INTERNATIONAL CAVITATION EROSION TEST

IMP PAN Rep. 20/98 **Gdańsk, September 1998**

PRELIMINARY REPORT

PART II : EXPERIMENTAL DATA

incorporating the update of March 2003

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[1] Absolute pressure values are indicated

ABOUT THIS VOLUME

The present volume is the second part of the International Cavitation Erosion Test (*ICET*) Preliminary Report. Experimental data presented in both volumes and the attached ICET database are the result of joint effort of 15 laboratories taking part in the project. The aims and scope of ICET as well as preliminary analysis of results are presented in Part I of the Report [1]. It is to be stressed that each Participant took care by himself to provide for financial support of his contribution to the project. No such support was available from the side of the Test Co-ordinator. Wide response to the initiative can be therefore considered a measure of significance attributed by eminent research and development centres to the goals of the project.

The data obtained were carefully reviewed and processed in order to be presented in a standardised form in this volume. The documentation of each *test series* (a series of tests conducted on the set of materials under specified test conditions at the specified facility) consists of :

- a copy of the Test Rig Identification Card
  which can be supplemented by additional schematics, drawings or photographs,
- Laboratory Results Summarisation Card which includes
  - values of parameters defining test conditions at the specified rig[1],
  - Test Series Summarisation Table,
  - averaged curves of cumulative volume loss and mean depth of penetration determined for all the materials tested in the series,
- documentation of all the *tests*[2] conducted in the series

The Test Series Summarisation Table comprises the following data:

- commercial name of each material tested,
- test duration,
- volume loss,
- eroded area,
- mean and maximum depth of erosion penetration,
- incubation periods,
- maximum and ultimate values of mean depth of penetration rates.

All the single-number parameters listed in the Test Series Summarisation Tables are averaged values. In case of different test duration for different materials, meantime values are added in order to compare erosion progress corresponding to the same exposure. Eroded area was usually specified by the contributor although in some cases it was needed to read it out of photographs. Mean depth of erosion penetration for each run was calculated by dividing the volume loss by the eroded area. Incubation periods $\tau_{0.2}$ and τ_{inc} are defined by an 0.2 mg mass loss and the tangent to cumulative volume loss curve at the inflection point, respectively.

[1] These values may slightly differ from those given in the Test Rig Identification Card. Reference level of pressures is the same as that adopted in Tables 9÷11 of Part I.

[2] Following the nomenclature adopted in this report and in the ICET database *a test* consists of a series of -- usually two - *erosion runs* of a specified material under specified cavitation conditions.

Documentation of each test consists of:

- values of parameters defining test conditions,
- Test Summarisation Table,
- additional comments on test and data processing technique applied,
- list of enclosures,
- cumulative volume loss curves for each specimen,
- averaged mean depth of penetration curve,
- averaged mean depth of penetration rate curve,
- optional data (enclosures)[1] which can include:
  - microhardness distribution table (if available),
  - photograph(s) of eroded surface(s)
    (including those obtained by means of optical and/or scanning electron microscopy),
  - maximum depth of penetration curve,
  - metallographs (obtained by means of optical and/or scanning electron microscopy),
  - roughness profiles of eroded surfaces.

The Test Summarisation Table comprises all the erosion parameters listed already in the Test Series Summarisation Table. However, data for each specimen are given. The averaged values are shown below the Table.

The main part of the data processing work was conducted between 1989 and 1991. Due to scarce access to the professional software, all the curves were drawn manually. Averaging was conducted very carefully in order to provide for smooth shape of both the cumulative erosion and erosion rate curves, which were also, determined using traditional techniques. Merits and demerits of such a procedure can be a matter of discussion.

In order to allow easy access to most of the source data delivered by the ICET Contributors a database software has been developed. Installation files of the database are attached to this Report. Further details including user's guide are to be found in Part I of this Report.

Dr Janusz Steller
ICET Co-ordinator

Gdańsk, September 1998

REFERENCES

1. Steller J.: *International Cavitation Erosion Test. Preliminary Report. Part I: Co-ordinator's Report.* IMP PAN Rep. 19/98

[1] In several cases, copies of selected photographs are enclosed. Copies of complete data are available at Test Co-ordinator's.