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22038

International Centre for Science and High Technology

ACIMAC

Association of Italian manufacturers of Machinery and equipment for Ceramics

International Training Course
On

"Best Available Technologies in Ceramic Production"

FINAL REPORT

Modena, 22-26 June 1998

Venue : ACIMAC Headquarters
Organized by : S.A.L.A. Srl Via Carlo Zucchi 21/B 41100 Modena

ACIMAC

FINAL REPORT

UNIDO Project n. : TF/GLO/96/105
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Introduction

In every country the building industry is a fundamental and strategic sector which sets the basis for economic development both in terms of investments and in employment. Indeed there is a close link between investments in the building industry and employment, due to the fact that the building market can provide a big boost to employment as a result of the labour-intensive nature of almost the entire production process. In France, it is said that when the building sector is going well, everything is going well. In the United States of America, much importance is attached to future investment in infrastructures with a view to boosting employment. The building sector accounts for a high proportion of the total work-force in developed countries, normally set around 10%, whereas the figure is much higher in developing countries and transition economies. Hence if the decline of this sector is particularly serious in a given country, it is often far more dramatic in developing ones.

The sector's development is definitely linked to improvements in the standard of living but it depends on technological innovation as a constant driving force. The availability of new products at increasingly competitive prices, made possible by technological development, comes on top of a growing market demand linked to the increase in standards of living. Technological innovation creates added value. It improves the product and cuts costs thus allowing for a greater distribution of the product on the market and an extension of the distribution range.

In Europe, which is the main producer of ceramic materials (tiles) with production exceeding 50% of the world's turnover, extensive technological innovation was introduced over the last few decades to face the decrease of internal demand and to push European production towards new and emerging markets. Increased sales are still forecast to developing countries, from the Far East to Africa.

Nevertheless, many developing countries have greatly improved their own production capacity and experienced production booms in particular sectors, but they still need extensive technological innovation. China tile production,

for instance, increased from 200 million square metres in 1991 to 900 million in 1994. Yet the country is still facing a steady increase of imports due to higher quality demand of the internal market which cannot be covered by local output. In 1995 Brazil achieved an output of 266 million sqm of tiles and some of the Brazilian companies are among the leaders on a world level. At the same time, the growth in the domestic market has led in recent years to the creation of numerous small companies whose products are not yet of sufficient quality to make them competitive in the international market.

Training Course Justification

The Training Course that ACIMAC has organized in co-operation with ICS aimed at conveying related information on how the increase in productivity and product quality is achieved with the introduction of technological innovations and by doing this, particular efforts were focused on the small- and medium-sized enterprises viewstand. Issues related to energy savings, the use of secondary raw materials, improved environment protection, and total quality control were taken into consideration.

The aim of the Course was to promote the most advanced technologies adopted in the ceramic industry, giving special emphasis to information management, know-how dissemination and transfer promotion of the best available technologies economically viable to be applied to prevent environmental damage while coping with the production needs.

Objectives of the training course

- To provide participants with the basic principles for the recognition of technological parameters in the ceramic process and their influence on product quality;
- To present a panorama of the latest innovation technologies in the ceramic sector and discuss the main aspects concerning the production cycle for ceramic bodies;
- To review the production cycle analysing the effect of ceramic production on the environment.

Venue and Date

The International Training Course was held at ACIMAC Headquarters in Modena (Italy), from 22nd to 26th of June 1998.

Modena represents the most important centre in Europe for the ceramic sector considering the nearness with Sassuolo, the real fulcrum of the ceramic industry.

ACIMAC the association of Italian manufacturers of machinery and equipment for Ceramics is located in Modena, where roughly 80% of the Italian ceramic production is concentrated with more than 500 active companies and about 80.000 employees operating in the area. For this reason Modena was considered the most suitable place for establishing connections with developing countries' industries in the area of ceramic sector.

Organization

The course was organized by ACIMAC, that has delegated to S.A.L.A. SRL, its administrative branch the whole operative organization and co-sponsored by ICS-UNIDO with a contribution for the activity of USD 44,000.

S.A.L.A. SRL assumed also the responsibility as subcontractor and hosting institution.

Participants

Course announcements, invitations and calls for application were circulated through ACIMAC members and ICS contact persons

The selection of participants was made by ICS through evaluation of the Curricula returned by candidates

The educational level of participants was rather high and most of them had a degree in technical fields or experience of several years as technologists operating in the ceramic sector as managers of the production cycle in their tiles company or they were decision makers in research institution.

19 technologists and technicians of the ceramic sector were chosen taking into consideration their relevant background and their region of origin and in particular the Mediterranean Area, Latin America regions, Africa, South-east Asia, Eastern Europe.

As for financial contribution, all participants coming from developing countries were fully supported by ICS (daily allowance and travel expenses).

No registration fees were requested.

A complete list of names and addresses of participants is reported in Annex 1.

Material distributed

Together with the general information and promotional material (Training Programme, Ceramic World Review, ACIMAC Directory, ICS Brochure) participants were also given a Technical Manual which is an introduction to ceramic production technology and includes a selection of the most interesting articles on production technology, particularly for ceramic tiles, published in the sector's trade journals.

Training Programme

The course was organized in five days of lectures, which aimed at reviewing some general aspects of the ceramic production cycle and the state-of-the-art of the best available technologies produced by the Italian manufacturers.

The main topics of the Training Course were the following:

- I Introduction
- II Body preparation
- III Pressing
- IV Drying
- V Glazing
- VI Decoration
- VII Firing
- VIII Sorting and packaging
- IX Defects and checks
- X Special products
- XI Environmental impact

Four experts of the ceramic sector, who alternated in order to keep keen the interest of participants, gave the lessons in English.

The course was scheduled as it follows:

9.00 – 11.00 : lesson

Coffee break

11.30 – 13.00 : lesson

Lunch

14.30 – 17.00 : lesson

Lecturers were given enough time for answering question and for discussion.

Two afternoons were dedicated to field visits aimed at showing the best Italian technologies at work, used in the ceramic production cycle of some of the most important companies in the sector.

A complete Programme is enclosed in Annex 2.

Field Visits

Two visits were included in the programme :

- A visit to the company Spray Dry in Sassuolo, which allowed participants to see the more advanced technologies, applied in the field of the body preparation.
- A visit to the Production Department of the company Emilceramica in Sassuolo which gave participants some very interesting inputs about the improvement of tiles production cycle by the application of the best and more advanced technologies.

Social events

A social event was organized in order to achieve better integration within the group in a more informal atmosphere. A get-together dinner was offered by ACIMAC the second day of the course. Participants, lecturers, ACIMAC and ICS staff took part at a dancing and amusing night.

Course evaluation

Feedback course evaluation was sought by distributing evaluation questionnaires to be filled in anonymously and returned to the course organization. Results are summarized and attached to this report in Annex 3. As a general remark it can be drawn that the course has been greatly appreciated, suggestion for more in depth illustration of particular technologies were given, but very few topics were considered to be dropped, while many were suggested to be expanded. Indications that the course contents would be disseminated within the beneficiary institutions by organizing in-house courses or seminars were obtained.

Comments and conclusions

A comprehensive review of the technologies adopted in ceramic production was given, outlining with particular emphasis the recent technological innovations adopted by the Italian ceramic industry. All topics were theoretically illustrated in room classes and then practically showed during visits to local industries (note that more than 200 ceramic firms are located in the area around Modena). Four lecturers were illustrating the course, at least two of which were always available during lecturing for answering to specific questions and stimulating discussions and interaction with participants.

Particularly interesting it has been the activity dissemination process and call for participation which was done through the ACIMAC network of Italian associated firms, which, in turn, spread the information through their business, allied firms in developing countries. The process proved to be particularly effective as in a few weeks time more than 50 applications were collected. In addition the process lead to the formation of an audience group particularly homogeneous in terms of background and competencies thus facilitating spontaneous interaction and great interest from the local industries. Moreover it was greatly appreciated that a general wide overview of different technologies available with no commercial bias from one or few local producers was presented, fact this which is rather unusual in common commercial cooperation programmes.

Detailed information on participants' institution/firm has been gathered by distributing networking questionnaires. Collected data have been transmitted to ICS.

Detailed information on local industry and national policies were sought by requesting the participants a short report. These data, which are currently being analysed, will be transmitted ICS.

Extensive information on the course aims and achievements will be publicized on the specialized magazine «Ceramic World Review» which is the world largest distributed sector magazine.

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Annex 1

INTERNATIONAL TRAINING COURSE
On

"BEST AVAILABLE TECHNOLOGIES FOR CERAMIC PRODUCTION"

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Annex 2

INTERNATIONAL TRAINING COURSE
On

«BEST AVAILABLE TECHNOLOGIES FOR CERAMIC PRODUCTION»

PROGRAMME

Monday , June 22nd

h. 09.00	Welcome to the Participants Distribution of the Technical Manual Presentation of ACIMAC and ICS Presentation of the Training Course Auto-Presentation of the Participants
h. 10.30	Introduction and Raw Materials
h. 11.30	Coffee Break
h. 11.45	Raw Materials
h. 13.00	Lunch
h. 14.30- h. 17.30	Body Preparation

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Tuesday, June 23rd

h. 09.00	Body Preparation
h. 11.30	Coffee Break
h. 11.45	Body Preparation
h. 13.00	Lunch
h. 14.30- h. 17.30	Technical Visit to the company «Spray Dry»- Sassuolo

Wednesday, June 24th

h. 09.00	Pressing
h. 11.30	Coffee Break
h. 11.45	Pressing
h. 13.00	Lunch
h. 14.30- h. 17.30	Drying and Glazing

Thursday, June 25th

h. 09.00	Decoration

h. 11.30	Coffee Break
h. 11.45	Decoration
h. 13.00	Lunch
h. 14.30- h. 17.30	Firing

Friday, June 26th

h. 09.00	Sorting and packaging Defects and checks
h. 11.30	Coffee Break
h. 11.45	Special Products Environmental impact
h. 13.00	Lunch
h. 14.30- h. 17.30	Technical Visit to the company «Emilceramica»-Sassuolo

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Annex 3

ICS Workshop/Training Course: EVALUATION QUESTIONNAIRE

Training Course: Best Available Technologies for Ceramic Production

A. Organization:

1. How did you obtain information about this workshop/course?

	Excellent	Very Good	Good	Fair
2. The information process was	2	6	5	-
3. The announcement and pre-course material was	2	3	7	-
4. I found the scientific programme	1	8	5	-
4.1. Applied Lecture/Workshop	-	10	4	-
4.2. Use of small working groups	2	5	4	2
4.3. Case Studies	1	5	6	2
4.4. The time spent by lecturers in class and after class on specific questions/examples	-	9	5	-
4.5. Students scientific knowledge was	Balanced	Unbalanced		
	11	1		

B. Duration of programme:

	Just right	Too long	Too short
1. Number of days	6	3	5
2. Length of working days	8	5	1

C. Training facilities & Hotel:

	Excellent	Very Good	Good	Fair
1. Lecture/Training Rooms	3	4	6	1
2. Breaks/refreshments	-	11	3	-
3. Hotel accommodation	-	5	6	2
4. Meals at the hotel	-	5	6	2

If "Fair" please explain why:
Being a UNIDO experts, I believe that this is not the UNIDO level of hotels and expenses; Prepaid luncheons and dinners should be avoided and participants given

mandate to choose what they want; Lecture room air-conditioning needs improvement, a good pointing device for lecturers is needed;

D. Organizer's response to participants needs	3	9	2	-
E. Overall programme organization	2	9	3	-

F. Would you recommend to others from your institution/ country to attend a similar activity in the future?

Yes	Maybe	No
12	2	-

1. Which part of the Activity did you find most useful?
Raw materials of body preparation; Energy consumption in ceramic materials grinding and drying; Innovative processes; Body preparation; Technical visits; Milling; Basic process principles and industrial development findings; Rheology part;

2. Which part of the activity do you think should be expanded?
Presses, glaze applications; Energy consumption, reformulating of body and/or glaze recipient; Raw materials processes; Visits to the new devices in the different factories; Firing; Technical visits; Pressing; Industrial processes development findings;

3. Which part of the activity do you think should be dropped?
Machinery for glazes application and decoration; Talks about basic knowledge; Thermodynamic formulas demonstrations;

4. Any other suggestions for future improvements to the programme?
More time for presses and glaze applications; Computer simulation of defects and their remedies; Include other areas of ceramic production, i.e. sanitaryware, tableware, refractories; Other processes; Less theory and more practical exercises;

5. Do you think that the topics/tools you studied during the course could be used by industries in you country? If so, how? If not, why not?
The topics yes; Yes could be by training courses technicians of industrial sectors; Yes, through provision of extended services of my institution and through training activities; Yes even though the course was very basic for myself; Yes, in production we are everytime concerned about the topics developed during the course in order to achieve a good product; The enhanced knowledge which I gained will help me in analyzing specific problems and in tackling them properly; Yes , to improve glaze formulations, develop new products and improve firm productivity;

6. Can you suggest any programme and future activities which ICS could pursue in order to help with the technological and scientific advancement of your country?

Arrange this type of training course in our country for several branches of industries; Computer software for reformulation of body recipes and glazes, glaze frit assessment, waste water treatment in ceramic industry and sludge recycling; Frits and refractory production; Research with a mixed team from our and your (Italy) country, publications, more seminars, consulting; Porcelain stoneware; Internet technological information access facility, translation of some Italian ceramic texts or research papers; Energy saving processes;

7. Do you think you have benefited from participation in this course/workshop? If so, how? and your Institution?

Yes, gaining knowledge on energy consumption which I will transfer during training courses in my institution; Knowledge and know how gained, will be transferred to other staff in the field hence improved services to be offered by the institution; Yes, because there were many people from different places in the world and there was exchange of information among participants; Yes I will organize a course for our workers; Yes, we learned innovation in technology; I improved my ceramic technology theory bases;

8. How do you intend to disseminate the information you have acquired during the activity once back in your own country?

All this information and the course material will be transferred to my people; Include part of energy consumption and efficiency in my institutions' course on materials; Through training activities; Speaking to employees in my institution; I will prepare a report on the illustrated topics; I will discuss with concerned enterprises the possibility to import tile production lines; Preparation of training notes for in-house training;

G. Evaluation of Lectures and Speakers

	Excellent	Very Good	Good	Fair
1. Course material	2	5	7	-
2. Resident Lecture presentation	-	7	6	-
3. International Lecture presentation	-	2	8	-
4. Ability of lecturers to answer specific questions	1	6	6	-

Annex 4

FINAL BALANCE

EXPENSES	
planes travel agency	30.730.400
planes USD$	5.124.403
TOT PLANES	35.854.803
trains/taxi	827.900
trains travel agency	148.000
TOT TRAINS	975.900
TOT TRAVELS	**36.830.703**
lunches N.Gazzotti	1.560.000
lunches C.Flambè	400.000
dinners Enzo	1.200.000
dinners Freto	900.000
lunches	189.300
coffe break	260.000
TOT LUNCHES	4.509.300
Hotel Roma	9.350.000
Hotel Raffaello	780.000
TOT HOTEL	10.130.000
TOT DSA	**14.639.300**
study tours	770.000
bus	231.000
TRANSPORT/STUDY TOURS	**1.001.000**
LECTURE HALL	**4.000.000**
TEACHERS	**8.100.000**
SECRETARIAT	**3.300.000**
TUTOR	**1.500.000**
translation	2.368.300
teaching material	1.296.000
TOT TEACHING MATERIAL	**3.664.300**
SUNDRIES	**2.000.000**
SUPER TOTAL	**75.035.303**