test:

After 1
day -

A trace of green corrosion product appearing over the surface of the brown slide fastener. Also a trace of white corrosion product over the slider and pull tab.

After 2
days -

Considerable green corrosion product over the full length of the brown slide fastener. Also the white corrosion product at the slider and pull tab had increased.

The green sample with riveted retainer had slight green corrosion product at the rivets.

After 3
days -

- (1) There was further corrosion on the brown slide fastener.
- (2) Corrosion at the four rivets increased.

(Continued on next page)

(Test Performed, cont'd) -

After 10
days -

- (1) Considerable increase in the amount of green corrosion. White corrosion product at the pull tab and slide also increased.
- (2) Slight increase of corrosion product at the rivets of the green slide fastener.

After 14
days -

Samples were removed from the cabinet.

Cleaning Procedure:

A rinse in cold water to remove salt from the surface proved very slow and difficult.

Samples were then placed in boiling water which proved to be a much better way of removing the salt.

Appearance After Cleaning:

1. The scoops, open end stops, and closed end stop on the brown slide fastener had considerable corrosion product over surface.

The slide and pull tab were severely corroded. (See Figure 1.)

2. The green slide fastener with closed end stop had corrosion product over most of the surfaces. (See Figure 2.)

3. The green slide fastener with riveted retainer and separating pin had corrosion product over all surfaces. (See Figure 2). The rivets through retainer and separating pin parts were severely corroded.

Serviceability After Salt Spray Test:

The three samples were hand-tested to determine whether or not corroded slide fasteners required more force

(Serviceability After Salt Spray Test, cont'd) -

to open and close them. The results are as follows:

- (1) The slide on the brown slide fastener broke apart, releasing the tab. Slide did not move and could not be moved by hand.
(See Figure 3.)
- (2) The operation of the corroded green slide fasteners only required slightly more effort to open and close them.
- (3) The retainer and separating pin were tested for fastness and found to pull apart very easily where the rivets were corroded.
(See Figure 4.)

Conclusions:

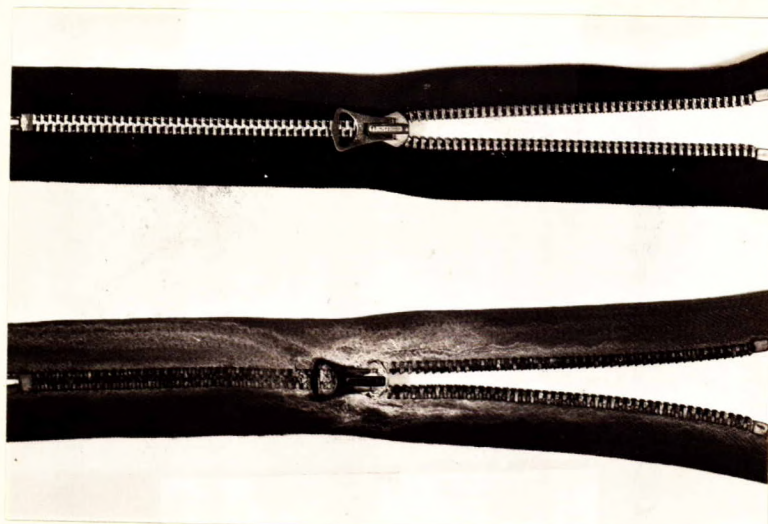
1. The brown slide fastener corroded very rapidly when placed in marine atmospheric conditions. After fourteen days it was impossible to move the slide by hand even after the salt was removed. It broke away from the tab with very little effort.
2. The green slide fasteners corroded much more slowly when placed in marine atmospheric conditions. After fourteen days only slightly more effort was required to open and close them after the salt was removed.
3. The riveted retainer on one green sample had been weakened at the rivets by corrosion and was easily pulled apart.

oooooooooooo
oooooooo
oo

WD:LB.

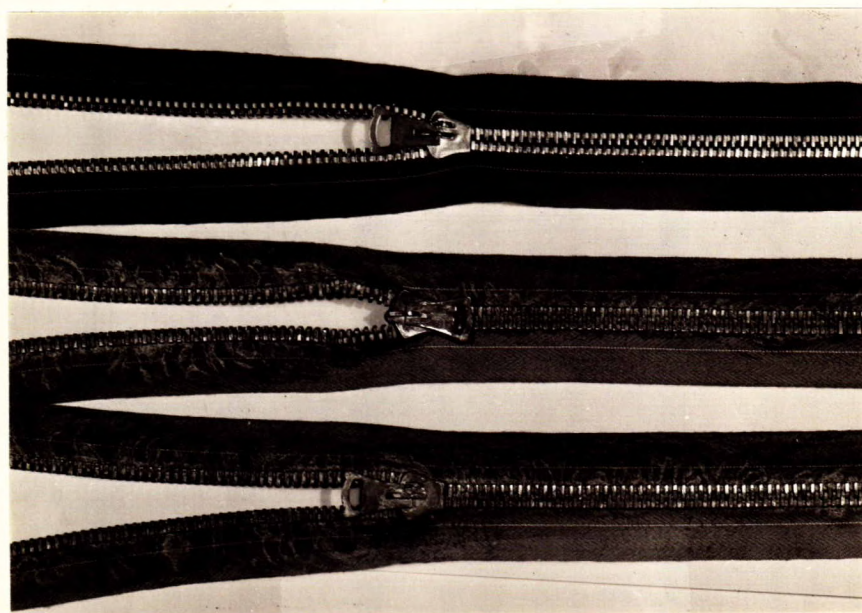
(Figures 1 to 4 follow,
(on Pages 5 and 6.)

Figure 1.



BROWN SLIDE FASTENER BEFORE AND AFTER
FOURTEEN DAYS IN SALT SPRAY.

Figure 2.



(a)

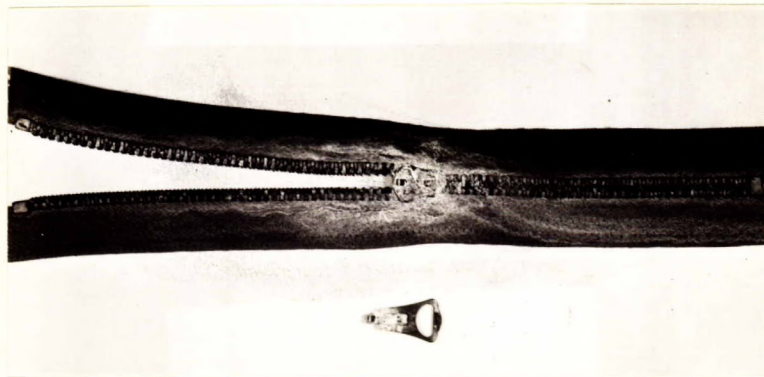
(b)

GREEN SLIDE FASTENERS BEFORE AND AFTER
FOURTEEN DAYS IN SALT SPRAY.

(a) With end closed.

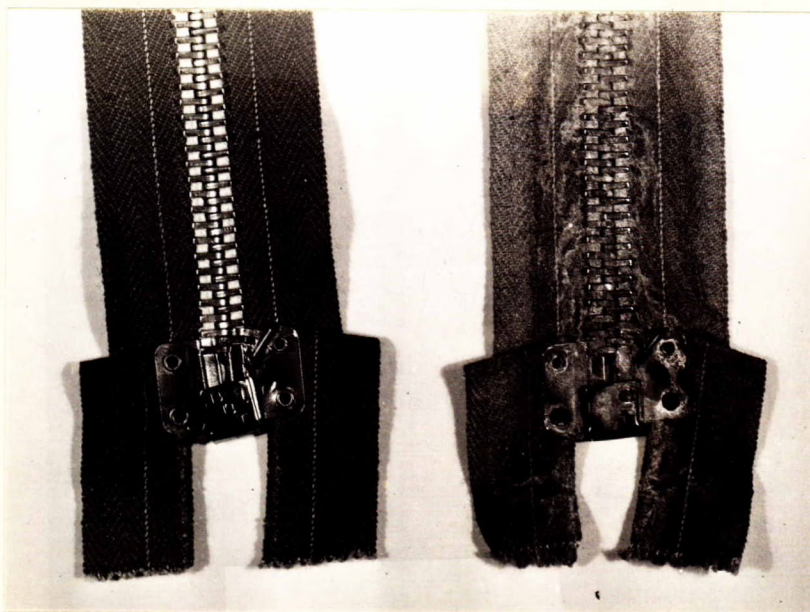
(b) With riveted retainer and
separating pin.

Figure 3.



BROWN SLIDE FASTENER AFTER TESTING FOR FORCE
REQUIRED TO OPEN AND CLOSE IT.

Figure 4.



RETAINER AND SEPARATING PIN BEFORE AND AFTER
TESTING THE STRENGTH OF THE RIVETS.

== == == == == ==
== == == ==

WD:LB.