TRIP REPORT

TR: 6659

Author: P. S. Gaal

Date: July 12, 1971

Unclassified

Trip to: Battelle Memorial Institute,
Columbus, Ohio

Duration of Trip: June 28, 1971

Security Classification

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PURPOSE OF TRIP: Monitor Friction Testing (P. O. No. 21412, TIS-DM-088.2)

Present: J. Kissel - BMI
W. Glasier - BMI
P. Gogal - WANL

OBSERVATIONS:

The purpose of the trip was to review in details the results of the first three tests (described in details in TR 6644, June 1, 1971).

1. The preliminary data (attached) clearly indicated that the extent of the apparent contact area is unimportant as long as the pressures are kept reasonably low (no plastic deformation expected). Inasmuch as the pressures in this case are several magnitudes below the critical level, the contact area can be ignored. This, of course, is predictable from theory as well. Consequently, it was decided that an unaltered cylindrical on flat configuration will be used for all future tests. The contact pressure will be computed from the actual contact area derived from photographs of the wear scars. To prevent uneven wear, a large radius cylindrical surface may be lapped on the specimen at the discretion of the tester.

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2. The flat plate portion of the specimen couple will be lapped flat. Surface roughness tests will be performed on a limited basis.
3. The initial results have shown an unusually high static friction between PO-3 and ZTA graphites. Extra care will be exercised to identify if test conditions might be the cause of this. One precaution that will be taken is the inclusion of a long piece of stainless steel tube coiled up and immersed into LN₂, into the gas train to freeze out traces of moisture possibly present in the hydrogen. Tests will be performed with and without LN₂ both to ascertain the effects, if any.
4. A careful review of the data shows that there is a definite drop in friction between 1 and 76 torrs of H₂ (cycles d and e). A special cycle will be followed for one of the coming tests where the gas will be bled in at a low rate while friction data is being taken to determine the functional relationships between these variables. This test will be performed at no added cost to WANL.
5. The previously reported brownish discoloration of the SS parts of the instrument are from using H₂O₂ for cleaning during a previous test series.
6. Decision was made to retain the weighing procedures followed in earlier tests.
7. Photographs of the wear surfaces may be taken at 10X only (deleting the additional 3X photos) as long as the whole specimen is shown on the picture. Higher magnification photos (up to 100X) will be taken in cases where anomalies in test data warrant. If funds permit a few scanning electron micrographs will also be taken of the more descriptive specimens.

SUMMARY:

The testing program is progressing very well. The excellent cooperation on the part of Battelle personnel is instrumental in generating meaningful data in this program, and predictably will surpass the initial goal set for this investigation. They are in need of more specimens. So far, WANL had supplied only three complete specimen pairs, the rest of the samples are only half of a pair. Unless the missing material specimens are supplied within a reasonable time, serious delays may occur in the program.

SIGNATURE

APPROVED

June

FRICION RESULTS

EXPERIMENT NUMBER

PO-3 CYLINDER ON ZIN PLAT

#1 (10) AS REG
#2 (10) 1000 RPM
#3 (10) 1000 RPM
#4 (10) 1000 RPM