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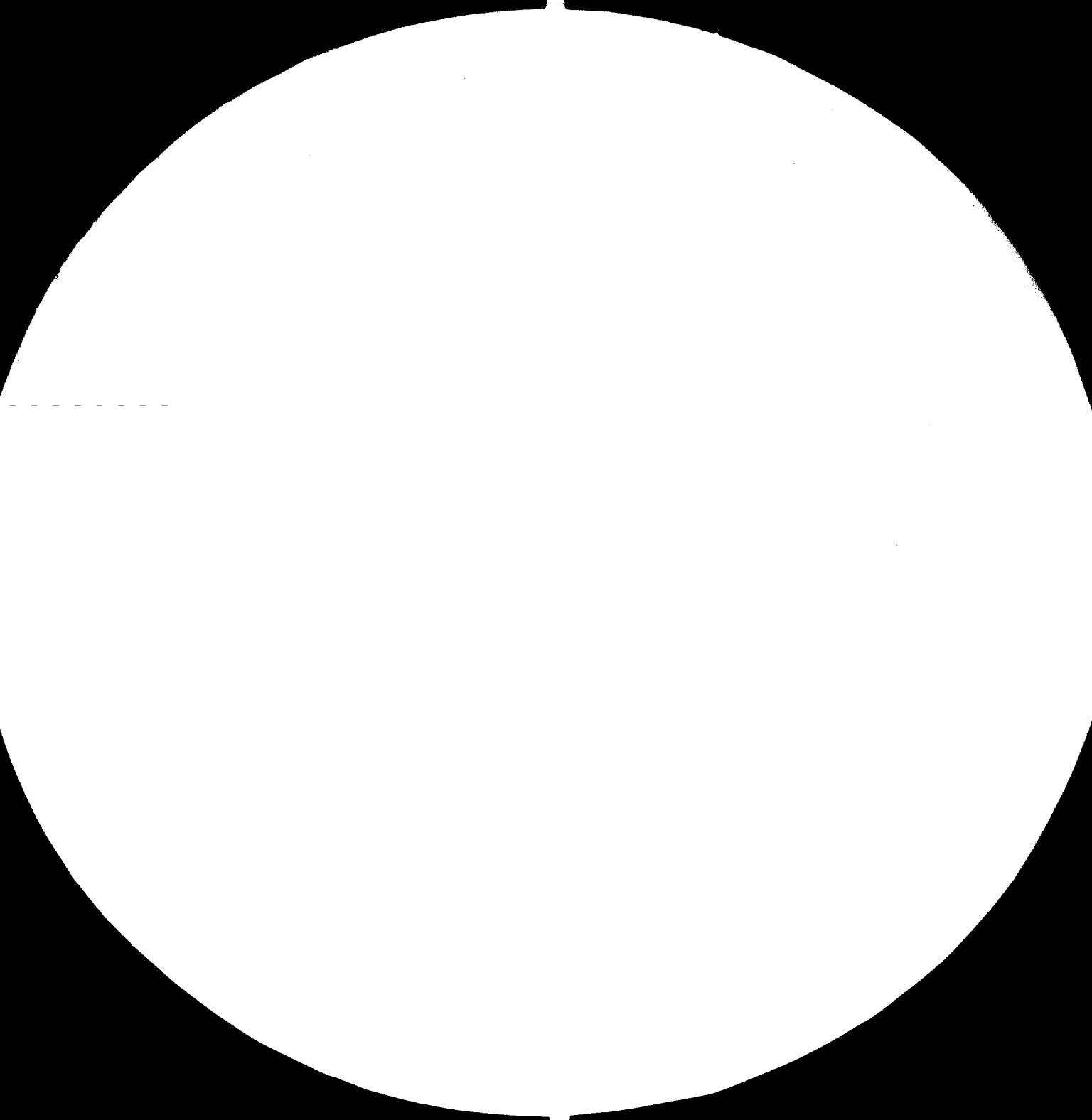
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MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

12508

MISSION TO

INDIA

(Resins as matrix for
composites).

FINAL REPORT

submitted

by

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Chief Technical Adviser

544

Post: DP/IND/81/003/11-01

Mission Duration: 24 August to 7 September 1982

The visiting schedule in India

In all cases the visits were prepared by UNDP, Delhi, with the exception of Trivandrum. However, it was possible to visit Trivandrum too in spite of the national holiday in Kerala (Onam).

All leading persons of this programme including the director of VSSC were coming to the Institute during the holiday, and we were working 3 days during this time.

The same is valid for Madras. Although it was a Saturday morning, all people including the director came to the Institute to work with me on the programme.

- 24 August (Tuesday) - UNDP Delhi - Setting up the schedule
- 25 August (Wednesday) - Nat. Physical Laboratory and
Indian Institute of Technology, Delhi
- 26 August (Thursday) - SRI Delhi, University Delhi
- 27 August (Friday) - UNDP Delhi - Lecture at NPL Delhi
- 28 August (Saturday) - CLRI, Madras
- 29 August (Sunday)
(Onam) - Trivandrum,
first discussion with Dr. RAC, VSSC
- 30 August (Monday)
(Onam) - Trivandrum,
discussion with Dr. GOWARIKER and
his team
- 31 August (Tuesday)
(Onam) - Trivandrum,
final discussions and flight to Bangalore
- 1 Sept. (Wednesday) - NAL, Bangalore
- 2 Sept. (Tuesday) - SUP University near Baroda
- 3 Sept. (Friday) - IPC, Baroda,
Meeting with Professor BHIDE and all
team leaders (until midnight)
- 4 Sept. (Saturday) - lecture and continuation of the
discussions in the laboratories
at IPL, Baroda

- 5 Sept. (Sunday) - Meeting with Dr. KUMBLE, Director DST Delhi
- 6 Sept. (Monday) - UNDP, Delhi
Meeting with secretary of the State Department for Science and Technology,
Dr. VARADARAJAN, evening meeting with
Prof. SIDON, director of CSIR, and
Dr. Varadarajan
- 7 Sept. (Tuesday) - Leave for Tokyo

RESULTS

There are nine cooperating laboratories, four in Delhi, one in Madras, one in Trivandrum, two in Baroda and last not least the NAL in Bangalore.

There is the exceptional situation that this UNIDO supported programme has a prerunning programme only supported by the Indian Government with the same subject. During these past 1 1/2 years, all 9 participants have worked on their specific problems, but more in an isolated manner and not unified in the whole programme to reach the goal, namely to get in India reasonable resins as matrix for composites.

Mainly the function of NAL did not work so far. From the beginning, it was a programme point that NAL should act as the highest instance in this collaboration. NAL has not to develop a resin but only to test the various developed resins concerning their suitability as matrix in composites. NAL has, however, misunderstood its function and has nothing done practically so far.

Together with Professor BHIDE we pushed the programme into a completely new basis which was intended with the start of the programme already.

The director of national division of NAL, Dr. SINGH, has now understood for the first time his responsibility in the programme. As first activity he will be sent on a study tour together with Prof. NANDA from University Delhi, immediately.

So far most of the other contributing laboratories are concerned, they understood the programme mainly as a support for their own special interests in synthesizing some resins, not thinking to use these resins in composite materials as matrix. Even some of them had never in hand a fibre reinforced resin nor did they know which preconditions for resins must be fulfilled to act as a suitable matrix in a composite.

I had a very good support by Professor BHIDE and also by the responsible director within the DST, Dr. KUMBLE. Although he is a new-comer in the field of composites, he recognized the problems. We try to send him on a study tour also as soon as possible (Int. Conference on Composite Materials, 25-28 Oct. 1982 in Japan).

EQUIPMENTS

I have checked the list of requested equipment, and I have discussed in detail with all laboratories the apparatus and have advised them for the most suitable types of these apparatuses. I can confirm that the listed equipments which will be donated by UNIDO are of excellent quality and of highest newest standard, even better than those available in many institutes in Europe.

I support the purchase and donation of the apparatuses to the Indian Institutes, I have, however, repeatedly pointed to the fact that the acceptance of such sophisticated newest apparatuses includes the responsibility of these Institutes to contribute to the success of the now starting UNIDO supported resin programme.

We had concluded with Professor BHIDE, that the first meeting of the team leaders of these nine laboratories with the first group of experts should be held during the IIT Anniversary on 18 of December 1982 in Bombay. It should be tried to get also some of UNIDO experts for presenting a paper during the first Indian Carbon Conference in Delhi between 15 and 17 December

at NPL. Dr. BHIDE will try to get a meeting of the Programme Committee on Monday, 20 December in Delhi. During this meeting the further schedule for 1983 will be discussed.

EXPERTS

It was decided to try to get 4 - 6 experts for the Bombay meeting on the subject: epoxy, polyester, thermoplastic, pitches, carbon/carbon composites, testing of composites, interface between fibre and matrix in composites.

STUDY TOURS

It was decided that study tours should be performed by the team leaders in several groups.

The first group should consist of Dr. SINGH, NAL, and Prof. NANDA, University of Delhi - both interested in testing of composites. They should start mid of October 1982, and should visit Europe and USA.

The second group will consist only of one man, namely the research director of Baroda, Mr. I.S. BHARDWAJ, to Europe, USA and Japan.

The third group under guidance of Prof. BHIDE with Prof. VERMA, IIT Delhi, Dr. RAO, VSSC, Trivandrum, and Dr. RAMI REDDY, CLRI, Madras, will travel in Spring 1983.

The fourth group under guidance of Dr. KUMBLE, DST, with Dr. D.A. DABHOLKAR, Deputy director SHRI RAM, Institute for Industrial Research, Delhi, and Mr. K.S. SASTRI, Chief Chemical Engineer, VSSC Trivandrum, as well as Prof. PATEL, SPU, near Baroda, will start in Summer 1983.

Final a fifth group: Dr. SETH, NPL, together with Dr. BAHL, NPL, should attend the Japan Carbon Conference and visit some institutes in Japan only, as both are familiar with the European pitch laboratories at least.

All further decisions, especially on training programme and further experts will be made in December 1982 at Delhi.

CONCLUSIONS

It is hoped that under the new directives the programme just starting with UNIDO support but having been running already 1 1/2 years without UNIDO support will now come into the correct direction, and some results concerning resins for composites can be expected.


Prof. Dr. E. FITZER

