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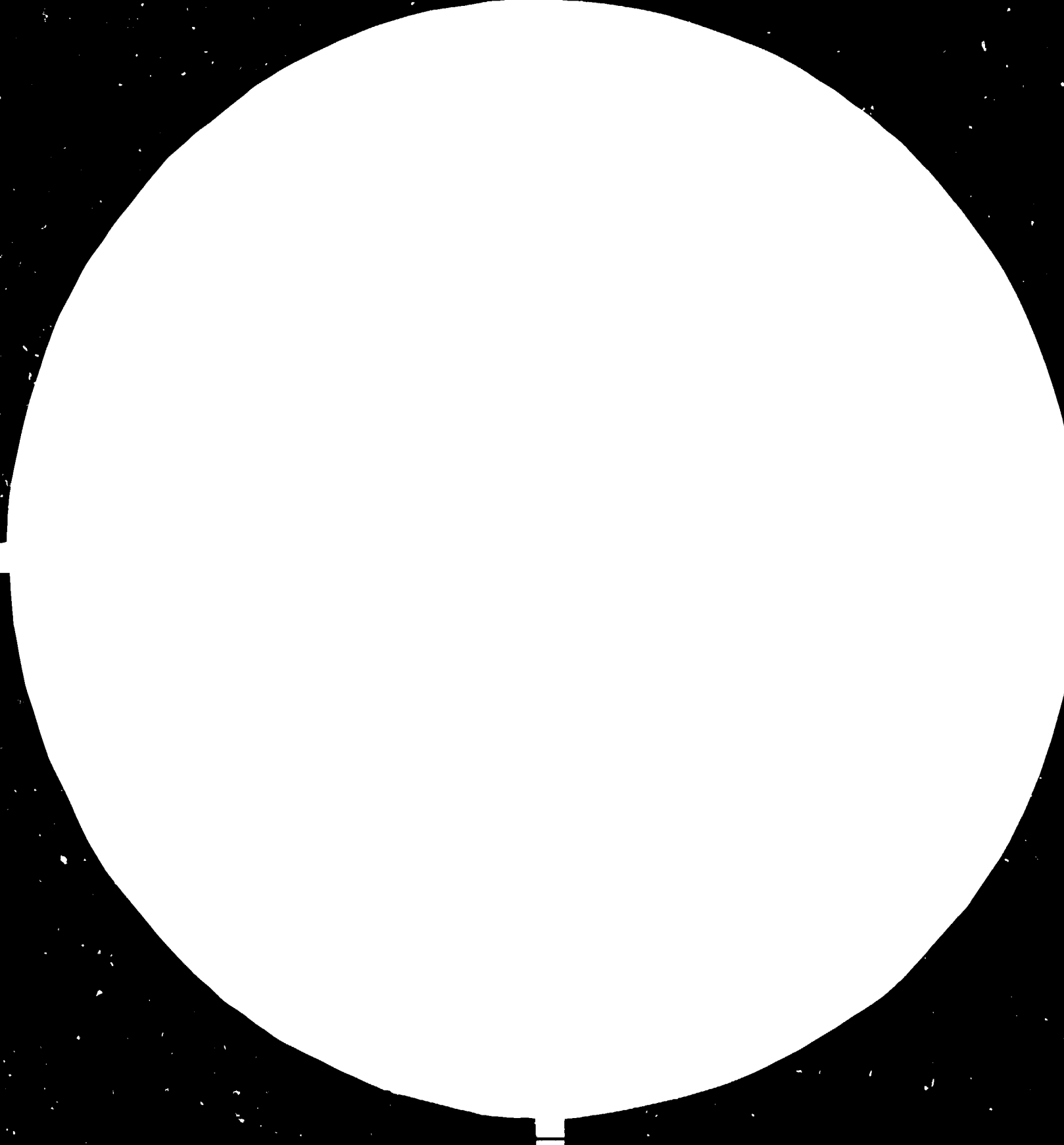
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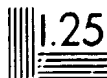
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1984

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TURKEY

TECHNIQUES AND IMPLEMENTATION OF DIE MAKING AND DEEP DRAWING.

DF/TUR/77/024/11-EE

MISSION REPORT PREPARED BY

PETER A. STAHR

Expert of the United Nations Industrial Development Organization acting as executing agency for the United Nations Development Programme.

This report has not been cleared with the United Nations Industrial Development Organization which does not therefore necessarily share the views expressed.

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Acknowledgments

The writer wishes to thank all the ITDC staff members for their kind assistance and cooperation, which was extended towards him, while working in Turkey for the SEGEM project.

I would like to thank especially my two counterparts Mr. Mustafa N. Yazar and Mr. Serdar Gülen for their friendliness and their special efforts made, to make my work and stay in Turkey easier and more successful both as interpreters and in technical matters.

Peter A. Stahr

1) Summary

Since 1978 SEGEM is involved in various projects to upgrade the skills and capabilities of national professionals employed in industry.

In July 1980 a seminar covering the basic theory of plasticity, the theory of deep drawing experimental techniques, deep-drawability of different materials and lubrication techniques in deep drawing was given by 4 Turkish Experts.

In 1981 a continuation or second phase to this seminar was planned for a 2 month period, covering the theoretical and mainly the practical approach to Problems encountered in deep drawing.

In Jan. 1981 the time allocated was reduced to one Month.

At the start of the stay of expert a programme was laid out the transfer practical know how to industry. The range of expertise was extended to cover deepdrawing, forming, Moulds, Dies and Jigs and Fixtures and Tooling of required.

The most likely approach was to contact industries in more concentrated Regions, assist in short term Trouble shooting and invite Engineers and Tool design staff to 2 day seminar, to be held in Ankara to the end of the assignment of the expert.

With the help from two counter-parts Mr. Mustafa Nuri Yazar (Mech.Eng.M.Sc.) and Mr.Serdar Gülen (Mech.Eng.M.Sc.) I was able to visit 28 different companies in the time of my stay. From this 28 companies 17 seminar participants to the seminar held in Ankara on April 5-6.1982 (List attached).

Our visits to the companies using drawing techniques were divided in to three Regions, Ankara, Bursa and Istanbul.

Our approach was mostly directly to the top Management of the companies which was achieved with the help of my counterparts personal contacts,

After a short introduction we offered our services to solve problems related to tooling and deep-drawing .

In most cases we were given a tour of the plant and problems were recognized by the Team or pointed out by the Engineering and design staff of the Company and on the spot trouble shooting was performed.

The response of the companies were very positive and the turn out from 17 participants from as far as Istanbul on less than 1 weeks notice could be a indication.

The reoccurring problems in industry are connected to Materials and Lubricants to be used in deep drawing operations.

The team made a great effort to try to get some local made deep draw lubricants available to the companies but was only successful at day of the seminar to get some valuable information to the participants.

The type of trouble shooting required had ranged from the simplest bending operation to Hydrolics, forming drawing, deep drawing and medium size companies had more problems as compared to the larger companies with fewer but more "sophisticated" problems.

The smaller companies lacking the Engineering staff and the imported technology would probably gain more from the approach taken by the team than the large companies.

The writer is of the opinion that if more industry could be contacted in other Regions and this process could be repeated yearly a great amount of assistance and know how could be transferred and the counterparts would gain a great amount of experience and exposure in relative short time.

The seminar which was held for 2 days covered the mostly practical approach to tool and die making and more detailed into the forming and deep drawing.

A great part of the time in the seminar was spend on discussions on problems brought in by the participants.

Considering the time invested the writer believes that the approach taken to service industry is effective and in coordinations with the programme promoted by ITDC .

The writer is in the believe that similar visits and seminars into other industry concentrated Regions or a support to industry.

Mission Background and Objectives.

In 1978 SEGEM as Part of the ITDC was created to assist in the training and Development to upgrade the skills and capabilities of national professionals employed in industry. The ITDC programme involves a combinations of consulting services, to diagnose specific problems and to recoment solutions and training services to enable trainee-professionals to implement the recommended solutions.

In july of 1980 a seminar was given under Segem's supervision by Doç. Dr. Bilgin Kaftanoğlu, Yard. Prof. Erol Kılkaş, Yard. Prof. Macit Karabay and Yrd. Prof. Abdülkadir Erden. 4 Turkish Experts on the technology, design and manufacturing of deep drawing dies.

A group of 34 Engineers and toolmakers had attended, coming from public and private sector.

The seminar had covered the basic theory of plasticity, the theory of deep drawing, deep drawing of different materials, experimental techniques and lubrication techniques.

The design of Dies by conventional and unconvetional methodes were covered as well.

In January of 1981 as continuation of the programme a expert was requested by the ITDC to conduct a 2 mounth training.



Activities:

Visits Performed in connection with the assistance requested by Segem; and contacts made to Invite Participants for the seminar in Ankara.

Friday 12<sup>th</sup> -3-82 Reported to UNIDO in Ankara and Segem (the project) I am assigned to.

Monday 15<sup>th</sup> -3-82 Planning and Scheduling at Segem for the next 3 weeks program plus seminar

Tuesday 16<sup>th</sup> -3-82 Visit to M.K.E.K. - Manufactures of Gas Mask, Electric-Meters and Switches, after touring the Plant a 1 hour Question and Answer period was held for the Engineering and tool design staff. Present with us where Mr. Butters from UNIDO, Mr. Mustafa Nuri Yazar and Mr. Erdoğan Taşkın.

A Meeting with the MKEK Ankara Plant manager and 2 Managers from other MKEK plants was held in which problems with progressive Dies and Hydro-forming was discussed.

Wednesday 17<sup>th</sup> 3-82 Visits to Kutlutaş Makina Sanayi A.Ş. Fabricator of Heavy-Steel-Constructions and Cranes. We toured the Plant with the Plant Manager Mr. Vedat Aral and Mr. Yalçın Soner the Production Engineer. Mainly two problems were discussed the bending of U. Channels for the Cranes main bearing and the possibility of bending U-Channels on the Break-press. I was accompanied by Mr. Butters; Mr. Mustafa N. Yazar and Mr. Erdoğan Taşkın

AYGERSAN A.Ş.: Toured the plant with Mr. Ertun Tezer, the Production Manager which pointed out Problem areas in the manufacturing of Headlights such as spot-welding and rolling operations. After touring the Plant a brain storm meeting was held with the design staff over a reducing tool presently being worked on, suggestions were also given to solve the spot welding problems.

Monday 22 to Thursday 25 Trip to Bursa I was accompanied by Mr. Mustafa Nuri Yazar + Mr. Serdar Gülen.

Thursday 18<sup>th</sup> -3-82 Preparing material for the trip to Bursa and for seminar.

Friday 19<sup>th</sup> -3-82 Completing preparation of Material needed for trip to Bursa with Handouts on partial seminar notes for Company's to be visited.

Monday 22<sup>nd</sup> March 1982 On the way to Bursa. we visited in Eskişehir the Arçelik A.Ş. Manufacture of Compressors used in Household-Refrigerators. By visiting the Press shop area we were made aware of problems related to the deep draw tooling. Some of the solutions were cleaning of the Material before lubricating and inserts in to the existing tooling to make up for the excessive wear and a simple tool for sizing operation to reduce the oversize radius now produced to a smaller radius allowing a flat and plane surface; To eliminate the grinding operation now used and reduce the scrap rate now exist in the welding operation. The second visit on the way to Bursa was with Türk-Demir-Döküm A.Ş. Manufacturer of Gas Heaters and Radiator panels from pressed steel-Sheats. Bozhöyük.

The problem in this Plant brought to our attention was a low production rate of their piercing Punches and Dies as compared to the Imported units. We were able to explain to them the need for High speed Steels necessary for such operation, due to the High Chrome and Vanadium contents of the Gas burner units on which the piercing operation was used. We also discussed the need for special Heat treatment for such High-Speed-Steels (HSS) and how to manufacture the 055 mm dia Hole in the hardened material accurately by the use of the Spark Erosion Machine.

Tuesday 23<sup>rd</sup> March 1982 We visited the Industrial Estate in Bursa and consulted with the Manager over planned plant visits. Our first visit was with the Coşkunöz Co. where Mr. Orhan Özozan the General Director arranged to tour his factory. We were accompanied by the designer's and shop formen of the Draw-tooling section of the factory. Problems brought to our attention were mostly with the deep draw operation of oilpans and some wrinkle problems with the Tractor Hood. We discussed the application of different Lubricants, Materials and the application and size of Drawing beads in his Tooling. On our second visit for the Day we were assisted by a Engineer from COŞKUNÖZ who accompanied us to Bayraktarlar A.Ş. manufacturer of the CIBIE-Car accessory light systems. We were shown through the Plant and we were able to help the tool room supervisor with a existing problem in the Tooling of his Drawing. Operations of 2 types of lamps using a parabolic shape.

Our third visit was to the SKT-Yedek-Farça ve Makina Sanayi A.Ş. where we met, Mr. Metin Leblebici the production Manager. We were shown different parts and asked for advice on some drawing and sizing operation of Oil-Seals, and ask if a drawn part now produced by the company could be improved from its rather low standard. We were not able to visit the Plant-Since the company had stopped producing of this time of the Day.

Wednesday 24<sup>th</sup> March 1982 We visited Transtürk-Fren-Debriyaj. and were shown through the Plant by Mr. Ahmet Kızılcay Plant Engineer and Miss Keral Arabacı the Head of the Laboratory. We discussed mainly the types of lubrication needed, Materials, cleanliness and an unloading operation, on a Press operation on a Break-lever.

Our second visit was to ARI Kalip Sanayi A.Ş. a manufacturer of Tool Dies and Moulds. We were asked to suggest the type of drawing operation and number of operation required to produce a part for a customer's Quotation. We also were asked to assist in a stripping problem on an existing Tool made by the Company with less than sufficient spring pressure. We suggested the use of Nitrogen Cylinder's and left some Literature concerning the subject with the Company.

Thursday 25<sup>th</sup> - March 1982 We visited Tofaş Türk Otomobil - A.Ş. where the Production Director Mr. H. Savaş ARIKAN toured the Plant with us and we consulted on his new venture into Larger size Tooling made in his Plant.

Our second visit was OYAK RENAULT. S.A. where Mr. Ergüder Güvener toured the Plant with us. Since he mostly imported his Tooling and some are produced by ÇOŞKUNÖZ we talked about tooling in general and lubricants.

Friday 26<sup>th</sup> March 1982

Preparing Material for Trip to İstanbul and contact UNIDO office in Ankara.

Sunday 28<sup>th</sup> March 1982 On the trip to İstanbul. I was accompanied by Mr. Mustafa Nuri Yazar from Segem.

Monday 29<sup>th</sup> March 1982 Our first visit was to the Profilo-Holdings-Feg Firm. A leading refrigerator manufacturer who wanted us to assist for 3 to 4 days in his Factory in Çerkezköy about 100 km west of İstanbul, since we were short of time we could not oblige to his request at this time. Our second visit was to Türk-Demir-Döküm Fabricators. As (4 plants) where we were touring the plant with Mr. Ferudun Hogi the Industrial Relation director. The main problem we worked on was a Hydraulic-System Problem which they themselves could not solve, we assisted by suggesting possible areas where the problem could originate and how to check for it. We also met shortly Mr. Necati Arıkan the General Director.

Our third visit was to the Sermak factory where the owner Mr. Mehmet Sertel showed us his Press operation and asked for some advice on a part he is now producing but finds the operation's too time consuming. We suggested shaving and Broaching operation in stead of Milling which is now used and he asked us to draw up some sketches for the next day, which we did and delivered the following day on a return visit.

Our fourth visit was to ERKA manufacturer of Break-Linings and Clutches where Mr. M. Yalçın Tiftik the general Manager suggested that we visited ITO a lock manufacturer of the same holding.

Our fifth visit was to UZEL Makina Sanayii A.Ş. to arrange a meeting for the next day.

Tuesday 30, March 1982 Our first visit<sup>for the day</sup> was a return to UZEL where Mr. Murat Gökdeniz the Plants - director organized a tour with his Tool designer through the Factory. We looked in to the design of 3 large tools used to produce tractor Parts and discussed the use of Nitrogen Cylinders in stead of the Springs he is using now. We left some literature with him since he showed great interest in the application.

Our next visit was a return visit to deliver the sketches for the shaving and Broaching tool's requested by Mr. Mehmet Sertel from Sermak. Our third visit was to Chromolüks a manufacturer and Exporter of Stainless-Steel-Kitchen sinks. Mr. Yücel Karman the General Manager toured with us the Plant and we discussed problems he has with a double sink and possible solutions. We also talked about Materials and Lubricants in general.

Wednesday 31, March 1982 Our first visit was to the Kalip İmalat Co. manufacturer of Break systems; the General Director Mr. Ahmet Arkan asked about different methods on such operations as spinning and Ironing used to be able to produce new shapes and closer tolerances. We also worked on the problems of scrap in his forming operation due to the orientation of the part to the Roll direction of the material he uses.

Our next visit was with Mr. Orhan Mesutoğlu director of the Karmaksan A.Ş. Company a producer of small propane Gas tanks in Turkey.

We discussed the different production and deep draw methods to unable him to reduce his operation's and possible cost for tooling.

He also was interested in the manufacturing of small brass Bellows to be used in The and the type of Tooling which would be required. Our third visit was to Elba a large holding group where we met the Managing Director of the Group Mr. Yüksel BAŞDEMİR who has shown us his large tool shop in which they produce moulds of medium size and complex shapes if required. It's customers are Renault + Tofaş which use the aluminium Die casted parts in their cars. He showed us shops, his company is supplying to retired worker which produce a large amount of Parts in a reasonable short time which are required for the manufacturing of Moulds.

Our fourth visit was to OTO-YOL Sanayi A.Ş. where the General Manager Mr. İlkin Erkutan introduced us the design staff, which in turn ask us about our opinion on their design drawings and a specific problem they have with large ~~Truck~~ ~~Bumper~~ section Tool. We discussed the Tool in the shop and gave our advise on how the tool could be repaired rather than a new tool to be made We also pointed out the cost of additional Tooling required if the design would be used as they had planned.

Thursday 1<sup>st</sup> April 1982 Visited OTOSAN Otomobil Sanayii A.Ş.  
A producer of truck Bods and Car Parts. We met Mr. Erdiņ  
Cennetođlu Manager for Planning and Supply.

We toured the shop area where tools are prepared in 3 shifts and  
are exported great extend. We assisted in reducing wrinkles in a  
drawing operation on a floor panel and where asked about our design  
for the tooling they are now planning for a Truck Engine mount  
member. We discussed their design and ours in great detail and  
spent approximately 4 hours in the factory.

Our second visit was to BP where we talked to Mr. İlhan Sermikli  
Technical Director about the availability and requirements of  
additives for deep drawing processes.

Friday 2<sup>nd</sup> April 1982 We visited the Chrysler corporation where  
we met the general director and his staff of design engineers.  
He advised us of problems he is experiencing with the Oil Pan for  
a Military vehicle which is produced at Çoşkunöz in Bursa.

Since we had seen the operation in Bursa and had discussed some of  
the problems on the job., we were able to assist with advise and  
suggestions for possible changes in the tool design. We had a very  
productive discussion which was enjoyed on both parts.

Our second visit was to the Henkel - Chemical Co where we arranged  
for them to contact Segem in Ankara to give us some assistance in the locating  
of lubricational additives.

The third visit was to ITO Kilit ve Yedek Parça A.Ş. Where we met  
with Mr. Aydın Bozdoğan the director. His company produces locks  
of all kinds and spare parts for mostly the Automotive Industry. We  
were able to advise him on some operations in the spare part  
section, mainly the design of a form-Die and the use of Air Cushions.  
In his presses which he has/in his factory but not installed  
at the present

We did discuss the design for rivett in progressive dies  
and he had appr. ten Questions on Basic Die design and some on  
specific parts and 2 Questions on Mould design and reasons for  
insufficient finishes.

Return from Istanbul to Ankara by car.

5<sup>th</sup> first day of two day seminar.

6<sup>th</sup> second and final day of seminar.

7<sup>th</sup> short 3 hour seminar at M.E.T. University and travel from  
Ankara to Vienna.

3. Mission

- 7 - 3 - 82 - Travel from Canada
- 8 - 3 - 82 - to Vienna
- 9 - 3 - 82 - Briefing in Vienna by UNIDO
- 10 - 3 - 82 - Briefing in Vienna by UNIDO
- 11 - 3 - 82 - Travel to Ankara from Vienna
- 12 - 3 - 82 - Reporting to UNIDO in Ankara and Segem.
- 15 - 3 - 82 - Planning and Scheduling Program for next 3 weeks
- 16 - 3 - 82 - Visit to M.K.E. K:
- 17 - 3 - 82 - Visit to Kutluş Makina Sanayi A.ş and AYGERSAN A.ş.
- 18 - 3 - 82 - Preparing material for seminar and factory visits.
- 19 - 3 - 82 - Preparing material for trip to Bursa
- 22 - 3 - 82 - Trip to Bursa with visit to Arçelik A.ş. in ESKİŞEHİR and <sup>2</sup> Türk-Demir-Döküm in Bözyük.
- 23 - 3 - 82 - Visit to. <sup>1</sup> Çoşkunöz Co.; <sup>2</sup> Bayraktarlar A.ş.;  
<sup>3</sup> SKT-Yedek Parça ve Makina Sanayi A.ş.
- 24 - 3 - 82 - Visits to <sup>1</sup> Transtürk F A.ş. and <sup>2</sup> ARI - Kalıp Sanayi A.ş.
- 25 - 3 - 82 - Visits to <sup>1</sup> Tofaş - Türk Otomobil A.ş.; <sup>2</sup> OYAK-RENAULT Otomobil A.ş. and return Trip to Ankara.
- 26 - 3 - 82 - Preparing Materials for trip to İSTANBUL and visit UNIDO.
- 28 - 3 - 82 - Trip to İstanbul
- 29 - 3 - 82 - <sup>1</sup> Visits to Profilo-Holdings. <sup>2</sup> Türk-Demir-Döküm Fab. A.ş. <sup>3</sup> Sermak A.ş. <sup>4</sup> ERKA-Balata ve OTOMATİK A.ş. <sup>5</sup> Uzel-Makina Sanayi A.ş.
- 30 - 3 - 82 - Visits to <sup>1</sup> Uzel-Makina Sanayi A.ş.; <sup>2</sup> Sermak A.ş.;  
<sup>3</sup> Chromolüks A.ş.
- 31 - 3 - 82 - Visits to <sup>1</sup> Kalıp-İmalat <sup>2</sup> Karmakson A.ş.  
<sup>3</sup> Elba - A.ş.; <sup>4</sup> OTO YOL Sanayi A.ş.;
- 1 - 4 - 82 - Visits to <sup>1</sup> OTOSAN Otomobil Sanayi A.ş.;  
<sup>2</sup> BF-Petrolleri A.ş.
- 2 - 4 - 82 - <sup>1</sup> Chrysler - Otomobil A.ş <sup>2</sup> Henkel -Chemical A.ş.  
<sup>3</sup> + O - Kilit ve Yedek Parça Sanayii A.ş.
- 3 - 4 - 82 - Travel to Ankara
- 5 - 4 - 82 - First day of 2 day seminar
- 6 - 4 - 82 - Second and final day of seminar
- 7 - 4 - 82 - 3 Hour seminar at M.E.T.U. university and Travel from Ankara to Vienna.
- 8 - 4 - 82 - De briefing in Vienna and travel to Frankfurt
- 9 - 4 - 82 - Travel from Frankfurt to Toronto - Canada.

PLANT NAME AND ADDRESS

NAMES

Kutlutaş Makina San.ve Çelik İmalat  
A.Ş.  
Menekşe Sokak 5/16 Yenışehir/ANKARA  
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Prod.Eng.Yalçın Süner  
Qual.Contr.Chief:  
İsmail Canbolat

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Organize Sanayii Méesesesi  
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Prod.Mng.  
Rifat Öztaşkın  
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BOZÖYÜK  
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Tech.Mng. Ceylan Küçük  
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Plant Mng.Ahmet ARKAN  
Prod.Mng.Lütfü Maraşlı

JOB DESCRIPTION

DP/TUR/77/024/11-EE

POST TITLE : Training expert in the techniques and implementation of deep-drawing.

DURATION : 1 Month

DATE REQUIRED : As Soons As Possible

DUTY STATION : Bursa, with possibility of travel within the country.

PURPOSE OF PROJECT: To assist the Industrial Training and Development Centre (ITDC) to upgrade the skills and capabilities of national professionals employed in industry. The ITDC programme involves a combination of consulting services (to diagnose specific problems and to recommend solutions) and training services (to enable trainee-professionals to implement the recommended solutions).

DUTIES : The expert, together with his counterparts from ITDC, will conduct a training programme with extensive troubleshooting sessions for engineers from various related manufacturing firms, engaged in Deep-Drawing techniques.

The expert will specifically be expected to:

1. Make visits to the plants of related firms to examine their present problem-recommendations and technical briefing sessions.
2. Demonstrate techniques and train, in-plant, engineers in charge of Deep-Drawing.
3. Supply ITDC, if possible, with the necessary

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

QUALIFICATIONS : Mechanical engineer with extensive knowledge and experience in Deep-Drawing.

LANGUAGE : English.

BACKGROUND : In July 1980 a seminar was held with the help of four local experts on the technology, design and manufacturing of deep-drawing dies. A group of 34 engineers and tool makers coming from public and private sector attended to the seminar.

During the seminar, the basic theory of plasticity, the theory of deep-drawing experimental techniques, deep-drawability of different materials and lubrication techniques in deep-drawing were explained. The die design and manufacturing by conventional and unconventional methods were covered.

This new programme can be considered as a second phase of the previous one covering mainly the practical problems encountered in deep-drawing.

