OCCASION

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

DISCLAIMER

FAIR USE POLICY

CONTACT

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

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

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

09340

RESTRICTED

DP/ID/SER.A/219
15 October 1979
English

ASSISTANCE TO THE MAURITIUS STANDARDS BUREAU

DP/MAR/75/008

MAURITIUS

Technical report: Paint testing and standardization*

Prepared for the Government of Mauritius
by the United Nations Industrial Development Organization,
executing agency for the United Nations Development Programme

Based on the work of A.R. Kozlowski, expert in paint testing and standardization

United Nations Industrial Development Organization
Vienna

*This report has been reproduced without formal editing.

id.79-7569

Explanatory notes

The following abbreviations have been used in this report:

ISO	International Organization for Standardization
MSB	Mauritius Standards Bureau
MSIRI	Mauritius Sugar Industry Research Institute

Mention of firm names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO).

ABSTRACT

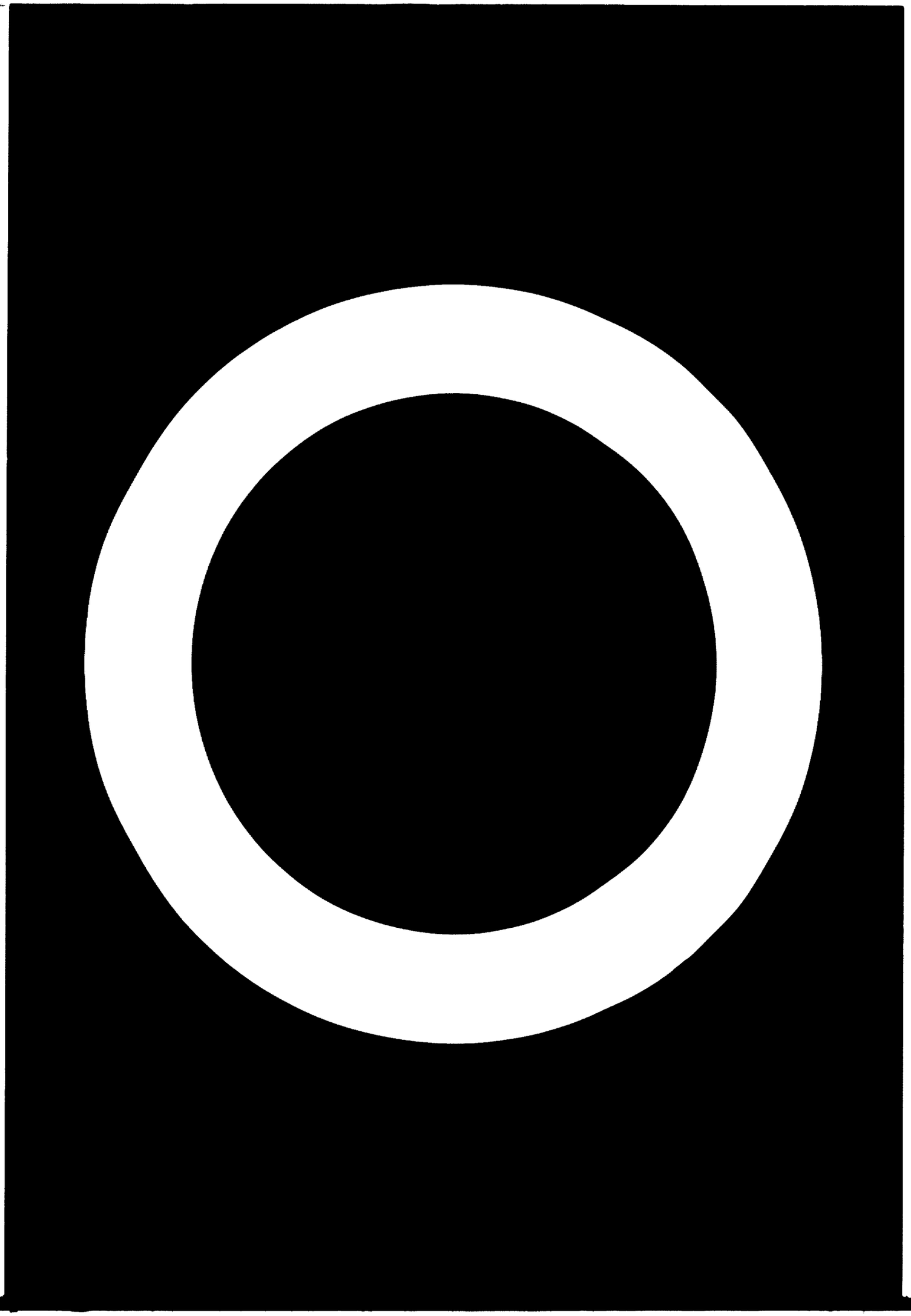
This report summarizes the results of three missions undertaken in 1977-79 by Dr. A. R. Koslowski, UNIDO paint expert within the project "Assistance to the Mauritius Standard Bureau" (DP/MAR/75/008/11-02).

During these missions the expert assisted in organizing activities of the paint section of the Mauritius Standards Bureau and advised in chemical, corrosion protection and operational problems of the Bureau.

The installation of the paint laboratory was completed and equipment checked. Counterpart personnel was trained on-the-job in paint testing and about 30 test methods were adapted for quality control of paints and galvanized materials.

Standardization activities were initiated and appropriate technical committees were brough to activity. 12 draft standards were prepared and the first will be officially established in this year.

The report recommends steps which should be taken by the Government to make the present expenditures and efforts more efficient.



CONTENTS

Appendices

INTRODUCTION

This is the report of a mission forming part of the project "Assistanoe to the Mauritius Standards Bureau" (DP/MAR/75/008) approved by the UNDP on 8th December 1976. The exeouting agency is the United Nations Industrial Development Organization (UNIDO). The expert was previously sent on two short missions for the same project. The first mission was from 2 November to 1 March 1978 and the seoond mission was for two months from 25 July to 24 September 1978. Both were subjected to separate teohnical reports.

The present mission from 8 August to 7 Ootober 1979 is the last stage of assistance and a follow-up of the previous ones.

Aooording to the job desoription the expert was to assist the Mauritius Standards Bureau in strengthening the paint testing activities. Speoifically, the expert was expected:

(a) to organize and operate the paint testing laboratory;

(b) to train local oounterparts in paint testing;

(c) to assist in drafting local standards;

(d) to assist with advioe in other physioal and chemical testing activities in which the expert may have useful experience.

This report is a separate desoription of the expert's activities during the last mission, therefore, it may be advantageous to read the report in oonjunotion with the expert's previous reports.[1/]

1/ See DP/ID/SER.A/141.

I ORGANIZATION OF THE PAINT LABORATORY

1. Installations

The paint laboratory occupies two rooms (Nos. 5 and 6) in the MSB building and the single carbon-arc weatherometer is installed in the environmental testing room No. 3. From the installation point of view it is presently almost fully equipped for paint and corrosion testing as it was recommended during the expert's first mission. The only installation works still to be completed involve erecting at least one rack at the Curepipe area (Bigara station) for outdoor exposure testing and connecting the laboratory spray-booth to the exhaust system (opening in the external wall and short ducting system). However, the spray-booth can be used even now provided water-based paints will be sprayed only.

The compressor order has been cancelled due to high cost of purchasing, lack of space and expected low degree of usage. Instead a cheap portable compressor was purchased to feed the spray-gun and the portable blast-cleaner can be easily used, as agreed, in conjunction with a compressor installed in the Mauvilao paint factory. There are also shot-blasting facilities in the Taylor & Smith dockyard and the Ireland-Blyth workshop (recently installed).

The above installation works should be completed in October as tenders are expected soon. The details concerning the layout of paint laboratory and installations are given in the expert's previous reports.

2. Equipment

The complete list of equipment and instruments in the paint laboratory is given in Appendix A. The total cost of the equipment, purchased both from UNDP and Government funds is about 34 000. US dollars. Each apparatus listed in Appendix A has been installed, inspected, calibrated and is in working order. The only instruments that have been additionally ordered during the present mission involve

two wet film thicknessmeters and a vacuum-suction plate. Both purchases are necessary as it was found that the measuring range of the Rossmann Wet Film Gauge, purchased in 1975, is unsuitable for emulsion paints, whereas vacuum-suction plate is required to obtain reproducible film thickness on Morest Charts (determination of hiding power). The estimated cost of purchases is 1 500. US dollars (from Government funds).

Apart from the above equipment, the paint laboratory is well equipped with general-purpose testing facilities such as oven, analytical balance, thermostat, temperature and humidity measuring instruments as well as with a suitable stock of auxiliary materials such as test plates (glass, asbestos cement, mild steel, aluminium, tin-plate), brushes, rollers, abrasive paper, solvents, etc. As there is usually a long (several months) time between the order and the delivery of such materials it is recommended to keep a stock for at least one yearswork. This is partioularly important for certain special reagents (such as non-ionic detergent for wet abrasion testing or special dyes solution in linseed oil used in staining test) and for fast-consumed materials and spare parts (carbon rods and glasses for the weatherometer, Morest Charts, glass panels for wet abrasion test, glassware, etc.). In general, the paint laboratory is at present sufficiently equipped to conduct both routine testing within the certification mark scheme and other tests as may be requested by local paint manufacturers or consumers.

In fact, such tests have been carried out, ordered mainly by the Mauvilac Co. Ltd., the largest paint manufacturere in Mauritius. This activity of the paint laboratory is highly recommended also in future as the MSB equipment (in certain cases the only available in the country) can be better used and additional revenue can be obtained.

The only test that cannot be carried out in the paint laboratory is laboratory testing of the anti-fungus resistance of emulsion paints. It results from the fact that there are no microbiological facilities at the MSB. Therefore, contact with the Mauritius Sugar Industry Research Institute (MSIRI) has been resumed and it was found that this test may be easily carried out by the Pathology Section of the MSIRI, provided it will be made 3 - 4 times a year. As only a small part of emulsion paints manufactured in Mauritius is labelled by the manufacturers as "anti-fungus", this would be sufficient to operate certification mark. It was also indicated by one of the members of the Technical Committee on Protective Coatings that the fungus test may be carried out by the School of Agriculture of the University. Use of this information should be made if more frequent testing will be required as well as the MSB outdoor exposure station located in "the fungus - area" may be exploited for the purpose.

To sum-up the above, it may be concluded that the paint laboratory is satisfactorily equipped and taking into account the cooperation with other laboratories in the country and provided the above-mentioned recommendations of the expert will be fulfilled soon, no additional purchases and funds are required.

3. Personnel

During the previous missions, the counterpart personnel consisted only of Mr. J. Perbhoo, Chemical Engineer and head of the section. However, since January 1979, the situation improved considerably as both the laboratory technician, Miss L. Ng Kwok Cheung, and the laboratory attendant, Mr. Bappoo, were appointed following the expert's recommendation. Both were delivered on-the-job training, initially by Mr. Perbhoo and later by the expert. Though their professional experience is still limited nevertheless considering the planned three months fellowship in Poland and the Federal Republic of Germany of Mr. Perbhoo, the personnel question has been solved satisfactorily both from the quality and the quantity points of view. However, the technician work should be well-organized and supervised to avoid misunderstandings and errors.

It is also recommended that the fellowship programme for Mr. Perbhoo is not limited to the paint testing but should include also more general aspects of corrosion protection, surface treatment and quality control. Appropriate steps have been taken by the expert to ensure this wider training during Mr. Perbhoo's fellowship in Poland.

II. TESTING AND TRAINING ACTIVITIES

Testing activities of the paint laboratory were concentrated on emulsion paints, as about 60% of paint production in Mauritius consist of emulsion paints (market value about 12 millions rupees). This type of paints is also imported from India, Kenya, Netherlands, South Africa and the United Kingdom of Great Britain and Northern Ireland.

The testing activities were connected both with on-the-job training and preparations for the certification mark operation as well as for the external orders. Thus, it was possible on one hand to introduce into the relevant standards those test methods which have been preliminarily tried and, on the other hand, to get more confidence from the paint manufacturers and consumers. Already three paint manufacturers in Mauritius (including the two biggest) have expressed their interest in obtaining the MSB certification mark.

An extensive test programme for emulsion paints both locally-manufactured and imported (7 brands) has already started and advanced during the expert's mission as the main part of on-the-job training. The results are given in Appendix B. Since certain tests are long-lasting this test report still has to be completed. However, some general conclusions can be drawn now.

The first conclusion is that the quality of paints imported into Mauritius is, notwithstanding what the general opinion is, not higher than that of emulsion paints manufactured in Mauritius. The second conclusion is that none of paints being tested meets the requirements of Mauritian Standard (MS 3) on emulsion paints, though only small

corrections are required for some of them. Therefore, certain recommendations may be given even before the test programme is completed. There is no reason to import into Mauritius sub-standard quality paints if they may be manufactured in the country to give jobs and to save foreign currency. The important aspects are also the cost of imported paints (which is dozens of per cents higher than for local paints and the fact that the production capacity of local manufacturers is presently used only up to 50% (see Appendix C). Taking the above into consideration, once the Mauritian Standard on emulsion paints is established by the Minister of Commerce and Industry, the paint importers should be warned against importing paints which don't comply with the Standard requirements. Simultaneously, the local manufacturers should be informed by the Bureau which paint properties should be improved. The latter may be combined with the first certification mark operations. It is also recommended that for paint importers, government supplies and companies applying for the Development Certificate the paint standards should become compulsory.

Apart from emulsion paints, red lead paints were also tested by the counterpart engineer for establishing the test methods for draft standard on this product and preliminary assessment of local paints. In another test programme involving also outdoor exposure, calcium plumbate primer and solvent-based marine enamel were tested.

Testing activities of the paint laboratory are not and should not be limited to testing of paints. It was already mentioned in the expert's first report that the paint laboratory should also deal with more general problems of corrosion protection as climatic conditions in Mauritius result in high aggressiveness of the environment in respect of metal structures, articles, etc. In fact the paint laboratory is sufficintly equipped to conduct corrosion testing as well (weatherometer, salt spray chamber, humidity cabinet, outdoor exposure station). In future, when the counterpart staff will get more experience in this field, the paint laboratory should be a consultant body in the country and it is recommended that all more

important projects (investments) in the country (such as for example bulk sugar terminal) should be consulted with and accepted by the MSB.

This activity was initiated during the expert's second mission when galvanized steel was tested. The test programme was connected with drafting the first standard on galvanized steel and iron (MS 18) and external orders. The selection of galvanized steel as a subject of the standard from this field results from the fact that this material is widely used in the country. On the other hand, there are two galvanizing (hot-dipping) shops in Mauritius and local manufacturers are interested in standard quality to avoid competition from imported products of sub-standard quality. This subject is more extensively discussed in the expert's second report.

Another important activity of the paint laboratory was testing for external customers. A relatively large test order was obtained during the expert's mission from the Mauvillac Co. involving accelerated testing of about 20 new paint systems developed by the manufacturer for car-refinishing purposes. The test programme is already well-advanced. This type of activity of the paint laboratory is highly recommended in the future. It enables better use of equipment, and gaining more experience and confidence from industry. Thus, the MSB activity is better related to the country needs and development. The last aspect of this activity is obtaining additional revenues. The paint laboratory earned so far about 6 000 rupees excluding fees for tests which are in progress.

With the above range of activity, the paint laboratory, with its present staff and equipment will be sufficiently burdened with work and reasonably utilized. However, when the certification mark operation will become in future routine and other paint standards will be established, most of the tests can be carried out by the technician or even attendant. And, to make better use of limited staff of the MSB, Mr. Perbhoo, as a Chemical Engineer, may be engaged in standardization and testing of other chemical or related products for which test methods exceed considerably analytical chemistry. Examples of such products

are matches, toothpaste, plastics, rubber, packaging materials, lubricating oils, paper and cardboard, fertilizers, insulating oils, fire fighting and testing, fuels, glass, inks, lime, plywood, safety codes, seals, waxes, etc. The above-mentioned products should not be treated as the standardization priorities of the MSB, nevertheless such products as matches, toothpaste are already covered by the Draft Mauritian Standards. They are only examples of products which have chemical "backbone" but for which test methods involve analytical, physicochemical, mechanical or even electrical testing as well as certain metrological aspects. Standardization and testing of such products should be coordinated within the MSB and the chemical engineer seems to be a right person to deal with this type of activity.

Taking above into consideration, it is not recommended to combine paint and chemical laboratories into one section. It will be easier for the Director of the MSB to separate duties and responsibilities within the present organisation of laboratories than with a large chemical section consisting of chemical engineer, two scientific officers and a number of technicians, assistant technicians and laboratory attendants. The paint testing methods are also very specific and very often far from chemical (analytical or instrumental) methods.

III. STANDARDIZATION

1. Present activities

Eight draft standards were prepared by the expert during the previous missions within the paint and corrosion protection field.

However, already during the second mission two draft standards were crossed out. In the case of DMS "Glossary of paint terms" it was found that the ISO standard 4618 "Paints and Varnishes - Vocabulary" has been established in the meantime which can be conveniently used for reference purposes. Similarly for DMS "Paint - methods of testing", many test methods are in an increasing number covered by the respective ISO test methods. Therefore, it was assumed that in Mauritian Standard on

ready-made products only reference will be made to the ISO Standard test methods whenever they exist, and for the remaining tests, the own, carefully adapted, method fully described in an appendix to the Mauritian Standard will be used. The above principle has been also adapted in the whole MSB standardisation activity. The advantage is that the user obtains in one compact document all the required informations on test methods with only references to easily-obtained and widely-recognised international standards; references to other national standards can be avoided. However, the drafter of the standard must be cautioned against "mechanical" quoting of the ISO standard. As a result of international compromise, the ISO standards do not specify often the test samples, methods of their preparation or even the particular equipment to be used. Therefore, before referring to the ISO standard the drafter has to read carefully the ISO standard, to check with the equipment available and to specify in the Mauritian Standard all the details in which the ISO standard allows various interpretation. On the other hand, the ISO Standards generally specify repeatability and reproducibility of results which are of great value in case of dispute.

Of three remaining standards on paints (MS 3 "Emulsion paints for interior use", MS 4 "Emulsion paints for exterior use" and DMS 13 "Red lead primers"), the first two were gazetted at the end of 1978. After 6 months available for public comments, the MS 3 and MS 4 were finally combined in one standard MS 3 "Emulsion paints for interior and exterior use" due to similarity of about 70% test methods and the fact that many paints manufactured in Mauritius now are for both purposes. This standard was finally approved by the Technical Committee on Protective Coatings on 12th September 1979. At the same meeting the DMS 13 "Red lead primer" was approved. Both standards were sent to the Standards Council for final approval before being established and printed and gazetting, respectively.

The Technical Committee on Protective Coatings has been enlarged to include more representatives of consumers. The actual membership list of this Committee is given in Appendix D. After participating in two other committees' meetings a quite considerable progress in the work performed by the MSB Technical Committees was found.

Among three draft standards on galvanized steel, all have been approved by the Technical Committee on Protective Coatings before the expert's mission. However, it was found useful that these standards should be also discussed by the Technical Committee on Construction Materials. Finally, the first standard MS 18 "Hot-dip galvanizing - requirements and guiding principles "was approved by this Committee on 13th September 1979. The other two should be submitted to this Committee as soon as possible and attention should be paid to the thickness of the steel substrate in respect of the cyclone regulations.

2. Future activities

The future standardization activity of the paint laboratory should involve both the implementation of the standards prepared by the expert (five standards) as well as new standards. The new standards in the paint field should cover first of all the more important ready-mixed materials manufactured in Mauritius. From the data collected in Appendix F it results that the following products should be standardized:

- calcium plumbate primer,
- zinc chromate primer,
- etch primer,
- alkyd (modified) enamel, general purpose,
- automotive refinishing enamel,
- marine enamel,
- road-marking enamel.

The other products should be standardized depending on the scale of production or import. The code of practice on painting buildings should be also prepared to enable proper application and inspection as the first factor considerably affects the quality of paint coatings.

Within the corrosion protection field a standard on zinc-coated fasteners should be prepared as an important part of standardization of hot-dip galvanized steel and products. Fasteners are particularly subject to corrosion which usually results in decreased mechanical strength (important in cyclone-areas). Also as abrasive (shot)-blasting becomes more popular in the country as a method of surface preparation before painting, a suitable standard for quality assessment should be adapted following Swedish or ASTM methods of assessment.

Depending on the work load, the paint laboratory should also deal with standardization of products mentioned in section 2 of this report. However, first the priority list of such products should be prepared by the MSB and Standards Counoil.

IV. CONCLUSIONS

The paint laboratory is satisfactorily equipped and staffed to conduct testing of paints, both emulsion and solvent-based. After completing the installation work and training of the head of the laboratory within 3 months UNIDO fellowship it should be also able to operate certification mark scheme for paint and corrosion-resistant materials.

V. RECOMMENDATIONS

To enable above the following recommendations for future action are proposed:

1. The installation work in the paint laboratory should be completed as recommended in this report. A suitable stock of auxiliary materials and spare parts should be kept for at least one year's work.

2. Further training of the technician by the counterpart chemical engineer is recommended. The test programmes should be well-planned and checked.

3. The counterpart engineer should go on a fellowship as soon as possible.

4. Collaboration with the Mauritius Sugar Industry Research Institute (MSIRI) should be firmly established and/or University of Mauritius to enable microbiological testing.

5. Testing activities concentrated now on emulsion paints should be extended to solvent-based paints and corrosion resistance testing. A work plan following recommendations given in this report should be established.

6. Future standardization activities of the laboratory should involve also these products in which the counterpart chemical engineer may have better experience than other staff members of the MSB. Examples of such products are: matches and toothpaste (already covered by the counterpart) as well as lubricating oils, fuels, packaging materials, paper, fertilizers, inks, seals, waxes, ceramic materials, etc.

7. It is not recommended to combine paint and chemical laboratories at the present stage of the MSB activities if the head of the combined section is not appointed immediately and duties and responsibilities are not clearly defined at the same time. Otherwise it would be rather difficult for the Director of the Bureau to manage such a large section.

8. To protect local industry, the import of sub-standard emulsion paints should be prohibited. The Mauritian standards on paint materials should be declared compulsory for importers, government supplier and new DC applications.

9. The quality of locally-manufactured emulsion paints should be improved and suitable precautions should be taken before the first MSB Certification mark is granted. Working collaboration with the manufacturers is recommended within preliminary testing.

Some recommendations apply both to the paint laboratory as well as to the MSB as a whole. These are:

10. Regulations concerning the certification mark procedure should be established as fast as possible.

11. The time required to establish the Mauritian Standard should be considerably shortened. The time for public comments could be easily reduced to three months and the waiting periods before gazetting and establishing standards could be also shortened.

12. The MSB cannot in fact become fully operational until such basic regulations as Certification Mark Operation and Metric Weights and Measures Bill are not established in the country. This delays also any international assistance that could be provided by the UNDP/UNIDO.

13. The MSB must collaborate with other laboratories and institutions in the country to enlarge its testing facilities. The test and research potential of MSIRI, University, Ministry of Agriculture, Ministry of Health, Ministry of Works is considerable and proper collaboration could markedly decrease the Bureau needs for highly qualified personnel and expensive and sophisticated testing (microbiological, atomic absorption spectrophotometer, etc.).

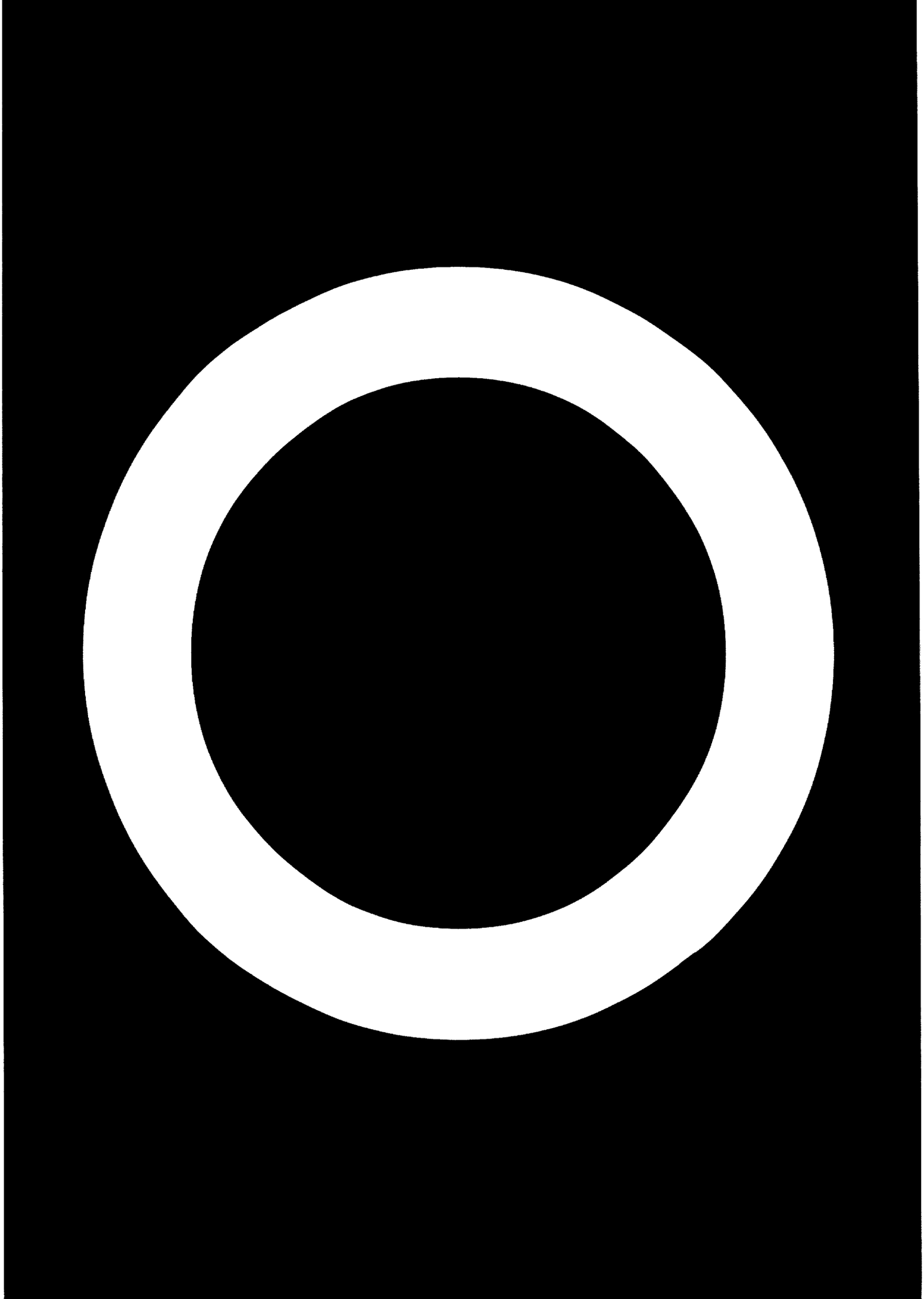
14. Closer collaboration between the MSB sections is recommended. Regular staff meetings and seminars, particularly after training abroad, would enable sharing the experience between staff members.

15. The administration services should be strengthened mainly from the quality point of view so the laboratories could concentrate more on the merits of their activities. Library and telephone services are examples.

16. An effort should be made in future to recruit candidates to work in the MSB in terms both of education and experience.

17. The testing and standardization lists of priorities should be worked out in each laboratory for the nearest 2 - 3 years. On this basis the MSB standardization programme could be elaborated, consulted with the National Consumers Council and approved both by the Standards Council and the Ministry of Commerce and Industry. This would dictate the main lines of the MSB activity and facilitate supervision. The heads of laboratories would be aware of their future activities so that feasibility studies (literature review, equipment, reagents, materials) could be made in advance. The fellowship programmes could be also better defined.

18. Considering the cumulated aspect of testing activties it is recommended that each laboratory should work out 2 - 3 standards per year on average. However, the chemical activities require larger amount of standardization work.



APPENDIX A

List of equipment installed in the paint laboratory

(main items)

Equipment	Property to be tested	Cost in US Dollar	Received from
Ford Cup No. 2 Ford Cup No. 3 Ford Cup No. 4	Viscosity	494.	UNDP
Elcometer Roughness Tester Model 101	Surface roughness	126	UNDP
Elcometer Thickness Gauge	Coating thickness	102	UNDP
Mandrel Bending Tester	Flexibility	285	UNDP
Rossmann Wet Film Guage	Wet film thickness	21	UNDP
Pfund Cryptometer	Hiding power	145	UNDP
Scratch tester	Scratch resistance	214	UNDP
Ball Jet Shaft	Chipping resistance	182	UNDP
Stormer Viscometer	Consistency	959	UNDP
Taber Abraser	Abrasion wear resistance	2 319	UNDP
Blast Cleaner (portable)	Preparation of test panels	1 058	UNDP
Paint Inspection Gauge	Film thickness of any coating on any substrate	337	UNDP
Leptoscope 2011 (electromagnetic)	Accurate thickness measurements on magnetic substrates	1 704	UNDP
Spray-booth (laboratory)	Paint application to test panels	1 633	UNDP
Set of sieves inoluding Shaker	Coarse particles and foreign matter	677	UNDP
ICI temperature viscosity calculators	Conversion of visoosity	52	UNDP

Equipment	Property to be tested	Cost in US dollar	Received from
Tabular impact ester	Impact resistance	360	UNDP
Scratch tester	Scratch resistance	323	UNDP
Conical bend tester	Flexibility, adhesion	285	UNDP
Sward rocker	Hardness	229	UNDP
Payne permeability cup	Resistance to aggressive	45	UNDP
Sag index applicators	Flowability, sagging	167	
ICI paint film spinner	Application of uniform paint coatings	310	UNDP
ICI cone and plate Viscometer	Viscosity	1 336	
Gardner Colorgard light booth	Colour assessment	1 530	UNDP
Reflectometer 0/45°	reflectance, hiding power	1 295	Government
Hunter Glossmeter, 20°, 60°, 85°	Gloss, sheen,	2 900	Government
Weight per gallon cup	density	50	Government
Multi-cross cutter	Adhesion	310	Government
Washability machine	Wet abrasion, development of gloss	4 300	Government
Hegman grindometer	Fineness-of-grind	140	Government
Drying time tester	Surface dry time hard dry time	1 060	Government
Film applicators (doctor blades)	Application of uniform film thickness	1 300	Government

Equipment	Property to be tested	Cost in US dollar	Received from
Spray gun with compressor (portable)	Application of paint coatings	300	Government
Salt-spray cabinet (Gallenkamp)	Corrosion resistance testing	3 600	Government
Carbon-arc (single) weatherometer	Corrosion resistance testing, Fastness to light	3 873	UNDP
	Total	34 021 US dollar	

Appendix B

RESULT OF TEST PROGRAMME FOR EMULSION PAINTS

	Paint Property	MS Requirement	Mauvillac Acrylic Exterior	Dulux Acrylic Antifungus	Permoglaze Interior/ Exterior	Bufallo Interior	Hasco (Holland) Emulsion	Decoplast (India) Int./Ext.	Crown (England) PVA-Acrylic
•	Condition in container								
a.	Water separation	max. 5%	Nil	<5%	<5%	Nil	<5%	<5%	Nil
b.	Settlement	Nil or very slight	Nil	slight	Nil	Nil	Nil	slight	Nil
c.	Irritating or offensive odour	Nil	Nil	Nil	Nil	Nil	Nil	Definite	Nil
d.	Lumps and skin	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
e.	Granulation	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
f.	Aeration	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
•	Non-volatile content	min. 50% by mass	42%	51%	51%	44%	28%	45%	50%
•	Course particles and foreign matter	max. 1% on a 75 μm sieve	0.1%	0.14%	0.02%	0.2%	0.1%	0.1%	0.1%
•	Consistency	0.7 - 1.5 poise or 250 - 425g (89-106 KU) (after stirring)	1.7p 100 KU	1.85p 112.5 KU	1.3p 95.2 KU	1.55p 95.2 KU	3.5p 125.3 KU	0.8p 78.5 KU	1.2p 106.6 KU
•	Dilution stability	No instability after 72 hours at 25 ± 2°C	Pass	Pass	Pass	Pass	Pass	Pass	Pass
•	pH value	5 - 8.5	7.00	7.51	6.76	7.32	8.96	6.59	7.40
•	Storage for 12 months at 18 - 30°C	to meet all standard requirements	for certification mark purposes the temperature stability test is applied.						
•	Tempeatur stability at 50 ± 2°C	2 months	the results will be obtained in mid-October						

	Paint property	MS Requirement	Mauvilac Aorylic Exterior	Dulux Acrylic Antifungus	Permoglaze Interior/ Exterior	Buffalo Interior	Hasco (Holland) Emulsion	Decoplast (India) Int./Ext.	Crown (England) PVA-Acrylic
9.	Application properties	No floating or coarseness in wet dry film	Pass	Pass	Pass	Pass	Pass	Pass	Pass
10.	Recoating properties	Three coats at 2 hours intervals	Pass	Pass	Pass	Pass	Pass	Pass	Pass
11.	Drying properties	max. 20 min.	30-35 min	40-45 min	30-35 min	35-40 min	30-35min	40-45min	40-45 min
12.	Specular gloss at 85°(sheen)	flat finishes: max.15 Egg-shell coats: 16 - 50	4.2 (flat)	1.7 (flat)	4.8 (flat)	2.1 (flat)	7.7 (flat)	3.2 (flat)	4.9 (flat)
13.	Colour	to pass the test	white, pass	white, pass	white, slight failure	white, pass	white, pass	pink	cream
14.	Reflectance of white paints, $0^{\circ}/45^{\circ}$	min. 85%	89%	84.9%	83.1%	87.0%	86.9%	NA	NA
15.	Hiding power by contrast ratio (reflectance)	min. 10 m^2/l for white min. 13.3 m^2/l for coloured	10.0	< 8.0	8.3	9.1	9.1	11.1	(the best) 12.5
16.	Resistance to wet abrasion	10.000 oscillations	Pass	Fail	Fail	Pass	to be tested		
17.	Accelerated weathering	500 hours (single carbon arc)	this test will be completed at the beginning of December						
18.	Resistance to exterior	No chalking after 6 months. No cracking, flaking or blistering 12 months	for certification mark purposes the accelerated weathering is applied						

	Paint property	MS Requirement	Mauvilac Acrylic Exterior	Dulux Acrylic Antifungus	Permoglaze Interior/ Exterior	Buffalo Interior	Hasco (Holland) Emulsion	Decoplast (India) Int./Ext.	Crown (England) PVA-Acrylic
19.	Fastness to light	168 hours (single arc) very slight colour change	this test will be carried out after accelerated weathering						
20.	Resistance to staining	to pass the dye test	NA	Pass	Pass	Fail	NA	Pass	Fail
21.	Reistance to development of gloss	375 oscillations	NA	Pass	Pass	Pass	NA	To be tested	
22.	Resistance to fungal growth	to pass the test	NA	to be tested by MSIRI	NA	NA	NA	NA	NA
23.	Water drop test	30 min.	> 45 min	Pass, little blistering after 45 min.	> 45 min.	>45 min.	>45 min.	Pass, little blistering after 45 min.	> 45 min.

APPENDIX C

Paint production in Mauritius (without lime and bituminuous materials)

	Production (litres/year)				
	Mauvilac	Maurco	Mauritius Paints	Blanche Birger	Total
Maximum capacity	1 350 000	125 000	1 331 200	240 000	3 046 200
Annual production:					
Emulsion paints (interior exterior, antifungus) .	406 640	28 000	463 504	10 572	908 716
Primers (red lead, calcium plumbate zinc chromate, etch primer, etc.)	44 852	7 500	15 235	-	67 587
Enamels (oil, alkyd-modified, synthetic, etc.)	191 499	35 000	94 471	4 623	325 593
Other related products	13 066	-	17 888	-	30 954
	656 057	70 500	591 098	15 195	1 332 850

APPENDIX D

Members of the Technical Committee on Protective Coatings

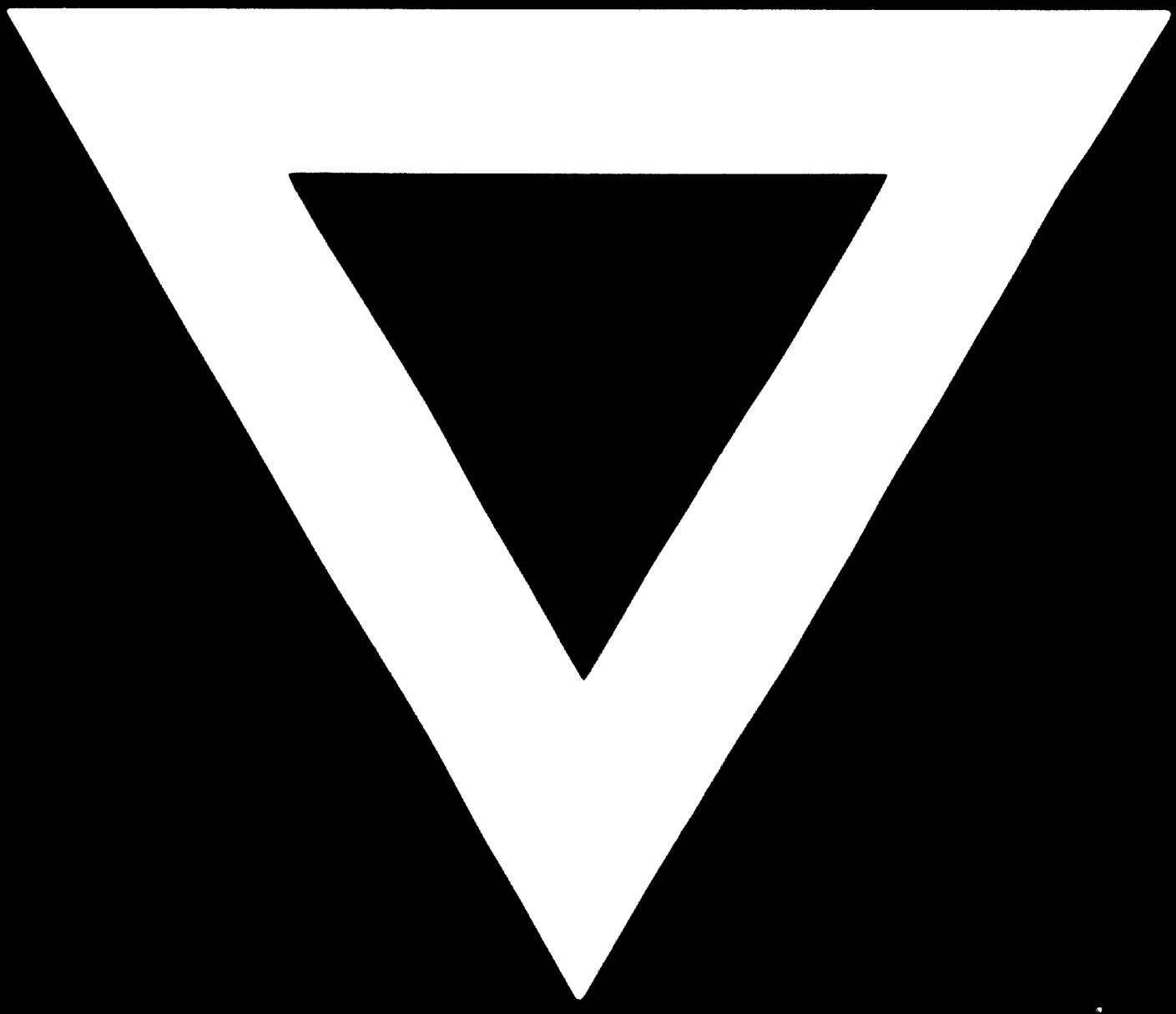
Membership list:

1.	Mr. G. Rochery (Chairman)	-	Ministry of Works
2.	Mr. J. M. Chauveau	-	Mahebourg Paints Co. Ltd.
3.	Mr. J. Rouillard	-	Mauvillac and Co. Ltd.
4.	Mr. R. Pilot	-	Blanche Birger
5.	Mr. C. Cantin	-	Mauritius Paints Ltd.
6.	Mr. J. F. Poupinel	-	Maurco Ltd.
7.	Mr. R. H. Prayag	-	Building and Engineering Co.
8.	Mr. Wong Too Yuen	-	University of Mauritius
9.	Mr. G. Carver (awaiting appointment by the Minister)	-	Institution of Engineers
10.	Captain Y. Betuel	-	Taylor and Smith Ltd.
11.	Mr. S. K. Gujadhur	-	Director of the MSB
12.	Dr. A. Kozlowski	-	UNIDO Expert
13.	Mr. J. Perbhoo (Secretary)	-	MSB

Observers:

14.	Mr. J. C. Hein	-	Private capacity
15.	Mr. H. Pilot	-	Mauvillac and Co. Ltd.

B-368



80.12.08