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O T T A W A      October 5th, 1942.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1312.

Flexible Wire Rope Endurance Tests.

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(Copy No. 14.)

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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Source of Material and Object of Investigation:

On September 10th, 1942, F/L E. R. Cook, for O.C., No. 11 A.I. District, R.C.A.F., Montreal, Quebec, acting under instructions from S/L A. J. Smith of R.C.A.F. Headquarters, Ottawa, Ontario, submitted four samples of aircraft cable for endurance tests. These samples were marked as follows:

Sample No. 1 (Anglo-Canadian Wire Rope).

This sample had the centre strand only lubricated before fabrication.

(Source of Material and Object of Investigation, cont'd) -

Sample No. 2 (Anglo Canadian Wire Rope).

This sample had all the wires pre-lubricated before fabrication.

Sample No. 3 (Dominion Wire Rope).

This sample had the centre strand only pre-lubricated before fabrication.

Sample No. 4 (Dominion Wire Rope).

This sample had all the wires lubricated before fabrication.

It was stated that the lubricant used in the manufacture of Anglo-Canadian wire rope was one recommended by the Roebling Wire Rope Co., Jersey City, N.J., U.S.A. The lubricant was known as Ironsides Cable Lubricant No. 1 $\frac{1}{2}$ . The lubrication used by Dominion Wire Rope and Cable Company Limited was a heavy grease (No. 1180) prepared for them by Imperial Oil Company Limited.

S/L A. J. Smith stated that the wire used by these two firms was the same as that used by Roebling's. According to report, the lubricant used by the B. Greening Wire Company Limited was the same as that used by the Anglo-Canadian Wire Rope Company Limited, but the source of wire was not stated.

-In addition to the above, the B. Greening Wire Company Limited, Hamilton, Ontario, sent in, on September 10th, 1942, a sample of 1/8x7x19 galvanized steel Trulay aircraft cable to be fatigue-tested to Specification AN-RR-C43.

Physical Tests:

The cables were all tested to Specification AN-RR-C43 and the following results were obtained:

(Continued on next page)

(Physical Tests, cont'd) -

BREAKING STRENGTH AFTER ENDURANCE TESTS

Table I. - Anglo-Canadian Wire Rope Co. Ltd.

Sample No.	Cable diam. inch	Lubrication	Number of revs	Straight section, pounds	Over bottom pulley, pounds	Over top pulley, pounds
1	1/8	Centre strand	61354	2380	584	Broke
"	"	"	52452	2400	430	"
"	"	"	63764	2160	522	"
"	"	"	72530	2160	630	"
2	"	All wires	68692	2200	540	"
"	"	"	77664	1980	650	"
"	"	"	70152	2100	782	732
"	"	"	70378	2340	480	880

Table II. - Dominion Wire Rope and Cable Co. Ltd.

3	1/8	Centre strand	45764	2080	780	Broke
"	"	"	53958	2200	Broke	262
4	"	All wires	67376	2180	"	280
"	"	"	55014	2260	"	330

Table III. - The B. Greening Wire Co. Limited.

1	1/8	All wires	70004	2200	2040	1712
"	"	"	71280	1820	1560	1398
"	"	"	70012	1800	1684	1600
"	"	"	71226	2080	1520	1986
"	"	"	70004	2000	1734	1564

Discussion of Results:

In Table I are given the results obtained on Anglo-Canadian wire rope. Three out of four samples of cable that had only the centre strand lubricated broke before the fatigue test was completed. The one which ran 70,000 reversals without breaking failed the breaking-load test.

The Anglo-Canadian cable, which had all wires lubricated in manufacture, had greatly improved fatigue properties. Three out of four samples passed the 70,000 reversals test. However, none of the cables had the required 1,000 pounds breaking-load strength after this test.

The results of tests on Dominion Wire Rope samples are shown in Table II. Both samples failed before the specified 70,000 reversals were completed. The cable with all the wires lubricated in manufacture, however, had higher fatigue properties than the sample with only the centre strand lubricated.

In Table III are shown the results of tests on samples of 1/8 inch diameter cable submitted by the B. Greening Wire Company Limited, Hamilton, Ontario. The Greening cable, which had all wires lubricated in manufacture, had the required breaking-load after the endurance test.

CONCLUSIONS:

The tests showed that in every case the fatigue properties of completely lubricated cable were superior to those of partially lubricated cables.

It can be concluded, from the results obtained on the B. Greening Wire Company's cable, that the values specified in Specification AN-RR-C43 can be obtained.

(Continued on next page)

(Conclusions, cont'd) -

As the wire cable submitted by the B. Greening Wire Company Limited, Hamilton, Ontario, meets the specification, whereas those submitted by the other two firms failed, it is proposed to carry out additional tests in order to determine, if possible, why it passed and the others failed.

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