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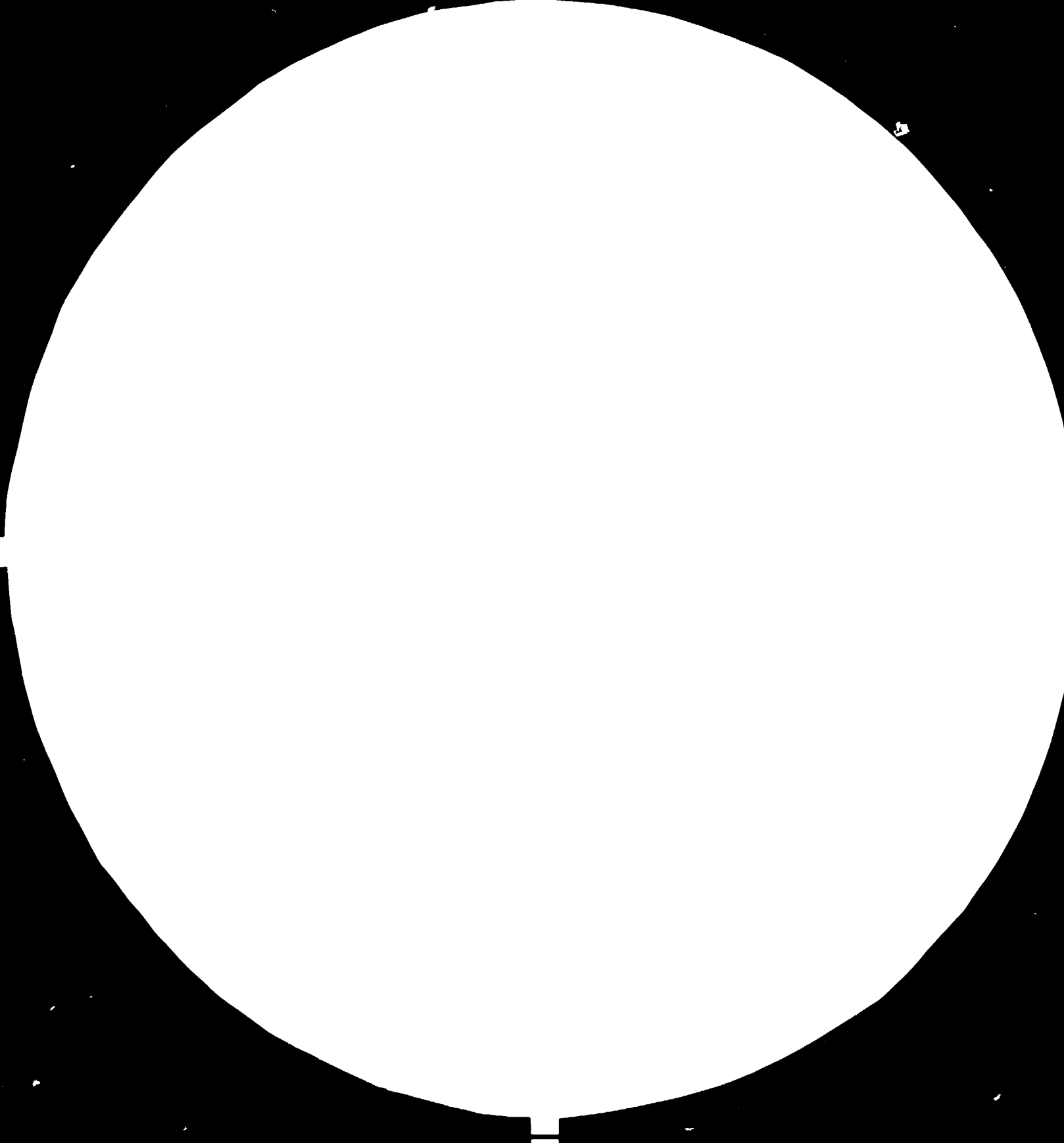
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1983

INDUSTRIAL TRAINING AND DEVELOPMENT CENTRE

(ITDC)

TURKEY

TRAINING PROGRAMME

IN

FOUNDRY PLANNING, ORGANISATION AND CONTROL

DP/TUR/77 024/11-03/A3/31.5.A

TERMINAL REPORT

Prepared by

J. D. Harper

M.A. F.I.B.F., Foundry Consultant

Expert of the ITDC in Colloboration
with The United Nations Industrial Development
Organisation acting as Executing Agency for
the United Nations Development Programme.

This Report has not been officially cleared with the
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which does not therefore necessarily share the views presented.

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(Separate Document)

1. SUMMARY

The Turkish economy is developing, and many Turkish foundries are acquiring new technology, mechanising, and aspiring to export castings. However operating efficiency is often poor, with low productivity, inadequate plant utilisation and poor quality control. In order to assist the industry to recognise and overcome these problems, the Industrial Training and Development Centre (ITDC) in conjunction with UNIDO, organised a training programme in "Foundry Planning, Organisation and Control".

Emphasis was given to "on the job" training and consultancy. Fifteen foundries were visited, including iron and steel, public and private sector, and mechanised and non-mechanised foundries. Improvements were proposed to operating, control, layout, and handling systems, and training was provided in the principles contributing to improved efficiency. In some cases planned training sessions were organised dealing with specific problems. In addition information was provided in response to individual technical queries.

A set of training notes, with illustrations and examples covering a wide range of relevant topics, was prepared for ITDC., and a formal training seminar was presented to about 25 participants.

The training and advice was well received, especially in the individual foundry visits, and the information will assist in achieving a number of important improvements.

It is recommended that further training of this kind should be provided, by further foundry visits and also by short seminars on specific aspects of the subject.

2. INTRODUCTION AND BACKGROUND

2.1. The Turkish foundry industry has shared in the general national economic improvement since 1980:

	Tons Iron Castings Produced	Tons Steel Castings Produced
1980	298 000	46 000
1981	310 000	45 000
1982	350 000	50 000

(Production estimates from "Producer Survey - Foundry Industry Sector in Turkey" 1982, Berlin Consult GmbH and TSKB - Turkish Manufacturing Industry Development Bank).

It is expected that activity will continue to increase as the world trade recession eases.

In particular many Turkish foundries, with Government incentives and encouragement, are seeking to increase the direct export of castings to Iran, western Europe, America, etc.

2.2. The conditions for increased activity are encouraging:

- Relatively low labour costs at present - one foundry calculates an average cost per man per year, including salary, social security and employment costs, of TL 850 000 (about U S \$ 4000).
- Many raw materials are available locally, despite some quality problems. Imported materials are becoming available and nett material costs are estimated as not more than 5 % - 10 % higher than in W. Europe.
- Most large and medium foundries employ technically qualified staff, including graduates. Although practical experience is often insufficient, technical ability is increasing.
- There is a general availability of excess capacity on serviceable conventional equipment (induction furnaces, pneumatic moulding machines, hot-box core blowers, etc.). There is also some more modern, automatic or highly mechanised, capacity; a number of new mechanised installations have recently been commissioned and others are planned.

- 2.3. Nevertheless there are serious limitations to be overcome before the potential can be realised. Some of these problems are metallurgical: overcoming raw material difficulties, and obtaining information on modern technology. The ITDC, with UNIDO cooperation, is offering increasing assistance in these fields.

However, as noted during previous ITDC programmes in 1980 and 1982, the standard of foundry management is often lower than the knowledge of technology. In many cases the lack of efficiency, lack of ability to control production and quality, and failure to apply shop-floor control to supplement technological theory, severely limit the effective capacity of the foundries.

- 2.4. In discussions with ITDC it was suggested that training in the techniques of foundry management and technological control would be useful (Ref DP/TUR/77/024/11-03/II 31.5. A).

- 2.5. Others have drawn similar conclusions:

2.5.1. The Berlinconsult/TSKB report (see 2.1 above) specifically recommends a programme of management training to improve efficiency, productivity and quality control.

2.5.2. The Türk Demir ve Çelik Döküm Sanayicileri Derneği (Turkish Iron and Steel Foundry Company Association, Büyükdere cad. 157/24, Zincirlikuyu, İstanbul) held a meeting in Ankara in April 1983, and called for an improvement in management efficiency in order to assist export potential.

- 2.6. ITDC accordingly prepared a job specification (Appendix I) for a two month training mission, intended to assist in showing the way towards the necessary improvements.

It was recognised that foundry management is closely linked to foundry technology, and that there would be a wide range of different problems and topics to cover. Particular importance was therefore given to a programme of foundry visits to discuss individual and particular problems.

A teaching seminar was to be presented, and lectures and discussions at foundries and at The Middle East Technical University were also arranged.

3. PROGRAMME

3.1. The programme was generally prepared by the ITDC metallurgical Department, and in particular by the official counterpart M.Ziya Tunç, who also accompanied the visits and acted as administrator, translator, and technical assistant, (until June 4th when he took up a training fellowship in U.K.)

The success of the programme must in considerable part be attributed to the counterparts' efforts.

3.2. PROGRAMME

The following programme was adopted:

April	12	1983	Travel to Vienna	
April	12 - 13		Briefing at UNIDO	Vienna
April	14		Travel to Ankara	
April	15		Arrange Mission Programme	Ankara
April	16- May 1		Prepare seminar notes and illustrations	Ankara
			Also Visits to:	
April	20		Türk Traktör Foundry	Ankara
April	25		MKEK Top ve Otomotiv Foundry	Kırıkkale
April	27		MKEK Machinery Foundry	Ankara
May	2-3		Visit Entil Foundry	Eskişehir
May	4		Visit Odöksen Foundry	Osmaneli
May	5		Visit Döktaş Foundry	Orhangazi
May	6		Visit Burçelik Foundry	Bursa
May	7		Travel to Izmir	
May	9		Visit Orsan Foundry	Izmir
May	10		Visit Pınar Döküm Foundry	Izmir
May	11		Visit Şafak Foundry	Izmir
May	12		Travel to Ankara	

May	13 - 14	Finalise Seminar preparations	Ankara
May	15	Travel to İstanbul	
May	16 - 27	Seminar Presentation	İstanbul
May	17	Also visits to:	
May	17	Dökumay Foundry	İstanbul
May	18	ADSAŞ	İstanbul
May	20	Dökyol Foundry	İstanbul
May	25	Boğaziçi Foundry	Gebze
May	28	Travel to Ankara	
May	30-31	Prepare for lectures · Commence Draft Report	Ankara
June	1-2	Lectures to Metallurgical Department, Middle East Technical University	Ankara
June	3	Complete Report. Visits to Ankara Technical School · Türk Traktör (2 nd visit)	Ankara
June	6	Special Seminar on improving Foundry plant utilisation, at Döktaş Foundry	Orhangazi
June	7	Visit T. Şeker Fabrikaları	Eskişehir
June	8	Discuss Report	Ankara
June	9	Travel to Vienna	
June	10	De-Briefing at UNIDO	Vienna
June	11	Travel to U.K.	

4. FINDINGS AND RESULTS

4.1. Foundry Visits

4.1.1. A Total of 15 foundries were visited

	Public Sector	Private Sector
C&st Iron	3	9
Steel	0	3

4.1.2. In all cases the visits were well received. Some foundries had prepared for the visit with written schedules and problems for discussion. In others it was necessary to take the initiative in order to provide a useful service.

The most productive visits were those when the management organised round-table discussion sessions with groups of staff.

4.1.3. The foundries covered a range of size, degrees of mechanisation, and of operating effectiveness.

None was without problems in the fields of organisation and efficiency, and potentially useful advice or training was given in all cases, concerning existing operations and in some cases concerning development project details.

4.1.4. Some of the managerial and technical staffs appeared not to be aware of their organisation and operation shortcomings.

Unnecessarily low standards of efficiency and of product quality were accepted. A number of foundries were preparing investment and expansion plans to create additional capacity, despite reserves of underutilised capacity within their existing facilities.

With one or two exceptions there was an optimistic market outlook, and a lack of concern at competition or over-capacity.

4.1.5. Frequently the foundries own perception of their problems concentrated on:

- Raw material Quality or Availability difficulties
- Short term order shortages
- Quality problems - Scrap and rejection
- Shortage of Capital for investment

These factors undoubtedly exist, but in the wider context of the management problems discussed above.

4.1.6. The shortcomings most frequently - but not universally - met were:

4.1.6.1. Poor Plant Utilisation

- Inadequate information systems
- Poor preventive maintenance
- Slow rectification of breakdowns
- Inconsistent supply of materials and poor production control
- Supporting and service facilities inadequate for mechanised units.

4.1.6.2. Low Productivity

- Overmanning
- Lack of attention to operating details.
- Poor supervision
- Lost time in waiting for material
- Inconvenient layout
- Insufficient handling equipment, or poor handling systems.

4.1.6.3. Poor Quality Control

- High Scrap, and lack of information on scrap.
- Acceptance of poor standards
- Lack of process control
- Inability to diagnose problems
- Unsuitable product specifications

(A few of the foundries on the other hand, had very good quality control).

4.1.6.4. High Stocks, especially of work in progress:

- Raw material supply organisation problems
- Bad material handling
- Poor production control
- Lack of appreciation of financial implications, despite high interest rates.

4.1.6.5. Uneven Technology

Generally moulding and melting departments were more effective and better equipped than core-making or finishing departments. This was often the cause of production bottlenecks and of limitations to product quality.

4.1.6.6. Management Ability

- Senior management remote from operations
- Shortage of experienced shop-floor supervision
- Young technical engineers with insufficient experience and little or no training in management topics.

4.1.7. In the course of a brief visit, it was often only possible to discuss some of the more important problems for each foundry. Whenever possible specific advice was given, concentrating on the most obvious shortcomings, and responding to questions from the foundries.

During many of the visits technical questions and problems were raised, outside the official Mission terms of reference. Whenever possible assistance was given in any related area.

By emphasising the practical aspects of the subjects discussed, and providing specific examples and suggestions, it is believed that the maximum advantage can be made of the services provided. Certainly the managements of the foundries expressed their satisfaction with the results of the visits.

4.2. Seminar

4.2.1. The job description terms of reference cover a wide field, and the problems of individual foundries differ. For these reasons the seminar programme provided a general introduction, although as many practical examples and items of specific advice as possible were included.

Reference notes were provided, and reproduced for the participants by I.T.D.C. (Appendix VI). The topics were divided as follows:

Process Selection

1. Introduction
2. Product and Market Factors
3. External Factors
4. Interactions
5. Melting
6. Pouring
7. Moulding Processes
8. Greensand moulding
9. Sand preparation
10. Chemically Bonded Sand
11. Other moulding processes
12. Core making
13. Finishing

Foundry Organisation

14. Mechanisation
15. Tooling
16. Layout and Planning
17. Management and Control
18. Quality Control
19. Maintenance Control
20. Production Control
21. Cost control
22. Data Processing

- 4.2.2. The notes were illustrated, and in addition a number of slides were used to illustrate examples. Use was made of an overhead projector for showing additional sample documents and illustrations.
- 4.2.3. The seminar was held in Istanbul, in the meeting room at the offices of M.E.S.S. (Turkish Metal Trades Employer's Association). The facilities, supplemented by ITDC projection equipment, were convenient and very satisfactory.
- 4.2.4. Based on experience of previous seminars, ITDC arranged for a two week programme, with seminar sessions in the mornings only (the proceedings did however extend into the afternoon on occasion). This allowed participants from foundries in the Istanbul district to attend without losing contact with their normal responsibilities. During the afternoons foundries were visited, and preparation made for the next seminar sessions.

However this procedure may have discouraged potential participants (especially those in senior positions) from outside Istanbul.

- 4.2.5. The detailed seminar programme followed the outline attached (Appendix IV) but variations to suit participant interests and priorities were incorporated.
- 4.2.6. The participants are listed in Appendix V
- | | |
|--------------------------------|--------------|
| Invitations sent out from ITDC | 130 (approx) |
| Acceptances | 41 |
| Attendance | 31 |
| Attending every session | 24. |
- 4.2.7. The background and experience of the participants was very uneven. For some it was essential to give elementary explanations of basic technical aspects, whilst others would have benefited from more detailed study of advanced control procedures and systems.
- The presentation therefore gave a general introduction, followed by discussion of particular examples, whenever possible guided by participant questions.
- 4.2.8. Participant response was inevitably uneven - some found it difficult to relate the procedures described to their own operations, while others did not require the general introductory material. The necessity to translate the lectures and discussion inevitably slows down presentation and makes visual aids essential to retain attention: (especially when a proportion of the audience does not need the interpretation).

Nevertheless a sufficiently varied seminar was presented to allow all participants to obtain ideas and concepts of use to them - if only to understand that there can be no complete functional separation between Foundry Technology and Industrial Engineering. The concept that technical staff were engaged in a management activity seemed strange, especially to participants from the larger foundries with formal and traditional management organisation.

4.3. Special Presentations

4.3.1 At the request of Professor Ekrem Selçuk, two lectures were given to the Metallurgical Department at the Middle East Technical University.

- Modern Developments in Moulding Technology
- Control Concepts in Foundries.

Senior undergraduates, graduate students, faculty members, and representatives from local foundries were invited.

The lectures were illustrated, and were followed by discussion periods.

4.3.2 The General Manager of Döktaş in Orhangazi requested that a special training session should be given for the staff of that foundry on the subject of controlling and improving plant utilisation, with special reference to the organisation of maintenance systems. A return visit was made to Döktaş for this purpose in the final days of the mission period.

5. GENERAL CONCLUSIONS

5.1. Because of the wide subject and different individual problems and standards, the value of the foundry visits and special training and consultancy is judged to have been greater than that of the formal seminar.

5.2. The seminar time-table may have restricted attendances, especially from outside Istanbul. The subjects might possibly have been better covered in separate shorter seminars, perhaps in regional centres.

5.3. The emphasis given to in-plant training was justified. In many cases specific problems were solved, and ideas and approaches to operations were suggested to increase the understanding of a number of individuals.

- 5.4. Because of their relative economic and geographical isolation many Turkish foundry engineers suffer from a lack of contact and association with advanced foundries in other countries. Part of the value of programmes such as this one is the opportunity provided for discussions and exchange of experience to supplement the reading of technical journals.
- 5.5. In discussion with Mr. G. Narasimhan (SIDFA in Ankara) it is understood that Management and Technical consultancy (other than architectural and technical planning services for new factories) is not common in Turkey. From the response to many of the visits made during this mission it would appear that such services might be welcomed, whether provided commercially or through an organisation such as I.T.D.C.

6. RECOMMENDATIONS

- 6.1. ITDC should continue to assist Turkish foundries to improve their operating efficiency, by combining technical training with relevant aspects of Industrial Engineering as related to foundry technology.
- 6.2. Such training should whenever possible be given at the level of individual foundries by "consultancy" visits accompanied by experts, and by special training programmes to suit individual requirements.
- 6.3. When more general training seminars are proposed, consideration should be given to subdividing large general subjects into relatively short special topic seminars. A visiting expert could present several such seminars - on the same or on several different topics - during one visit to Turkey, probably in different regional centres.
- 6.4. The subjects included in this mission programme should be repeated in the form of more detailed training on certain of the more important topics.

For example:

- "Alternative coremaking processes"
- "Design, organisation and operation of sand preparation and moulding plants"
- "Internal scrap (reject) control and reduction systems including defect identification and prevention methods".
- "Foundry Maintenance Systems"
- "Foundry Costing Systems"
- "Foundry Material Handling Systems and Layout".

Some of these subjects, together with other general technical problems, are already included in ITDC advance planning.

- 6.5. During programmes of limited duration, better use could be made of experts time if seminar lecture notes were prepared some time before travelling to Turkey. In this way there would be time to translate the notes into Turkish before the seminar, which would improve the effectiveness of the training and also allow a larger proportion of the time to be spent on individual plant visits.

Such a procedure would apply especially to experts who already have experience of Turkish conditions.

APPENDIX I:

JOB DESCRIPTION

DP/TUR/77-024/11-03/HHH

POST TITLE : Expert in the Foundry Planning, Organization and Technical Control.

DURATION : 8 Weeks

DATE REQUIRED : April-May 1983

DUTY STATION : ITDC in Ankara, Istanbul and with possible travel within the country

PURPOSE OF PROJECT: The purpose will be to upgrade the skills and capabilities of management professionals and senior engineers employed in foundries and to train them in the subject of foundry management, technical control and organization.

DUTIES : The expert, together with his counterparts from ITDC will conduct a training programme to improve the managing and technical controlling capabilities of engineers employed in foundries.

More specifically, the expert will be expected to:

1. Review the prevailing foundry planning, organization and technical control aspects and examine the related problems; This study will be based on the plant visits within the country. Meanwhile some trouble-shooting sessions will be conducted.

2. Prepare a training programme to cover general aspects of foundry planning, organization and technical control, namely:

A. Foundry processes

- a) Factors to be considered in process selection.

- b) Alternative Processes: Melting, Pouring, Sand Preparation, Moulding, Coremaking, Finishing

- c) Application of Mechanization: Relationship of system to production requirements, Manual, semi-mechanized, mechanized and automated systems in foundries.

Control of mechanized and automatic systems in foundry environments.
Implications of production methods on tooling requirements and costs.

B. Foundry Organization and planning

- a) Principles of foundry layout and planning
- b) Material Handling and Work Flow
- c) Material storage requirements
- d) Foundry Building requirements
- e) Services required
- f) Access to plant for operators and maintenance
- g) Mechanical and Electrical Control
- h) Laboratory and technical control

C) Foundry Management and Control

- a) Importance of the following factors:
Productivity, Plant Utilisation, Tooling Utilisation, Yield, Scrap, Material Wastage Control, Stock control
- b) Management and Supervision Organization
- c) Technical control
- d) Cost and Financial Control
- e) Production Control
- f) Maintenance Control
- g) Safety and Environmental Problems

3. The expert should supply back up materials for the mission in the form of
 - articles and lecture notes
 - films slides and books which would be purchased by ITDC if the expert make these available
4. Supply the ITDC with necessary training aids; such as books, written articles, films, lecture notes, diagrams etc.
5. Document the training materials in booklet form.

The expert will also be expected to prepare a final report, sending out the findings of his mission and his recommendations to the Government on further action which might be taken.

QUALIFICATION

- : Expert, preferably a foundry engineer should have extensive experience on the subject and also training experience in this field.

LANGUAGE : English.

BACKGROUND
INFORMATION

: It has been observed that in many Turkish foundries the Planning, Organisation, and Technical control is not satisfactory. The connections between technical, economic, and organisation aspects are often misunderstood.

Foundries are often managed by Engineers without management training, and with a technical training that does not cover all the areas which are necessary to ensure correct foundry planning and efficient operation.

It has been suggested that an ITDC training course could help to meet this training need. This programme is organised after the requests from public and many private sector foundries and it is expected that about 30 Engineers will participate.

The Industrial Training and Development Centre (ITDC) is a joint project of Turkish Government and United Nations which provides training and consultancy services to the industrial sector. Its objective is to upgrade the skills and capabilities of professionals employed in industry there by contributing to the national economy.

APPENDIX II

OFFICIAL CONTACTS

UNIDO Vienna

Mr. J. Dee	Substantive Officer
Ms. Taylor	Personnel Recruitment
Ms. M. Diesting	Personnel Administration
Ms. K. Sochatzy	Personnel Administration
Ms. I. Mennel	Briefing Unit.

UNIDO/UNDP Ankara

Mr. G. Narasimhan	SIDFA
Mr. H. Rosnitchek	JPO

ITDC Ankara

Mr. Yilmaz Ayman	Director + Project Coordinator
Mr. Teoman Tümer	Assistant Technical Director
Mr. Murat Bursa	Assistant Project Coordinator
Mr. Türker Aykal	Chief of Metallurgical Depart
Mr. M. Ziya Tunç	Programme Counterpart
Mr. Ali Han	Assistant Programme Counterpart
Mr. Salih Oktay	Metallurgical Department
Mr. Celalettin Karabayer	" "

APPENDIX III FOUNDRY VISITS

III. 1 Türk Traktör ve Ziraat Makinaları A.Ş.,
Güvercin Yolu 96 Gazi, Ankara 20.4.1983, 3 .6.1983

Fikret Erdaş - Foundry Manager
Mustafa Kaya - Metallurgical Engineer
Private Sector - (Fiat Association)
Semi mechanised foundry for grey iron tractor castings.
7000 tons/yr.
Demand is high, including work for tractor exports to Iran.
Quality control was good - rejects below 4 %

Advice given on

1. Organisation and operation of electric melting plant commissioned 1983
2. Foundry layout alterations and future development plans
3. Sand Cooling
4. Core production - mechanisation and quality poor relative to moulding.

III. 2 MKEK Top ve Otomotiv Döküm , Kırıkkale 25.4.1983

Yılmaz Altan - Works Director
Mustafa Özbayramoğlu - Foundry Manager
Basri Akcasoy - Metallurgical Engineer
Mustafa Özfatura - " "
İhsan Gürsoy - " "

Public sector. Producing 4000 tons/yr of miscellaneous grey and SG iron. Major problem is scrap and rejections (over 20 %). Cost control rudimentary - foundry judged by output and service alone.

Advice given on

1. Organisation of scrap control procedures
2. Sand control
3. Metal pouring temperature
4. Defects due to use of sand slinger for heavy castings
5. Design of SG iron runner systems
6. Responsibility for method design and specification

III. 3 MKEK Makina Sanayii Müess. Ankara 27.4.1983

Sinan Kalyonca - Works Manager
Yalçın Yılmaz - Foundry Manager

Public sector. Attached to MKEK engineering (off-highway vehicles) and also supplies Kırıkkale works. Produces 4000-5000 tons/year of grey iron and a little non-ferrous metal.

Effectively no technical control, and layout, plant utilisation and productivity not up-to-date. However product quality was claimed to be high.

- Advice given on
1. Priority for basic technical controls and organisation.
 2. Adoption of new core-making processes
 3. Improved utilisation/moulding machines by better lay-out and standardisation of pattern plates
 4. Need to modernise melting practice
 5. Long term policy considerations: can this foundry justify its existence in the same organisation as the Kırıkkale foundry?

III.4. ENTIL. İKİ EYLÜL CD. 75, ESKİŞEHİR 2-3.5.1983

- Salih Vatansever - Foundry Manager
- Deputy General Manager
- Works Engineer.

Private sector. Very busy - producing at 3 times 1982 rate. Castings for tractor and similar industries, also large die blocks and ingot moulds.

- Advice given on:
1. System of work handling in coreshop.
 2. Better operation of moulding machines
 3. Alterations to shake out system
 4. Attention to shot blast machine performance
 5. Improved sand control procedures
 6. Need to improve casting quality to reduce cleaning costs.
 7. Priorities for mechanisation to improve productivity.

III.5. ÖDÖKSAN A.Ş., OSMANELİ-BİLECİK 4-5-1983

- Osman Demiralay - Work Manager
Nejat Elçirpan - Technical Director

Private Sector. Special purpose foundry for baths and radiators. Current marketing problems due to overcapacity (cast radiators). Attempting to diversify into engineering castings.

This company was actively seeking technical advice, and arranged a useful "question and answer" session with foremen and supervisors.

Advice given on : Improved hot box coremaking procedures
Better (ie less) core storage and handling
Runner Systems for engineering castings
Improved moulding techniques
Use of Cheaper raw materials (scrap).
Organisation of Quality Control Department
Casting defects due to sand problems.

III.6. DÖKTAŞ ORGANİZE SANAYİ BÖLGESİ, ORHANGAZI 5.5.1983, 6.6.1983

Mete Nakiboğlu - General Manager
Tayali Günay - Deputy works manager (Technical Manager)
Hamdi Doğru - Works Manager
Levent Hatırlı - Project Engineer

Private Sector . A well equipped large modern automobile castings foundry. Technology well in advance of other Turkish foundries visited. Produce 15-20 000 tons per year, and are planning an expansion programme. Has close technical and commercial links with Fiat in Italy. Export to Germany, Iran, etc.

Advice Given on : 1. Plant utilisation - a special seminar on preventive maintenance in foundries was requested for a further visit.
2. Core storage, core making (corebox utilisation)
3. Grinding related to gating technology.

III.7. BURÇELİK Çelik Döküm Sanayi A.Ş., Atatürk Cd., İpekçi Han, Bursa
6.5.1983

Önder Çelikçi - Work Manager
Fatur Özer - Technical and Development Manager

A steel foundry producing about 3000 tons/year. The company also produces a range of foundry machinery for sale. Metallurgical control good (licence from Esco in USA) but production organisation in need of improvement.

Advice given on: 1. Layout and work flow
2. Improved performance from moulding machines
3. Use of refined steel scrap as raw material for S.G. iron.
4. Heat Treatment furnace temperature uniformity
5. Specifications of silicate for CO₂ process.

III.8. ORSAN Döküm Yedek Parça Sanayi Ticaret A.Ş.

Yeşillik Cad. 256, İzmir - 9.5.1983

Mehmet Erşivri - Foundry Manager

Produce cylinder liners for engines and compressors by centrifugal casting. (also a small amount of sand cast engineering work). Metallurgical control and work flow organisation good. Quality high. Export and domestic sales for O.E. and spares.

Advice given on : Methods of improving low yield (improvements to mould materials, including production of compacted graphite iron moulds).

Possible developments of shell moulding for air cooled cylinder production.

Handling improvements to aid productivity.
Process control improvements to supplement inspection
Inoculation materials.

III.9. PINAR DÖKÜM Sanayi Ticaret A.Ş.

Kemalpaşa Asfaltı 68, Pınarbaşı, İZMİR 10.5.1983

Ersan Karagözlü - Technical Manager

Yalın Çay - Development Engineer

Nadir Çoban - Metallurgist

Private Sector, Recently (1980) established steel foundry specialising in wheel hubs and excavator parts. Produce 1500 tons (1983). Employ 150. Melting quality control good, but problems with moulding, coremaking and processing.

Advice given on : Details of proposed new greensand preparation and moulding system - layout, handling, sand cooling, sand spillage etc. to improve productivity and sand quality.

Core blowing

Improvement of metal: Sand ratio on furane moulding.

Reduction of fettling to aid work flow-
exothermic feeders, chills, breaker cores, etc.

Analysis and elimination of persistent defects.
Use of partial atmosphere control in heat treatment.
Production of metal working rolls.

III.10. ŞAFAK Döküm, Camdibi 301. Sk. No 35, İzmir 11.5.1983

Nuri Kahraman - Director
Mesut Gören - Metallurgist
Önder Aydın - Metallurgist

Private Sector. Grey and S.G. iron production, 3-4 000 tons/year. Mechanised moulding line (good layout), traditional hand moulding section, and some centrifugal cylinder liners. Specialise in cylinder heads, manifolds etc. Electric melting. Some hot box, but coremaking mostly manual. Mechanised facility not utilised fully - management appeared more interested in technical details than in efficient working. Employ 180 people.

Advice given on : Improved methods of SG iron production
Basic approach to plant utilisation control.
Precautions to avoid defects on water-cooled cylinder head castings.
Means to improve productivity of hand moulding area
Need to control sand preparation

III.11. DÖKÜMAY Döküm Pres Emaye Ltd. Şti. Esk., Londra Asfaltı Bakırköy, İSTANBUL 17.5.1983

Mehdi Aydın - General Manager
Ural Aydın - Assistant Manager.

Private Sector - family business. Production of cast iron baths and similar enamelled products - about 80 baths per day. Employ 150 people.

Semi - mechanised foundry (German equipment about 20 years old), with cupola melting. Little technical control, rely on experience of general manager.

Advice Given on : Possible causes of a cracking problem
Necessity for improved metallurgical control.
Methods of improving surface finish to reduce fettling labour costs.
Improved pouring systems.
Future developments, and modern bath foundry technology - including V process, and other developments.
Cupola pollution control equipment.

III.12. ADSAŞ Setüstü Palandaz 9/7, Kabataş İstanbul 18.5.1983

Murat Sezer-Technical Manager

Private sector. The company intends to build a new foundry for automobile and tractor castings.

Advice given on : selection of melting, moulding, and caremaking processes.

III.13. Dökyol Döküm Sanayi A.Ş. Bahariye Cd. Şehnaz Sk. 5/5, Eyüp, İST.

20.5.1983

Aytaç Coşar - General Manager
Levent Nilüfer- Technical Manager
Ata Sezgin - Deputy Technical Manager

Private Sector. Production of S.G. iron and alloy iron castings for the automobile and commercial vehicle markets. Output 70 tons/month. 30 workers. Well managed small foundry with good technical control and quality standards. Planning expansion in 1984-1985. Also associated with Atli Zincir İgne ve Makina Sanayi, producing foundry and other machinery.

Advice given on : SG iron treatment (Cover 'sandwich' process) details.

Moulding machine production
Persistent pinhole type defect
Electric furnace specifications

III.14. Boğaziçi Döküm ve Makina Sanayi A.Ş.

P.K. 54 Gebze, KOCAELİ 25.5.1983

Murat Bilgen - General Manager
Yılmaz Yeğen - Works Manager

A small steel foundry, established 1978. Production about 1200 tons/yr, 120 employees, 3 shifts. Carbon Steel, Hadfield steel, Alloy steel castings. Machine shop and heat treatment shop.

Foundry non-mechanised. Layout of cleaning and finishing areas good.

Visit paid together with Dr. Savaş İzgür, from İstanbul Segmen Sanayii who was a 'local expert' presenting a seminar for ITDC on gating and feeding of steel castings. Discussions therefore included comparisons between methods in this topic.

Advice given on: Layout of foundry and sand plant when mechanisation plans are adopted.

Core making practice, especially prevention of defects on impeller castings.

Sand specifications for coremaking and moulding processes.

Use of exothermic materials to improve casting yield.

III.15. Türkiye Şeker Fabrikaları A.Ş. Eskişehir - 7.6.1983

Hüseyin Özdal - Works Manager
Kerim Doğdaş - Foundry Manager.

Public Sector: An iron foundry, with cupolas and induction furnaces, producing the requirements for new sugar processing machinery and spare parts for sugar mills.

Advice given included : Production of S.G. iron
Metal handling.

III.16. Aktaş Endüstri Lisesi, Ankara

In addition, at the invitation of a seminar participant, a visit was paid to the teaching foundry of one Ankara technical school, for general interest and discussion of points of relevance in the seminar mission to the vocational training programme.

APPENDIX IV

FOUNDRY PLANNING, ORGANISATION AND TECHNICAL CONTROL

PROGRAM OUTLINE

This programme will be conducted in ISTANBUL between
May 16-27, 1983 by J.D. HARPER

May 16th, 1983

- 10.00 - 11.00 . Opening and Orientation.
11.00 - 13.00 . Factors to be considered in Process Selection:
- . Introduction
 - . Market Factors
 - . External Factors
 - . Interrelations

May 17th, 1983

- 9.00 - 13.00 . Selection of melting and Pouring Processes:
- . Melting Processes
 - . Pouring Processes

May 18th, 1983

- 9.00 - 13.00 . Selection of Moulding Processes:
- . General Considerations
 - . Green Sand
 - . Chemically Bonded Sand
 - . Other Processes

May 20th, 1983

- 9.00 - 13.00 . Selection of Coremaking Processes and/of finishing processes:
- . Core sand binders
 - . Core making
 - . Casting cleaning
 - . Casting grinding

May 23rd, 1983

- 9.00 - 13.00 . Mechanisation and Tooling:
- . Principles of Mechanisation
 - . Problems of Control
 - . Patterns and Coreboxes

May 24th, 1983

- 9.00 - 13.00
- Organisation and Management:
 - Principles of Control
 - Management Organisation
 - Manpower control and work study

May 25th, 1983

- 9.00 - 13.00
- Quality Control:
 - Process Control
 - Product Inspection
 - Standards

May 26th, 1983

- 9.00 - 13.00
- Production Control and Maintenance:
 - Work Planning
 - Influence on markets and economics
 - Data Processing in Foundries

May 27th, 1983

- 9.00 - 13.00
- Cost Control:
 - Budgetary Control Systems
 - Cost Estimating
 - Project Evaluation
 - Seminar Review

APPENDIX V

LIST OF PARTICIPANTS

<u>Name</u>	<u>Profession</u>	<u>Organization</u>	<u>Exp. (Year)</u>
1. Mahir KAMACI	Met. Eng.	TÜMOSAN-Karanfil Sk. 20 ANK.	6
2 Ata SEZGİN	Met. Eng.	DÖKYOL Döküm San. A.Ş. Eyüp İSTANBUL	5
3 Atilla KÖLELIOĞLU	Mech. Eng.	1012 Ana Tm. Fb. BALIKESİR	8
4 Hakkı GÜROL	Met. Eng.	BUNSA DÖKÜM Bünyan-KAYSERİ	10.5
5 Ahmet BAL	Chem. Eng.	D.Ç. KARABÜK	10
6 Muharrem DORUK	Mech. Eng.	D.Ç. KARABÜK	10
7 Abir SU	Mech. Eng.	SIDEMAS - SİVAS	15
8 Ragıp GÜRKAN	Ind. Eng.	K.K.Tek.D.Bşk. K.Esat-ANKARA	10 months
9 Yaşar ÇALIŞ	Mech. Eng.	Alarko Rami/İSTANBUL	5
10 Mehmet ARSLAN	Met. Eng.	MKEK Pirinç Fb. - KIRIKKALE	3
11 Ali HAN	Met. Eng.	SEGEM	1
12 Mürsel GÜMÜŞLÜ	Met. Eng.	Haliç Tersanesi Fatih-İST.	12
13 Ünal AYDINER	Mech. Eng.	Dökümay A.Ş. Bahçelievler-İST.	4
14 Kenan YAKUT	Techn. Ins.	Aktaş Em.L. Md. - ANKARA	15
15 Kemal HARMANŞAH	Eng.	ELMS Mües. Döküm Fb.-ESKİŞEHİR	13
16 Barlas ERYÜREK	Dr. Eng.	İ.T.Ü. Mak.Fak.Konstrük ve İmalat Anabilim dalı İSTANBUL	11
17 Hüseyin ÖZDAL	Mech. Eng.	T.Ş.F.A.Ş. ESKİŞEHİR Makina Fb.	7
18 Kerim DOĞDAŞ	Mech. Eng.	T.Ş.F. A.Ş. ESKİŞEHİR	23
19 Şenol TAŞKIN	Ind. Eng.	İ.T.Ü. - Gümüşsuyu-İSTANBUL	-
20 Muzaffer ELÇİ	" "	" " "	-
21 Mehmet BALLYAŞ	" "	" " "	-
22 AKIN TOLUNAY	Met. Eng.	SINGER SAN. A.Ş. Cevizli Tugay Yolu 92-İST.	3
23 Mehmet DERİNDERE	Mech. Eng.	Kızılırmak Döküm San. ve Tic. A.Ş.	20
24 H.Nuri ÖZBİLEN	Met. Eng.	TAKSAN A.Ş. - KAYSERİ	11

