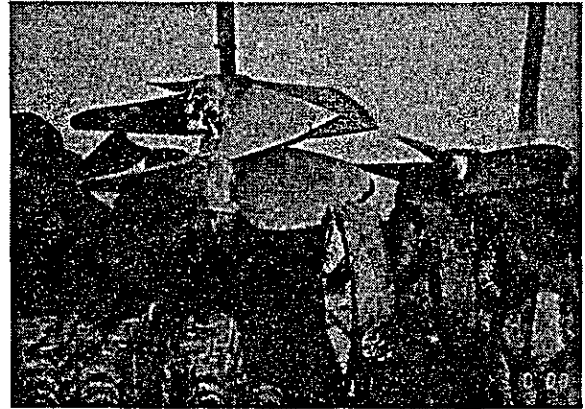
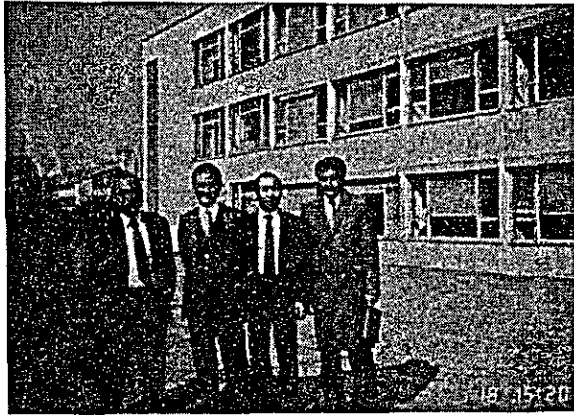


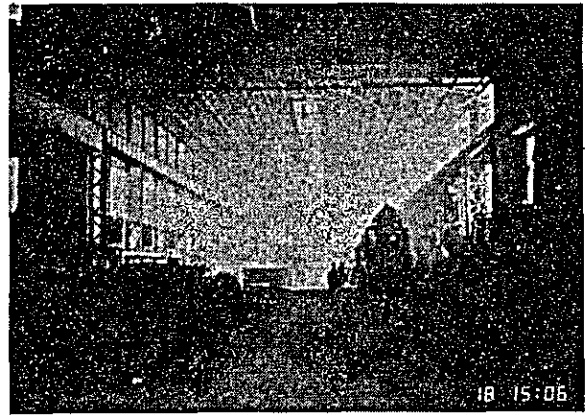
BDC CO<sub>2</sub>半自動溶接装置  
(大阪電気製)



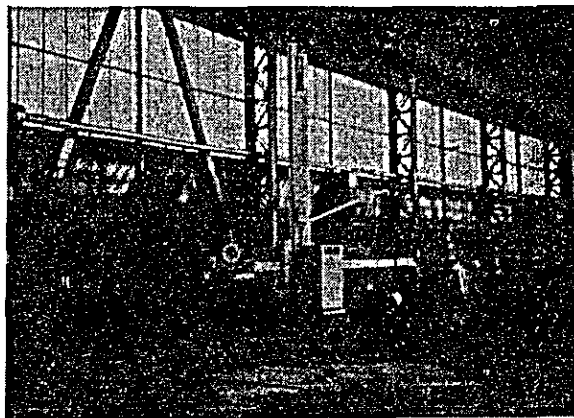
BDC プロペラの製作  
他企業から依頼の車輪も見える( 鋳造工場にて )



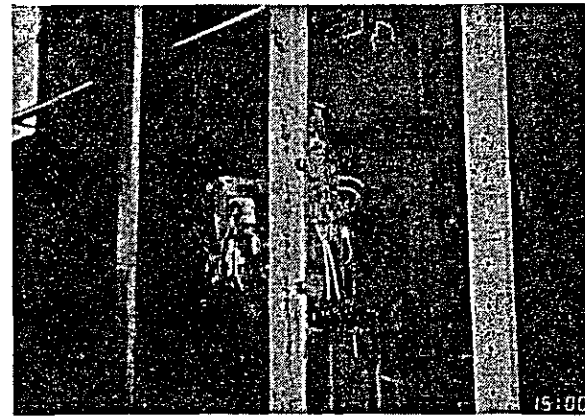
トルコ 製糖公社  
アンカラ機械工場事務所前で



トルコ 製糖公社工場にて



トルコ 製糖公社  
マニプレーター(エサブ社製)

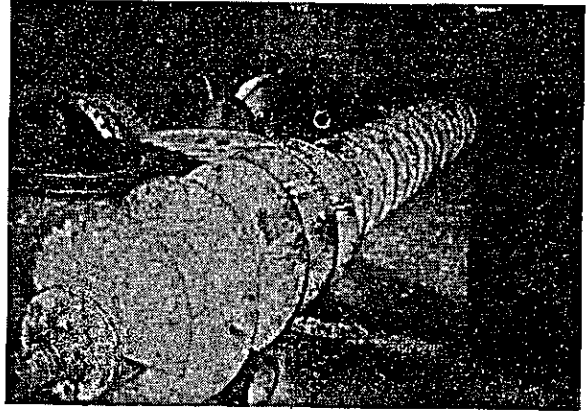


トルコ 製糖公社 アンカラ機械工場  
3 電柱エレクトロスラグ溶接装置(エサブ社製)

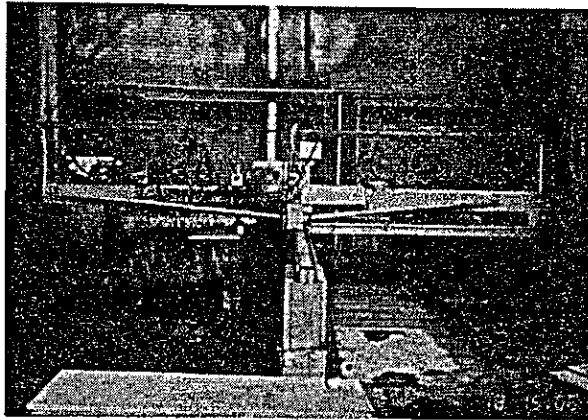




トルコ製糖公社 アンカラ機械工場  
ステンレス製容器の製作



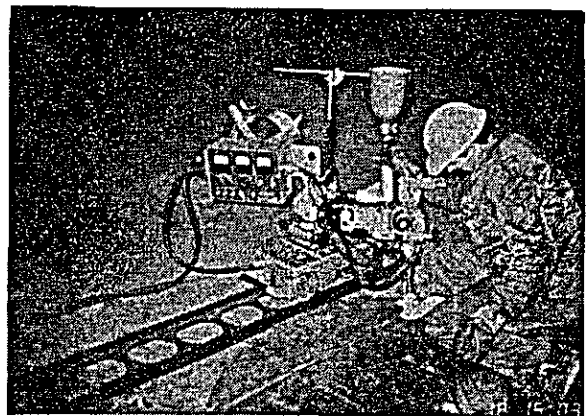
トルコ製糖公社 アンカラ機械工場  
ステンレス製混合器



トルコ製糖公社 アンカラ機械工場  
プラズマ切断装置（アイトレーサーによる図型  
ならい）

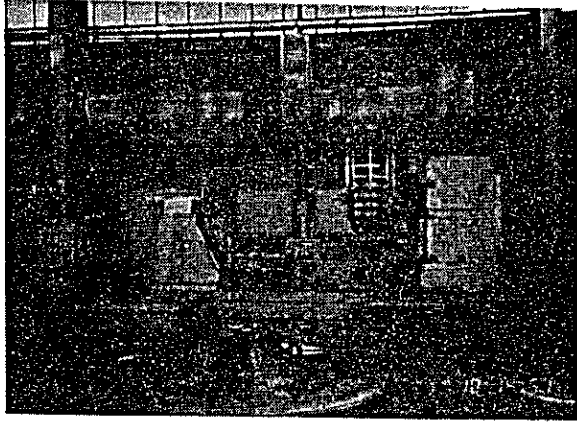


トルコ製糖公社 アンカラ機械工場  
化工機インターナルのTIG溶接（ステンレス鋼）

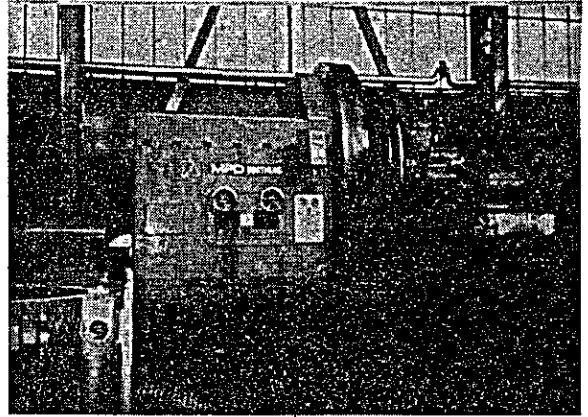


トルコ製糖公社 アンカラ機械工場  
サブマージアーク溶接

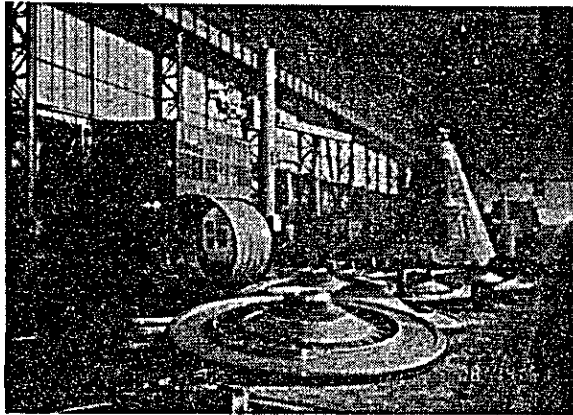




トルコ製糖公社 アンカラ機械工場  
ポジショナー



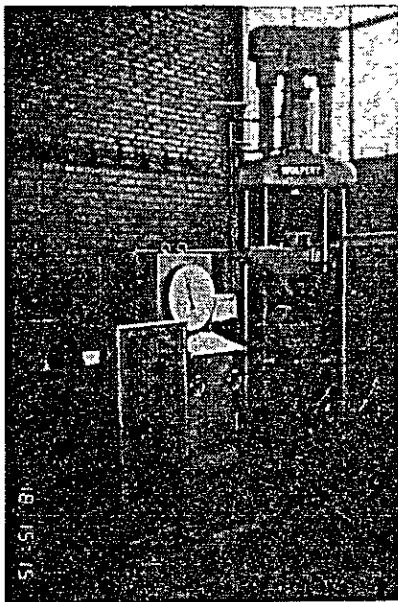
大型工作機械



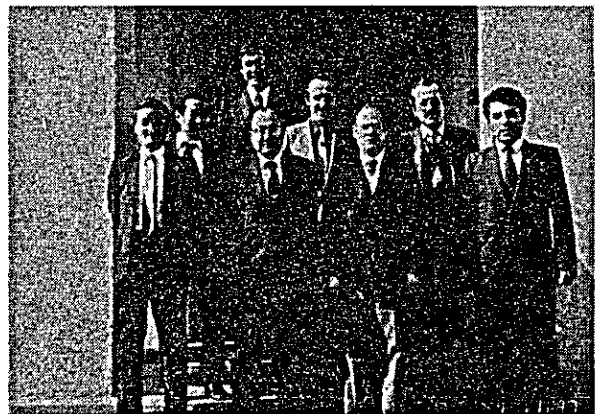
化工機の組立 (マニプレーター)



トルコ製糖公社 アンカラ機械工場  
自社製のショットブラスト装置

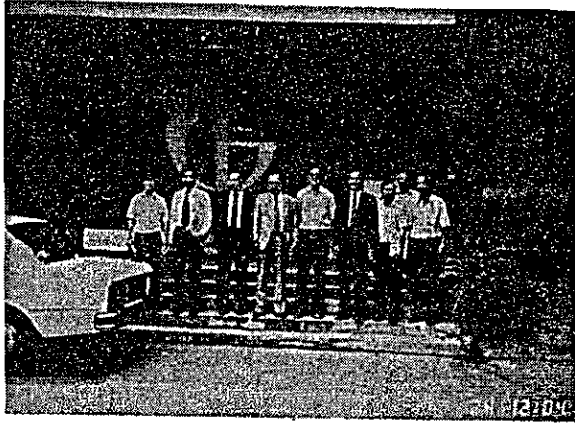


品質保証室にある30 ton型ア  
ムスラ試験機



トルコ MKEK産業機械工場事務所前にて  
所長および帰国研修生と

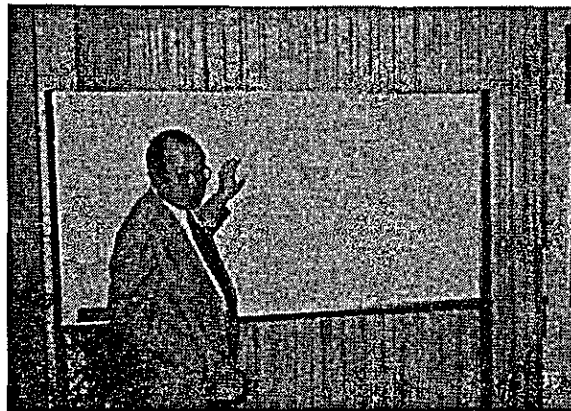




シンガポール VITB事務所  
(VITBスタッフとともに)



VITB事務所での討論



VITB事務所にて 益本教授による日本の溶接技術者認定制度の説明



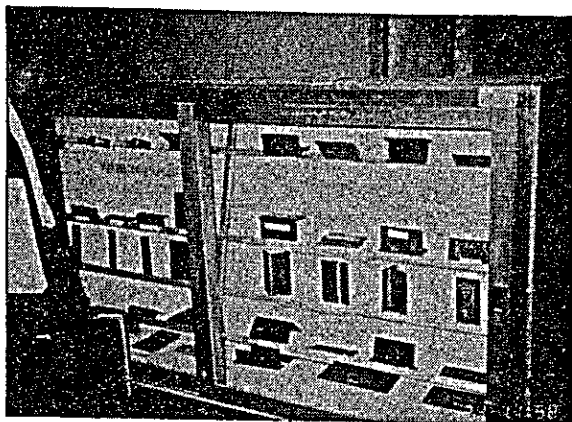
シンガポール VITB事務所での討論



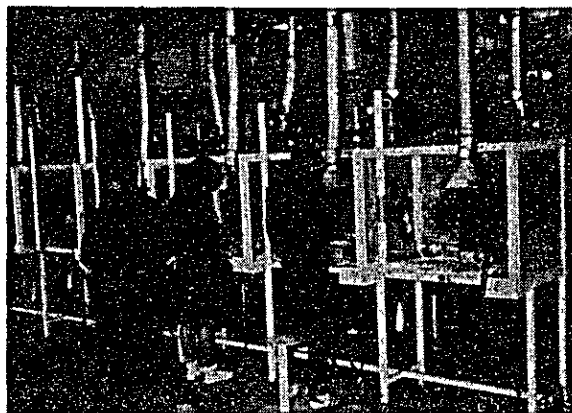
VITB 職業訓練所







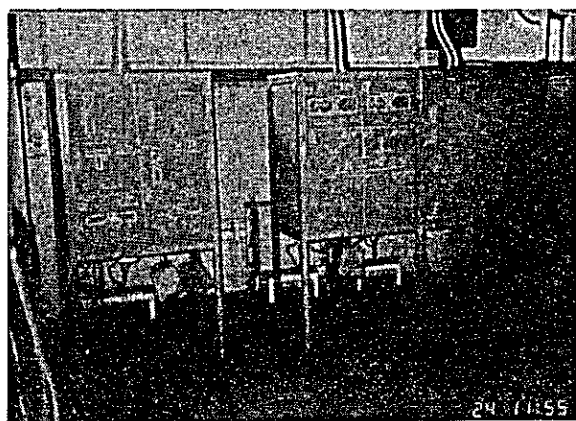
V I T B 溶接訓練所



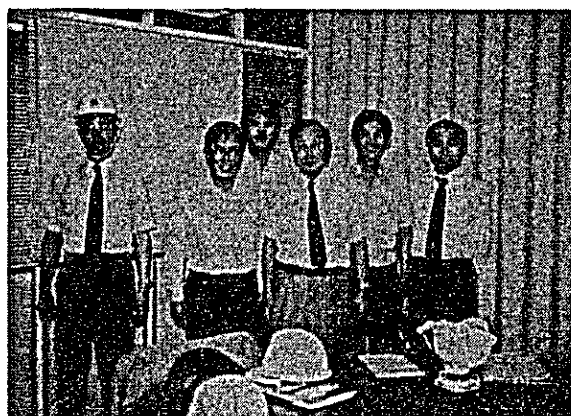
V I T B 溶接訓練所



V I T B 職業訓練所 溶接訓練所



V I T B 職業訓練所 溶接訓練所



シンガポール センバワン造船所事務所にて  
人事部長、帰国研修員と



<資料 1 >

Follow-up Team for Ex-participants of the Group  
Training Course in Welding Technology

The ex-participants of Heavy Industries Corporation request the following information.

1. Ex-participants have forging die blocks (material = JISG 4404 SKT 3, SKT 4) which has worn or broken spots. Ex-participant wishes to know if they are repairable by welding, and if so, the process of repairing.

Die block size is around 300 x 400 x 600 mm and is heat treated.

2. Ex-participants have difficulties in spot welding Aluminium sheets. The material is JISH 4000- A 5052 P. Thickness 1.2 to 2.0 mm.

Pre treatment is decreasing by Tri-chloro ethylene. Spot welding is done within three days after decreasing.

The problems encountered are: sheets not welded at the Spot, after ten to twenty spot welding actions, material turned out at the spot, rough weld spots.

We have the appropriate spot welding machine.

3. Ex-participants have a metal-spraying equipment and wire meant for built-up of worn shafts and automobile crankshafts. We wish to request technical literature on metal-spraying technique.

4. Ex-participants wishes to ask:

- (i) The maximum carbon content in plain carbon steel which can be welded from the point of (a) productivity (b) economy (c) Strength.
- (ii) As above for alloy carbon steel.
- (iii) Pre-heating and post heating for cast iron repair welding (especially Engine Head).
- (iv) How to weld Aluminium except MIG and TIG.

- (v) Design literature on welding structure and welded parts (such as automobile, trucks, bus) from the viewpoint of welding technology.

The Factories and Products of HIC

No. 1. Heavy Industry

Rangoon

PRODUCTS

A. Heavy Vehicles

- |                        |          |
|------------------------|----------|
| 1. 6.5 ton trucks      | 5 models |
| 2. 3.5 ton trucks      | 1 model  |
| 3. (25) seats Bus      | 1 model  |
| 4. Fire Fighting Truck | 1 model  |

B. Electrical Home Appliances

1. Electric bulbs, lamps, lighting fixtures
2. Radio, Television, Calculator
3. Refrigerator, air conditioner, water cooler, washing machine
4. Electric Stove, Rice Cook, Ele Iron
5. Battery
6. Electric Accessory

C. Others

1. Bicycles
2. Cutlery, Razor Blades
3. ,Candle Making Machines

No.2. Heavy Industry

Malun

PRODUCTS

- |                           |          |
|---------------------------|----------|
| 1. Tractor                | 1 model  |
| 2. Trailer                | 5 models |
| 3. Diesel Injection pumps | 5 models |
| 4. Nozzles                | 5 models |
| 5. Dry Cell Battery       |          |

No. 3. Heavy Industry

Sinde

PRODUCTS

1. Irrigation pumps
2. Pesticide Equipments
3. Dower Tiller
4. Rice Huller, Thresher
5. Portable Power Generator
6. Mammotie, Pick Axe, shovels
7. Hand Tools
8. Casting Parts for agricultural machinery, electric machinery, light vehicles, heavy vehicles, machine tool, general engineering products, air cooled engine.
9. Electric Motors, Fans
10. Power Meters, Torch Lamp, Bicycle dynamo, Lighting Fixtures
11. Forging parts for agricultural machinery, light vehicles, heavy vehicles, machine tool
12. Covered Electrodes

No. 4. Heavy Industry

Hton Bo

PRODUCTS

- |                                  |          |
|----------------------------------|----------|
| 1. 600 cc Automobile             | 2 models |
| 2. 2000 cc Cross Country Vehicle | 3 models |
| 3. 2000 cc 2 ton truck           | 1 model  |
| 4. 600 cc Engines                |          |
| 5. 2000 cc Engines               |          |
| 6. Piston                        | 14 types |
| 7. Piston Rings                  | 14 types |
| 8. 140 HP Diesel Engine          |          |
| 9. Storage Battery               |          |

No. 5. Heavy Industry

Hyaung Che Dauk

PRODUCTS

1. Lathe
2. Milling Machine
3. Drilling Machine
4. Power Hack Saw
5. Shaping Machine
6. Distribution Transformers
7. PVC Wire

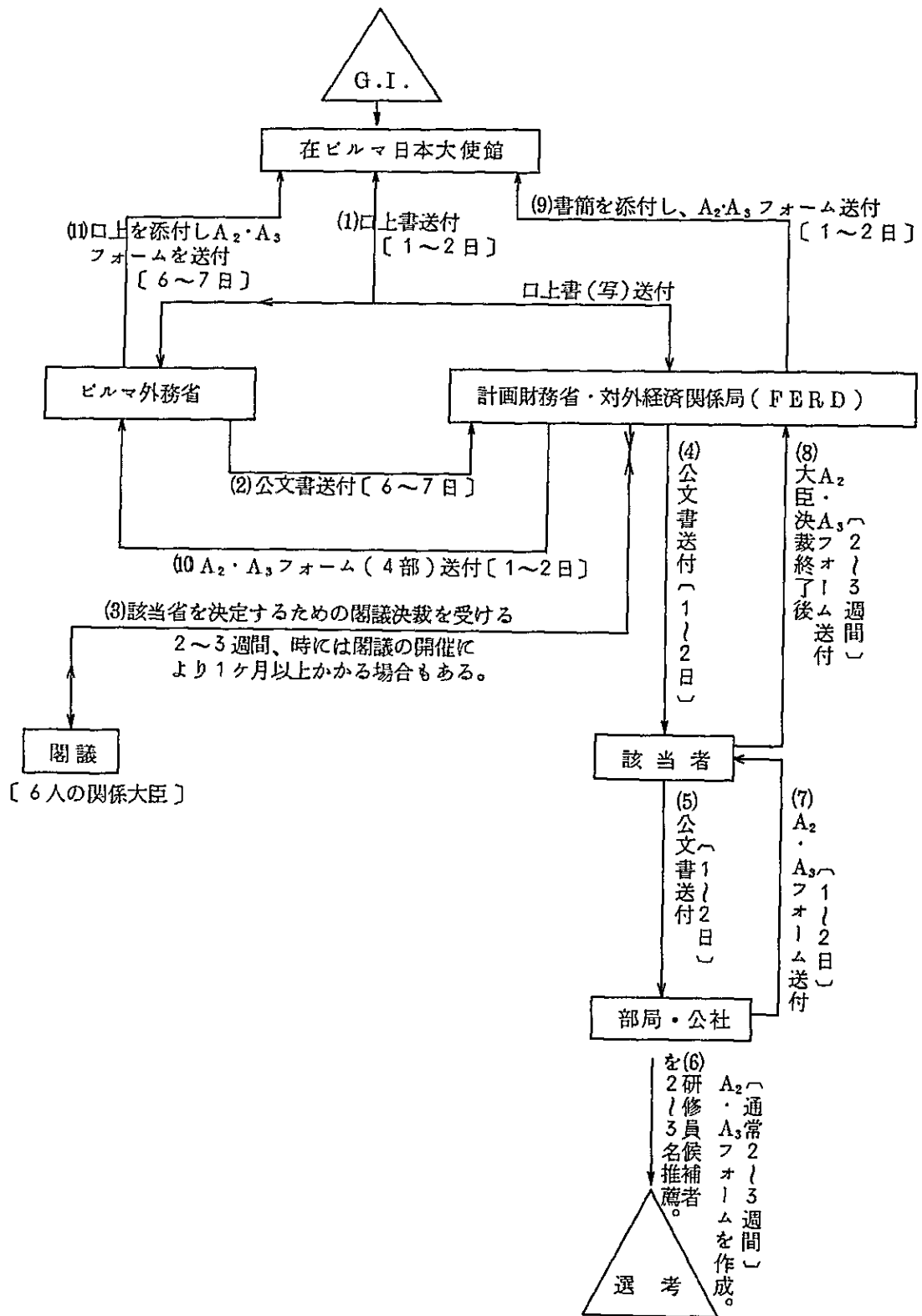
No. 6. Heavy Industry

Thaton

PRODUCTS

1. Tire & Tubes for Passenger Cars
2. Tire & Tubes for Light Trucks
3. Tire & Tubes for Heavy Vehicles
4. Tire & Tubes for Agriculture Use
5. Bicycle Tire & Tubes
6. Rubber and Rubberized Products

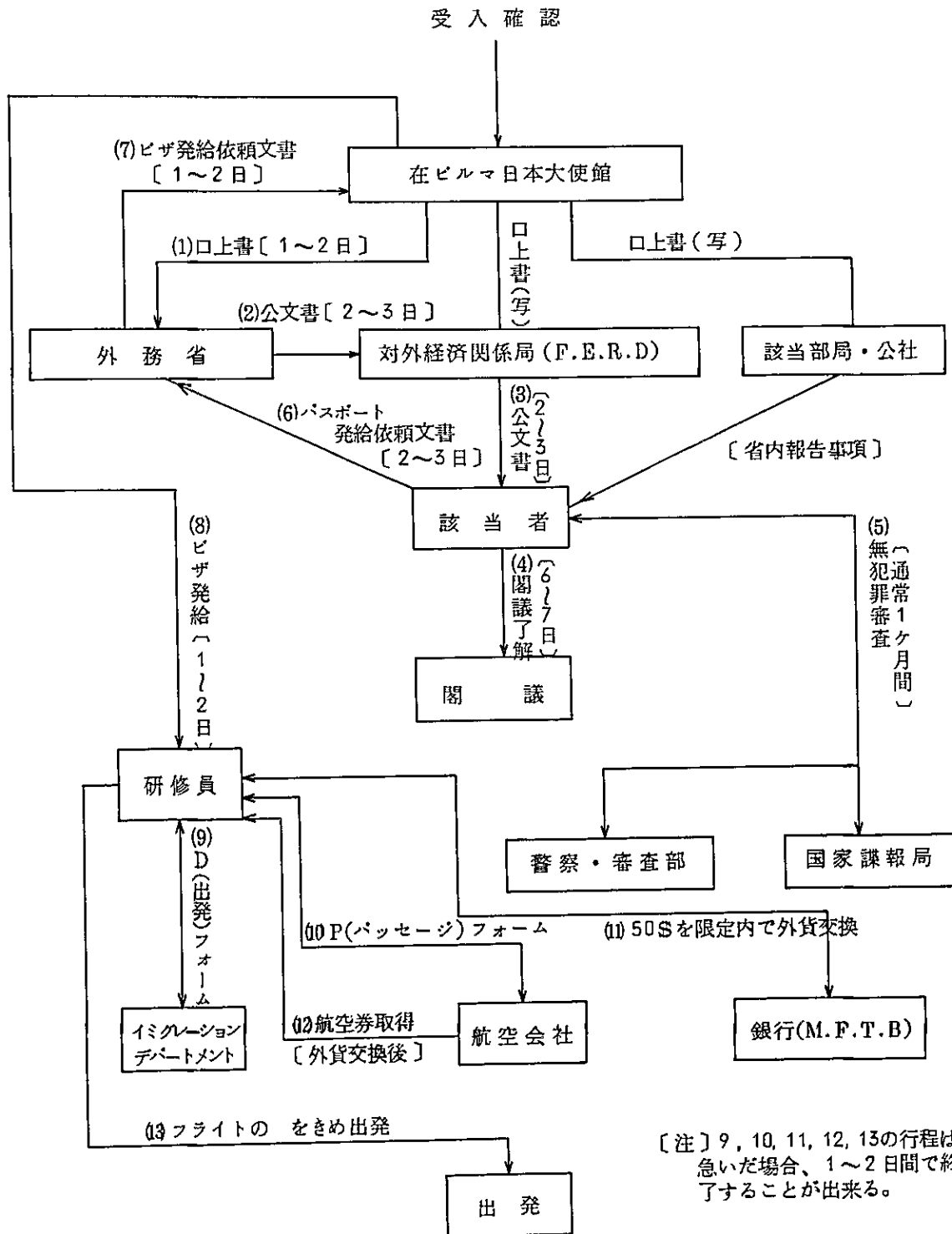
ビルマでのG.I.の流れと研修員人選決定まで(2.6ヶ月)





<資料4>

受入確認入手より研修員が当地出発まで(1.8ヶ月)



<資料 5 >

Ministry of No. (1) Industry  
Metal Industries Corporation  
Engineering Factory No. (2)

1. Short History : Founded in 1952 Formerly known as B.I.P. (Burmese Industrial Production Factory) owned by Private (U Pwa Gyi) manufacturing Self - Contained Rice Mills and Spares. Nationalized on the 14th August 1963 by Industrial Development Corporation Ministry of Industry and renamed as People's Engineering Industry No.(2). After Nationalization the Factory manufactured not only Rice Mills and Spares but also carried out the works such as General Fabrication Jobs Producing of Machine units and spares Hot and Cold formed Bolts and Nuts, Lead Pipe and Cast Iron Casting Products.  
Under the management of Metal Industries Corporation, Engine Boring and Crank Shaft Grinding Work-shop was annexed to P.E.I. (2) in 1981 and from that time it was again renamed as Engineering Factory No. (2).
2. Situation : No.102, Rangoon-Insein Road, Thamaing, Rangoon
3. Direct Labour :

|                  |   |     |
|------------------|---|-----|
| (a) Skilled      | - | 52  |
| (b) Semi-skilled | - | 132 |
| (c) Un-skilled   | - | 112 |
4. Supervisor & Engineers :

|                  |   |    |
|------------------|---|----|
| (a) Engineers    | - | 3  |
| (b) Foreman      | - | 8  |
| (c) Charged Hand | - | 17 |
5. Annual Production : Production Value (Kyats in Million) (13.00)
6. Product Groups and their Capacity:

|                 |                |   |                              |
|-----------------|----------------|---|------------------------------|
| (a) <u>Bolt</u> | (i) Hot formed | : | Size dia: 3/8"Ø to 1"Ø       |
|                 |                |   | length : 1 1/2" and above    |
|                 |                |   | Capacity per year: (540) ton |

- (ii) Cold formed: Size dia:  $\frac{1}{4}$ " $\emptyset$  to  $\frac{1}{2}$ " $\emptyset$   
length: 1" to  $3\frac{1}{2}$ "  
Capacity per year: (118) ton
- (b) Nut Hot formed: Size dia:  $\frac{3}{8}$ " $\emptyset$  to 1" $\emptyset$   
Capacity per year: (60) ton
- (c) General Fabrication
- (1) Steel Containers and vessels for F.O.;  
Alcohol, H.S.D.; water and others (Capacity from  
200 gallons to 100000 gallons)
  - (2) Rice Cooker, Morlarsess Tank, Juice Sulphitator,  
Sulphur oven and other steel structure for Food  
Stuff Industries Corporation.
  - (3) Silicate Digester, Caustic Dissolver, Soap Tank  
and other machinery for Pharmaceutical Industries  
Corporation.
  - (4) Chipper Casing, Conveyor Housing, Decomposer  
and other steel structure parts for Paper and  
Chemical Corporation.
  - (5) Blower and chimney Housing, Trolley, Bucket and  
other steel fabricated parts for Ceramic Industries  
Corporation.
  - (6) Capacity per year:  
In Raw Material Consumption of Steel Plate  
Angle Channel and Flat Bar (450) Metric Tons.
- (d) Rice Mill and Spares
- (1) Rice Mill: Capacity lbs of Paddy per hour  
Peral No. 2 : 920 - 1012  
" 4 : 1150 - 1380  
" 8 : 3320 - 3680  
" 12 : 6624 - 7360
  - (2) Major Units of Rice Mill
    - (a) Paddy Cleaner
    - (b) Under Runner Disc Sheller
    - (c) Husk Separator and Cow Bran Seive
    - (d) Paddy Separator

- (e) White Rice Cone
- (f) White Rice Aspirator and Seive
- (g) Bucket Elevator
- (h) Dust Collector
- (i) Mill Frame
- (3) Capacity per year:  
"Peral" No. 12 Rice Mill (50 Ton Type)  
Complete set (1) set

(e) Machine spares

- (1) Spare Parts for Mills, under the Ministry of No.(1) Industry.
- (2) Complete set of Machines
  - (a) Defibering Machine, Two-Ply Twine Making Machine, Sliver Making Machine for Cir Rope Factory.
  - (b) Rasper, Root Washer, Rotary Screen and Root cleaner for Tapica Project, Food Stuff Industries Corporation.
  - (c) "Hinth" Weighing Machine
- (3) Capacity per year:  
In Raw Material Consumption of Mild Steel and Cast Iron (114) Ton.
- (4) Capacity per year:  
"Hinth" Weighing Machine (480) Sets

(f) Casting Products

- (1) Grey Cast Iron Castings for above Rice Mill Spares and Machine Spares
- (2) Capacity per year: 120 tons
  - (a) 18"Ø Cupolar (1 Ton/hour)
  - (b) 30"Ø " (4 Ton/hour)
  - (c) Largest Casting Weight 1120 lbs

(g) Lead Pipe (Lead Pipe Extruding Plant)

| (1) Size: | <u>Inside Dia.</u> | <u>Thickness</u> |
|-----------|--------------------|------------------|
|           | m.m                | m.m              |
|           | 13                 | 4.7              |
|           | 16                 | 5.3              |
|           | 20                 | 5.8              |
|           | 25                 | 6.3              |
|           | 30                 | 6.8              |
|           | 40                 | 8.1              |
|           | 50                 | 9.4              |

(2) Capacity per year: (120) ton

(h) Engine Boring

(1) Service works such as Engine Boring, Cylinder Boring, Crankshaft Grinding Valve Seat cutting and machining of bearings and Cast Iron Parts.

(2) Capacity per year:

In square feet of grinding and boring areas  
(4440) sq.ft.

6. Price List (Ex-Factory)

| (1) Rice Mill<br>Peral No. | <u>Paddy per hour (lbs)</u> | <u>Price (Without Prime mover)</u><br>(Kyats in lakh) |
|----------------------------|-----------------------------|---|
| 2                          | 920 - 1012                  | 1.2   |
| 4                          | 1150 - 1380                 | 1.6   |
| 8                          | 3320 - 3680                 | 3.5   |
| 12                         | 6624 - 7360                 | 6.8   |

| (2) <u>Major Units of Rice Mill</u>   | <u>Price (Without Motor)</u><br>(Kyats in thousand) |
|---------------------------------------|---|
| (a) Paddy cleaner                     | 12.2  |
| (b) Under Runner Disc Sheller         |   |
| (1) 3'6" dia                          | 19.3  |
| (2) 4' dia                            | 25.1  |
| (c) Husk Separator and cow bran sieve | 26.6  |
| (d) Paddy Separator (60 compartments) | 48.0  |
| (e) White Rice Cone                   |   |
| (1) 2'                                | 25.1  |

|                              |      |
|------------------------------|------|
| (2) 3'                       | 27.5 |
| (f) Rice Aspirator and sieve | 33.5 |
| (g) Single Bucket Elevator   |      |
| 2" bucket x 25' ht           | 15.6 |
| (h) Double Bucket Elevator   |      |
| 7" Bucket x 25' ht.          | 27.7 |

7. F.E. Portion Involved in Rice Mills

| <u>Peral No.</u> | <u>F.E. (F.O.B.) (Kyats in thousand)</u> |
|------------------|--|
| 8                | 60.00                                    |
| 12               | 100.00                                   |

8. Major Units of Rice Mill and their Capacity

(a) Under - Runner Disc Shellers and Capacity

| <u>Dia of Stone</u> | <u>Capacity of paddy per hour (lbs)</u> | <u>Speed R.P.M.</u> |
|---------------------|---|---------------------|
| 2'-6"               | 990 - 1320                              | 300                 |
| 3'-6"               | 1540 - 2200                             | 205                 |
| 4'-0"               | 2420 - 3080                             | 170                 |

(b) Whitening and Polishing Cones

| <u>Dia of cone</u> | <u>Single</u> | <u>Capacity of white rice per hour (lbs)</u> |               |              | <u>Speed R.P.M.</u> |
|--------------------|---------------|--|---------------|--------------|---------------------|
|                    |               | <u>Double</u>                                | <u>Triple</u> | <u>Quart</u> |                     |
| 2'-0"              | 1440          | 2325   | 2750          | 3050         | 400                 |
| 2'-8"              | 2000          | 3200   | 3800          | 4200         | 320                 |
| 3'-4"              | 2650          | 4400   | 5100          | 5600         | 250                 |

(c) Paddy Separator

| <u>Number of compartments</u> | <u>Arrangement of compartments</u> | <u>Capacity Cargo Rice Per hour (lbs)</u> | <u>Speed R.P.M.</u> |
|-------------------------------|------------------------------------|---|---------------------|
|                               | <u>Deck x No. of compt.</u>        |   |                     |
| 24                            | 3 x 8                              | 2110 - 2700                               | 90 - 112            |
| 36                            | 3 x 12                             | 3170 - 4000                               | do                  |
| 45                            | 3 x 15                             | 4000 - 5000                               | do                  |
| 54                            | 3 x 18                             | 4750 - 5940                               | do                  |
| 60                            | 3 x 20                             | 5280 - 6600                               | do                  |

<資料6> 24 CrMo V 55 Steelの化学成分

Chemical Composition of Cast Steel

|                       |                        |                        |                        |                        |                        |
|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| $\frac{C}{0.24-0.30}$ | $\frac{Si}{0.30-0.50}$ | $\frac{Mn}{0.70-0.80}$ | $\frac{Ni}{1.80-2.00}$ | $\frac{Cr}{0.70-0.90}$ | $\frac{Mo}{0.40-0.60}$ |
| $\frac{Cu}{0.20}$     | $\frac{P}{0.035}$      | $\frac{S}{0.035}$      |                        |                        |                        |

Chemical Composition of Steel plate

|                       |                        |                        |                   |                        |                        |
|-----------------------|------------------------|------------------------|-------------------|------------------------|------------------------|
| $\frac{C}{0.22-0.26}$ | $\frac{Si}{0.20-0.30}$ | $\frac{Mn}{0.40-0.50}$ | $\frac{Ni}{0.60}$ | $\frac{Cr}{1.30-1.40}$ | $\frac{Mo}{0.50-0.60}$ |
| $\frac{V}{0.15-0.25}$ | $\frac{Cu}{0.20}$      | $\frac{P}{0.035}$      | $\frac{S}{0.035}$ |                        |                        |

Chemical Compositions of Some electrodes

As 63 60

|                  |                  |                  |                 |                |                  |
|------------------|------------------|------------------|-----------------|----------------|------------------|
| $\frac{C}{0.03}$ | $\frac{Si}{0.7}$ | $\frac{Mn}{0.6}$ | $\frac{Cr}{18}$ | $\frac{N}{12}$ | $\frac{Mo}{2.8}$ |
|------------------|------------------|------------------|-----------------|----------------|------------------|

As 63 32

|                  |                  |                  |                 |                 |                  |
|------------------|------------------|------------------|-----------------|-----------------|------------------|
| $\frac{C}{0.05}$ | $\frac{Si}{0.8}$ | $\frac{Mn}{0.6}$ | $\frac{Cr}{19}$ | $\frac{Ni}{11}$ | $\frac{Mo}{2.8}$ |
|------------------|------------------|------------------|-----------------|-----------------|------------------|

As 63 80

|                  |                  |                  |                 |                 |                  |                  |
|------------------|------------------|------------------|-----------------|-----------------|------------------|------------------|
| $\frac{C}{0.03}$ | $\frac{Si}{0.8}$ | $\frac{Mn}{1.5}$ | $\frac{Cr}{18}$ | $\frac{Ni}{12}$ | $\frac{Mo}{2.8}$ | $\frac{N6}{0.6}$ |
|------------------|------------------|------------------|-----------------|-----------------|------------------|------------------|

FOX A-7-A

|                  |                  |                  |                   |                 |                  |
|------------------|------------------|------------------|-------------------|-----------------|------------------|
| $\frac{C}{0.11}$ | $\frac{Si}{1.5}$ | $\frac{Mn}{4.0}$ | $\frac{Cr}{19.5}$ | $\frac{N}{8.5}$ | $\frac{Mo}{0.7}$ |
|------------------|------------------|------------------|-------------------|-----------------|------------------|

FOX A-7

|                  |                  |                  |                   |                  |
|------------------|------------------|------------------|-------------------|------------------|
| $\frac{C}{0.11}$ | $\frac{Si}{1.0}$ | $\frac{Mn}{6.0}$ | $\frac{Cr}{18.5}$ | $\frac{Ni}{8.5}$ |
|------------------|------------------|------------------|-------------------|------------------|

FOX CN 29/9

|                  |                  |                  |                   |                   |
|------------------|------------------|------------------|-------------------|-------------------|
| $\frac{C}{0.11}$ | $\frac{Si}{0.8}$ | $\frac{Mn}{0.7}$ | $\frac{Cr}{29.0}$ | $\frac{Ni}{11.0}$ |
|------------------|------------------|------------------|-------------------|-------------------|

<資料7>

MAKİNA VE KİMYA ENDÜSTRİSİ KURUMU  
1984 EXPORT PROGRAMME AND PRICES

| <u>Description</u>                                 | <u>Prices</u>        |
|--|----------------------|
| 1. Dormitory Trailer                               | US\$ 4,525.-/unit    |
| 2. Restaurant Trailer                              | 4,730.-/unit         |
| 3. Office Trailer (small)                          | 3,190.-/unit         |
| 4. Loom (130 cm)                                   | 5,200.-/unit         |
| 5. Loom (180 cm)                                   | 5,510.-/unit         |
| 6. Spinning Frame (432 spindles)                   | 27,750.-/unit        |
| 7. Atomizer (carried on back)                      | 174.-/unit           |
| 8. 100 lt. Mobile Sprayer                          | 460.-/unit           |
| 9. Mono-Phase Electric Watthourmeters              | 10.40/unit           |
| 10. Tri-Phase Electric Watthourmeters              | 31.-/unit            |
| 11. Lathe UT 48 x 1000                             | 9,025.-/unit         |
| 12. Lathe UT 48 x 1500                             | 9,100.-/unit         |
| 13. Lathe UT 48 x 2500                             | 8,960.-/unit         |
| 14. Milling Machine FU-FD 2.5                      | 10,870.-/unit        |
| 15. Milling Machine FU-FD 1                        | 5,610.-/unit         |
| 16. Shaper PY 600                                  | 6,980.-/unit         |
| 17. Drilling Machine SM 23                         | 1,580.-/unit         |
| 18. Road Maintenance Grader                        | 18,460.-/unit        |
| 19. Road Construction Grader                       | 56,860.-/unit        |
| 20. Mobile Compressor                              | 8,820.-/unit         |
| 21. Palletted Compressor                           | 11,350.-/unit        |
| 22. Steel Construction Barrack (MKE Type)          | 4,780.-/unit         |
| 23. Steel Construction Barrack (HANGAR Type)       | 14,170.-/unit        |
| 24. Galvanized Barbed Wire                         | 700.-/ton            |
| 25. Galvanized Wire                                | 625.-/ton            |
| 26. Wire Netting (40x40)                           | 3.62/m <sup>2</sup>  |
| 27. Wire Netting (50x50)                           | 3.20/m <sup>2</sup>  |
| 28. Gelatinite Dynamite (in cardboard boxes)       | 1,180.-/ton          |
| 29. Gom 2 Al Dynamite (in cardboard boxes)         | 1,395.-/ton          |
| 30. Safety Fuse                                    | 78.-/km              |
| 31. Blasting Cap. Nr. 8                            | 55.-/1000            |
| 32. Electrical Blasting Caps (1.5m Cu)             | 333.-/1000           |
| 33. Electrical Blasting Caps (1.5m Al)             | 270.-/1000           |
| 34. Electrical Delayed Blasting Caps               | 580.-/1000           |
| 35. R-6 Batteries (small)                          | 84.-/1000            |
| 36. R-14 Batteries (medium)                        | 132.-/1000           |
| 37. R-20 Batteries (Large)                         | 205.-/1000           |
| 38. Shotguns (double barrel)                       | 160.-/unit           |
| 39. Hunting Cartridges (12 and 16 bore)            | 140.-/1000           |
| 40. Hunting Cartridge caps (Remington Type)        | 20.-/1000            |
| 41. Beech and Pine Plywood 5-9 mm thick I. Quality | 480.-/m <sup>3</sup> |
| 42. " " " 5-9 mm " II. "                           | 440.-/m <sup>3</sup> |
| 43. " " " 5-9 mm " III. "                          | 400.-/m <sup>3</sup> |
| 44. " " " 10-30 mm " I. "                          | 420.-/m <sup>3</sup> |
| 45. " " " 10-30 mm " II. "                         | 385.-/m <sup>3</sup> |
| 46. " " " 10-30 mm " III. "                        | 350.-/m <sup>3</sup> |
| 47. " (water proof) 5-9 mm " I. "                  | 720.-/m <sup>3</sup> |
| 48. " ( " ) 5-9 mm " II. "                         | 660.-/m <sup>3</sup> |



|     |                              |   |                   |   |          |   |      |   |                      |
|-----|------------------------------|---|-------------------|---|----------|---|------|---|----------------------|
| 49. | "                            | ( | "                 | ) | 5-9 mm   | " | III. | " | 600.-/m <sup>3</sup> |
| 50. | "                            | ( | "                 | ) | 10-30 mm | " | I.   | " | 660.-/m <sup>3</sup> |
| 51. | "                            | ( | "                 | ) | 10-30 mm | " | II.  | " | 605.-/m <sup>3</sup> |
| 52. | "                            | ( | "                 | ) | 10-30 mm | " | III. | " | 550.-/m <sup>3</sup> |
| 53. | Beech Blockboards 16mm thick |   |                   |   |          |   |      |   | 510.-/m <sup>3</sup> |
| 54. | "                            | " | 19-22-25 mm thick |   |          |   |      |   | 494.-/m <sup>3</sup> |
| 55. | Pine Blockboards 16mm thick  |   |                   |   |          |   |      |   | 523.-/m <sup>3</sup> |
| 56. | "                            | " | 19-22-25 mm thick |   |          |   |      |   | 503.-/m <sup>3</sup> |
| 57. | Chipboards 4 mm thick        |   |                   |   |          |   |      |   | 214.-/m <sup>3</sup> |
| 58. | "                            | " | 6 mm              |   |          |   |      |   | 206.-/m <sup>3</sup> |
| 59. | "                            | " | 8 mm              |   |          |   |      |   | 197.-/m <sup>3</sup> |
| 60. | "                            | " | 10 mm             |   |          |   |      |   | 196.-/m <sup>3</sup> |
| 61. | "                            | " | 13 mm             |   |          |   |      |   | 185.-/m <sup>3</sup> |
| 62. | "                            | " | 16 mm             |   |          |   |      |   | 171.-/m <sup>3</sup> |
| 63. | "                            | " | 19 mm             |   |          |   |      |   | 161.-/m <sup>3</sup> |
| 64. | "                            | " | 22 mm             |   |          |   |      |   | 143.-/m <sup>3</sup> |
| 65. | Prefabricated Buildings      |   |                   |   |          |   |      |   |                      |
| 66. | Steel Material               |   |                   |   |          |   |      |   |                      |
| 67. | Brass and Copper Material    |   |                   |   |          |   |      |   |                      |
| 68. | Seamless Steel Pipes         |   |                   |   |          |   |      |   |                      |

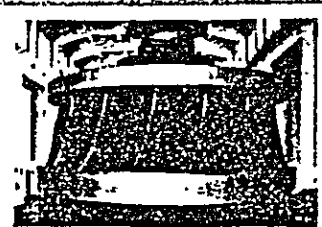
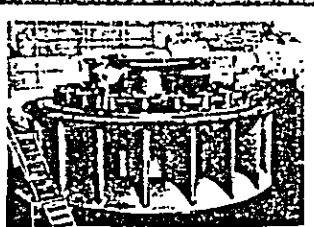
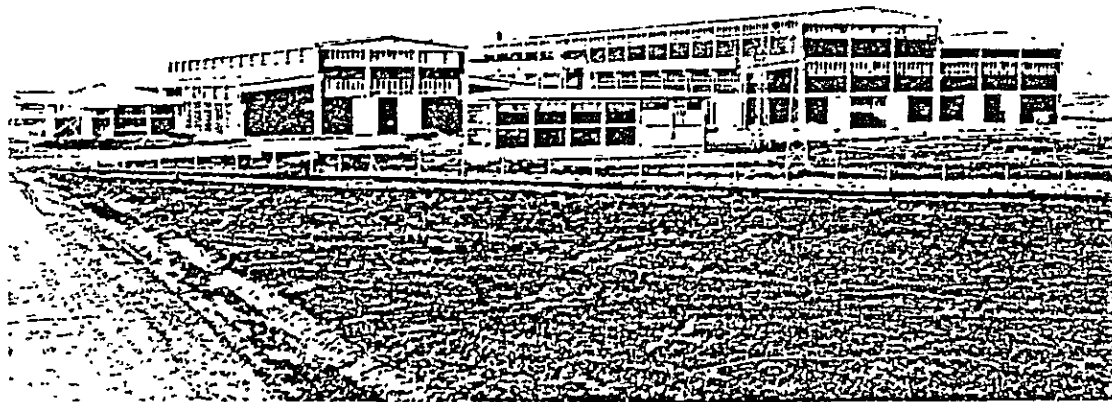
All sixtyeight items.

- PS. a) Prices for items 41 to 52 are prepared on EX-FACTORY (Ankara) basis. All other prices are FOB TURKISH PORTS. Explosive material can only be loaded from DERINCE PORT of TURKEY.
- b) Prices for items 65, 66, 67 and 68 will be quoted after we are informed of the definite kinds and the quantities of the orders.
- c) Delivery terms will also be stated after the kinds and the quantities of the orders are informed.
- d) Payments are to be done through irrevocable and confirmed Letter of Credit which will be opened directly in our favour.
- e) Above prices are valid until the end of March 1984.



# TEMSAN

TÜRKİYE ELEKTROMEKANİK  
SANAYİİ A.Ş.





# TEMSAN

## TÜRKİYE ELEKTROMEKANİK SANAYİİ A.Ş.

### TEMSAN'IN TANITIMI

#### TEMSAN'IN YAPISI VE GÖREVI

TEMSAN— Türkiye Elektromekanik Sanayi A.Ş. 13.11.1975 tarih ve 7/10907 sayılı Bakanlar Kurulu kararına ek esas mukavele ile kurulmuştur.

TEMSAN'ın görevi ülkemizde elektrik enerjisi üretimi ve dağıtımına yönelik elektro—mekanik sanayini kurmaktır.

9.2.1977 tarihinde kuruluşu tescil edilen TEMSAN'ın bugünkü sermayesi 4 milyar TL.'dir.

#### ORTAKLARI

HAZİNE

TEK

DESIYAB

MKEK

T. ŞEKER FABRİKASI A.Ş.

T. VAKIFLAR BANKASI A.O.

#### YATIRIM PROGRAMI

- o Su Türbini ve Pompa Fabrikası (Diyarbakır)  
Kapasitesi: 150 MW/yıl, 20 MW'a kadar Su Türbini, 900 adet Pompa/yıl
- o Generator ve Motor Fabrikası (Diyarbakır)  
Kapasitesi. 150 MW/yıl; 25 MVA'ya kadar Hidrogeneratör
- o Büyük Generatör ve Motor Fabrikası (Diyarbakır)  
Kapasitesi: 1000 MW/yıl Turbogeneratör, 1139 MW/yıl Hidro—generatör, 1222 MW/yıl elektrik motoru (Etüd—Proje aşamasındadır.)
- o Büyük Buhar ve Su Türbinleri Fabrikası (Diyarbakır)  
Kapasitesi: 1000 MW/yıl Buhar Türbini, 1139 MW/yıl Su Türbini. (Etüd—Proje aşamasındadır.)
- o Buhar Kazanları Fabrikası  
Kapasitesi: 1000 MW/yıl  
Linyit yakıtlı buhar kazanları imal edecektir. Batı Alman VKW—Vereinigte Kesselwerke A.G. firması ile lisans, mühendislik, teknik yardım konularını kapsayan "Teknik İşbirliği Anlaşması" yapılmıştır. Yıl içinde fabrikanın projeleri hazırlanacak, 1983'de inşasına geçilecektir.
- o Transformator Fabrikası  
Kapasitesi: 5260 MVA/yıl, 380 KV için 375 MVA ünite gücüne kadar.  
(Etüd—proje aşamasındadır.)
- o Yüksek Gerilim Kesici ve Ayırıcı Fabrikası (Ankara)  
İller Bankası'nın Ankara'daki Orta Gerilim Kesici Fabrikası yatırımıyla entegre edilerek kurulacaktır.
- o Havaî Hat Hırdavat Malzemeleri Fabrikası (MALATYA)  
(Etüd—proje aşamasındadır.)
- o Yardımcı Malzemeler Fabrikası (Malatya)  
(Etüd—proje aşamasındadır.)

### INTRODUCTION

#### STATUS AND FUNCTIONS of TEMSAN

TEMSAN— Turkish Electromechanics Industries Corp was established under the Statutes annex to the Decree of the Council of Ministers dated November 13, 1975, No 7/10907

TEMSAN's duty is to establish electromechanical industries for the generation and distribution of electrical energy in Turkey.

Establishment of TEMSAN was registered in February 9, 1977.

Its present capital stock is 4 billion Turkish Liras Shareholders are.

#### TREASURY

TURKISH ELECTRICITY AUTHORITY  
STATE INDUSTRY AND WORKER'S  
INVESTMENT BANK  
MECHANICAL AND CHEMICAL  
INDUSTRIES CORP  
TURKISH SUGAR FACTORIES CORP  
TURKISH PIOUS FOUNDATION BANK.

#### INVESTMENT PROGRAMME

- o Hydraulic Turbines and Pumps Factory (Diyarbakır)  
The capacity is 150 MW per year for hydraulic turbines up to 20 MW per unit and 900 pumps per year.
- o Generators and Motors Factory (Diyarbakır)  
The capacity is 150 MW per year for hydro—generators up to 25 MVA per unit.
- o Large Generators and Motors Factory (Diyarbakır)  
The capacity is 1000 MW per year for turbo—generators, 1139 MW per year for hydro—generators, 1222 MW per year for electric motors. (Under study)
- o Large Steam and Hydraulic Turbines Factory (Diyarbakır)  
The capacity is 1000 MW per year for steam turbines, 1139 MW per year for hydraulic turbines (Under study)
- o Steam Boilers Factory (Malatya)  
The capacity is 1000 MW per year for lignite firing steam boilers.  
"Technical Cooperation Agreement" signed between TEMSAN and West German firm VKW — Vereinigte Kesselwerke AG covers licence, engineering services and technical cooperation matters The investment projects will be implemented beginning 1983
- o Transformers Factory (Elâzığ)  
The capacity is 5260 MVA per year. (Under study)
- o High Voltage Circuit Breakers and Disconnecting Switches Factory (Ankara)  
This project will be integrated with Medium Voltage Circuit Breakers Factory of İller Bankası in Ankara (Under study)
- o Overhead Lines Hardware Equipment Factory (Malatya) (Under study)
- o Auxiliary Equipment Factory (Malatya)  
(Under study)



## İŞTİRAKLER

Elektromekanik ekipman sanayinin kurulması amacıyla özel sektörle de işbirliği yapılmaktadır. Aşağıda belirtilen firmalara ortak olunmuştur.

**ÇESTAŞ**: Ortaklık payı % 10 olup firma 170 kv'a kadar kesici, 154 kv'luk avırıcı, 80-1000 A'lık pakete şalterini Brown Boveri lisansı altında imal etmektedir.

**MAKSAN**: Ortaklık payı % 10 olup firma (50-1600) KVA'lık yılda 660 MVA'lık transformator imalatına Bonar Long lisansı altında 1982'de başlamıştır.

**AKSARAY MOTOR SANAYİİ VE TİCARET A.Ş.**: Niğde Aksaray'daki fabrikasında her nevi dizel motorları imal etmek üzere TUMOSAN, DESİYAB, TÜRK-İŞ KONFEDERASYONU, TEMSAN ve TAKSAN tarafından kurulan bu şirkete ortaklığımız devam etmektedir.

## PARTICIPATION

*In order to establish electromechanical industries in Turkey, TEMSAN has been cooperating with other private firms. It is a shareholder of the following firms*

**ÇESTAŞ** *The share of capital is 10%. The firm has been manufacturing circuit breakers up to 170 KV, disconnecting switches for 15.4 KV and switches of 80 - 1000 A under the licence of Brown Boveri*

**MAKSAN** *The share of capital is 10%. The firm has started manufacturing transformers in 1982. Its capacity is 660 MVA per year within the range of 50 - 1600 KVA under the licence of Bonar - Long*

**AKSARAY MOTORS AND INDUSTRIES CORP** *The firm was established with the participation of TEMSAN, DESİYAB, TAKSAN and TÜRK-İŞ Confederation. It is manufacturing diesel truck engines*

## HİDROELEKTİRİK SANTRAL KURMA ÇALIŞMALARI

Türkiye'de 3 x 5.5 MW'lık Tercan Hidroelektrik santralını analitik teslimi olarak kurmak üzere Devlet Su İşleri ile bir protokol yapmıştır.

Neyrpic ve Jeumont-Schneider firmaları lisansları ile türbin, generatör ve gerekli teçhizat fabrikalarımızda imal edilerek DSI'ye teslim edilecektir.

## THE ACTIVITIES FOR THE ESTABLISHMENT OF HYDRAULIC POWER PLANT

*A protocol has already been signed between TEMSAN and DSI in order to establish the 3 x 5.5 MW Tercan Hydraulic Power Plant on the turnkey basis.*

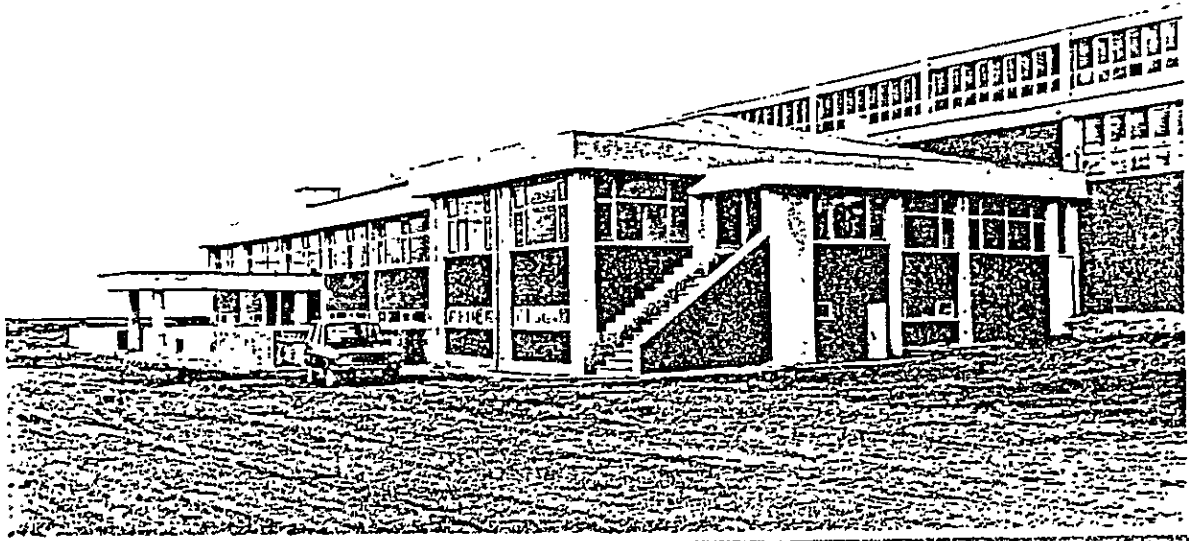
*Turbine generators and related equipment will be manufactured in TEMSAN factories under the licence of Neyrpic and Jeumont - Schneider and delivered to DSI*



# TEMSAN

## DIYARBAKIR SU TÜRBİNİ VE POMPA FABRİKASI

*HYDRAULIC TURBINE & PUMP FACTORY*



### SU TÜRBİNİ VE POMPA FABRİKASI

Fabrikanın kapalı alanı 9000 m<sup>2</sup>'dir. Ayrıca vinç altında 3000 m<sup>2</sup> açık stoklama alanı vardır. İdari ve sosyal tesislerle birlikte toplam kapalı alanı 20.000 m<sup>2</sup>'dir.

Fabrika 5 milyon dolarlık makine ve teçhizatla donatılmış durumdadır. Bugüne kadar yapılan toplam yatırım 11 milyon dolara denktir.

Fabrikada ilk aşamada 20 MW ünite gücüne kadar yılda 9 adet su türbini imal edilecektir. Bu konuda üretim yapmak üzere Fransız NEYRPIC firması ile lisans, mühendislik ve teknik yardım konularını kapsayan bir "Teknik İşbirliği Anlaşması" yapılmıştır.

Fabrikanın personel kadrosu 286'dır. Bu fabrika aynı zamanda mühendislik hizmetleri bakımından 38'i mühendis olmak üzere merkezdeki 100 kişilik kadro tarafından desteklenmektedir.

### HYDRAULIC TURBINES AND PUMPS FACTORY

*Factory has a covered area of 9000 square meters in addition to a stockyard of 3000 square meters equipped with an overhead mobile crane. Its total covered area including administrative and social buildings is 20 000 square meters.*

*Total investment cost is about 11 million US Dollars. This includes 5 million US Dollars worth of machinery and equipment.*

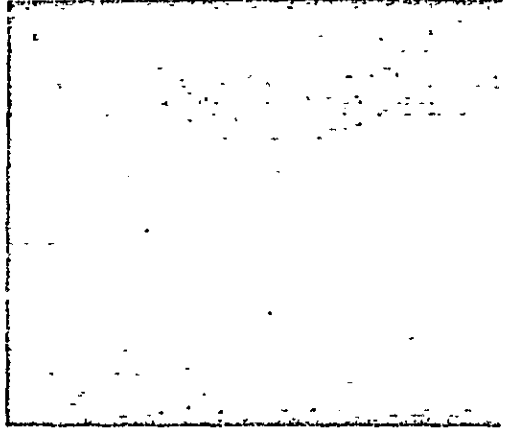
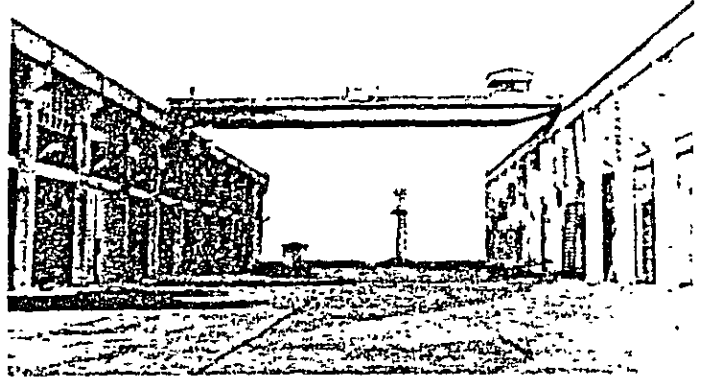
*9 Hydraulic turbines up to 20 MW per unit will be annually manufactured in this factory.*

*For the manufacturing of above mentioned turbines a licence and Technical Cooperation Agreement including engineering services and know-how was signed between TEMSAN and French firm NEYRPIC.*

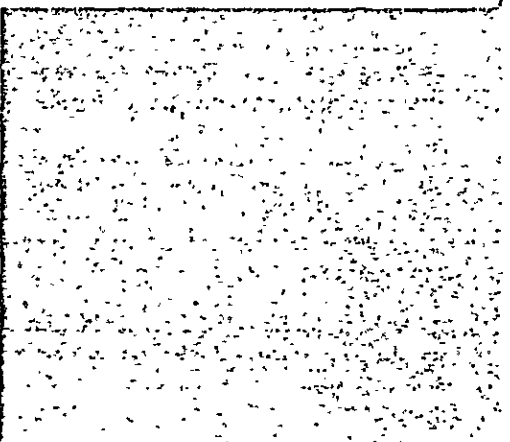
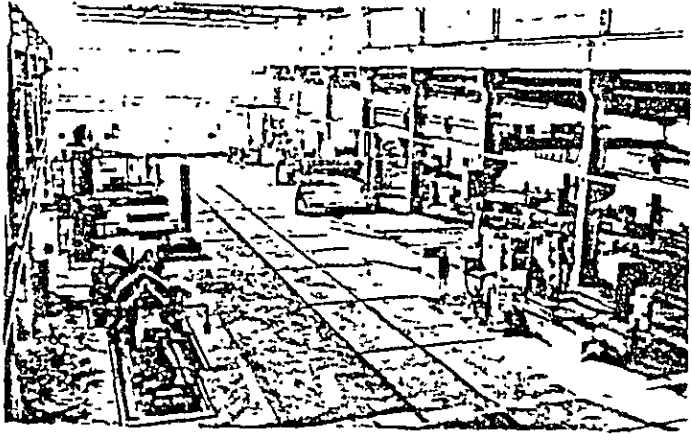
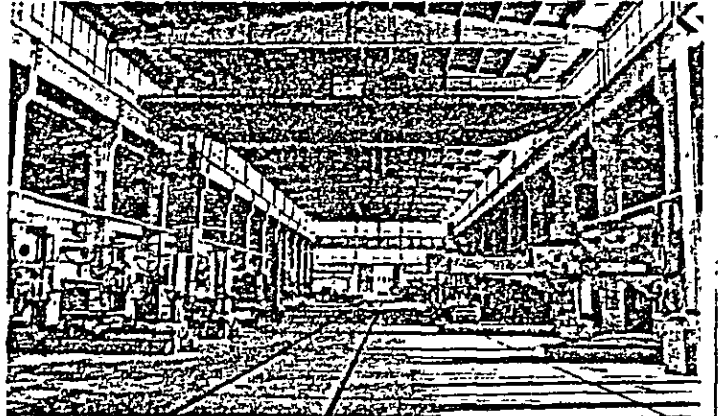
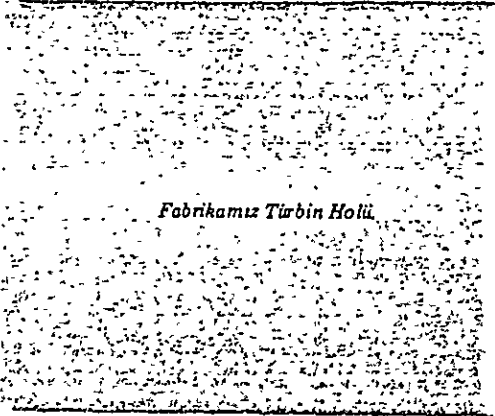
*Man power of the factory will reach 286 in the year 1982. It has the support of 100 qualified personnel including 38 engineers in head office.*



Açık ambar ve stoklama sahası



Fabrikamız Türbin Hali.

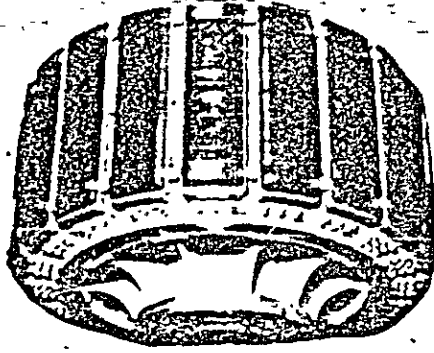




# TEMSAN

## DİYARBAKIR

### GENERATÖR VE MOTOR FABRİKASI



#### GENERATÖR VE MOTOR FABRİKASI

Fabrika bina inşaatı tamamlanmış olup yerli ve yabancı makineler satın alma aşamasındadır. 1983 Yılında üretime geçilecektir.

25 MVA'ya kadar Hidrogeneratör imal edecek olan bu fabrika su turbini ve pompa fabrikası ile entegre edilmiştir.

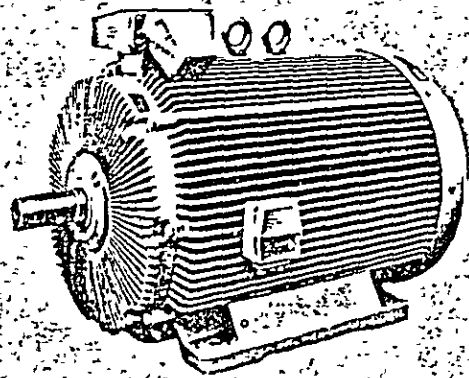
Fabrikanın kapalı alanı 3000 m2 olup ayrıca Turbin fabrikası ile müşterek kullanılmak üzere vinç altında 3000 m2'lik açık stoklama alanı vardır.

Üretim için Fransız JEUMONT – SCHNEIDER firması ile lisans, mühendislik ve teknik yardım konularını içeren "Teknik İşbirliği Anlaşması" yapılmıştır.

#### GENERATORS AND MOTORS FACTORY

*Buildings of this factory have been completed, foreign and domestic machinery will be ordered during 1982. The factory will be commissioned in 1983, and will produce hydro-generators up to 25 MVA per unit.*

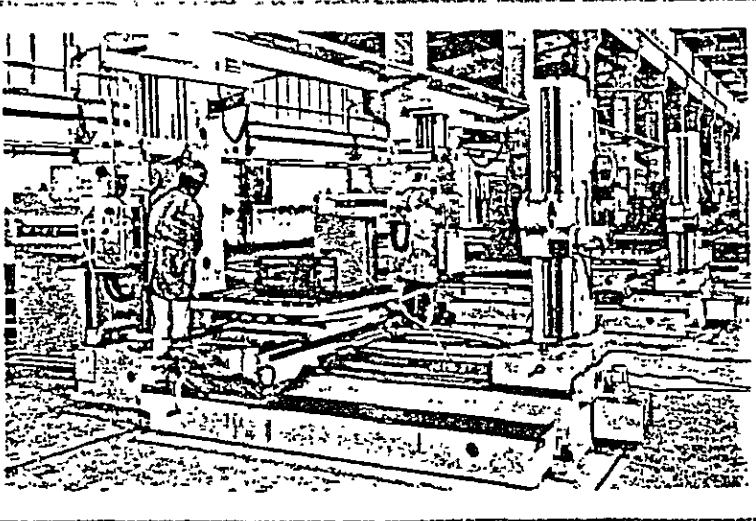
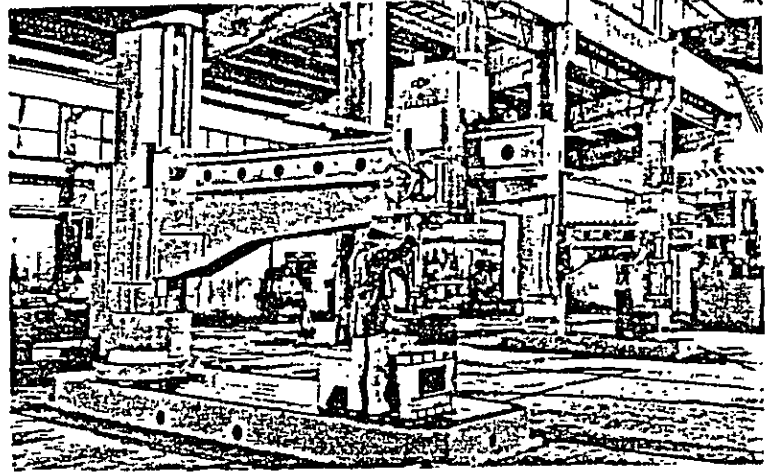
*This factory has a covered area of 3000 square meters and a stockyard of 3000 square meters equipped with an overhead mobile crane which will be used in common with the small water turbines factory. "Agreement of Technical Cooperation" covering licence, engineering and technical assistance aspects of production was signed with French firm JEUMONT-SCHNEIDER.*





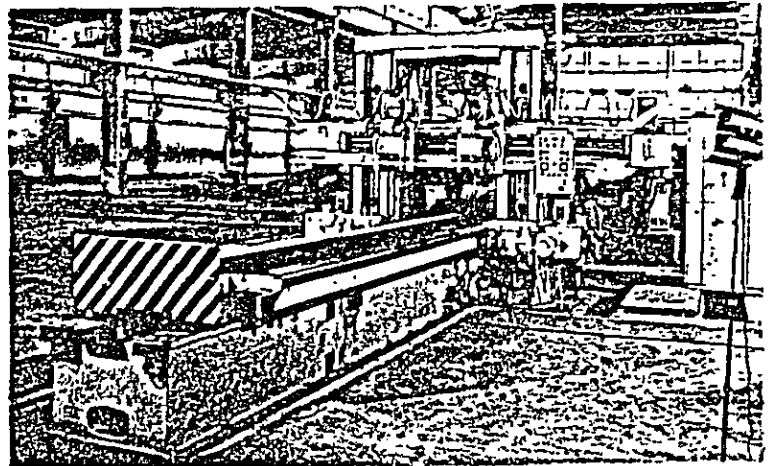
## FABRİKALARIMIZIN İŞ TEZGAHLARINDAN BAZILARI

*Radyal matkap..*



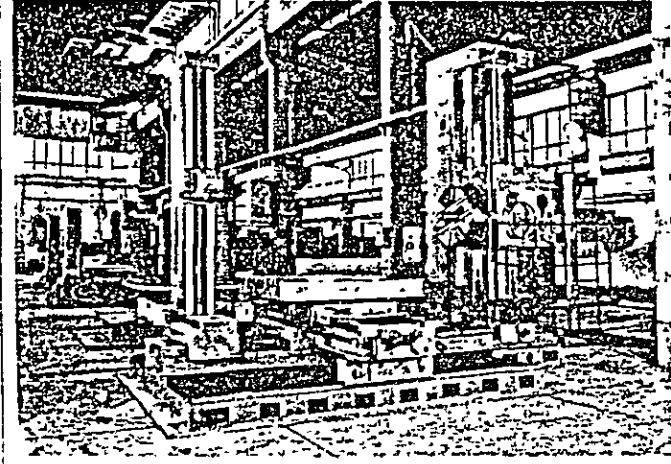
*Yatay delme ve frezeleme tezgahı..*

*Vargel tezgahı..*

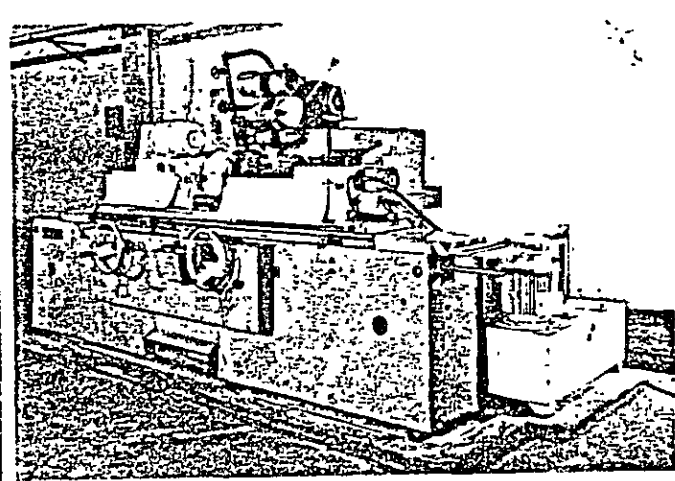




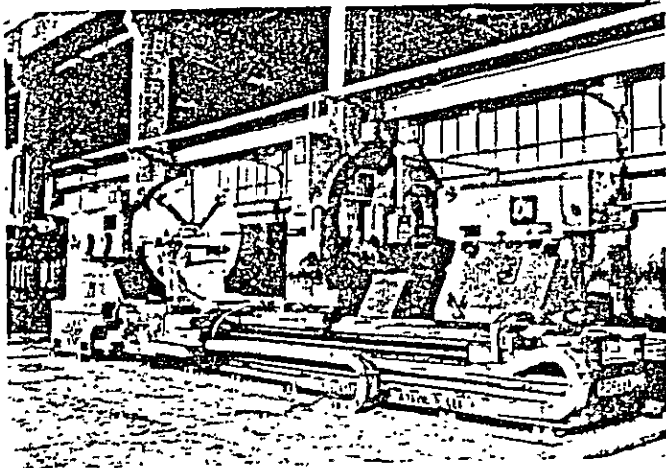
FABRİKALARIMIZIN İŞ TEZGAHLARINDAN BAZILARI



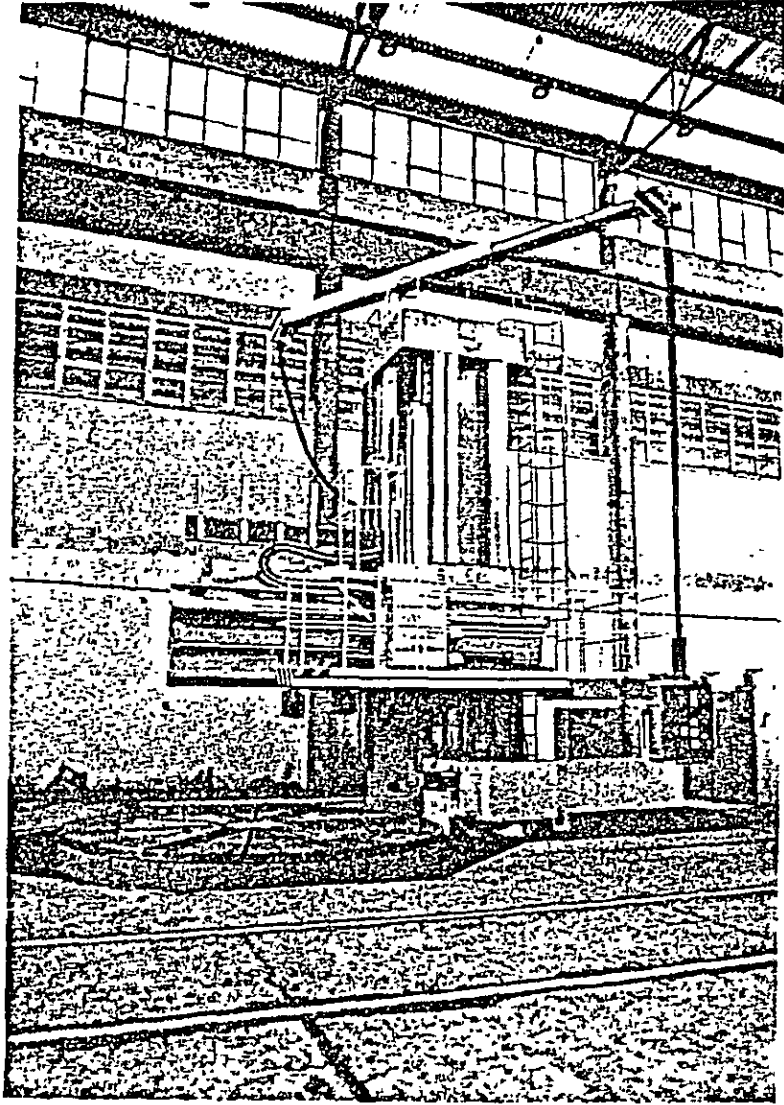
Delme ve frezeleme tezgahı



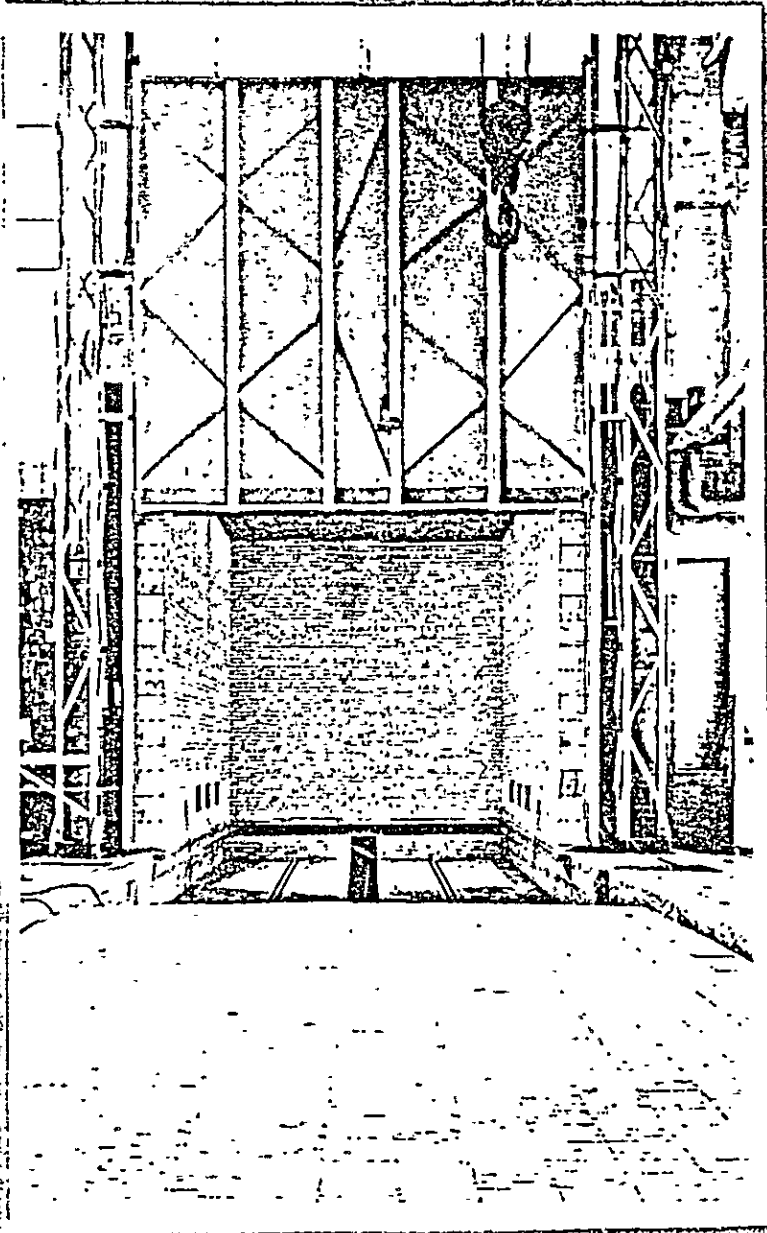
Silindirik taşlama tezgahı..



Yatay torna..



*Dik Torna Tezgâhi*  
(Makâmum tornalama çapı : 10.000 mm.)



*Toulama firini.*



**DIYARBAKIR FABRİKALARIMIZ İŞ TEZGAHLARI LİSTESİ**  
**(MACHINERY & EQUIPMENT LIST OF OUR FACTORIES)**

**YATAY TORNALAR**  
**(HORIZONTAL LATHES)**

| CİNSİ           | PUNTA YÜKSEKLİĞİ | İKİ PUNTA ARASI MESAFE | ADET |
|-----------------|------------------|------------------------|------|
| Üniversal Torna | 250 mm.          | 1500 mm.               | 2    |
| Üniversal Torna | 355 mm.          | 3000 mm.               | 2    |
| Üniversal Torna | 240 mm.          | 2500 mm.               | 2    |
| Üniversal Torna | 250 mm.          | 1000 mm.               | 1    |
| Üniversal Torna | 1000 mm.         | 5000 mm.               | 1    |

**DİKEY TORNALAR**  
**(VERTICAL LATHES)**

| CİNSİ       | İŞ TABLASI ÇAPİ | MAKSİMUM TORNALAMA ÇAPİ | TORNALAMA YÜKSEKLİĞİ | ADET |
|-------------|-----------------|-------------------------|----------------------|------|
| Dikey Torna | 1100 mm.        | 1350 mm.                | 950 mm.              | 1    |
| Dikey Torna | 1250 mm.        | 1400 mm.                | 1150 mm.             | 1    |
| Dikey Torna | 2000 mm.        | 2300 mm.                | 1500 mm.             | 1    |
| Dikey Torna | 2500 mm.        | 2800 mm.                | 2500 mm.             | 1    |
| Dikey Torna | 5000 mm.        | 10000 mm.               | 3150 mm.             | 1    |

**RADYAL MATKAPLAR**  
**(RADIAL DRILLING MACHINES)**

| İŞ MİLİ ÇAPİ | MAKS.YATAY HAREKET | DİKEY HAREKET | ADET |
|--------------|--------------------|---------------|------|
| 70 mm.       | 2000 mm.           | 2200 mm.      | 1    |
| 110 mm.      | 3470 mm.           | 2785 mm.      | 2    |
| 60 mm.       | 900 mm.            | 1250 mm.      | 1    |

**YATAY DELME VE FREZELEME TEZGAHLARI**  
**(HORIZONTAL BORING AND MILLING MACHINES)**

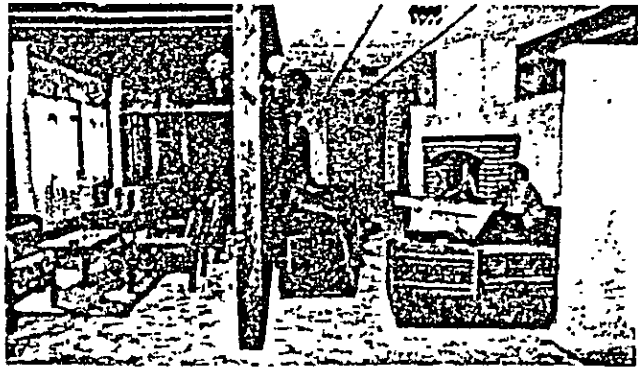
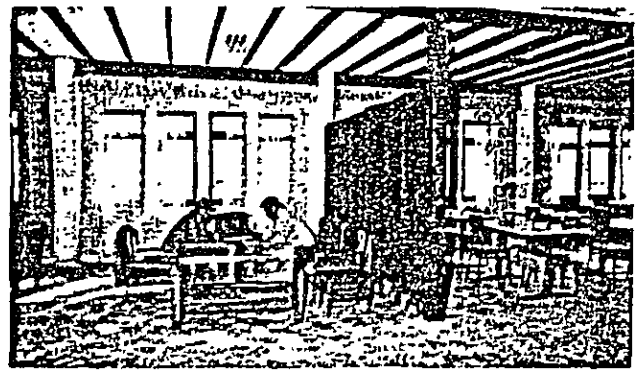
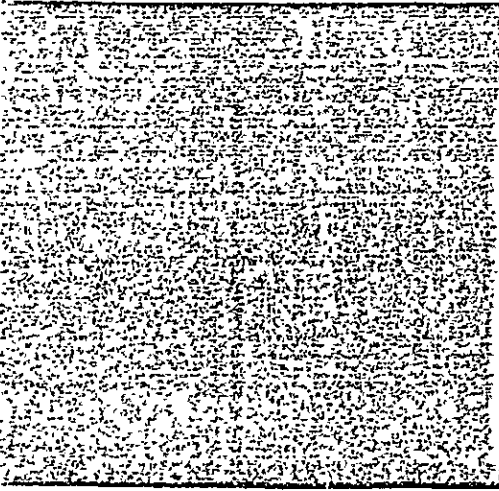
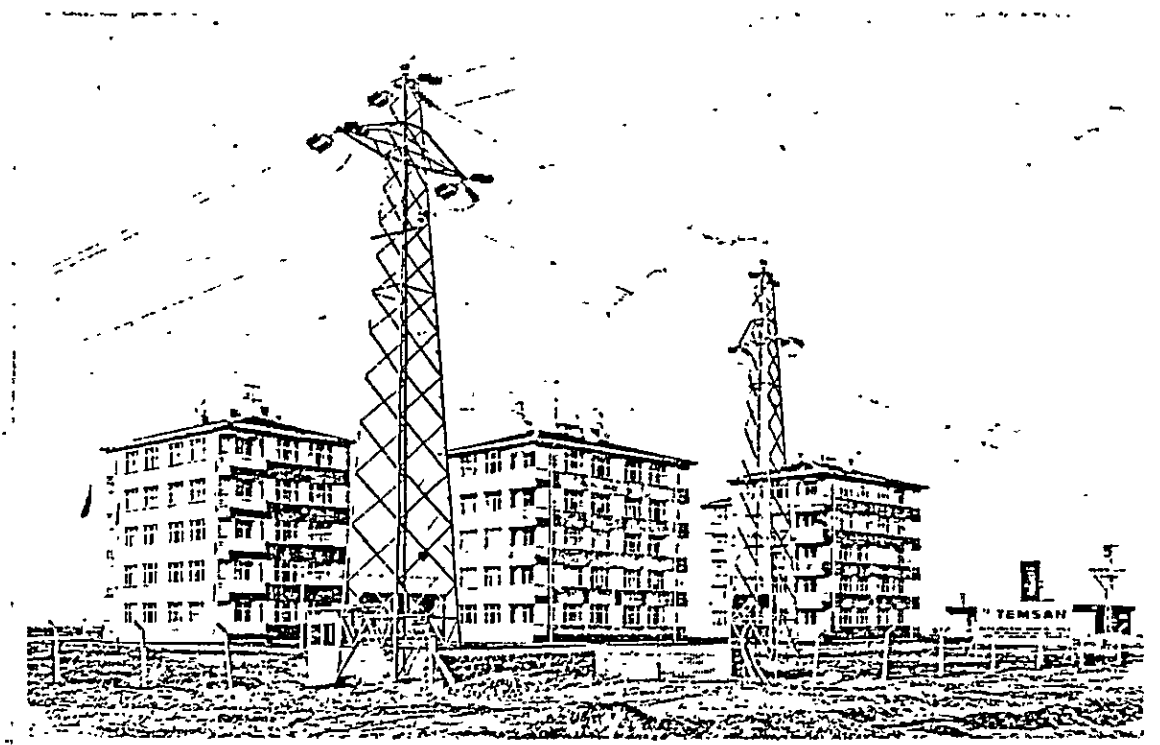
- |    |  |   |
|----|--|---|
| a) | Delme ve frezeleme tezgahı<br>Tablanın Hareketi<br>Tabla Ölçüleri<br>İş mili Çapı  | 2 Adet<br>4 Pozisyonlu<br>1200 x 1500 mm.<br>90 mm.                             |
| b) | Delme ve Frezeleme Tezgahı<br>Tablanın Hareketi<br>Tabla Ölçüleri<br>İş Mili Çapı  | 2 adet<br>4 Pozisyonlu<br>1200 x 1500 mm.<br>120 mm.<br>(3 eksenli hareket var) |
| c) | Hareketli Kolonlu Delme ve Frezeleme Tezgahı<br>İş mili çapı<br>İş milinin boyuna hareketi<br>Ram'in Kesiti<br>Ram'in Yer Değiştirmesi (Düşey)<br>Yatay Yer Değiştirme | 1 Adet<br>130 mm.<br>600 mm.<br>300 x 325 mm.<br>3000 mm.<br>7000 mm.           |
| d) | Planya Tezgahı<br>Kurs Boyu  | 1 Adet<br>500 mm.   |
| e) | Sütunlu matkap tezgahı<br>Delme Çapı   | 3 Adet<br>35 mm.  |



|   |                |                  |
|---|----------------|------------------|
| 5- GAZ KESME MAKİNALARI (GAS CUTTING MACHINES)                |                |                  |
| a) Optik okuyuculu kesme makinesi                             |                | 1 Adet           |
| Hamaç sayısı  |                | 3                |
| Tabla ölçüleri  |                | 2200 x 4000 mm.  |
| b) Kesme Makinesi (El Kumandalı)                              |                | 5 Adet           |
| 6- HİDROLİK GİYOTİN MAKAS (HYDRAULIC GUILLOTINE SHEAR)        |                | 1 Adet           |
| Maksimum kesme kalınlığı                                      |                | 16 mm.           |
| Maksimum Kesme Geniřlięi                                      |                | 3000 mm.         |
| 7- HİDROLİK YÜZEY PRESİ (HYDRAULIC SURFACE PRESS)             |                | 1 Adet           |
| Basma Kapasitesi  |                | 200 Ton.         |
| Tabla ölçüleri  |                | 2030 x 4400 mm.  |
| 8- ABKANT PRESİ (FOLDING AND BENDING PRESS)                   |                |                  |
| Basma Kapasitesi  |                | 400 Ton          |
| Kolonlar arası bükme boyu                                     |                | 3000 mm.         |
| 9- BUKME TEZGAHI (4 silindirli) (BENDING MACHINE)             |                | 1 Adet           |
| Bükülebileceęi malzeme kalınlığı                              |                | 25 mm.           |
| Bükülebileceęi malzeme boyu                                   |                | 3000 mm.         |
| 10- KAYNAK MAKİNALARI (WELDING MACHINES)                      |                |                  |
| a) DC. Döner Kaynak generatörü                                |                | 350 Amp. 10 Adet |
| b) DC. Döner Kaynak generatörü (Gaz ve tozaltı kaynaęı yapar) |                | 600 Amp. 5 Adet. |
| 11- HAVALI EL TAŐI (PNEUMATIC GRINDING)                       |                | 10 Adet          |
| 12- FREZELER (MILLING MACHINES)                               |                |                  |
| CİNSİ   | TABLA EBADI    | ADET             |
| Üniversal freze Tez.  | 225 x 1000 mm. | 1                |
| Üniversal freze Tez.  | 400 x 2000 mm. | 1                |
| Üniversal freze Tez.  | 350 x 1600 mm. | 1                |
| Dık freze Tez.  | 450 x 2000 mm. | 1                |
| 13- TESTERELER (SAWING MACHINES)                              |                |                  |
| a) Kollu Testere  |                | 2 Adet           |
| Kesme kapasitesi  |                | 250 mm.          |
| 14- TAŐLAMA TEZGAHI (GRINDING MACHINES)                       |                |                  |
| a) Silindirik taŐlama tezgahı                                 |                | 1 Adet           |
| TaŐlama çapı  |                | 320 mm.          |
| TaŐlama boyu  |                | 1000 mm.         |
| 15- VİNÇLER (CRANES)  |                |                  |
| a) Gezer Köprü vinci  |                | 3 Adet           |
| Kaldırma Kapasitesi   |                | 5 Ton            |
| Açıklık   |                | 10 m.            |
| b) Gezer Köprü Vinci  |                | 1 Adet           |
| Kaldırma Kapasitesi   |                | 20 + 5 Ton.      |
| Açıklık   |                | 20 m.            |
| c) Gezer Köprü Vinci  |                | 5 Adet           |
| Kaldırma kapasitesi   |                | 20 Ton           |
| Açıklık   |                | 25 m.            |
| 16- FORKLİFT (FORKLIFT)                                       |                |                  |
| Kaldırma yükseklięi   |                | 1 Adet           |
| Kaldırma Kapasitesi   |                | 3 m.             |
|   |                | 6 Ton.           |
| 17- VARGEL TEZGAHI (PLANING MACHINE)                          |                |                  |
| Kurs boyu   |                | 1 Adet           |
| Tabla Ebadı   |                | 4000 mm.         |
|   |                | 1200 x 4000 mm.  |
| 18- TAVLAMA FIRINI (ANNEALING FURNACE)                        |                |                  |
| Ebadı   |                | 1 Adet           |
| Tavlama sıcaklıęı   |                | 5 x 5 x 8 m.     |
| 12 Noktadan elektronik sıcaklık kontrolü                      |                | 750 C            |



# SOSYAL TESİSLER



Lokalden Görünüşler.



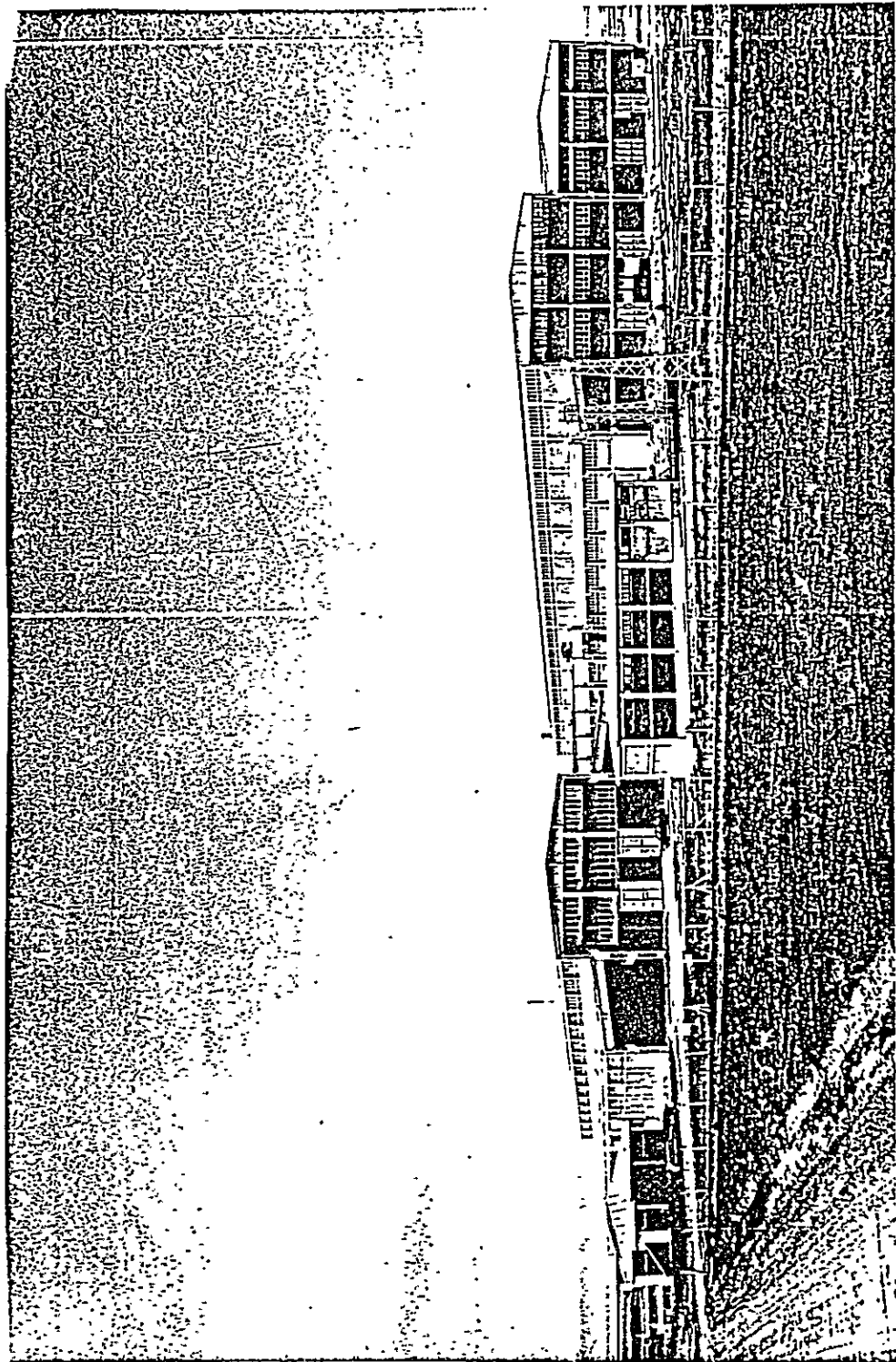
## **FABRIKAMIZIN YARDIMCI TESİSLERİ** **(FACTORY AUXILIARY SERVICES)**

### FABRIKAMIZIN YARDIMCI TESİSLERİ

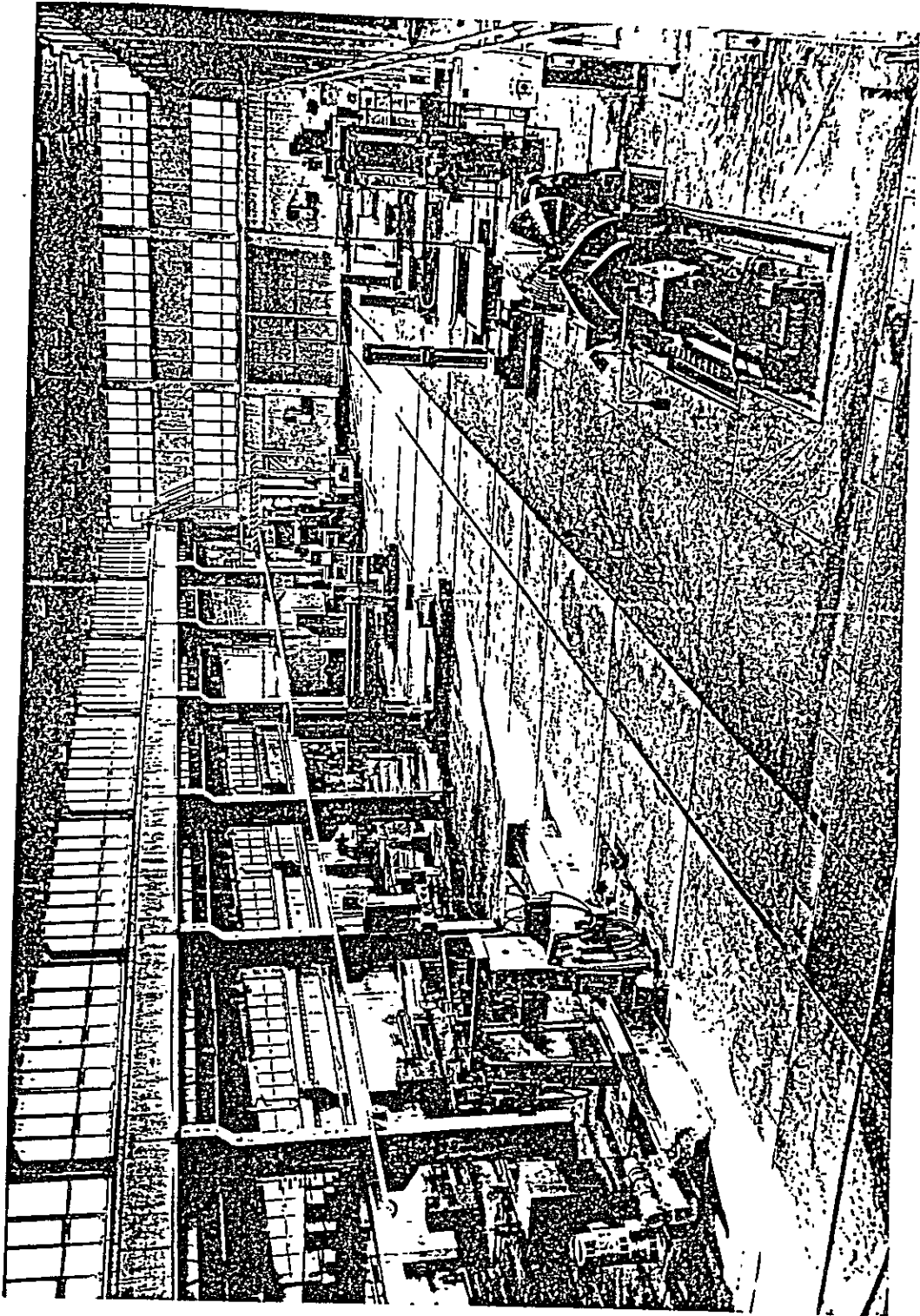
- 400 Tonluk mazot deposu
- 34.5 KV'lık enerji dağıtım merkezi.
- 1000 KVA 34.5/0.4 KV'luk düşürücü Transformator postası
- Kuvvetli ve zayıf akım elektrik tesisatı
- 2 Adet 16 m<sup>3</sup>/dak. 8 Atü basınçlı kompresor istasyonu
- 30 Ton kapasiteli sıvı LPG tankı
- 20 Ton kapasiteli sıvı oksijen tankı
- Gaz dağıtım tesisleri
- Kumlama ve boyama tesisleri
- Test laboratuvarları
- Isı merkezi
- Derinkuyu pompaj istasyonları
- Yemekhane ve sosyal tesisler
- Lojman binaları
- Kantin ve kafeterya
- Kapalı depolar

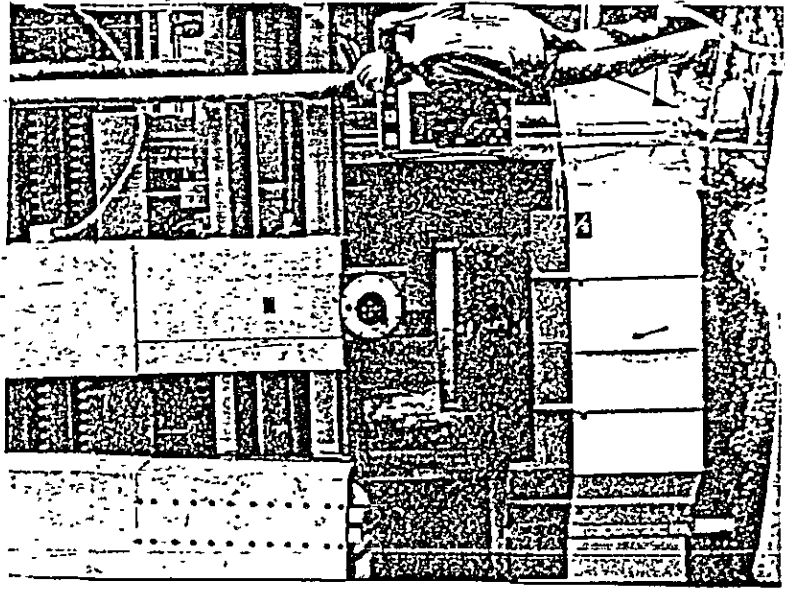
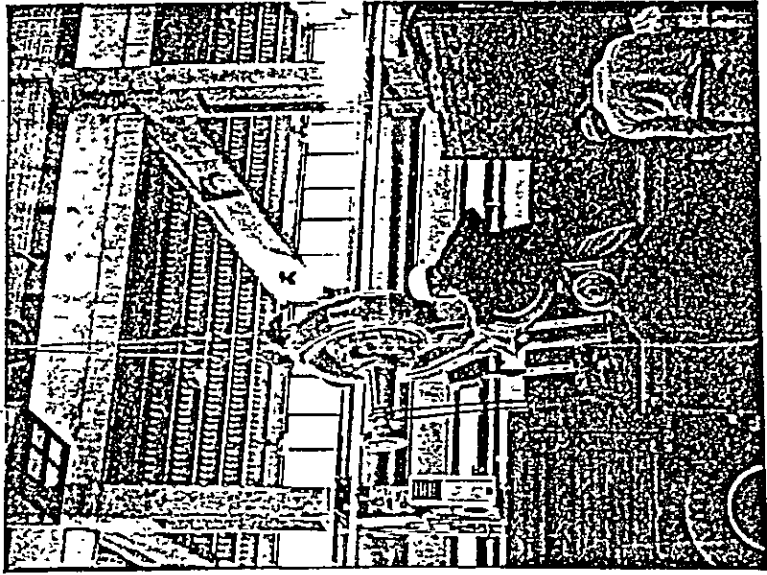
### FACTORY AUXILIARY SERVICES

- 400 Tons fuel storage tank
- 34.5 KV energy distribution center - 2 x 1000 KVA
- 34.5/0.4 KV Transformer station, high and low voltage electrical installation
- Compressor station - 2 x 16 cubic meters/minute, 8 Kg/square centimeters compressors.
- 30 tons LPG tank
- 20 tons liquid oxygen tank.
- Gas distribution installations
- Sand blasting and painting shops
- Test laboratories
- Heating centers
- Deep well pumping stations
- Dining hall and social buildings
- Lodging buildings
- Canteen and cafeteria
- Warehouses









# HOME NEWS

## Chinese chamber to send teams to China, E Europe

By LEE HAN SHIH

THE Singapore Chinese Chamber of Commerce and Industry is planning to send an investment mission to China and a trade mission to Eastern Europe this year.

The Chinese mission, organised under the banner of the Federation of Chambers, will set off within the next few months, subject to government approval.

Although chamber officials declined to reveal the details of the mission, it is likely that the team will explore further possibilities of investing in China's oil and manufacturing industries.

The East European mission, covering East Germany, Yugoslavia, Hungary, Rumania and Czechoslovakia, is planned for the second half of this year.

The chamber's latest

annual report, released yesterday, shows that it admitted 99 companies to its membership last year while 77 left, due to the death of their owners as well as other reasons.

This brought the chamber's corporate membership up to 3,706 at Dec 31, 1983, an increase of 6 per cent from the year before. These companies made up more than half of the chamber's membership.

Total membership — corporate and individual — stood at 5,966, a slight drop of 10 due to attrition. The chamber's 60-man management committee also suffered losses. Mr Hauw Sing King, chairman of Tuck Lee Icework and a long-time

committee member, passed away last Dec 23.

Mr Chng Tok Ngam, chairman of Poh Heng Jewellery and chamber vice-president, passed away in January.

The chamber will be holding a by-election soon to replace these deceased office-holders.

Unlike most other business groups, the Chinese chamber is represented by different dialect groups, with the Fujian (Hokkien) clan enjoying an overwhelming majority.

Almost half (2,382 members or 49.9 per cent) of all chamber members are from the Fujian province. They are followed by the Chaozhou clan (1,447 members or 24.3 per cent), the Guangdong clan (707 members or

11.8 per cent), the Shanghaiese clan (372 members, 6.2 per cent), the Hainanese clan (73 members, 1.2 per cent), the two Hakka clans (264 members, and four non-group members).

As such, the Fujian clan also dominates the management committee.

The Chinese chamber, by far the largest of all chambers of commerce here, has among its members most major Chinese businesses in Singapore.

It also represents the various trade associations, including the Singapore Bakery and Confectionery Trade Association, the Provision Shop Friendly Association, the Singapore Hardware Association and the Singapore Contractors Association.

## Mobil upgrades process unit

A PROCESS unit previously used by Mobil Oil Singapore to remove sulphur content in oil, has been upgraded to produce refined products.

This has given Mobil's refinery greater flexibility to supply varying grades of middle distillates and fuel oil, said a company spokesman yesterday.

Since it was upgraded last month, the new distillate dewaxer unit (MDDW) is giving a middle distillate and petrol yield of 93 per cent and 6 per cent volume respectively. There is one per cent of liquefied petroleum gas.

The MDDW unit at the Jurong refinery is the first of its kind in a Mobil affiliate outside Europe and the US. There is one each operating in China and Japan, but they are under licence by Mobil.

The upgraded unit now has a 6,000 barrel-per-day (bpd) capacity as against the 13,500 bpd capacity when it was doing the simpler de-sulfurisation work. Mobil which has two desulfurisation units, decided to freeze the first plant as it has sufficient working capacity from the other unit.

The year-long conversion — from design to implementation — was carried out by the company's own team of local engineers and marked the first time that a major refinery project here was carried out by local personnel.

## Japanese mission

A THREE-MAN mission from Japan arrived yesterday to discuss the transfer of welding technology with Singapore government officials.

The Japanese government team comprises Professor I Masumoto, from Nagoya National University, Mr K Hayashi, from the Japan International Co-operation Agency (JICA), and Mr H Nomura, general manager of Nippon Kokan K K (NKK) Welding Institute.

The Japanese team will also meet 10 Singaporeans who have been sent to NKK Welding Institute for training to provide an update of the latest in welding technology.

## NZ will maintain troops in region

NEW Zealand will continue to maintain its 800-strong contingent in Singapore as part of its contribution to the Five-Power Defence Pact, which also involves Britain and Australia.

New Zealand Defence Minister David Thomson, who was in Singapore on Tuesday on his way to Brunei to attend its independence celebrations, said that whatever the outcome of Australia's decision on its air force stationed in Malaysia, his country would continue to maintain its commitments to the region.

During his visit to Singapore and Malaysia last week, Australian Prime Minister Bob Hawke had discussed the Australian air force presence in Butterworth with prime ministers of the two countries.

Mr Hawke said he would brief his Cabinet on the issue, which would announce a decision soon after his return to Australia.

Mr Thomson said that New Zealand's troop presence here was made in consultation with Singapore and Malaysia.

## Explosive welding draws interest at exhibition

By JOANNE YAP

INTEREST in explosive welding, a new technique for repairing broken pipelines, has been shown at the 5th Offshore Southeast Asian exhibition now being held at the World Trade Centre (WTC).

ExploWeld AB, the Swedish company possessing the skills, has been approached by a contractor for quotations.

Mr Jan Delersjo, the company's managing director, declined to name the contractor but said that the pipeline to be repaired was located near the WTC 15 metres below the surface of the sea.

The contractor could ei-

ther lift the broken pipeline onto land and repair it or it could repair the pipeline using ExploWeld's method, he explained.

Results should be forthcoming by the end of the week, Mr Delersjo said, and added that the company was considering joint-ventures with several interested parties.

The exploding technique has been used in similar jobs in the North Sea and has proved successful. It eliminates the need to employ a qualified diver who is also a qualified welder to carry out the repairs.

Explosives are placed within the pipes to be mend-

ed and then detonated. The pressure released during the explosion causes the metals to become liquid. The two sections are joined together at this time.

This method was introduced to the European market last year and a market has been established, Mr Delersjo said.

The exhibition has been one way of testing the Far East market, he continued, and response has been good.

Response to the exhibition itself has also been encouraging. On its opening day, more than 3500 visitors attended the event.

The organisers said visitors came from 21 countries.

## Accord holds working meeting

THE newly-formed Advisory Council on Community Relations in Defence (Accord) held its first working meeting at Mindel yesterday.

The council, which comprises people in business, trade unions, the public sector, schools and institutions of higher learning, community organisations and members of parliament, was chaired by the Minister of Defence and Second Minister of Health, Mr Goh Chok Tong.

Two papers were discuss-

ed. One considered the deployment of SAF reservists to the Civil Defence Force and other Total Defence organisations when reservists complete their reservist military service. The other discussed the use of civil resources in times of emergency.

For the concept of Total Defence to be successful, the community has to accept reserve service as a life-long commitment. At present a typical SAF

reservist can expect to complete his in-camp training cycle at between 30 and 35 years of age.

He is therefore still well within the maximum national service age limit of 50 for officers and 40 for other ranks provided for under the Enlistment Act. The Ministry of Home Affairs has already worked out a plan to deploy such reservists in the Civil Defence Force.

The majority will be deployed in constituency based Civil Defence Units.

VITB Training Institutes and Centres

Full-Time Institutes/Centres

Aljunied Vocational Institute  
Mattar Road  
Singapore 1438

Ayer Rajah Vocational Institute  
Vocational Drive  
Singapore 0513

Baharuddin Vocational Institute  
Stirling Road  
Singapore 0314

Boys' Town Vocational Institute  
Upper Bukit Timah Road  
Singapore 2367

Bukit Merah Vocational Institute  
Jalan Lengkok Bahru  
Singapore 0315

Geylang Serai Vocational Institute  
Jalan Turi  
Singapore 1440

Jurong Vocational Institute  
Jalan Boon Lay  
Singapore 2261

Kim Keat Vocational Institute  
Jalan Ampas  
Singapore 1232

McNair Vocational Institute  
Towner Road  
Singapore 1232

Mountbatten Vocational Institute  
Dakota Crescent  
Singapore 1439

National Institute of Commerce  
Prince Edward Road  
Singapore 0207

Pasir Panjang Vocational Institute  
Alexandra Road  
Singapore 0511

Ponggol Vocational Institute  
Upper Serangoon Road  
Singapore 1953

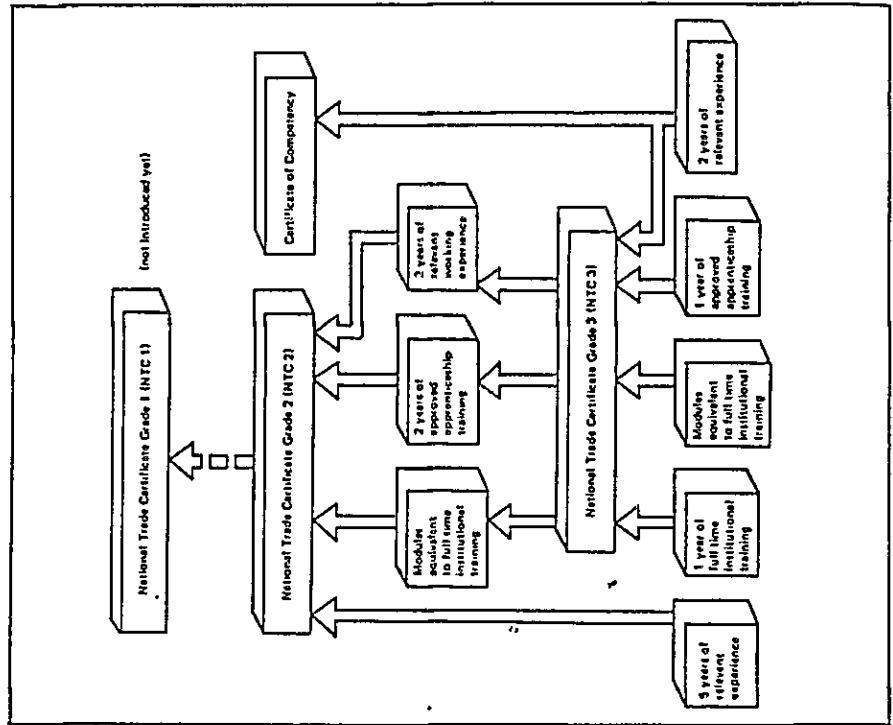
Singapore Technical Institute  
Circuit Road  
Singapore 1337

Singapore Vocational Institute  
Balestier Road  
Singapore 1232

Courses Offered by the VITB

|   |  |
|---|--|
| Diploma in Applied Arts Courses                                 | National Trade Certificate Grade 3 Courses |
| Graphic Design  | Air-conditioning & Refrigeration Mechanics |
| Interior Design   | Boiler/Pipe Fitting & Servicing            |
| Industrial Technician Certificate Courses                       | Building Drafting                          |
| Air-conditioning & Refrigeration Engineering                    | Dressmaking                                |
| Automotive Engineering  | Electrical Fitting & Installation          |
| Electrical Engineering  | Electronics Servicing                      |
| Electronics Engineering   | Furniture Production                       |
| Furniture Design & Production                                   | General Welding                            |
| Mechanical Engineering  | Graphics Reproduction                      |
| Mechanical Engineering Drawing & Design                         | Hairdressing                               |
| Business Studies Courses  | Heavy Duty Diesel Mechanics                |
| Certificate in Business Studies - Accounting                    | Maintenance Fitting                        |
| Certificate in Business Studies - Secretarial Practice          | Marine Fitting                             |
| Preliminary Certificate in Business Studies - Clerical Practice | Mechanical Drafting                        |
| National Trade Certificate Grade 2 Courses                      | Marine Steelwork                           |
| Air-conditioning & Refrigeration Mechanics                      | Men's Tailoring                            |
| Architectural Drafting  | Metal Machining                            |
| Arc Welding   | Motor Vehicle Mechanics                    |
| Boiler/Pipe Fitting & Servicing                                 | Offset Printing                            |
| Civil/Structural Drafting                                       | Pattern Making                             |
| Electrical Drafting   | Plumbing/Pipe Fitting                      |
| Electrical Fitting & Installation                               | Sheetmetal Fabrication                     |
| Electronics Servicing (Digital Equipment)                       | Upholstery                                 |
| Electronics Servicing (Video Equipment)                         | Watch Repairing                            |
| Furniture Production  | Certificate of Competency Courses          |
| Heavy Duty Diesel Mechanics                                     | Barbending                                 |
| Lift & Escalator Mechanics                                      | Bricklaying                                |
| Marine Fitting  | Carpentry (Formwork)                       |
| Marine Steelwork  | Electrical Wiring                          |
| Motor Vehicle Mechanics   | Joinery                                    |
| Plumbing/Pipe Fitting   | Painting                                   |
| Precision Machining   | Pipe Fitting                               |
| Tool & Die Making (Injection Mould)                             | Plastering                                 |
| Tool & Die Making (Press Tool)                                  | Tiling                                     |
| Watch Repairing   | Woodworking Machine Operation              |

The NTC and CoC Systems



However, candidates who fail badly may be barred, for a period of up to one year, from registering for a re-test. The purpose is to allow candidates time to prepare for the re-test.

Candidates who fail in either the practical or the theory part of the test may register for that relevant part only in the re-test.

**AWARD OF CERTIFICATE**

**National Trade Certificate**

Candidates who are successful in passing the practical and theory tests in one sitting will be awarded the full National Trade Certificate.

Candidates who pass only the practical test will be issued the National Trade Certificate indicating a pass in the practical test.

Those who pass only the theory test will be issued a Statement of Result.

There will be no exchange for the full National Trade Certificate for those who pass the practical and the theory tests at separate sittings.

Candidates who pass the practical and theory tests in separate sittings are deemed to have attained the standard equivalent to the full National Trade Certificate.

**Certificate of Competency**

Normally, the Certificate of Competency is awarded to a candidate who is successful in the practical test. In areas where knowledge of the fundamental theory relating to regulations and safety is considered essential, the candidate's performance in both the theory and practical components will be considered in the award of the certificate.

**Lost Certificate**

Certificates are issued only once to successful candidates. If a certificate is lost, no replacement will be made but a certified statement may be issued upon a written request by the applicant.

In submitting this request, the applicant must state his/her name, the National Registration Identity Card or Passport numbers, trade and level of test and the date test was taken.

The applicant may be required to pay an administration fee of \$2.

**FURTHER INFORMATION**

Those who require further information on the trade tests or the certification system may contact:

Tests & Examinations Department  
 Vocational and Industrial Training Board  
 Vocational Drive  
 Singapore 0513  
 Telephone: 7757800 ext 137

## GENERAL WELDING

### National Trade Certificate Grade 3

#### Aim

This course provides training in the fundamental knowledge and skills of arc and gas welding including arc preparation of plate edges prior to welding and welding on mild steel in the various positions.

#### Entry Qualification and Duration

- Completed Primary Education — 2 years.
- Completed Secondary 1 & 2 — 2 years.
- Completed Secondary 3 — 1 year.

Trainees in the two-year course undergo the common Basic Engineering Programme (see page 23) in the first year, before entering this one-year NTC-3 course.

#### Course Outline

|  |              |
|--|--------------|
| <i>Module 1 — Arc Welding I</i><br>Fundamental knowledge and skills in oxy-acetylene flame-cutting, edge preparation of joints and basic arc welding in the downhand position.   | Hours<br>300 |
| <i>Module 2 — Arc Welding II</i><br>Plate edge preparation and more advanced arc welding in the vertical and horizontal positions.   | 300          |
| <i>Module 3 — Arc Welding III</i><br>Reading and interpretation of simple blueprints, welding of various types of joints in the horizontal, vertical and overhead positions and welding of simple flange to pipe joints. | 300          |
| <i>Module 4 — Gas Welding</i><br>Fundamental knowledge and skills in the use of oxy-acetylene welding of equipment for welding various types of joints in the downhand, horizontal and vertical positions.               | 300          |
| Attitudinal Development  | 80           |
| Industrial Safety  | 40           |
| Trade English  | 80           |
| Extra-curricular Activities & Physical Education   | 200          |
| <b>Total</b>   | <b>1,600</b> |

### National Trade Certificate Grade 3 In Arc Welding

#### Job Title Manual Arc Welder

- Nature of Work*
- Welds mild steel manually. Places the workpiece in position, cleans and prepares the plate edges by means of oxy-acetylene cutting equipment where necessary, selects the welding electrodes, connects the welding unit cable to workpiece, regulates the current.
  - May mark off plates before welding according to drawing and other specifications.
  - Observes all safety precautions.

### National Trade Certificate Grade 2 In Arc Welding

#### Job Title Manual Arc Welder

- Nature of Work*
- In addition to the job of the NTC-3 Arc Welder, an NTC-2 Arc Welder:*
- Performs welds on heavier metals.
  - Performs more complex welds and pipe welds.

# SEMBAWANG GROUP OF COMPANIES



**Sembawang Shipyard**  
A fully integrated ship-repair organisation with the most comprehensive facilities in South East Asia.



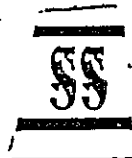
**Sembawang Engineering**  
An international enterprise servicing primarily the offshore oil industry with high quality engineering and construction facilities.



**Sembawang Towing**  
Operates one of the most powerful modern and versatile tug fleets in South East Asia.



**Hedemora Diesel S.E.A.**  
A joint-venture between Sembawang Shipyard Ltd. and A.B. Hedemora Verkstader for the production and assembly of Hedemora diesel engines.



**Sembawang Shipping      Sembawang Shipping Beta**

Owning, managing and chartering sea-going vessels.

The Ayrodev Service Station at Sembawang Shipyard is a 24-hour service. For enquiries after office hours please contact Sembawang Shipyard and ask for the Yard Manager or Electrical Manager.



## SEMBAWANG SHIPYARD LTD.

Sembawang P.O. Box 3, Singapore 27.  
Telephone: 2573511/ 2571121/ 2570461/ 257216 (35 Lines)  
Telex: RS21345    Cable: Semdok Singapore



SUMMARY REPORT OF THE TECHNICAL  
FOLLOW-UP TEAM FOR JICA EX-PARTICIPANTS  
IN WELDING TECHNOLOGY COURSE

I. Introduction

Being dispatched by the Japan International Cooperation Agency as part of its technical follow-up programme for the ex-participants in the Welding Technology Course, the team, consisting of three members headed by Dr. Isao MASUMOTO, professor of Nagoya University, as mentioned below, arrived at Rangoon on the 11th of February, 1984 and conducted its follow-up activities for a period of 5 days.

The team has the pleasure to submit a summary report on the results of its study for the purpose of reference by the officials and engineers of the authorities concerned in the Government of Burma.

II. Team Members

- |                        |   |
|------------------------|---|
| (1) Team Leader:       | Dr. Isao MASUMOTO<br>Professor, Faculty of Engineering,<br>Nagoya UNIVERSITY  |
| (2) Technical Advisor: | Mr. Hirokazu NOMURA<br>Director, Production Engineering Department,<br>Tsu Laboratories, NIPPON KOKAN                       |
| (3) Coordinator:       | Mr. Kazuaki HAYASHI<br>Training Officer, Nagoya International<br>Training Center, JAPAN INTERNATIONAL<br>COOPERATION AGENCY |

### III. Objectives

The dispatch of the team is primarily aimed at reviewing, assessing and evaluating the fruits of the training in Japan by visiting the organizations to which the ex-participants belong, as well as through the personal interviews with ex-participants and their superiors.

The second aim of the team is to have a technical discussion meeting in order to find out the needs, effectiveness and evaluations of the training programme, and to make further improvements for the training course.

### IV. Itinerary

- 11 Feb. PM Arrival at Rangoon from Tokyo via Bangkok.  
Received at the Rangoon Airport by the ex-participants, Major Tin Kyi, deputy director of No. 1 Heavy Industries Corporation, and Mr. Takashima, staff of JICA Rangoon Office.
- 12 Feb. Interview with the ex-participants.  
Reception hosted by Mr. Takeda, director of JICA Rangoon Office.
- 13 Feb. AM Courtesy visit to Foreign Economic Relation Department, Minister's Office (FERD).  
PM Technical Discussion Meeting with all the ex-participants  
Reception hosted by the Follow-up Team.
- 14 Feb. AM Visit to the Burma Dockyard Corporation (BDC).  
PM Visit to the Heavy Industries Corporation (HIC).  
Reception hosted by the ex-participants.
- 15 Feb. AM Visit to the Metal Industries Corporation (MIC).  
PM Leave Rangoon for Ankara.

V. List of Burmese Officials concerned

1. Courtesy Meeting at FERD

- (1) U Khin Maung  
Assistant Director, FERD
- (2) U Hla Pe Than  
Assistant Director, FERD
- (3) U Kyaw Tein  
Additional Director, FERD

2. Technical Discussion Meeting with ex-participants at HIC

- (1) U Tin Win  
Senior Welding Engineer, BDC
- (2) U Aung Min  
Project Engineer, HIC
- (3) U Soe Aung Soe Ya  
Mechanical Foreman, MIC
- (4) U Thein Aung  
Plant Manager, HIC
- (5) U Aung Lwin  
Plant Manager, MIC

(6) U Myint Than  
Plant Manager, HIC

:

(7) U Saw Win  
Assistant Plant Manager, HIC

(8) U Zaw Tint  
Assistnat Plant Manager, HIC

3. Courtesy Meeting at BDC

(1) Commander Thein Tun  
Managing Director, BDC

(2) U Maung Aung  
Planning Engineer, BDC

(3) U Tin Win  
Senior Welding Engineer, BDC

4. Courtesy Meeting at HIC

(1) Lt. Col. Aung Kyi  
Superintendent, HIC

(2) Major Maung Kyi  
Deputy Superintendent, HIC

(3) Ms. Daw Khin May than  
Deputy Superintendent, HIC

(4) U Than Htut  
Assistant Superintendent, HIC

(5) U Aung Min, HIC  
Project Engineer

(6) U Thein Aung  
Plant Manager, HIC

(7) U Myint Than  
Plant Manager, HIC

(8) U Saw Win  
Assistant Plant Manager, HIC

(9) U Zaw Tint  
Assistant Plant Manager, HIC

5. Courtesy Meeting at MIC

(1) Lt. Col. Oung Kyaw  
Managing Director, MIC

(2) U Maung Maung Aye  
Deputy Planning Director, MIC

(3) U Myint Swe  
Assistant Planning Director, MIC

(4) U Nay Myo Nain  
Assistant Engineer, MIC

- (5) U Khin Maung Nyo  
General Manager, Engineering Factory No. 2
  
- (6) U Hlaing Thein  
Deputy General Manager, Engineering Factory No. 2
  
- (7) U Myo Myint  
Planning Engineer, Engineering Factory No. 2
  
- (8) U san Hlain  
Production Engineer, Engineering Factory No. 2
  
- (9) U Aung Lwin  
Plant Manager, Engineering Factory No. 2
  
- (10) U Soe Aung Soe Ya  
Mechanical Foreman, Engineering Factory No. 2

VI. Opinions on the Welding Technology Course and its Follow-up Activities by Ex-participants

On the Welding Technology Course, all the ex-participants agreed to emphasize that it was entirely effective and useful. Especially, its importance and usefulness were recognized by the ex-participants of BDC and HIC, as well as by their superiors. And no particular request was made to further change or to improve it.

On the other hand, follow-up activities, such as a periodic dispatch (at least 3 to 4 years interval) of a technical follow-up team and a continuous supply of latest technical information from Japan, were earnestly requested. The required technical information includes the

Standards of JIS and AWS, catalogues and technical documents concerning to steel materials and welding equipment.

The training of welding instructors who are able to train welders and to maintain high welding skills was strongly requested as well. Establishment of a training course for the welding instructors in Japan or dispatch of experts who are able to train the welding instructors in Burma from Japan is necessary.

VII. The Impression of the Team after the Interview with the Ex-participants and the Visits to the Factories of BDC, HIC and MIC

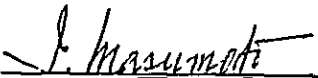
Through the discussions and the visits, the following impressions were recognized by the Team.

1. Not only to continue but also to expand the Welding Technology Course is necessary and effective for the Burmese heavy industries.
2. All the ex-participants are well assigned and actively working with adequate responsibilities in the field of welding engineering, however, the total number of welding engineers in the industries is still in short.
3. Owing to the shortage of the welding engineers and the welding instructors, a wide gap of technological level between the welding engineers (i.e. the ex-participants) and the welders exists. Furthermore, the welding engineers are facing to a lot of welding problems such as welding defects to be solved.
4. Establishment of the Technical Center which functions as a receiver of technical information from JICA, the Japan Welding Society and

the Japan Welding Engineering Society, and in the future, as an organization of testing laboratory or an information center which can answer to questions of the welding engineers in the country is strongly recommended by the Team.

Finally, the Team would like to express sincere appreciation and gratitude to the kindness and cooperation of the FERD, BDC, HIC, MIC, Japanese Embassy and JICA Rangoon Office.

15th of February, 1984



Prof. Dr. Isao MASUMOTO

Team Leader

Technical Follow-up Team  
for JICA Ex-participants of  
The Welding Technology Course



SUMMARY REPORT OF THE TECHNICAL  
FOLLOW-UP TEAM FOR JICA EX-PARTICIPANTS  
IN WELDING TECHNOLOGY COURSE

I. Introduction

Being dispatched by the Japan International Cooperation Agency as part of its technical follow-up programme for the ex-participants in the Welding Technology Course, the team, consisting of three members headed by Dr. Isao MASUMOTO, professor of Nagoya University, as mentioned below, arrived at Ankara on the 16th of February, 1984 and conducted its follow-up activities for a period of 5 days.

The team has the pleasure to submit a summary report on the results of its study for the purpose of reference by the officials and engineers of the authorities concerned in the Government of Turkey.

II. Team Members

- (1) Team Leader: Dr. Isao MASUMOTO  
Professor, Faculty of Engineering,  
NAGOYA UNIVERSITY
- (2) Technical Advisor: Mr. Hirokazu NOMURA  
Director, Production Engineer-  
ing Department, Tsu Laboratories,  
NIPPON KOKAN
- (3) Coordinator: Mr. Kazuaki HAYASHI  
Training Officer, Nagoya Inter-  
national Training Centre, JAPAN  
INTERNATIONAL COOPERATION AGENCY

### III. Objectives

The dispatch of the team is primarily aimed at reviewing, assessing and evaluating the fruits of the training in Japan by visiting the organizations to which the ex-participants belong, as well as through the personal interviews with ex-participants and their superiors.

The second aim of the team is to have a technical discussion meeting in order to find out the needs, effectiveness and evaluations of the training programme, and to make further improvements for the training course.

### IV. Itinerary

- 16 Feb. PM Arrival at Ankara from Rangoon.  
Received at the Ankara Airport by the ex-participants.  
Courtesy visit to Japanese Embassy.  
Dinner invited by the ex-participants.
- 17 Feb. AM Visit to Machinery Industry Agency, M.K.E.K.  
PM Courtesy visit to Bilateral Economical Affairs Department, Ministry of Foreign Affairs.  
Visit to Textile Machinery Factory, M.K.E.K.  
Reception hosted by the ex-participants.
- 18 Feb. AM Visit to Ankara Machine Works, Turkish Sugar Corporation.  
PM Technical Discussion Meeting with all the ex-participants.  
Reception hosted by the Follow-up Team.
- 19 Feb. Interview with the ex-participants.
- 20 Feb. AM Visit to the Headquarter of Turkish Electro-Mechanics Industries Corporation.  
Visit to the Faculty of Engineering, Middle East Technical University.  
PM Leave Ankara for Istanbul.

- 20 Feb. PM Arrival at Istanbul from Ankara.  
Courtesy visit to the Consulate General of Japan.  
Dinner invited by the ex-participants.
- 21 Feb. AM Leave Istanbul for Singapore.

V. List of Turkish Officials Concerned

1. Courtesy Meeting at Machinery Industry Agency, M.K.E.K.

- (1) Mr. Burhan Ersen  
Director, Machinery Industry Agency, M.K.E.K.
- (2) Mr. Orhan Büyükbay  
Assistant Director, Machinery Industry Agency, M.K.E.K.
- (3) Mr. Sinan  
Assistant Director, Machinery Industry Agency, M.K.E.K.
- (4) Mr. Mehmet Yaman  
Design Engineer, Machinery Industry Agency, M.K.E.K.
- (5) Mr. Cengiz Senyen  
Production Engineer, Machinery Industry Agency, M.K.E.K.
- (6) Mr. Ahmet Öney  
Mechanical Engineer, Machinery Industry Agency, M.K.E.K.

2. Courtesy Meeting at Bilateral Economic Affairs Department,  
Ministry of Foreign Affairs

- (1) Ms. Mumin Alanat  
Chief, Bilateral Economic Affairs Department, Ministry  
of Foreign Affairs

3. Courtesy Meeting at Textile Machinery Factory, M.K.E.K.

- (1) Mr. Recep Cetin  
Director, Textile Machinery Factory, M.K.E.K.
- (2) Mr. Orhan Büyükbay  
Assistant Director, Machinery Industry Agency, M.K.E.K.
- (3) Mr. Mehmet Yaman  
Design Engineer, Machinery Industry Agency, M.K.E.K.
- (4) Mr. Osman Durak  
Production Manager, Textile Machinery Factory, M.K.E.K.
- (5) Mr. Hasan Ozyasar  
Production Engineer, Textile Machinery Factory, M.K.E.K.
- (6) Mr. Oguz Ulsay  
Mechanical Engineer, Textile Machinery Factory, M.K.E.K.

4. Courtesy Meeting at Ankara Machine Works, Turkish Sugar Corporation

- (1) Mr. Haluk Direskeneli  
Chief Engineer, Ankara Machine Works, Turkish Sugar Corporation
- (2) Mr. Melih Altunoklar  
Plant Manager, Turkish Electro-Mechanics Industries Corporation

5. Technical Discussion Meeting with Ex-participants at Machinery Industry Agency, M.K.E.K.

- (1) Mr. Orhan Büyükbay  
Assistant Director, Machinery Industry Agency, M.K.E.K.

- (2) Mr. Melih Altunoklar  
Plant Manager, Turkish Electro-Mechanics Industries Corporation
  - (3) Mr. Lutfi Dinç  
Chief Design Engineer, Etibank Aluminum Repair Shop, A.I.M.M.
  - (4) Mr. Mehmet Yaman  
Design Engineer, Machinery Industry Agency, M.K.E.K.
  - (5) Mr. Cengiz Senyen  
Production Engineer, Machinery Industry Agency, M.K.E.K.
  - (6) Mr. Ahmet Öney  
Mechanical Engineer, Machinery Industry Agency, M.K.E.K.
  - (7) Mr. Yalcin Yilmaz  
Mechanical Engineer, Machinery Industry Agency, M.K.E.K.
6. Courtesy Meeting at the Headquarter of Turkish Electro-Mechanics Industries Corporation
- (1) Mr. Necdet Akinciturk  
Director General, Turkish Electro-Mechanics Industries Corporation
  - (2) Mr. Melih Altunoklar  
Plant Manager, Turkish Electro-Mechanics Industries Corporation
7. Courtesy Meeting at the Faculty of Engineering, Middle East Technical University
- (1) Dr. Ekrem Selcuk  
Assistant Dean, Professor, Faculty of Engineering, Middle East Technical University

- (2) Dr. Alpay Ankara  
Professor, Faculty of Engineering, Middle East  
Technical University
- (3) Dr. Hurman Eric  
Assistant Professor, Faculty of Engineering, Middle  
East Technical University
- (4) Dr. Tulay Yosin  
Assistant Professor, Faculty of Engineering, Middle  
East Technical University
- (5) Dr. Selcuk Yahs  
Assistant Professor, Faculty of Engineering, Middle  
East Technical University

VI. Opinions on the Welding Technology Course and its Follow-up  
Activities by Ex-participants

On the Welding Technology Course, all the ex-participants agreed to emphasize that it was entirely effective and useful. Especially, its importance and usefulness were recognized by the ex-participants of Machinery Industry Agency, M.K.E.K. and Turkish Electro-Mechanics Industries Corporation, as well as by their superiors.

And for the further improvement of Welding Technology in Turkey, establishment of an advanced training course in Welding Technology or an opportunity to study at a Japanese university through JICA is requested by them.

On the other hand, follow-up activities, such as a periodic dispatch (at least 3 to 4 years interval) of a technical follow-up team and a continuous supply of latest technical information from Japan, were earnestly requested. The required technical information includes the Standards of JIS and AWS, catalogues and technical documents concerning steel materials, welding consumables, welding processes and welding equipment.

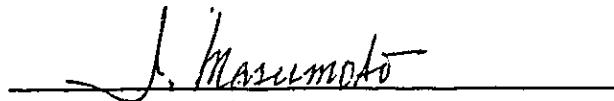
VII. The Impression of the Team after the Interview with the Ex-participants and the Visits to the Factories of M.K.E.K. and Turkish Sugar Corporation, and Middle East Technical University

Through the discussions and the visits, the following impressions were recognized by the Team.

1. The level of Welding Technology in Turkish industries is considerably high, with the exception of the field of mechanization and automation of welding.
2. All the ex-participants are well assigned and actively working with high responsibilities in the field of welding engineering and factory management as well, however, the total number of welding engineers in the industries is still in short.
3. Establishment of the Technical Centre which functions as a receiver of technical information from JICA, the Japan Welding Society and the Japan Welding Engineering Society, and in the future, as the organization of the Welding Engineering Society of Turkey is strongly recommended by the Team.
4. The Faculty of Engineering of Middle East Technical University hopes for dispatch of a teaching staff to a Japanese university to study the higher level of Welding Technology. The Team will find the possibility of his/her acceptance in Japan.

Finally, the Team would like to express sincere appreciation and gratitude to the kindness and cooperation of the Ministry of Foreign Affairs, Machinery Industry Agency of M.K.E.K., Textile Machinery Factory of M.K.E.K., Ankara Machine Works of Turkish Sugar Corporation, Turkish Electro-Mechanics Industries Corporation, Middle East Technical University, the Embassy of Japan and the Consulate General of Japan.

21st of February, 1984

A handwritten signature in cursive script, reading "I. Masumoto", is written over a solid horizontal line.

Prof. Dr. Isao MASUMOTO

Team Leader  
Technical Follow-up Team  
for JICA Ex-participants of  
the Welding Technology Course



SUMMARY REPORT OF THE TECHNICAL  
FOLLOW-UP TEAM FOR JICA EX-PARTICIPANTS  
IN WELDING TECHNOLOGY COURSE

I. Introduction

Being dispatched by the Japan International Cooperation Agency as part of its technical follow-up programme for the ex-participants in the Welding Technology Course, the team, consisting of three members headed by Dr. Isao MASUMOTO, professor of Nagoya University, as mentioned below, arrived at Singapore on the 22nd of February, 1984 and conducted its follow-up activities for a period of 4 days.

The team has the pleasure to submit a summary report on the results of its study for the purpose of reference by the officials and engineers of the authorities concerned in the Government of Singapore.

II. Team Members

- (1) Team Leader: Dr. Isao MASUMOTO  
Professor, Faculty of Engineering,  
NAGOYA UNIVERSITY
- (2) Technical Advisor: Mr. Hirokazu NOMURA  
Director, Production Engineering Department,  
Tsu Laboratories, NIPPON KOKAN
- Coordinator: Mr. Kazuaki HAYASHI  
Training Officer, Nagoya International  
Training Centre, JAPAN INTERNATIONAL  
COOPERATION AGENCY

### III. Objectives

The dispatch of the team is primarily aimed at reviewing, assessing and evaluating the fruits of the training in Japan by visiting the organizations to which the ex-participants belong, as well as through the personal interviews with ex-participants and their superiors.

The second aim of the team is to have a technical discussion meeting in order to find out the needs, effectiveness and evaluations of the training programme, and to make further improvements for the training course.

### IV. Itinerary

22 Feb. PM Arrival at Singapore from Ankara.

Received at Changi International Airport by the ex-participants and Mr. Mizobuchi, Director of JICA Singapore Office.

Reception Hosted by Mr. Mizobuchi, Director, JICA Singapore Office.

23 Feb. AM Courtesy visit to the Embassy of Japan.

Courtesy visit to the Public Service Division, Ministry of Finance.

PM Technical Discussion Meeting with all the Ex-participants, and Collected News Materials by Singapore Broadcasting Corporation (TV Channel 5) and a News Reporter of a Newspaper.

Dinner invited by the ex-participants.

24 Feb. AM Visit to the Head Office of Vocational and Industrial Training Board (VITB).

Visit to Ayer Rajah Vocational Institute.

PM Visit to Sembawang Shipyard Limited.

Reception hosted by the Follow-up Team.

25 Feb. AM Interview with the ex-participants.

PM Leave Singapore for Tokyo.

V. List of Singaporean Officials Concerned

1. Courtesy Meeting at the Public Service Division, Ministry of Finance

(1) Mr. Tan Boon Huat

Director, Public Service Division, Ministry of Finance

(2) Mr. Jeffrey Teong

Deputy Director, Public Service Division, Ministry of Finance

(3) Mr. Lee Kat Kan

Assistant Director, Public Service Division, Ministry of Finance

(4) Miss. Tan Mui Ngoh

Training Coordinator, Public Service Division, Ministry of Finance

2. Technical Discussion Meeting with all the Ex-participants at the Regional Language Centre

(1) Mr. Putharaju Naidu

Head, Welding and Sheet Metal Department, Vocational and Industrial Training Board

- (2) Mr. Ong Peng Seng  
Product Manager, ESAB Singapore Pte. Limited
- (3) Mr. Heng Yau Hua  
Senior Welding Engineer, Sembawang Shipyard Limited
- (4) Mr. Ong Geck Choon Gerald  
Welding Instructor, Sembawang Shipyard Limited
- (5) Mr. Lee Tong Seng @ Lee Tong Toh  
Training Officer, Vocational and Industrial Training Board
- (6) Mr. Loy Jit Ming  
Training Officer, Vocational and Industrial Training Board

3. Courtesy Meeting at Vocational and Industrial Training Board

- (1) Mr. Tan Hong Choon  
Manager, Staff Development, Vocational and Industrial Training Board
- (2) Mr. Lam Kee Yue  
Curriculum Development Officer, Vocational and Industrial Training Board
- (3) Mr. Lew Yew Tong  
Curriculum Development Officer, Vocational and Industrial Training Board
- (4) Mr. Mok Soh Ham  
Curriculum Officer, Vocational and Industrial Training Board

(5) Mr. Lim Weng Keh  
Curriculum Officer, Vocational and Industrial Training Board

4. Courtesy Meeting at Sembawang Shipyard Limited

(1) Mr. Loke Ho Yong  
Director, Personnel Department, Sembawang Shipyard Limited

(2) Mr. Chan Chee Hoe  
Personnel Officer, Sembawang Shipyard Limited

(3) Mr. Heng Yau Hua  
Senior Welding Engineer, Sembawang Shipyard Limited

(4) Mr. Ong Geok Choon Gerald  
Welding Instructor, Sembawang Shipyard Limited

VI. Opinions on the Welding Technology Course and its Follow-up Activities by Ex-participants

On the Welding Technology Course, all the ex-participants agreed to emphasize that it was entirely effective and useful. Especially, its importance and usefulness were recognized by the ex-participants of Vocational and Industrial Training Board and Sembawang Shipyard Limited, as well as by their superiors.

And for the further improvement of Welding Technology in Singapore, establishment of an advanced training course in Welding Technology which includes welding design, quality control and quality assurance was requested by them.

On the other hand, follow-up activities, such as a periodic dispatch (at least 3 to 4 years interval) of a technical follow-up team and a continuous supply of latest technical information from Japan, were earnestly requested. The required technical information includes the Standards of JIS and AWS, catalogues and technical documents concerning steel materials, welding consumables, welding processes and welding equipment.

VII. The Impression of the Team after the Interview with the Ex-participants and the Visits to Vocational and Industrial Training Board and Sembawang Shipyard Limited

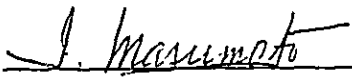
Through the discussions and the visits, the following impressions were recognized by the Team.

1. The training programmes for welders of Vocational and Industrial Training Board and Sembawang Shipyard Limited are highly developed and well carried out.
2. The level of welding technology which is applied in the heavy industries of Singapore, such as constructions of high-rise buildings, shiprepairing including modifications of pressure vessels, fabrications of off-shore structures and so on is considerably high. However, nevertheless quality of welding owes much to welding designs, supervisions of welding engineers and skills of welders, importance of the rolls of welding engineers is not recognized in Singapore and the most part of welding engineering including welding designs, material selections and quality assurances are transferred from foreign companies.
3. It is essentially important to establish welding engineering and to educate welding engineers. From this point of view, the universities of Singapore are strongly requested to endeavour to study welding

technology and to educate welding engineers. Japan International Cooperation Agency (JICA) will be possible to cooperate with you in this field.

Finally, the Team would like to express sincere appreciation and gratitude to the kindness and cooperation of the Ministry of Finance, Vocational and Industrial Training Board, Sembawang Shipyard Limited, the Embassy of Japan and JICA Singapore Office.

25th of February, 1984



---

Prof. Dr. Isao MASUMOTO

Team Leader

Technical Follow-up Team  
for JICA Ex-participants of  
the Welding Technology Course







JICA