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for a sustainable future

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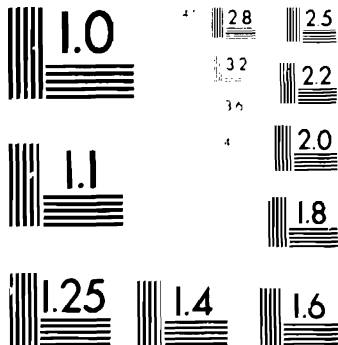
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13609

6th IN-PLANT GROUP TRAINING PROGRAMME IN THE FIELD OF
MOULD DESIGN AND MOULD MAKING

US/INT/83/174

organized by the
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
(U N I D O)

in co-operation

THE GOVERNMENT OF AUSTRIA and
HEINRICH SCHMIDBERGER G M B H

held in Vienna

from 22 November 1983

19 December 1983

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1. REVIEW

Since 1970 the Laboratorium für Kunststofftechnik at the Technisches Gewerbe Museum (LKT/TGM) hold eight seminars about Plastic-technology.

In 1974 a synthetic-fibre programme was created and in 1975 a mould making and mould design group was included in the Plastic-technology programme.

This year , the In-Plant Trainings-Programme for mould making, mould designing and mould-maintaining took place the sixth time at Schmidberger factory in Vienna.

This year we had two groups of participants in different time.

First group, which is two trainees, participate the Training programme from 12th September to 25th of November.

Second group (six trainees), six weeks, participate the Trainings-Programme in LKT/TGM between 11th of October to 21th of November. Last four weeks they attend the courses in Schmidberger.

Thirtythree participants from twentyfour different countries benefited from these trainingprogrammes.

The regional distribution was the following:

Far east	13	40 %
Middle East/ North Africa	7	21 %
Latin America	8	24 %
Eastern Europa	2	6 %
Central Africa	3	9 %

79 % of the participants come from companies and
21 % from institutes.

	1975	1976	1977	1978	1979	1983
BOLIVIA	-	-	X	-	-	-
BULGARIA	-	X	-	-	-	-
BURMA	-	-	-	X	X	-
CHILE	-	-	-	-	-	X
CHINA	-	-	-	-	X	-
COLOMBIA	-	-	X	X	-	-
COSTA RICA	-	-	-	-	X	-
CUBA	X	-	-	-	-	-
CYPRUS	X	-	-	-	-	-
EGYPT	-	X	X	X	-	-
GHANA	-	-	-	-	-	X
INDIA	X	-	-	X	-	X X X
INDONESIA	X	-	-	-	-	-
IRAQ	-	X	-	-	-	-
JEMEN	-	-	-	-	-	X
JORDAN	X	-	-	-	-	-
MALAYSIA	X	-	-	X	-	-
MALAWI	-	-	-	-	-	X
PANAMA	-	-	-	-	X	-
EL- SALVADOR	-	-	X	-	-	-
SRI LANKA	-	X	-	-	-	-
THAILAND	-	-	-	-	-	X
TANZANIA	X	-	-	-	-	-
TRINIDAD-TOBAGO	-	-	-	X	-	-

1.1 Participants 1975

ALLY A.R. MLEWA

Tanganyika Tegry Plastics Ltd.

P.O.BOX 2219 DAR-ES-SALAAM

TANZANIA EAST AFRICA

M.S. FRANCIS

Central Institutes of Plastics
Engg & Tools

GUINDI MADRAS 600 032

INDIA

D.Z. JAZIR

Lemigas/RPK

Cipulir Kebayoran Lama P.O. BOX 89

JAKARTA INDONESIA

K.C. YOUNG

Nam Shing Mech Molds

121 Kallang Way

SINGAPORE 13 MALAYSIA

WALID A JADA

United Industries Corp.

P.O.B. BOX 6057

AMMAN JORDAN

RAUL I. LOPEZ

Empresa de Plasticos

L Y 25 VEDADO

HABANA CUBA

A.S. MATTHOPOULOS

Plastic & Mould Manufact. CO.

Sofocleous St. 33 ACROPOLIS

NICOSIA CYPRUS

1.2 Participants 1976

BAKER Salah Technical Plastic Articles co.
Alwiyah, P.O. BOX 2303 C./O. S.A.
BAGHDAD IRAQ

EL TARAWY Ahmed Egyptian Plastics and Electrical
Industries
CAIRO , EGYPT

FERNANDO Francis G. M. Nayagams Ltd. Ragama Road
WELISARA, SRI LANKA

MINCHEVA Maria P.O. Plastproject
Mihailova SOFIA , BULGARIA

1.3 Participants 1977

CABRERA Ismael Plastoform Ltd. Donsttucion 329
LA PAZ , BOLIVIA

GALINDO CARRILO Industries de Centro America S.A
Jesus Del Pilar Poulevard del Ejercito National, Km 9
SAN SALVADOR, EL SALVADOR

SUARES I. Benavides Beroñ S.A.
Apdo Aero 7571
BOGOTA, COLOMBIA

ZIKRY Ali Ahmed National Plastic co.
15 Emad El-Din Street
CAIRO, EGYPT

1.4 Participants 1978

CHARLES Gerart Kenrick	Trinidad and Tobago Mayfair Gardens Lower Santa Cruz TRINIDAD, W.I.
HIRAM Jimenez Neira	Colombia Diag. 145 A Nr. 32-68 BOGOTA 10 DE. COLOMBIA S.A
MAJID Mohd Amin Bin Abdul	Taman Goodwood, Klong, Selangor 17 Jalan 53, Kawasan 3 MALAYSIA
A. KUPPUSWAMY	Cipet Madras Institute 98, Kodambakkan Rd. MADRAS 600 033 INDIA
SALLEM Ahmed Hassan	Egyptian Plastics & Elect. Industries P.O.Bag Alex.5 EBN, Okil Street Victoria, Alexandria, EGYPT
CHO Khin Maung	S.Rep. of the U. of Burma 117, Mounq Tonkay Street RANGOON, BURMA

1.5 Participants 1979

ARTURO Gomez Garcia	P.O.BOX 8226 Zone 7 Panama REP. OF PANAMA CENTRAL AMERICA
JOSE Elmer Arias	Envases Comerciales S.A. Copey, Tibas P.O. BOX 1802 SAN JOSE, COSTA RICA
U PYON Cho	Weavy Industries Corporation G. PO, 370 RANGOON, BURMA
PENG Yucheng	The South China Technical University CANTON, CHINA

1.6 Participants 1983

First group

SRISIRI Charoen Business Organization of Teachers
Institute
5 Prasumeru RD. Banglumpoo
BANGKOK 10200, THAILAND

MOSES S. Fredrick Central Institute of Plastics
Engineering and Tools, Guindy
MADRAS 600 032, INDIA

Second group

GOVINDAN K. P. Central Institute of Plastics
Engineering and Tools, Guindy
MADRAS 600 032, INDIA

MOHAMED NAINAR S. M. ditto

DULANTO Gonzalo Duratec S.A.
Casilla 1011
SANTIAGO, CHILE

HAGAN Albert Aidoo Gihoc Electronics Co. Ltd.
P.O. BOX 577
TEMA, GHANA

MUWERO Keegan Mabvuto Plastic Products Limited
Wensley
P.O. BOX 907
BLANTYRE, MALAWI

NASSER Hussein Alala Al-Gundi Plastic Factory
P.O. BOX 4206
ADEN, JEMEN

2. OBJECTIVES

The rate of growth of the plastic industry in developing countries was rapidly increasing during the last years and so the demand for a trained staff increased too.

So the "UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION" (UNIDO) wanted to find training opportunities in this field of plastic-processing for engineers of developing countries.

In co-operation with the Government of Austria, the Austrian Federal Ministry of Education and Fine Arts, the Austrian Federal Chamber of Commerce and the Association of Austrian Industrialist, some programmes of this kind could be carried out:

- a training programme in Plastics technology
- a training programme about Synthetic fibre and
- a training programme in Mould-making and Mould-design.

The principal objective of these programme is to bring together a group of selected persons, who are expected to benefit from a concentrated course in modern plastics technology or in the field of mould-making and mould-design which demands otherwise a long period of training, research and development work.

In the programme for mouldmakers the main emphasis was always given to practical work in the workshop and the designing office, as to visits of other mould-maker shops; to modellmakers, stell-hardening galvanising and other workshops engaged with all fields of mould-making.

3. FACTS ABOUT SCHMIDBERGER

3.1 HISTORY

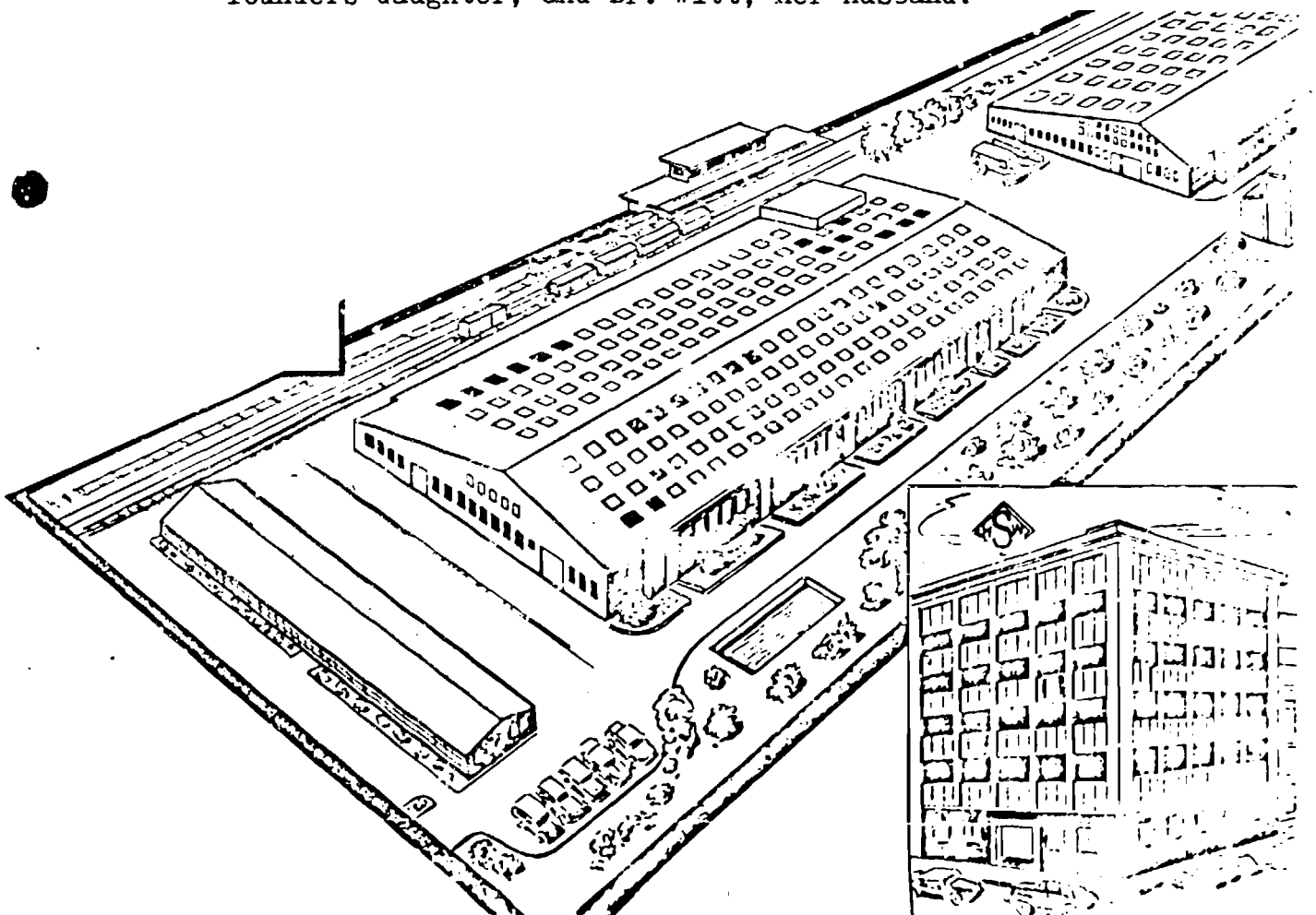
The company was founded in 1922 by Mr. Heinrich SCHMIDBERGER.

Mr. Schmidberger, who died in 1965, foresaw the importance of plastics in the earliest stages of his activities.

A number of production sites that had originally been located in different areas were concentrated at the Vienna-Liesing plant in 1960.

This plant, which covers an area of 73.000 m² includes 2 large workshops sized about 27.000 m². The company's management and administration are located in their own office-building in Vienna II.

The company management is headed by Mrs. F. Witt, the founders daughter, and Dr. Witt, her husband.



3.2 STAFF

KR Friederike WITT	Director General
KR Dr. Erich WITT	Director
Magist. Gabriele WITT	Deputy Director
Herbert MAYERHOFER	Plant Manager
Franz HINTERECKER	Production Supervisor
Training Manager	Training Assistant
Ing. Ing. Batu ÖZHAN	Ing. Marcus WERSONIG
Designing Dept:	Ing.Ing.Batu ÖZHAN
Mould Making Dept:	Roman BRUNNER
Injections Mould Dept:	Miroslav RADUSIC
Blow Moulding and Extrusion Dept:	Anton SPRENGNAGEL
Press Moulding Dept:	Ing.Marcus WERSONIG

3.3 EQUIPMENT

3.3.1 Mouldmaking workshop:

Copy-milling machine	2000 x 1000 mm TOS
Copy-milling machine	1000 x 1200 mm TOS
Copy-milling machine	Deckel KF 1
Milling machine	Deckel FP 1
Milling machine	Deckel FP 2 LB
Milling machine	6 T 75
Milling machine	Thiel
Milling machine	FK 086
Horizontal boring machine	HCW
Div. drilling machines.	
Turning lathe	Heid
Turning lathe	Hopfgärtner
Turning lathe	TOS
Turning lathe	Nils and others.
Shaping machines	
Grinding machine	Zocca
Grinding machine	Elb and others.
Sand-blast unit	
Electro-erosion machine	Dieter HANSEN 750/S and others
Diprofil equipment	
Biax equipment	
Measuring equipment	

3.3.2 Injection Moulding Dept.

TRIULZI	10 Kg.
ENGEL	1200/900
IDRA	MP 85
BATTENFELD	3000
STÜBBE	2000
ENGEL	1500/500
ENGEL	500 P
IDRA	MP 40
IDRA	MP 35
ENGEL	350 P
IDRA	MP 30
NETSTAL	350
ENGEL	500/250
ENGEL	250/650
ENGEL	300/150
ENGEL	150/90
IDRA	MP 10
ENGEL	100/50
ENGEL	90/50
ENGEL	50/50
ARBURG	UNIMAT
BATTENFELD	7,5 gr.
BATTENFELD	2 gr.

and others

Div. Conveyor and inking equipment

Div. Mills

3.3.3 Blow Moulding Dept.

KAUTEX Blow-Moulding Machines up to 50 L.

BEKUM Blow-Moulding Machines HBD BA 2

and others.

Div. Conveyor and Colouring Equipment

Printing-machines DUBUIT

Printing-machines KAMANN witt elevator

Printing-machines SIMA and others

4. TIME TABLE

Begin 08.00 hrs
Lunch 12.00 to 13.00 hrs (except Friday)
Finish 16.00 hrs (Friday 13.00 hrs)

FIRST WEEK

22 November

Tuesday 08.00-12.00 Meeting at Schmidberger
Visit the factory
13.00-16.00 Design department.
Discussion of trainees individual interest
in the subject matter, questions and
answers.

23 November

Wednesday 08.00-12.00 Design department.
Calculation of mould elements, types of
injection Moulds.
13.00-16.00 Design department.
Calculation of steel, type of steel,
choosing, hardning.

24 November

Thursday 08.00-12.00 Design department.
Design of Mould in respect to material.
13.00-16.00 Design department.
Shrinkage, cooling system, design of sprue,
runners and gates and mould units.

25 November

Friday 08.00-13.00 Workshop and injection-mould department.

SECOND WEEK

28 November

Monday 08.00-12.00 Design department.
Single-cavity, Multi-cavity Mould.
13.00-16.00 Workshop.

29 November

Tuesday 08.00-12.00 Design department.
Split, side pull Mould.
13.00-16.00 Split, side pull Mould.

30 November

Wednesday 08.00-12.00 Design department.
Three-plate, Four-plate Mould.
13.00-16.00 Workshop and injection-mould department.

1 December

Thursday 08.00-12.00 Design department.
Isolation channel, Hot runner Moulds.
13.00-16.00 Isolation channel, Hot runner Moulds.

2 December

Friday 08.00-13.00 Workshop

THIRD WEEK

5 December

Monday 08.00-12.00 Design department.
Sprocket gear moulds.
13.00-16.00 Sprocket gear moulds.

6 December

Tuesday 08.00-12.00 Design department.
Two and Multi colour Moulds.
13.00-16.00 Workshop and injection mould department.

7 December

Wednesday 08.00-12.00 Design department.
Technical mould designs.
13.00-16.00 Technical mould designs.

8 December

Thursday Holiday

9 December

Friday 08.00-13.00 Workshop.

FOURTH WEEK

12 December

Monday 08.00-12.00 Design department.
Thermosetting materials, design of thermo-
setting moulds, transfer moulds.
13.00-16.00 Thermosetting department.

13 December

Tuesday 08.00-12.00 Design department.
Extruder machines, design of dies and Blow
moulds.
13.00-16.00 Blow mould department.

14 December

Wednesday 08.00-12.00 Design department.
Foaming-Expandet polystrol , mould of
expandet materials.
13.00-16.00 To visit SOS

15 December

Thursday 08.00-12.00 Design department.
Copies of interesting designs for the
Trainees.
13.00-16.00 To meet with Mr. Gummen in the VIC.

16 December

Friday 08.00-13.00 Workshop.

FIFTH WEEK

19 December

Monday 08.00-12.00 Individual discussions.
13.00-16.00 Closing session.

5. ACTIVITIES

5.1 Introduction at Schmidberger

A plant visit and a survey of the Schmidberger factory and its facilities, Evaluation of special interests.

Organization and timetable of the work.

5.2 Visit-Plant

28 November	Hasco	Guntramsdorf
		Mould units
2 December	Dieringer	1230 Wien
		Modern mould-making and Injection-moulding company
6 December	Porit Hartschaum g.m.b.H (Schmidberger)	
		Foaming-Expandet polystyrol
7 December	Ing. Stefan Pöltner K.G.	1220 Wien
		Stell hardning
14 December	Kunststoffinstitut	1030 Wien
		Research and test Laboratory
	SCS	Vösendorf
		Shopping
16 December	Allgemeine Unfallversicherungsanstalt	
		1200 Wien
		Test Laboratory

5.3 In-plant training

In the designing department exercises in designing were made and available drawings were studied and discussed. In accordance with the held lectures the first considerations about lay-out of existing moulds were discussed.

The reasons and thoughts connected with calculation of moulds and item, choice of processing machine and materials used for the mould and the item were also discussed.

Some discussion took place and then the participants tried to sketch possible solutions of their own. Afterwards they could study our solutions of these moulds by regarding our designs. Copy of these designs were available for the trainees.

As a further step they could disassemble these moulds in question, analyse, and put them together again. This was done with several articles which require different kinds of moulds, with different stripping equipments and different kinds of sprues. All this was also discussed in special lectures, especially questions about multi-cavity-moulds, their sprues and additional devices.

Different types of runners, like single-gates, hot-runners or insulated channels, tunnel-gates etc. were spoken of.

In the injection-moulding department practical work was performed, mounting moulds to the machines and adjusting the necessary parameters of production for high-speed ratio, reducing shrinkage and distortion; for getting the best possible items.

Considerations about operation; labour saving, improvement and stabilization of product quality and control of moulds temperature, efficiency of cooling systems - heat transferring ratio and temperature conductivity, surface area and direction of flow of the cooling means were taken about and also different kinds of extruders (mono-twin-screw) and different kinds of screws themselves for different materials. Possibilities to increase output-rate, rate and quality of product.

In the blowmoulding department the work was similar to the one in the injection moulding department. Mounting of moulds into the machines, achieving the best processing parameters by working and all the others considerations about working efficiency.

Special interests was paid to a device for automatically adjusting the pin-slot for making bottles of even wallthickness.

For this kind of processing the considerations about operation speed and labour saving are especially important.

In the extruding department the production of tube, pipes and profiles was studied. The ratio of diameters of dies to the diameter of finished articles, the shape of dies for profiles etc. of special interests were a device to reinforce waterhoses with cross-linked filament.

Further, equipment for cooling, take-off, cutting to length, reeling up etc. was studied and discussed.

Great emphasis was given to the raw-materials; to choosing the right material for the right purpose. The properties of the different materials were discussed and papers of some raw-material producers were given to the trainees.

A good deal of time was spent with the determination of materials without labmeans. The trainees learned how to distinguish the most used materials only by their appearance, their hardness, the behaviour and smell when heated or burned.

5.4 Special papers

HÜLS - Injection moulding

DME - Hot runner catalog

PLASTIC Service g.m.bH - Hot runner systems "Thermoject"

Prospects of visited factories

5.5 Social Events

Lunch - SCS (Schmidberger)

Dinner - Chinatown (Schmidberger)

6. GENERAL REMARKS

Throughout the training programme of four weeks duration a smooth and fruitful co-operation has been established between the participants and related staff of the Schmidberger.

Scope of the training programme was designed to meet the needs of the participants, and it is expected that the training has proved to be useful for the participants.

We would like to express our sincere thanks and appreciation to all involved in the organization of this training programme and would like to re-iterate our willingness to be the host institute for these training programs.

7. PROPOSAL FOR THE FUTURE

Most of the participants are coming from the tropical countries. According to us early Autumn training programme would be the best time for them.

Before they come to Vienna participants should be informed that, from the airport they could take the terminal buses to the city.

