



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

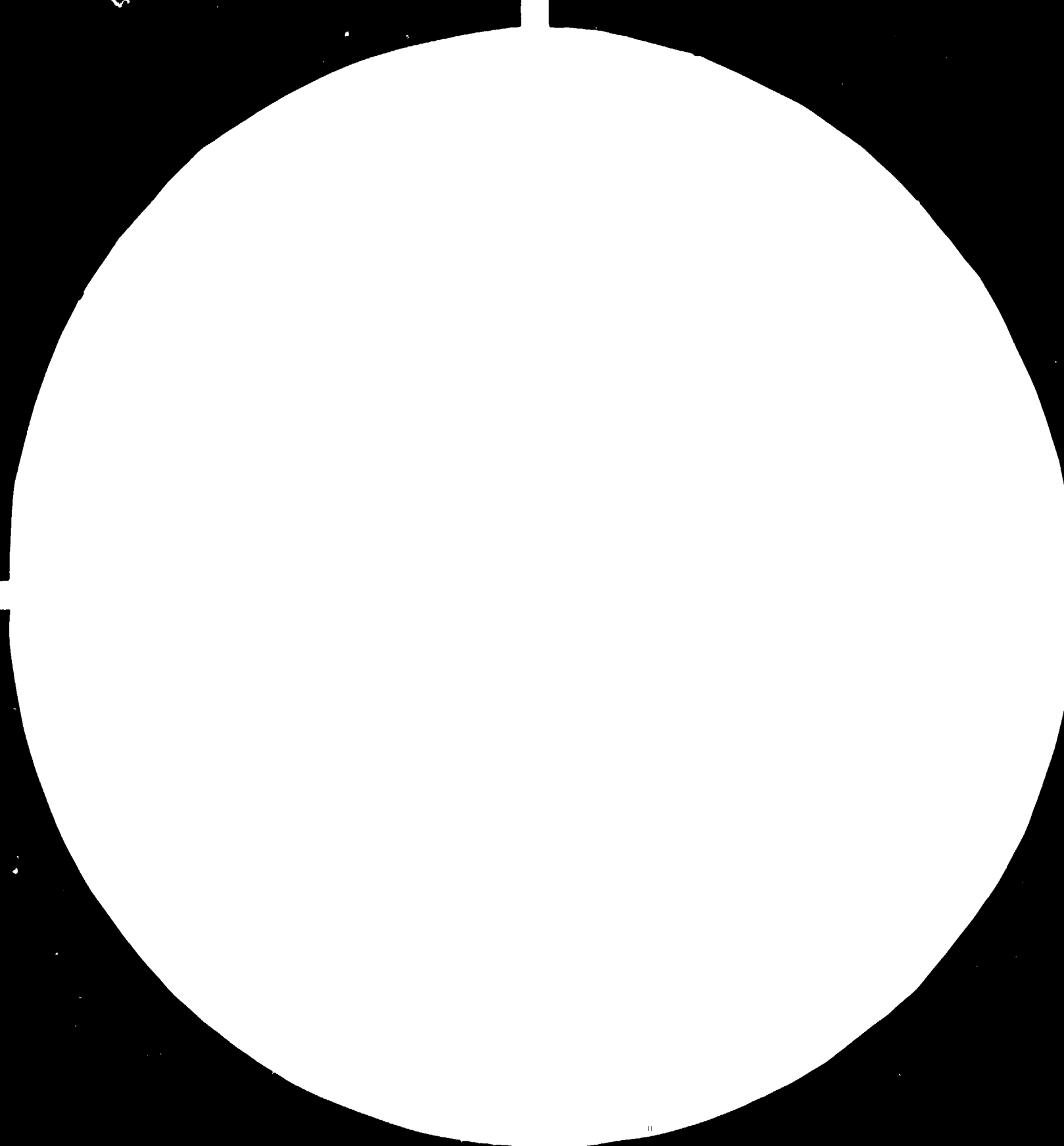
FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org





3.2

3.6

4



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010A
ANNEX 2 TO TEST CHART #1010

14516

Ihr Zeichen, Ihre Nachricht vom

Unser Zeichen

(0222) 72 16 85 - 0*

Datum

ABA/Dkfm.Hu/LS

Durchwahl 14

1984 Dec. 11

Reference: Project No. US/INT/84/092 - 4th Workshop on
Maintenance and Plant Inspection - Contract No.84/58

Petroleum Refinery,)

FINAL REPORT

This is to confirm that the following technical papers, given to each participant of the above mentioned Workshop, were also handed over to Mrs. Runca

1. Folder on "Maintenance in Refineries" by J. Maier
2. Folder on "Maintenance of Equipment (Compressors, Turbines)" by H. Miglitsch
3. Folder on "Plant Inspection" by O.P. Hornasek
4. Information on "Process Pump Maintenance" by Mr. Sieh
5. Information on "Maintenance of Instruments" by Dr. Kloyber
6. Information on "Computerized Material Management" by Dr. Strauss
7. Information on "Analytic Trouble Shooting" by Dkfm. H. Huber

Our experts have held extensive lectures on the above subjects; schedule of these lectures was as follows:

Monday, Nov. 5, 84

AM Opening Session at UNIDO

11:00 AM arrival in Refinery Schwechat, welcome by Refinery Manager and introduction to ÖMV

12:00 Lunch

- to 13:00) MAINTENANCE (by J. Maier)
- to 17:00)
- General Overview/Introduction
 - The Total Maintenance Function
 - Maintenance policy
 - Maintenance strategies
 - Maintenance by contractors
 - Shut-down work planning
 - General failure theory

3294

Tuesday, Nov. 6, 84

to 9:00) Maintenance of Rotating Equipment
to 12:00) (compressors, turbomachinery) lecturer: Miglitsch

12:00 LUNCH

to 13:00) Maintenance of process pumps, lecturer: Sieh
to 16:30)

-/2

Wednesday, Nov. 7/84

All day, interrupted by lunch:

PLANT INSPECTION (lecturer: Hornasek)

- Corrosion problems
- Lifetime of equipment
- Special testing methods
- Scheduling equipment for inspection
- Special Schwechat Refinery problems and their solution
- On-stream inspection methods
 - . thermovision
 - . sound emission
 - . leak detection
 - . tracer methods

16:00 leaving Refinery to have "Social Evening" at
Heurigen "Fuhrgasslhuber", Neustift with members of
Federal Economic Chamber, UNIDO staff, ÖMV associates
to 21:30 return to Hotel Strudlhof

Thursday, Nov. 8/84

9:00) PLANT INSPECTION (lecturer: Hornasek)
to 13:00) with excursion through various refinery units

13:00 Lunch

14:00 lecture on "MATERIAL STANDARDS" by Dipl. Ing. Raaber, TÜV
to 16:00 (expert from Technical Safety Institute, Vienna)

Friday, Nov. 9/84

9:00) ANALYTICAL TROUBLE SHOOTING (lecturer: Dkfm. Huber
to 14:00) afterwards LUNCH

Several specific questions were answered by various ÖMV
experts (see page 3)

Weekend Nov. 10/11/84 - was for free disposal of participants

Monday, Nov. 12/84

9:00 MAINTENANCE of INSTRUMENTATION (lecturer: Dr. Kloyber)
to 12:00 Lunch

13:00 Maintenance Organization & Maintenance
to 17:00 Information System (lecturer: J. Maier)

Tuesday, Nov. 13/84

9:00) All day, interrupted by lunch:
to 17:00)

PLANT INSPECTION - PRACTICAL DEMONSTRATION (Hornasek)
(visit to workshops; demonstration of inspection
devices, etc.)

Wednesday, Nov. 14/84

All day, interrupted by lunch:

QUESTION and ANSWER SESSION with all ÖMV lecturers;
specific questions were answered by specific experts,
see page 3)

Thursday, Nov. 15/84

Visit to OPEC FUND

Friday, Nov. 16/84

Visit to ÖMV operational departments, i.e. Drilling site;
Aderklaa; Natural Gas Department, Auernthal, Central
Workshop, Gerasdorf - always with guides and extensive
lectures. Many questions by participants were treated.

Saturday, Nov. 17/84 Sightseeing trip through Vienna by bus; Lunch
compliment ÖMV: Donauturm (from 9:00 to 15:00 o'clock)

Sunday, Nov. 18/84 at free disposal

Monday, Nov. 19/84 Visit at Austrian Federal Economic Chamber
presentations by Austrian supplier firms all morning;
Lunch; afterwards Question and Answer Session with
suppliers. End of session about 16:00 o'clock

Tuesday, Nov. 20/84)
Wednesday, Nov. 21/84) Experience Exchange among participants
Thursday, Nov. 22/84) in VIENNA INTERNATIONAL CENTER (Room D-1573)
moderated by Mr. Holloway, England and under
participation of Mrs. Runca & Mr. Maung (partially)

Friday, Nov. 23/84 morning: Visit to ÖMV Computer Center; demonstration on
computer of Material Management (with question
& answer session)

11:00 Group met again at VIC, final discussion with
Mr. Holloway

13:00 Lunch

14:00 CONCLUDING SESSION in Conference Room III; followed
by reception; End about 17:00 o'clock.

As mentioned before, in addition to the above described lectures, ÖMV experts answered many specific questions raised by the participants, as for instance:

- Evaluation of remaining life of equipment which was exposed to elevated temperatures (above 450°C); tests procedures were outlined, hints for laboratory work were given.
- Testing centrifugally casted pipes with coarse grain by means of ultra-sonic tests.
- FCC problems were explained to Mr. Fang, China, by our FCC plant manager
- Waste water treatment problems were solved for participants from Ethiopia by one of our experts.
- Corrosion problems caused by sulphur on material exposed to high temperatures (above 300°C) were solved by optimization of material used; proposal made: ASDM A 335 B 5 piping 5% chrome steel.
- possibilities were outlined to train plant inspectors by attending non-destructive testing courses offered in Vienna by "Schweisstechnische Zentralanstalt" (corresponding data supplied at our request by this institute were given to all participants).
- Special problems on mechanical seals in slurry systems were solved.
- How to prevent dirt on hydrogen recycling systems in compressors during operation.
- General remarks on vibrations in centrifugal compressors and pumps
- Information on flare gas recovery system was provided.

Many more smaller problems were also clarified for the participants.

From the moment of their arrival at airport Schwechat until closing of this Workshop, the group was accompanied by Mrs. Smejda, whom we had asked to organize the smooth performance of this workshop.

Participants also completed a questionnaire and evaluation of these forms is attached for your information.

U N I D O WORKSHOP

ON

MAINTENANCE AND PLANT INSPECTION IN PETROLEUM REFINERIES

November 5 to 23, 1984

We would like to improve performance and would appreciate your help. Please complete this questionnaire and return it to us. Your assessment will be ANONYMOUS.

Please check off correct answer :

1. Was it your own desire to participate in this WORKSHOP ?

YES 8

NO 1

PARTLY 4

2. Was the time allotted to: completely adequate not compl. adequate not long enough

Lectures	0 6	0 3	0 4
Discussions	0 5	0 4	0 3
Exchange of experience	0 6	0 3	0 2
Relaxation	0 11	0 2	0 0

3. Have the themes discussed been too extensive in relation to available time:

too extensive

0 2

adequate

0 9

not extensive enough

0 2

4. Were the themes presented

9 a) helpful to you in your job

4 b) only partly helpful

0 c) not related to praxis/too theoretical

5. As a whole, has this WORKSHOP been

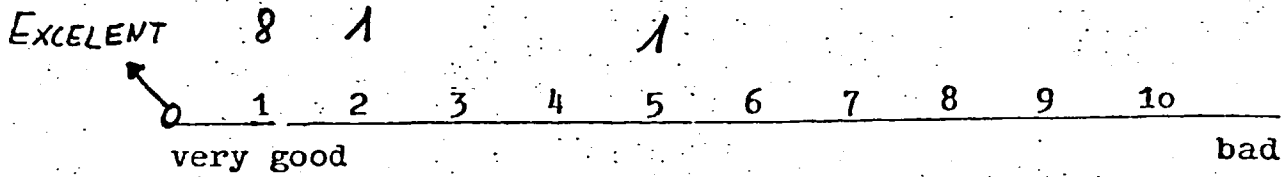
6a) very valuable to you and your job

6b) valuable

c) hardly valuable, because.....

d) without any value, because.....

6. Please grade organization and administration of this WORKSHOP.



7. Suggestions as to how similar WORKSHOPS could be improved:

.....
.....
.....
.....

8. Which additional themes should be treated ?

.....
.....
.....
.....

Thank you for completing this questionnaire !

ÖMV AKTIENGESELLSCHAFT

- Training Department -

EVALUATION OF UNIDO WORKSHOP QUESTIONNAIRES
completed by participants

To point 7) (Suggestions as to how similar Workshops could be improved)

- Everything is OK
- The coming Workshop could be improved if more time is allotted for the topics to be covered extensively
- Each participant should be submitted his problem(s) and detail about the problem(s) occurred and what did he do - before workshop opens
- The lecturers should prepare their notes basically on their own experience, i.e. the problems they have faced and how they have overcome it with technical and theoretical backing
- More time to be allotted to every top lecture. Hours: 9 to 16 hrs. Period for the Workshop to be more than three weeks
- Would suggest that topics for discussion should be made in strict compliance with time table. Invitations to workshop should be made early enough and should be held August-September when the weather would be more favorable
- a) Each person attending the seminar should have talked about his special problem or special subject which can be valuable to other participants
- b) some numbers or ratios of good maintenance operations can be handed out to each participant who will try to get that point for their refineries
- c) Weather conditions should be more enjoyable
- 1) We should spend more time at the refinery or with a specialist of a developed country
- 2) Should be evaluated the possibility of organizing this workshop as a cycle exchange of experience among developing and developed countries in the fields of maintenance and inspection
- 3) Get information as much as possible
- It should be a more specialized course either MAINTENANCE or INSPECTION at one time - not both
- To separate the Workshop subjects into (1) Inspection conference, (2) Maintenance Conference, also to increase study cases to maximum and reduce practical problems
- In my opinion, some failure of equipment are not only due to bad maintenance but also due to technical problems such as the structure of those equipments are unreasonable. So, I hope, the improvement for those equipments will be offered by ÖMV

To Point 8) (Which additional themes should be treated ?):

- If lectures could be arranged, extensive enough, on computer application, it will be a good help in particular for the maintenance work. Also, sufficient lectures on problem-solving and decision-making could be of very much help.
- Additional themes should depend on the problems of every participant and also on "how to analyze and solve the problem(s)".
- As the pumps and compressors are the most critical equipment in a plant, more time should be allotted to these lectures. The lecturer should come with more failures that they have experienced. In general, what I understand, the ÖMV Refinery is a trouble-free organization, i.e. an organization without any problems (except the corrosion problems)
- ± Safety precautions with regards to maintenance
- Maintenance planning and safety in the refinery
- There are many themes that should be treated and any one could be repeated many times because there are many things to be improved in each one, but I believe that the themes related to the organization of inspection, maintenance, material management and so on should never be omitted
- past experiences, problems in different fields in a petro-chemical industry which ÖMV faced and sorted out
- Study cases to be presented by different personnel from different refinery areas and solutions achieved; that could be applied across the board
- Temper embrittlement (TE) is a understanding problem in alloy steel especially in 2-1/4Cr-1 M Steel recently. If the material used as reactors which was built about seven years ago are normal chemical composition of 2-1/4 Cr-1 Mo, how can you prevent TE. I believe this problem should be treated.

