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MOUND LABORATORY

Operated By

[illegible] CHEMICAL COMPANY

[illegible], OHIO

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Classification authority by Paul B. Dowd 1/12/71
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Reviewed by C.W. Huntington 8/29/79

M. M. Haring
Laboratory Director

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Authorizing Official
Date:

LABORATORY INSTRUMENT DESIGN PROGRESS REPORT

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[redacted]

~~GROUP 1~~
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Date: May 1-31, 1949

Prepared by: R. G. Olt

Distributed: AUG 2 1949

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I. PERSONNEL

A. Group 7

D. L. Haas, L. A. Jewett, C. L. Lesher, C. H. Mellor, R. G. Olt, S. R. Orr, B. J. Rosbac, and E. W. Stautzenbach

* Vacation May 23, 1949 to May 27, 1949.

II. PROJECT

A. Group 7

1a. A Mechanism for Drawing Quartz Fibers - R. G. Olt and S. R. Orr

No progress to report.

1b. Measurement of the Properties of Quartz Fibers - R. G. Olt and S. R. Orr

No progress to report.

2a. The Standard Torsion Equal-Arm Balance - L. A. Jewett, R. G. Olt, S. R. Orr, and E. W. Stautzenbach

Initial service has renewed the contaminated quartz-fiber balances. Repairs were made on the mechanical systems and on hang-down fibers. Dropped foils, both gold and plated, were removed and the pan septum areas and portions of the interior optical systems were cleaned of accumulated films. Five men spent a total of 79 man-hours working with the hot portions of the balances with no rise in urine counts resulting from this exposure.

3. Design and Construction of a Lens Spectrograph - D. L. Haas, C. A. Lesher, and C. H. Mellor

No progress to report.

4. Refilling B-wall Tubes - D. L. Haas, C. A. Lesher, and C. H. Mellor

Several B-wall tubes have been refilled with an argon and ethyl ether mixture to pressures yielding satisfactory performance.

Experience, both here and at Argonne National Laboratory, indicates need for complete disassembly and reconstruction of B-wall tubes in order to correct as far as possible initial constructional weakness.

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III. DETAILED [illegible]

2a. The Standard Torsion Equal-Arm Balance - L. A. Jewett, R. [illegible] Dlt. [illegible] R. Orr, and [illegible] Schutzenbach.

In order to attain lower levels of air-borne contamination and physical traffic, contamination-earth-floor balance repair facilities were set up in high risk area, Room 1-71, instead of 7-54 as originally planned.

Two balance housings were opened, dropped pan holders and foils recovered, inside areas cleaned and internal repairs and adjustments completed without spread of activity to the outside surfaces of the balance housings or to the personnel involved in the repair.

Design or constructional weakness disclosed included failures of joints in the flexible shaft drives of pan-arrest rotators; planetary drive bearing for torsion fiber rotation; and in the case of one balance operated under vacuum, a hang-down displacement and fogging of internal optics.

The soldered joints on the flexible shafts on the load-side pan rotators failed on both balances. Relocation of this drive to provide a direct line of operation through the end of the balance housing rather than the side should result in a more rugged and dependable rotator drive.

Failure of the planetary gearing under the present rate of operation (72 weighings per day per balance) is not surprising since this drive is a [illegible] of the Metallurgical Laboratory design which was intended to be used in the order of ten times a day. Design work has been started on an electric-motor drive for installation in place of the present planetary drives. Completion of a satisfactory electric-drive design should result in reduced operator fatigue and, possibly, in some increase in speed of weighings.

The hang-down displacement experienced in the balance operated under vacuum probably occurred as a result of a rapid increase of pressure inside the housing causing a rapid flow of air through the pan septum. Provision of one-half inch spaces between the balance side plates and cover plates may serve as adequate pressure equalizing passages in all but the most extreme rates of pressure rise.

Fogging of internal optics during vacuum operation was caused, at least in part, by the presence of high [illegible] or pressure lubricants used in the course of construction and assembly of the balance housing. Lubrication recommendations

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[illegible] be compiled during final assembly of the balance housings now under con[illegible]uction. Separation of the [illegible] optum illumination system from the viewi[illegible] [illegible]tem will reduce the sensitivity to logged surfaces

The two balance housings were in high risk areas for a total of nine [illegible] during the course of which five men spent the greater portion of 79 high [illegible] man-hours working with the contaminated parts. A minimum of two men were [illegible]sent in the high risk area [illegible] all periods of repair. By adhering to the [illegible]cedure whereby one individual handled uncontaminated areas and tools only, [illegible] the other worked with the contaminated portions only, spread of contamin[illegible]n to the housing exteriors, tools and personnel was kept at a minimum. [illegible]lence of air-borne contamination spread was observed during this period

4. Refilling B-wall tubes - E. H. Daggett, C. L. Lesher, and C. H. [illegible]

A number of eight inch nonoperative B-wall tubes were experimented [illegible] [illegible] the following conclusions were drawn from the data collected.

1. The tubes can be refilled with a mixture of argon and ethyl ether [illegible] the pressure adjusted to perform satisfactorily.

2. The refilled tubes show no marked improvement in the plateau [illegible]operties indicated in prior data.

3. The change in operating characteristic in old tubes is due prin[illegible]ally to the loss of the quenching gas. Experiments with the flashing of [illegible]ments (collector wires) indicated no improvement in operation.

4. A close inspection of the counter tube bodies showed that in [illegible] [illegible]ses as much as 20 per cent of the inside wall of the tube was covered with [illegible]ldering flux from the end-sealing operation. This flux could not be removed [illegible] [illegible]out damage to the B coating. Further, two of the tubes were built without [illegible]ngs in series with the center wire. In these cases the tungsten wire was [illegible]en at the bottom insulator.

It was decided advisable to make a visit to Argonne National Labora[illegible] [illegible] to inspect their tube repair unit and possibly secure some replacement [illegible]all tubes to ease our shortage. On May 25, 1949 E. Daggett and H. [illegible] [illegible] to Argonne National Labora[illegible] [illegible] visited Dr. Shonka and L. Johnson [illegible] discussed the refilling and [illegible] of the B-wall tubes. It was learned [illegible] there was no essential di[illegible] between Argonne National Laboratory's [illegible]ndard refilling technique and our experimental setup except for the Argonne [illegible]onal Laboratory's use of neon in the place of argon.

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During the visit at Argonne National Laboratory, three B-wall tubes were secured and brought back to this site. On the completion of tests by Argonne National Laboratory, two more tubes will be sent here completing our N. O. No. 89. Arrangements were made to secure Kovar header punchings from Argonne National Laboratory to do repair jobs on our tubes here. When the headers are received, further work on the repair of the tubes will be carried on.

In a discussion with L. Johnson, it was suggested that we copy the automatic plateau-rate meter that he uses in his laboratory. Requests have been made to secure existing wiring diagrams and data on the instrument to further investigate its value in our applications.

L. Johnson has observed, during the repair of B-wall tubes, the soldering flux mentioned above. He exercises greater care in the assembly of tubes to avoid the accumulation of flux on the inside surface of the tubes, since he feels its presence in the tube greatly reduces the life and efficiency of the tube.

IV. TIME DISTRIBUTION SUMMARY

Problem	S-202	S-205-P	S-206-P	S-413	S-524	Total
			Man-Months			
1a						
1b						
2a	1/4		3/4		3/4	1 3/4
3		1/4	3/4	1/2		1 1/2
4		3/4	1/4	1/4	1/4	1 1/2
Nonresearch Activities and Services	3/4		1/4	1/4	2	3 1/4
Total						8

RJD/pjr

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