

File

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O T T A W A

May 14, 1945.

## R E P O R T of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1867.

Nature of Corrosion on Under Surfaces of Wings,  
Fuselages and Tail Units of Lockheed Model  
12A Aircraft CF-BZM and CF-BZN.

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Background:

A letter (File No. 5008-B26-13,14) dated May 9, 1945, from Mr. J. L. Smith, Acting Chief Aeronautical Engineer, Civil Aviation Division, Department of Transport, Ottawa, Ontario, requested that a sample of alclad sheet, taken from the lower wing surface of Lockheed aircraft CF-BZM, be investigated to determine the nature of the corrosion on its surface. It was stated that this was representative of the corroded condition of the under surfaces of the wings, fuselages and tail units of aircraft CF-BZM and CF-BZN.



Tests Performed:

A typical piece was cut from the sample, for microscopic examination. The remainder was photographed in order to obtain a permanent record of the appearance of the corrosion (see Figures 1a and 1b).

The cut piece was mounted and polished, and the pits on the surface were examined under the microscope. Most of the pits observed were quite shallow and seemed to be of little importance. A very few of them were comparatively deep. The depth of the deepest one was found to be 0.003 inch. This pit was photographed (see Figure 2).

The piece was next etched with Keller's reagent and again examined under the microscope. The thickness of the aluminium layer on the surface of the alclad was found to be approximately 0.002 inch. Aside from the surface pits, the metal appeared to be sound.

(Figures 1 and 2 appear  
on Pages 4 and 5.)

Conclusions:

1. The shallow pits which did not penetrate through the aluminium layer on the surface of the alclad appeared to be of little importance.
2. Pits which penetrated the aluminium layer and entered the duralumin underneath were much more serious, because corrosion might continue at these points until serious damage has been produced.
3. This continuation of corrosion would be much slower if the aircraft is operated inland where it will not come in contact with salt solution and salt spray such as are encountered in the vicinity of the ocean.
4. It is possible, as suggested, that the corrosion on the bottom of the aircraft was due to the improper use of cleaning materials.



Recommendations:

1. In order to remove any traces of cleaning material which might still be present in the pits, it is recommended that the surface of the metal be thoroughly scrubbed and rinsed with hot water. No chemicals should be added to the water.

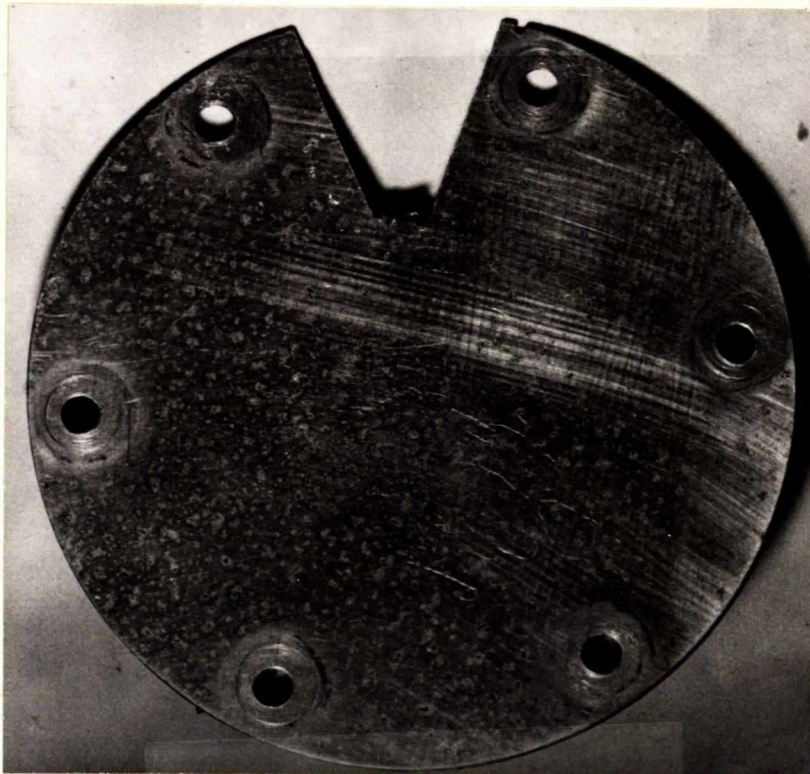
2. Should these aircraft be used, it is recommended that they should be watched closely to determine the rate at which the corrosion is progressing.

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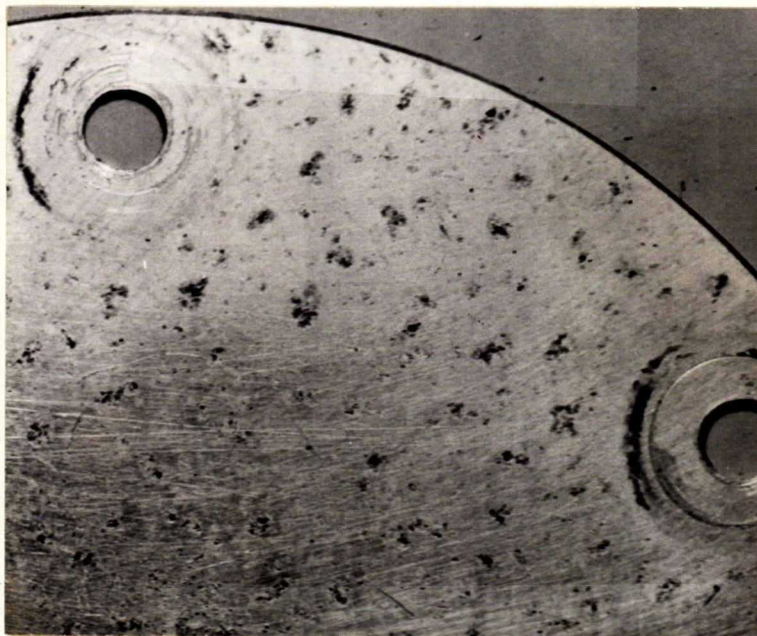
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Figure 1.



(a)



(b)

CORRODED SAMPLE OF ALGLAD TAKEN FROM THE LOWER  
WING SURFACE OF LOCKHEED AIRCRAFT CF-BZM.

Magnification:

(a) X 1.2  
(b) X 2.6



Figure 2.



X500, as polished.

DEEPEST PIT FOUND ON MICROSCOPIC EXAMINATION  
OF THE CORRODED SURFACE OF THE ALGLAD.

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