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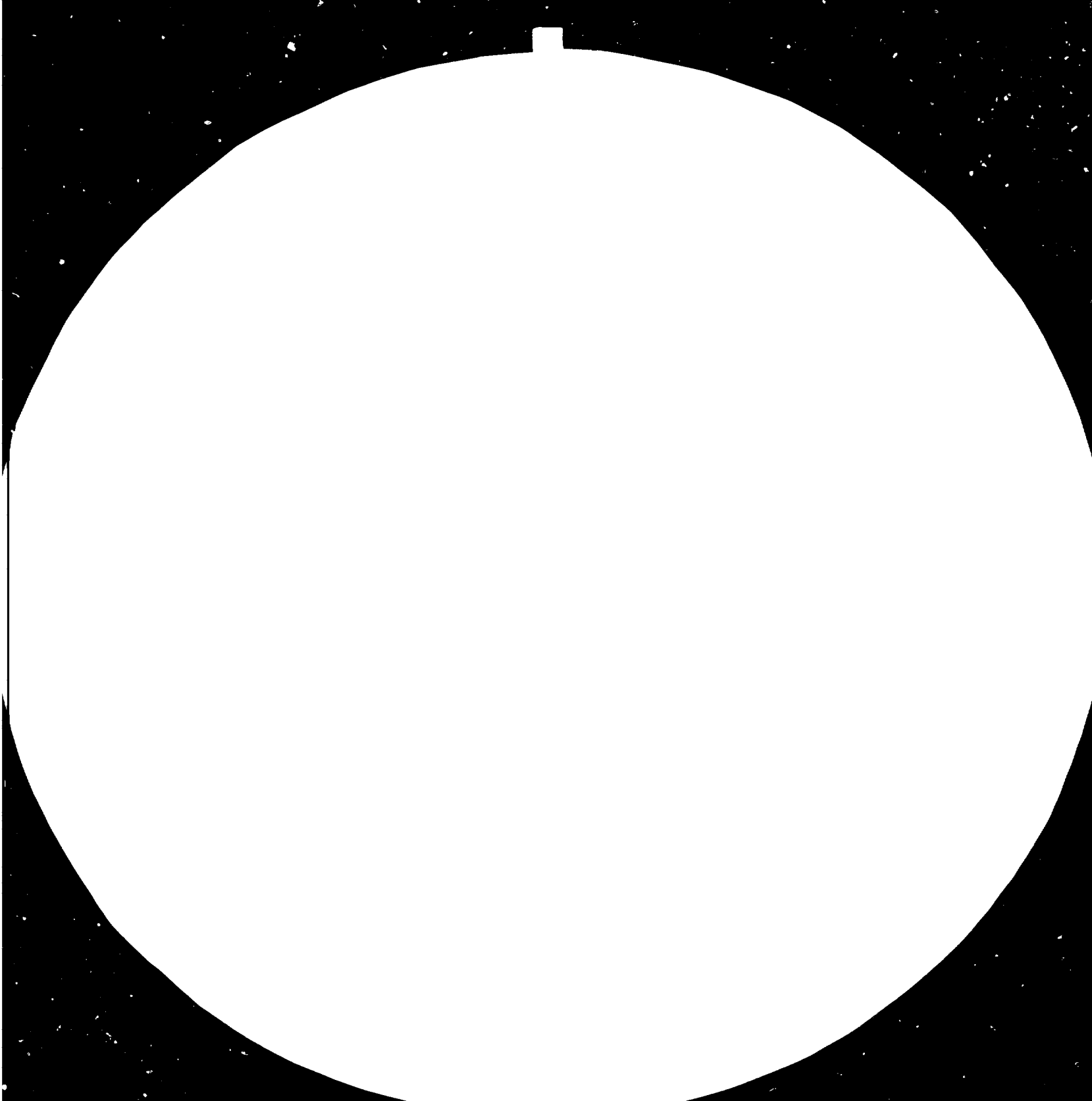


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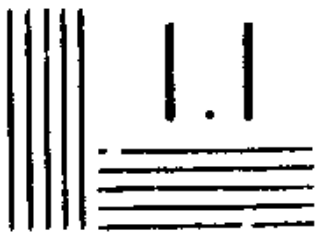
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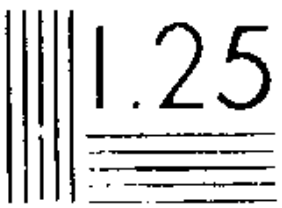
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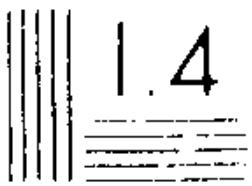
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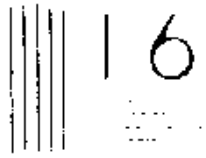
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9 April 1983

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ASSISTANCE TO THE GOVERNMENT OF THE
DEMOCRATIC REPUBLIC OF AFGHANISTAN

Project : SI/AFG/82/802

Afghanistan

INDUSTRIAL ADVISER ON A
DEMONSTRATION FOUNDRY PLANT
WITH INTEGRATED FORGING SECTION

Terminal Report
An Opportunity Study

Prepared for the Government of the
Democratic Republic of Afghanistan

by

BOGDAN A. SZYDLO
Expert in Foundry Plants
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna

This report has not been cleared with the United Nations Industrial Development Organization (UNIDO) which does not, therefore, necessarily share the views presented.

EXPLANATORY NOTES

1. Afghan Year starts on 21st of March and ends on 20th of March, twelve months later. Current Afghan Year is 1362 (21 March 1983 to 20 March 1984).

2. National currency in Afghanistan is "Afghani" for one unit, and "Afghanis" for two or more units; abbreviated form of it is "Afs".

3. Present (April 1983) exchange rate is :

   1 US $ = 55.00 Afs.

   United Nations operational rate of exchange (since March 1983) is :

   1 US $ = 92.00 Afs.

4. DRA - Democratic Republic of Afghanistan.

5. MMI - Ministry of Mines and Industries.

6. BTES - Board for Techno-Economical Studies, Planning Department, Ministry of Mines and Industries.

7. DFP - Demonstration Foundry Plant.

ACKNOWLEDGEMENTS

The author of this Report gratefully acknowledges the continued assistance and cooperation made available during the period of this study by several officers of the Government of Afghanistan, among whom special mention should be made of the following in particular :

1. Mr. E. KAWA	President, Planning Department, Ministry of Mines and Industries.
2. Eng. A. NASIR	General Director, Planning Department, Ministry of Mines and Industries.
3. Mr. E.A. SULTAN	Deputy Director, Board for Techno-Economical Studies, Planning Department, Ministry of Mines and Industries.
4. Mr. D.M. ALEPI	BTES Member
5. Mr. A.A. AZIZI	BTES Member
6. Mr. A. IBRAHIMI	BTES Member
7. Eng. ZALMAI	BTES Member
8. Mr. A. SAMANDER	Director General, State Planning Committee.

The author of this Report would like to thank Mr. INGOLF SCHUETZ-MUELLER, UNDP Resident Representative and Mr. H. YARI, Programme Officer, UNDP, in Kabul for valuable guidance, support and assistance which were afforded to him in this study and for their excellent administrative arrangements.

The author would also like to express particular appreciation for the valuable guidance, remarks, comments and advice which had been provided to him by Mr. STANISLAW R. GAJOWSKI, UNIDO Officer in Charge at the UN Planning Team, and all the Experts, especially Mr. I. MILEV and Mr. K.S. PATHAK.

ABSTRACT

The Project "Industrial Adviser on a Demonstration Foundry Plant with Integrated Forging Section" (SI/AFG/82/802) has to examine the status of the foundry industry in Afghanistan and to assess the need for casted and forged parts in other sectors of industry; to assess the demand for agricultural tools and implements.

The six months duration project has been realized from 17 October 1982 to 16 April 1983 (in Afghanistan, from 22 October 1982 to 9 April 1983).

The study of the foundry and forge industry in Afghanistan has been carried out. The present and future capacities of the foundries and forge shops has been estimated. The study of the market conditions for casted and forge parts has been prepared. The market consumer survey for casted and forge parts has been conducted in such industrial branches as mining, cement, textile and wool, construction, agriculture, transport and public works, irrigation, rural development for drinking water and local market (bazaars). The present (1983) demand for castings and forge parts has been identified as 4,400 tons castings and 2,500 tons forged parts. The demand for 1990 is forecasted as 9,250 tons of castings and 2,500 tons of forge parts.

The present capacities of the foundry industry have been identified as 700 tons of castings and that of the forge industry as 3,000 tons of forge parts. The forecasted capacities for 1990 have been estimated as 2,500 tons in the foundry industry and as 3,000 tons in the forge industry.

The capacities of the foundry industry are much behind the present and future demand for castings and it is highly recommended to increase the foundry capacities by establishing a new foundry. The capacities of the forge industry are higher than the demand for forged parts and so at present there is no need for its further development. The pre-investment assessment for establishing a new Demonstration Foundry with a capacity of 1,500 tons has been carried out.

A draft project document for the further UNDP/UNIDO assistance to the foundry industry has been prepared.

TABLE OF CONTENTS

INTRODUCTION

In view of the rapidly growing import of cast and forge parts, especially parts for coal mines, cement industries and textile factories, the Government of DRA has given high priority to the establishment of a modern foundry. Further demand for grey iron and steel castings was also envisaged, particularly for centrifugal pipes, fittings, water pumps bodies, valves, household facilities such as heating stoves, agricultural implements and others. The overall demand for castings and forging was roughly estimated at 10,000 tons, with a value of approximately US $ 30 million per year. By establishing a modern foundry, the demand for spare parts and casted products could partly be satisfied by local production.

The eventual establishment of the foundry required a reasonably clear assessment of the present and projected products mix, in terms of casting weight, size, type, metal and quantity. This type of data, however, was lacking and should be developed before planning and establishing the foundry. The Government of DRA has recognized this deficiency and requested assistance in carrying out such a market survey, on 12 January 1981. In January 1982, UNIDO prepared a project proposal, which has been approved by the UNIDO's Division of Industrial Operations, on 12 January 1982, in Vienna.

The Expert arrived at Kabul on 22 October 1982 on a six months assignment as Expert on Demonstration Foundry Plant with Integrated Forging Section for the UNIDO Project SI/AFG/82/802 "Industrial Adviser on a Demonstration Foundry Plant with Integrated Forging Section"

within UNIDO Special Industrial Services. The appropriate job description SI/AFG/82/802/11-03/31.8.D is attached hereto as Annex 1.

The Expert has been assigned to the Board for Techno-Economical Studies (BTES) at the Planning Department of the Ministry of Mines and Industries (MMI) in Kabul.

The Expert's main task was to examine the status of the foundry industry in Afghanistan and to assess the need for cast and forge parts or semi-ished products in other sectors of industry; to assess the demand for agricultural tools and implements.

II. RECOMMENDATIONS

1. The carried-out studies of the foundry industry in Afghanistan and the conducted market consumer survey for castings have shown a very high deficiency in the capacities of the foundries, which have been identified as 3,700 tons in 1983 and 6,750 tons in 1990, and will have to be imported. In order to decrease this high deficiency, new foundry capacities will have to be established. A new demonstration foundry with a capacity of 1,500 tons of good castings per year could much contribute to the increase in the production capacities of the foundry industry.

It is highly recommended to establish such a demonstration foundry. The prepared pre-investment assessment for such a demonstration foundry estimates the total investment cost as about 250 million Afghanis equivalent to US $ 4.5 million, for which foreign exchange of US $ 2.8 million will be required. A draft project document for the UNDP/UNIDO technical assistance for the establishment of the demonstration foundry has been prepared. The immediate objectives of this project consist of preparation of feasibility study and engineering designs as well as the supervision of the construction and commissioning and training of the technical staff.

2. The existing foundry industry in Afghanistan utilized in the last year its production capacity only in 60 per cent by one shift work. This was mainly due to lack of skilled, semi-skilled manpower, deficiency in basic raw materials such as coke and pig iron and deficiency in electrical energy.

The improving of these deficiencies would much contribute to the increase of the production of the foundry industry without any additional investment costs, although the production will still remain far behind the demand.

3. The studies of the forge industry and the market survey for forged parts have shown that the present and future (1990) production capacities (3,000 tons) of the forge industry in Afghanistan are slightly higher than the identified demand (2,500 tons) and so there is, at present, no need for further increasing the forge industry's capacities.

4. If the demonstration foundry is established, an agreement would have to be reached with the Jangalak Mechnical Works for assistance in a comprehensive training of skilled and semi-skilled workers for this new foundry.

5. In order to make the best use of the locally available iron and steel scrap, the basic domestic raw material for the foundry industry, a specialized State agency or a commercial enterprise should be established to collect, sort out and process the scrap to a form adaptable for the melting units of the foundry as well as the planned-to-be-established mini-steel plant.

6. As high quality moulding sand is available in at least two identified sites, i.e. Koh-i-Alburz and Chashman-Shafa in the Balkh province and Taluqan as well as Tala-Bar-Pak in the Baghla province, the establishment of a sound digging and processing plant would be highly recommended. The plant should dig the sand and process it (sorting, screening) according to the requirements of the foundry industry. Such a plant would much contribute to the improvement of the quality of the castings produced by the domestic foundries.

7. Further geological surveys for deposits of moulding sand - mainly quartz sand as well as bentonite - should be continued and intensified in the Kabul region in order to meet the needs of the foundry industry in the capital area and reduce the transportation cost of the good moulding sand from the Balkh and Baghla provinces, which are about 500 km far from Kabul.

8. The present crucial situation in the supply of the electrical energy in the Kabul area resulted in the steel castings being dropped from the production programme of the planned-to-be-established demonstration foundry. But, if the situation concerning the supply of electrical power should improve and the estimated demand for about 700 kW could be provided for the demonstration foundry, the set up position programme should be reviewed and the steel castings included into it. This would also require the additional installation of a 250 kW medium frequency induction furnace of the capacity of 650 kg per hour, for which the space has been planned in the lay-out of the demonstration foundry.

III. FINDINGS

1. After the Expert's arrival in Afghanistan, the discussions with the Ministry of Mines and Industries (MMI) made it clear that the Government would like to establish a Demonstration Foundry Plant (DFP), but without the Forging Section, as the demand for forged parts is expected, at present, to be met fairly fully. Instead of the Forging Section, the Government would like the establishment and inclusion into the DFP, a Mechanical Workshop for machining some of the rough castings, which would require machining. This has been approved by the Metallurgical Industries Section in Vienna. After completing the market survey for forged parts, where the demand has been identified as rather low, the Forging Section has been dropped out from the next stage of the Expert's studies, but a small mechanical workshop has been taken into consideration.

2. As requested by the Government, the Expert prepared a work programme, which, in principle, is in line with the Expert's job description. This work programme has been approved by the Government and is attached hereto as Annex 2.

3. The existing situation in Afghanistan made it impossible for the Expert to move outside of the industrial area of Kabul. Also the instructions from the UNDP Resident Representative in Kabul did not allow the international United Nations personnel to move outside the exact prescribed areas, which is in practice only Kabul. In such a situation, the Expert was not able to get personally in touch with other industrial centres in the provinces such as Gulbahar, Herat, Mazar-i-Sharif, Pule Khumri, Kunduz,

Kandahar and Shebergan, where the foundry industry also exists. In the provinces, among others, there exist the whole mining and cement, fertilizer, ginneries and press industries of Afghanistan. But even so, some information has been collected concerning the foundry industries which exist outside of Kabul, based upon reports and oral information given to the Expert by the Government authorities, so far as they are available.

4. Four counterpart members of the BTES had been assigned to the Expert. The counterparts have been particularly useful in assisting the Expert in the consumer market survey studies concerning the demand for castings and forge parts, in Kabul area as well as Mazar-i-Sharif.

A. Study of the Foundry Industry in Afghanistan

5. A thorough study of the existing foundry industry in Afghanistan has been carried out and is attached hereto as Annex 3.

6. The present foundry industry consists of eight identified foundries in Kabul and two in the provinces. The detailed description of the identified conditions of the foundry industry has been worked out and is attached hereto as Annex 4.

7. Production data concerning the identified foundries have been collected and are presented in Annex 5 attached hereto. The present capacities of the foundries have been estimated as 700 tons per year/580 tons in Kabul and 120 tons in the provinces/ and the last year's production of the foundries in Kabul was identified as 348 tons. In this production, cast iron participated in 84.7 per cent and the non-ferrous metals in 15.3 per cent. The produced castings have been utilized by the cement, construction, irr[illegible]tion, transport, public works, textile and wool indust[illegible]ell as the local market (bazaars).

8. At present, the foundries (except Jangalok) are facing a high deficiency of skilled workers as well as difficulties in the supply of raw materials such as coke, pig iron and others. Lack of availability of these basic utilities, particularly electricity, makes the production of castings very difficult.

9. In the country are available some of the basic raw materials for the production of the foundry industry like metallic scrap, high-quality moulding sand, and some others. But, in order to make full use of them, they have to be processed into the most useful form.

10. The produced castings are not of high-quality in respect of its function (leaking of fittings) as well as general accuracy of size and surface quality (appearance).

11. In general, the technical level of the foundry industry is at present the appropriate one for the existing conditions.

12. The castings produced by the domestic foundry industry at present in the existing conditions, even though are not of top quality, do very much support to the national economy and therefore there is full justification to continue the efforts for the development of this industry, particularly as the demand for castings is very high and far exceeds the production capacities of this industry.

B. Study of the Forge Industry in Afghanistan

13. A detailed study of the forge industry in Afghanistan has been worked out and is attached hereto as Annex 6.

14. The forge industry in Afghanistan has been at present identified as consisting of one forge division for own needs and maintenance purposes established at one big industrial company (Jangalok) and small forge shops, say, rather smitheries, estimated as about ten thousands in number and located in the villages and the bazaars.

14. The forge division in Jangalak Mechanical Works is manufacturing some very simple forged products only for its own use, according to the needs of its own production or maintenance services.

15. The smitheries manufacture various products, mainly agricultural tools and implements, for sale in the local market, satisfying the needs of the rural population in this respect.

The yearly production of the smitheries has been estimated as 3,000 tons and its manpower as consisting of 35 thousand men.

The raw material used by the smitheries is steel scrap as well as charcoal, which are available in the country at present and for many hears ahead.

16. At present, it seems that there is no need for increasing the production capacities of the forge industry in Afghanistan, because the existing smitheries all over the country are manufacturing the agricultural tools and implements in the needed quantities and satisfying the demand of the market.

C. Study and Assessment of the Market Conditions for Cast and Forge Parts

17. The study and the assessment of the market conditions for the casted and forge parts have been prepared and is attached hereto as Annex 7.

18. At the request of the Government, the Expert evaluated the Questionnaire prepared by the Government and completed by eleven industrial enterprises, "The Industrial Questionnaire for the Year 1360" (Annex 8), which was supposed to provide all the information needed for the market survey. The data provided by the eleven companies did not contain the expected information for the study and assessment of the present and future demand for castings and forge parts.

19. In this situation, the Expert decided to launch a consumer market survey by himself and prepared a new questionnaire "Information Concerning the Demand and Market Studies of Castings and/or Forge Parts in the Enterprises", for the time-period from 1982 to 1990. This prepared new questionnaire is attached hereto as Annex 9.

20. In close cooperation with the Government authorities, the present and future consumer industries have been identified. The consumer survey has been realized in such industrial branches as mining, cement, textile and wool, construction, agriculture, transport and public works, irrigation, rural development for drinking water and local market (bazaars). Due to the situation existing at present in Afghanistan, and the limited possibilities of surveying outside of Kabul,

an appropriate sampling policy has been established. This sampling policy has also taken into consideration such components as the technical level of production and the available machinery and equipment.

As the industries selected for surveying are of various types and much different from one another, the consumer market survey in each industrial branch has been performed in a different way.

21. A detailed survey for castings in the textile industry had been launched in four carefully selected sample factories following the set sampling policy. Based on some available catalogues of the textile machinery, on personal inspections of the stores at the weaving and knitting shops as well as many discussions with the technical staff, the yearly demand for casted spare parts has been identified, piece by piece, at all the four sample factories. The number has been estimated as 549 different castings. All the identified casted spare parts with their sizes, unit weights and required numbers per year are given in the attached hereto Annexes 14, 15, 16 and 17, separate for each sample factory.

22. The demand for casted pipes and fittings has been collected at each of the eight existing construction units in the country and is presented in detail in the Annexes 18, 19 and 20 attached hereto.

23. More details concerning the launched market consumer survey in other selected branches of industry are given in Annex 7 attached hereto.

24. The Expert paid more than 130 visits to 60 various Ministries, Government institutions, offices, organizations

and state-owned and private companies and factories in order to identify the demand for castings and forge parts. The detailed specifications of the institutions surveyed by the Expert are attached hereto as Annex 10. The market demand has been discussed with many persons which are specified in Annex 11.

25. As the result of the launched consumer market survey, the present and future demand for the year 1990 has been identified as following :

- 4,400 tons of castings in 1983 and 9,250 tons in 1990

- 2,500 tons of forged parts in 1983 and 2,500 tons in 1990.

The detailed specifications are given in the attached hereto Annex 21.

26. This market survey made it very clear that the present and future (1990) demand for castings in Afghanistan is very high. As the production of the local foundry industry is at present around 350 tons only, and after 1986 the production capacity is expected to increase upto 2,500 tons, so there will remain a huge quantity of about 4,000 tons in 1983 and 6,750 tons in 1990 of castings to be imported.

27. In such a situation increasing the production capacities of the foundry industry is most recommended and the establishment of a new foundry is fully justified.

28. As the market demand for forge parts has been identified as 2,500 tons and the estimated production

capacities (Annex 6) are 3,000 tons, there is at present no need for further development of the production capacities of the forge industry.

29. The assessment of the market conditions for castings and forge parts is given in details in the attached hereto Annex 7.

The market conditions existing at present for castings will not create any problems for the existing factories for many years ahead.

30. Based on the identified high demand for castings, the future development of the foundry industry is going to be a very crucial factor for the development of other domestic industries.

31. The identified market position of the castings and the comparatively low production capacity of the foundry industry call for the establishment of a new foundry, which should be a demonstration foundry with a capacity of 1,500 tons. The functions of such a demonstration foundry have been worked-out and are specified in the attached hereto Annex 22.

D. Pre-investment Assessment of establishing a new foundry

32. The pre-investment assessment of establishing a new demonstration foundry has been prepared and is attached hereto as Annex 29.

The capacity of the DFP has been estimated as 1,500 tons per year of good castings including :

- 1,100 tons grey cast iron including 340 tons centrifugally casted pipes;
- 300 tons malleable cast iron;
- 60 tons aluminium and its alloys; and
- 40 tons bronzes.

33. The recommended production programme for the DFP has been prepared and is attached hereto as Annex 25. The quantitative and qualitative specifications of castings recommended for the production programme of the DFP have been worked-out and are given in attached hereto Annex 23.

34. The break-down of the production programme of the DFP due to weight groups, sizes and types of castings has been prepared and is given in attached hereto Annexes 26, 27 and 28.

35. On the basis of the detailed production programme, the appropriate technology has been elaborated. It is proposed that the to-be-established DFP should consist of four basic divisions such as the pattern making workshop, the iron foundry, the non-ferrous metals foundry and the machinery and maintenance workshop. The worked-out technology includes the melting processes to be done in the cupola and oil-fired reverberatory furnace for grey

and malleable iron and in the oil-fired crucible furnace for aluminium and bronze. The patterns will have to be manufactured in the pattern-making workshop. It is anticipated that the workshop will manufacture both woodden and metallic patterns. The moulding will have to be done in green sand in flasks and in the floor. Flaskless moulding with self-hardening sand has also to be applied. The centrifugally casting equipment has been planned for the casting of pipes. The filling and cleaning will have to be done by abrasive blasting as well as grinding and cutting by hand-saws and chisels. The castings of the malleable cast iron and some of the pipes will have to be heat-treated in an oil-fired heat-treatment furnace.

The appropriate inspection according to the requirement of the castings will have to be performed.

The machining of some of the rough castings has been foreseen. More information concerning the production technology is attached hereto as Annex 29.

36. The required machines and equipment have been estimated and are specified in Annex 31. Basing on European price level, the cost of machines and equipments including freight and installations has been estimated as 143,550,000 Afghanis equal to US$ 2,610,000.

37. The fenced area of the DFP has been assumed at 38,400 square metres (240 m x 160 m) and the total covered area is estimated as 6,000 square metres. The general layout has been prepared and is attached hereto as Annex 30.

38. After careful studies and consultations with the Government authorities, it is proposed to establish the DFP in Puli Charkhi, the industrial park area of Kabul.

39. The manpower required for the full production of the DFP was estimated as 168 including 12 staff-members. More detailed information concerning the manpower are given in Annexes 29 and 32.

40. For the next stage of the preparation of this project, a considerable foreign technical assistance will be required in planning, designing, establishing and implementation.

41. At present the foundry industry is facing a very high deficiency of manpower. It is assumed that at the time the DFP will be established, i.e. after a few years, only the general manpower will be available, but the skilled and semi-skilled will not be available.

42. The modernisation of Jangalak's foundry in 1984 to 1986 includes a wide and comprehensive training programme for skilled and semi-skilled workers, such as moulders, core-makers, melters, etc. The authorities of Jangalak's Mechanical Works declared willingness for considering the assistance in the training of the personnel for the DFP. Such an assistance would make much easier the systematic training problem of skilled and semi-skilled workers for the planned-to-be-established demonstration foundry.

43. Besides the domestic training, also an overseas group training for the staff has been foreseen, but it is assumed that it will have to be financed by outside sources.

44. The detailed financial evaluation of the establishment of the DFP is given in Annex 32. The most important financial figures as well as commercial profitability factors are :

Yearly Sales:

Iron castings	1,400 tons	Sales	147,000,000 Afs
Non-ferrous metal castings	100 tons	Sales	22,000,000 Afs
		Total Sales	169,000,000 Afs
		equals US $	3,072,727

2. Total Production Costs		117,830,000 Afs
	equals US$	2,142,364
3. Gross Profit		51,170,000 Afs
	equals US$	930,364
4. Net Profit		39,843,000 Afs
	equals US$	724,418
5. Personnel		
Total personnel		168
including		156 labour
6. Total Investment Cost		250,052,000 Afs
	equals US$	4,546,400
including		
- Fixed capital		214,005,000 Afs
- Working capital		36,047,000 Afs
of which foreign exchange	US$	2,843,068
7. Capital return		4.33 years
8. Profit variation ratio		0.542
9. Break-even Point (BP)		95,601,476 Afs
	equals US$	1,738,209
10. Break-even Point (BP) as per unit of yearly sales		56.57 %
11. Rate of Return		25.93 %
12. Repayment period		3.0 years

45. At this stage of project development and under the prevailing circumstances, it is impossible to envisage firm financial arrangements for funding the demonstration foundry project in Afghanistan. Presently a number of obstacles and constraints do exist towards undertaking a serious initiative aimed at negotiating the financial assistance.

46. One of the possible ways of financing is specified in Annex 29, but in brief it consists of -

45 per cent long-term soft loan
10 per cent supplier's commercial credit
30 per cent regular government development budget
15 per cent short-term loan from local bank.

47. The life of the planned-to-be-established demonstration foundry has been taken as twenty years.

48. The project - if implemented - will bring certain economic benefits at the national level. These benefits could be used to compare it with other development projects and enable the Government to establish further priorities.

49. Three of the main economic benefits arising from this project - if implemented - are :

- production of 1,500 tons of iron and non-ferrous metals castings of a total value of 169 million Afs,
- foreign exchange savings estimated at US$ 2,108,000, and
- job creation.

50. Other general social and economic benefits expected to be derived from the DFP may be quoted as :

- indirect positive effects on other casting-consuming sectors of economy such as textile, construction, agriculture, transport, public works and irrigation, industries, etc.

- utilization of a domestic raw material (metal scrap), which is relatively abundant in the country and which otherwise would gradually be degraded in value due to the influence of natural and human factors.

E. Draft Project Document

51. A draft project document covering the further UNDP/UNIDO assistance to the foundry industry including a detailed plan of implementation, training requirements, sub-contracting the feasibility study as well as the engineering design together with the technical documentation has been prepared and is attached hereto as Annex 34.

III. ANNEXES

UNITED NATIONS

Annex 1.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO 21 May 1982

Request from the Government of the Democratic Republic of Afghanistan

for Special Industrial Services

INTERNAL

JOB DESCRIPTION

SI/AFG/82/802/11-01/31.8.D

Post title: Expert in Demonstrative Foundry Plants with Integrated Forging Sections

Duration: Six months

Date required: As soon as possible

Duty station: Kabul

Purpose of project: To examine the status of the foundry industry in the country and to assess the need for cast and forge parts or semi-finished products in other sectors of industry; to assess the demand for agricultural tools and implements.

Duties: The expert will be assigned to the Ministry of Industry and, in close collaboration with the concerned government authorities, will determine the most effective form and content of UNIDO assistance to the country in developing the foundry and forge industries. More specifically, the expert will be expected to:

1. Carry out a detailed study, including a description of the conditions of the foundry and forge industries;

2. Study and assess the market conditions for cast and forge parts;

3. Determine the quantative and qualitative specifications of the cast and forge parts recommended for future manufacturing;

4. Make a pre-investment assessment of establishing a new foundry and forge plant with particular reference to the following:

   a) availability of metal scrap and other local raw materials such as silica sand, fire-clay, limestone graphite, etc.;

.../..

b) import regulations and transport conditions of industrial raw materials imported from abroad such as pig iron, ferro-alloys, steel profiles, steel ingots, etc.;

c) manpower requirements;

d) availability of electrical power, and other sources of industrial fuel, i.e.oil, coal, coke, etc.;

5. Draft a project document covering Phase II of UNDP/UNIDO assistance to the foundry/forge industries including a detailed plan of implementation, training requirements, sub-contracting, a feasibility study and an engineering design together with technical documentation.

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

Qualifications — Metallurgical Engineer, with extensive industrial experience in metal transforming technologies related to foundry, forging, extruding and heat-treatment techniques; some experience in developing countries an asset.

Language — English

Background Information — In view of the rapidly growing import of cast and forge parts especially parts for coal mines, cement industries and textile factories, the Government has given high priority to the establishment of a modern foundry and forge unit. Further demand for grey iron and/or steel castings is also envisaged particularly for centrifugal pipes, fittings, water pump bodies, foot valves, household facilities such as heating stoves, agriculture implements, etc. The overall demand for castings and forgings is roughly estimated at 10,000 tons, with a value of approximately US$ 30 million per year. By establishing a modern foundry/forge plant, demands for spare parts and cast products could partly be satisfied by local production.

The eventual establishment of the foundry industry would require a reasonably clear assessment of the present and projected products mix, in terms of casting size, type, metal, quantity, etc. This type of data, however, is lacking and should be developed before planning and establishing the foundry and forge plant. The Government has recognised this deficiency and is requesting assistance for carrying out such a market survey.

Annex 2

[illegible]

1. Mr. Ingolf A. SNOEIG, UNIDO-Expert in Demonstrative Foundry Plants with Integrated Forging Sections is assigned to the Ministry of Mines and Industries, Department of Planning - Board for Technico-Industrial Studies for a period of six months.

2. The main goal of this assignment is:

   TO ELABORATE THE MOST EFFICIENT FORM AND CONTENT OF UNIDO-ASSISTANCE TO THE DEMOCRATIC REPUBLIC OF AFGHANISTAN IN DEVELOPING THE FOUNDRY AND FORGE INDUSTRIES.

3. More specifically the expert plans:

   3.1. to carry out a detailed study with the description of the conditions of the existing foundries and forge industries up to 15 November 1982.

   3.2. to study and assess the market condition for cast and forge parts in the Democratic Republic of Afghanistan in terms of casting sizes, weights, types, alloys, quantities with particular reference to the mining-, cement- or textile - industries as well as the water supply authorities, the agriculture implements, the automotive spare parts, fittings, foot valves, water pump bodies, household facilities (heating stoves, grates, oven doors, boiling containers etc.) up to 10 January 1983.

   3.3. to determine the quantative and qualitative specifications for the castings and parts to be forged - recommendations for future manufacturing up to 20 January 1983.

   3.4. to identify investment opportunities/a part of pre-investment assessment/for establishing a new foundry with forge section including the machinery workshop for machining of cast- and forged parts with particular preference to

3.4.1. availability of local raw materials such as pig iron, cast iron scrap, steel scrap, ferro-alloys and consumables, refractories (high grade silica-alumina), chemicals, silica sand for moulding, binders (bentonite, resins, organic components), clay, graphite etc.

3.4.2. import regulations and transport conditions of industrial raw materials imported from abroad such as pig iron, ferro-alloys, steel ingots, steel profiles etc.

3.4.3. Manpower requirements.

3.4.4. availability of electric power and other sources of industrial fuel such as oil, coal, coke etc.

up to 5 March 1983.

3.5. to draft a project document covering phase II of the UNDP/UNIDO technical assistance to the foundry and forging industries including a detailed plan of:

- implementation
- training requirements and
- sub-contracting the feasibility study, the engineering design and the technical documentation

up to 25 March 1983.

3.6. to prepare the final report, setting out the findings of the mission and recommendations to the Government of the Democratic Republic of Afghanistan on further action which might be taken up to 10 April 1983.

Annex 3

STUDY OF THE FOUNDRY INDUSTRY

IN AFGHANISTAN

1. The existing situation in Afghanistan at the Expert's arrival to Afghanistan made him possible to move only within the boundaries of the capital Kabul set down very exactly by the UNDP-Office.

In such a situation this study refers only to the existing foundry industry in Kabul and does not include in details the foundries in other places of the country like Gulbahar, Herat, Kunduz, Kandahar.

However, the expert has been told that in fact at this time outside of Kabul there are being operated only two foundries at the Government-owned estates AFGHAN TEXTILES in Gulbahar and SPINZAR GENNERIES and PRESS in Kunduz, hence this study may be considered as covering the country as a whole.

2. The expert identified in Kabul area eight existing foundries and visited all of them. The detailed description of all the visited foundries is given in Annex 4. The identified foundries are in the following factories:

1. Jangalak Mechanical Works in Kabul - Jangalak
2. Shafi's Engineering Works in Kabul - Puli-Charkhi
3. Hamid's Aluminum in Kabul - Puli-Charkhi
4. Common Facility Centre for the Industrial Estate in Kabul - Puli-Charkhi
5. Bagrami Cotton Textile Mill in Kabul - Bagrami
6. Aslami's Foundry in Kabul - Jadai-Maiwand
7. Afghan Textile Guzergah in Kabul - Guzergah
8. Central Maintenance Workshop of the Ministry of Defence in Kabul - Puli-Charkhi

The expert has been told that other five foundries do exist in the provinces, but the expert was not able to visit them, due to the existing situation in this country. The foundries outside of Kabul in the provinces are in the following companies:

1. Gulbahar Afghan Textiles in Gulbahar (Province Parwan)
2. Spinzar Gineeries and Press in Kunduz (Province Kunduz)
3. Mr. Gevet Behbuti - foundry in Herat (Province Herat)
4. Bradaran Repair Shop in Herat (Province Herat)
5. Noor - Foundry in Kandahar (Province Kandahar)

3. At expert's arrival to Afghanistan any statistical data concerning the production expressed in terms of weight, value and kind of metals were not available. Also any statistical informations concerning the imported into Afghanistan castings so at the Central Statistical Organization, the Ministry of Commerce, the Ministry of Finance, the Ministry of Mines and Industries and the State Planning Committee were not available at all.

All these informations have been collected by the expert from the foundries during his visits there and are presented in Annex 5. The capacity of the Afghanistan foundry industry in the year 1982 is assumed as 700 tons per year, where from 580 tons per year only the foundries in Kabul - area.

The production of the foundries in the Kabul - area in the year 1982 is estimated as 348 tons of castings, with a value of 16,979,000 Afs equals US Dollars 308 thousands. The utilization of the existing foundry capacity in Afghanistan was in the last year 60 per cent at one shift work.

4. All the eight foundries in the Kabul area are employing thirty workers on a full-time basis and three workers on the as the need may be time basis. The staff of Jangalak's foundry consists of 23 workers and Aslami's foundry employs 7 boys. All the foundries except Jangalak are complaining lack of skilled workers for the foundry industry. Jangalak says official that they do have theirs workers well trained in the foundry requirements. They do plan to send their workers for foundry training abroad to Soviet Union following theirs planned training specifications

connected with the modernization of this foundry.

In general may be said that the foundry industry in Afghanistan is facing at present an acute deficiency of skilled workers.

5. As seen from the produced amounts of castings in the last year (Annex 5) 97.7 per cent of the total country's production has been manufactured in two foundries i.e. Jangalak (81.9 per cent) and Aslam (15.3 per cent). So this two foundries may be considered as the representative of the foundry industry in Afghanistan.

6. The production level of the foundry industry is not very high but appropriate to the existing conditions in those foundaries. The moulding is being done in green sand on floor and flask moulding. For some non-ferrous metals are applied also permanent moulds. The applied moulding sand is of poor quality, although high quality moulding sand is available in the country, but about 500 km far from Kabul and the existing situation does that it is not available in Kabul. There is also an economical aspect in applying the high - quality sand, as the transport costs of the good sand are at present very high and making up to around 60 per cent of its price. As binders are being used clay and molasses, which are mixed in the mullers and mixers. (only Jangalak). Bentonite is not used. The cores are manufactured in Jangalak of the same sand mixture in boxes and in plates and dried in an oven. There is applied facing and backing sand, the last consisting in 80 per cent of used sand.

The melting of iron is done in cupola and electric arc furnace (Annex 4) and for the non-ferrous metals (copper, aluminum and theirs alloys) are applied pit-furnaces with crucibles of a capacities up to 100kg. Some ferro-alloys are being used in the melting processes of iron in the arc furnace. For the non-ferrous metals are applied fluxes like bottle-glass (copper-alloys) and charcoal (aluminum).

The pouring is being done by two-man ladles as well as the crane ladles are applied.

The laboratory at Jangalak is regular determining the chemical composition of the basic elements in each heat of its casted irons. There is also available the mechanical-testing and sand testing laboratory but it seems they are not being regular utilized.

The cleaning of the casting is done by grinding and shot-blasting, what is the proper and adequate technology.

The expert could not get the exact informations concerning the rejects but it is estimated as around 10 per cent, taking in mind that the acceptance criteria are rather low.

7. The purchased castings are not of a high quality so in respect of its functions (lacking of fittings, non-uniform wearing off at the balls for the cement industry and others), as well as general size accuracy and surface quality (appearance). In general the casting orders are being worked-out in the technological office and a proper technical documentation is being produced, but frequently the orders are supplied from the customers without the drawing of the casting, but with a worn-out or broken casting itself. In such cases the drawing has to be produced by the foundry.

The foundaries like Jangalak are facing also some economical problem, as frequently the orders are calling for a very limited number of castings, and so the price of such few castings is very high.

8. In general may be said that the technical level of the foundry industry is at present the appropriate one for this conditions, as this industry is facing a general lack of proper quality of raw materials, which are supplied not always regular as well as troubles with electricity and fuels and the Jangalak's foundry (representing this industry) is getting modernized in the next two years with the assistance of the Soviet Union. It is expected that after the modernization the foundry industry in Afghanistan will be brought to a improved technical standard, although the production will increase substantive in terms of quantities and qualities of the mainly at present produced castings but not in new types of castings like centrifugally casted pipes, castings for the agriculture implements and others, for which the demand in the country is also high.

9. The production level of the Aslami's foundry, which is a private company, is far from being satisfactory. This is mainly due to lack of skilled workers, lack of basic utilities such as electricity and fuel as well as deficiency of basic raw materials like coke for cupola and the proper scrap, not to mention the hand prepared moulding mixture for floor moulding and cores.

At present Afghanistan but particular the Kabul - area is facing a very high deficiency of electricity, what is very harmfull for the foundries, as cut-offs are made unexpected and unannounced particular for the private companies like Aslami's foundry. In such a situation the foundries are using hand or feet-driven blowers, which are applied for oil-fired furnaces in case of electricity cut-offs. The deficiency of electricity in the Kabul area is expected to last for some years about up to the 1990's, when the planned high-voltage supply transmission line from Soviet Union will be completed in Kabul.

10. It has to be taken in mind that in Afghanistan are available some basic raw materials for the production of the foundry industry like iron and steel scrap, high-quality moulding sand, limestone, dolomite, but still some others like coke, ferro-alloys, non-ferrous master alloys, some fluxes, fuel-oil have to be imported by road, the only available means of transportation for such goods. Beside this some of the raw materials being available in Afghanistan like scrap require to be processed into the usefull form for the charging material. Similar situation is with the sand, which is of high-quality, but its exploitation has to be established and the sand should pass also some technological processes in the sand site in order to utilize in full its properties in the foundry industry.

11. All this makes that it will be require much efforts to catch-up in a very short period of time high level of the casting technology in this country. But still the produced here at present castings in the existing conditions are very useful for the national economy and they also find the market without troubles. So it is in full justified to continue the development of the foundry industry in Afghanistan.

Annex 4

DESCRIPTION OF THE CONDITIONS OF THE FOUNDRY INDUSTRY IN AFGHANISTAN

1. The expert identified and visited eight foundries in Kabul, and he has been told that there are five others outside of Kabul in:

    1. Gulbahar - Afghan Textiles (Public Enterprise) This foundry is working and covering the local demand for casted spare parts for the local textile industry.

    2. Herat - Mr. Goyet Behbudi - Private foundry which is now standing still.

    3. Herat - Bradaran Repair Shop - private enterprise closed at this time.

    4. Kandahar - Noor Foundry - private enterprise also out of work.

    5. Kunduz - Spinzar Ginneries and Press (public sector). This foundry is supplying at present some casted spare parts for the Ginneries and Presses.

    But exact information about those five given above foundries are not available, as the Expert was not able to visiting them.

2. The expert identified in Kabul are-a eight foundries, which may be considered as the whole foundry industry. Those foundries have been visited by the expert and are sited in the following companies:

    1. SHAFI's ENGINEERING WORKS (private sector)

    2. HAMIDI's ALUMINUM (private sector)

    3. COMMON FACILITY CENTRE (public sector)

    4. BAGRAMI COTTON TEXTILE MILL (public sector)

    5. ASLAMI's FOUNDRY (private sector)

    6. JANGALAK MECHANICAL WORKS (public sector)

7. AFGHAN TEXTILE - GUZERGAH (public sector)

8. CENTRAL MAINTENANCE WORKSHOP of the MINISTRY of DEFENCE (public sector)

3. Detailed description of those eight identified and visited foundries in Kabul - area are given below.

3.1 The Foundry at SHAFI's ENGINEERING WORKS in Kabul - Industrial Park Area Puli-Charkhi

The SHAFI's ENGINEERING WORKS is a private company dealing with repairing of combustion engines and manufacturing of injection moulds for plastics.

They do have a small and poor foundry for theirs own needs only. The surface of this foundry is about 150 square meters and its capacity is estimated as 120 tons per year of castings of iron, aluminum, bronze and copper. This capacity has been never utilized in full mainly due to the lack of own demand for such a high casting's production. It was supposed to employ up to 5 workers in one shift. At time the Expert visited this foundry it did not work, but he has been told that it is working only a few days per month. Theirs production in 1982 was 3.5 tons.

This foundry is equipped in:

- one mobile oil-fired horizontal rotary furnace of a capacity of 500 kg for melting grey cast iron, but not used since many years.

- two pit-type oil-fired crucible furnaces of 100 kg capacity each for melting of grey iron, aluminum, bronze and copper.

The iron is mainly casted into regular cylinderical or cube-like shaped blocks, being the only primary raw material for next machining of some manufactured by piece- order parts, as other forms of material are not available at all.

There is also casted aluminum for its subsequent machining for injection moulds for plastic. Also some bushings of bronze and copper as well as cylindrical shapes are being casted for its next machining to the required shape as the need may be.

Moulding is being done as floor-moulding but sometimes are applied also simple self-made flasks of the size 400x200x200mm. The sand is being taken from Bagram, a place 60 km far from Kabul. The preparation of the sand includes only the screening. The moulding mixture is done by hand and consists of Bagram sand and loam brought from Talukhan 60 km far from Kabul mixed with water and molasses.

The patterns are being made of wood or metal, as the case is for castings subsequent machined for injection moulds.

The metallic charge for the furnaces is consisting only of scrap. For the iron castings are used parts of scraped cylinder blocks, cut into suitable sizes by oxygen - torch in the foundry. For aluminium castings the charge consists of purchased scraped pistons, blanking scrap and returns. For the melting of copper and bronze are used scrap of copper and bronze, mainly fittings.

Some of the produced there castings have been seen. Theirs sizes reached upto 300mm in diameter and 300mm in length in the case of iron castings. The seen few aluminum castings have had theirs overall sizes up to 250 x 100mm. The castings are of very simple shape.

This company is well equipped in few lathes, drilling and boring machines. The whole company used to employ 80 workers few years ago, but now due to lack of orders, lack of manpower and lack of raw materials they do employ only 12 workers, where from two in the foundry as the need does exists.

The future development of this company including the foundry's activities is possible and even planned, but not earlier as the existing situation will get normalized. The main difficulties and obstacles in a normal running of this company are the following:

- lack of proper raw materials and tools
- lack of workers, but particular of skilled workers
- shortage of electrical power and non-regular supplies of oil as well as frequently cut-offs of electricity
- difficulties in industrial co-operation
- difficulties in transport of goods to Kabul
- shortage in foreign currency exchange.

3.2 The Foundry of HAMID's Aluminium in Kabul - Industrial Park Area

The HAMID's ALUMINIUM Workshop is a private company producing tea-pots of imported aluminium sheets. The blanks are being cut out from the sheets and later by a spinning tool formed to the required shape of the tea-pot. The spouts are being casted in a small iron mould with a metal core. The metal is being melted in an oil-fired pit furnace of a 30 kg capacity. The furnace charge is the own blanking scrap and returns. The melting is done without any cover, not even charcoal is being used. The furnace is working according to the needs of the blanking section, but usually not more than three days per week, providing the aluminium sheets for blanking are available.

The owner is thinking of a new bigger furnace, which would make him possible to re-melt all of his blanking scrap into aluminium ingots.

It is producing about 350 tea-pots per month, but due to a high percentage of failed spout-castings he is casting about 1,000 spouts per month, each 100 grammes.

The total production of the casting in 1982 was 1.2 tons. The furnace is served by one boy of the age of 12 years. All the staff consists of young boys, mainly due to lack of workers.

The casted spouts are next welded into the formed tea-pots and sold in the local market by a reasonable price.

3.3 The Foundry at COMMON FACILITY CENTRE in Kabul Industrial Park Area Puli-Charkhi

The COMMON FACILITY CENTRE is an Government establishment. It was set-up before five years as an common Indian-Afghan project and consists of a foundry with pattern making section, a [illegible] welding shop and precision machining department, as well as an electrical workshop. All equipment is Indian-made.

The main field of its activity is supposed to be manufacturing of spare parts for various branches of industries located in the industrial park area. It is getting the technical assistance from India and two Indian experts - among them one for the foundry are still there. The total number of employees is planned to be 29. But at present, due to lack of manpower the whole staff of the foundry with the pattern making section consists of one foreman and two workers only.

The foundry is located on a surface of around 80 square meters. The equipment consists of a small cupole furnace 300mm in diameter and one oil-fired tilting furnace of 100 kg capacity. There is also for the sand preparation one sand muller and one mobile sand mixer. The pattern-making section, occupies a surface of about 20 square meters and is equipped in one universal wood cutting machine and basic tools. There is also a small heat-treatment furnace for stress-reliefing of the castings.

At the time of the expert's visit all the equipment in the foundry was completely idle. It has been told that they do produce about twice a month some few castings of aluminium and bronze. The cupole is not working due to lack of coke since few years. They are getting sometimes few orders for one or two pièces to be casted. The orders are few mainly due to the charged high prices for the castings usually this are parts of aluminium or bronze. The customer brings the failed part, and on this basis a wooden pattern is being prepared. As the production is very small the prices of such few castings are very high and are calculated after the part has been casted.

The production is very low also mainly due to the lack of skilled workers and lack of good raw materials. The floor-moulding is done in green sand with clay binders of a poor quality like molasses and clay. The sand is taken from Bagram and its processing is very limited. The metallic charge consists only of returns as well as scrap of unknown origin and unknown chemical composition purchased from the bazaars.

The capacity of this foundry is estimated as 40 tons per year of iron and non-ferrous metal castings. In 1982 they produced 4.8 tons of bronze and aluminium castings.

The difficulties they do face at present may be specified as lack of proper raw materials (coke), lack of skilled workers and workers as general, shortages of electrical energy and water as well as fuels.

3.4 The Foundry at BAGRAMI COTTON TEXTILE in Kabul - Bagrami

The Bagrami Cotton Textile is a Government owned establishment set-up by the Chinese assistance.

There is also a small foundry sited on a surface of about 60 square meters. This foundry is equipped in one oil-fired pit furnace of 100 kg capacity for melting of alumminium, brass as well as grey iron. The weight of the heaviest casting was up to 40kg. They do have a lot of returns of aluminium. There are also some wooden pattern as well as alumunium flasks of the sizes 350 x 250 x 150mm. The floor-moulding has been done in green sand of Bagram as well as flask-moulding was applied. This foundry is since one year out of work, mainly due to lack of workers. The production was aimed at manufacturing spare parts for its own textile factory. The pattern have been prepared by theirs own wooden-workshop.

The capacity of this foundry is estimated as 10 tons per year.

3.5 The Foundry of ASLAMI in Kabul - Jadai - Maiwand

The ASLAMI's Foundry is a private company set-up two years ago by two teachers of the Kabul Engineer's Assistance High-School. It is located in the Bazaar's area and covers a surface of about 600 square meters. They also produce some small spare-parts for the bazaar's demand but mainly they are manufacturing aluminium-made pressure cookers of the capacities of four, seven and nine litres. Those cookers consist of the aluminium-made pot, aluminium made cover, cast iron sealing clamp, brass chucks, aluminium valve and steel press bolt with casted aluminium handle. All those parts are manufactured at this foundry. They produced in 1982 about five thousands of pressure cookers of a total weight 20 tons as well as as cast iron fittings, anvils, stove plates for private bakeries and gears and some bronze bushings. The cast iron amount produced in 1982 by this foundry was 30 tons. They produce also one ton of bronze castings in 1982. This foundry is equipped in two oil-fired pit furnaces of the capacity 30kg each for melting of aluminium and bronze. There is also a cupole furnace 300mm diameter, which is used only two days per month mainly due to lack of workers, raw material (coke) and orders. The aluminium is casted into steel

made moulds as well as green sand. The floor-and flash moulding is applied for moulding of iron and bronze castings.

The good quality sand is brought from Bamiyan Province about 450km far from Kabul. It is screened and mixed by hands with clay and molasses. The raw material for melting of aluminium is only scrap, but for the pressure-cookers pot and cover are used mainly the scraped pistons of combustion engines.

The coke for the periodical running of the cupola is purchased with great troubles from Jangalak in very limited amounts, while Jangalak is importing it from Soviet Union.

As there is a lack of workers, they employ about six boys of the age 10 - 15 years.

The development of this foundry is mainly limited by the lack of raw materials and deficiency of energy as well as lack of orders from the state-owned industry. There is a rule which has to be observed by the state-owned industry that a state-owned company may give an order for producing of a casting to a private foundry only after getting a negative reply from the Jangalak foundry. In practice the negative reply is being given not frequently even the Jangalak foundry does not accept such orders, due to economic and technical reasons.

3.6 The Foundry at JANGALAK MECHANICAL WORKS

The JANGALAK MECHANICAL WORKS is the biggest metal - working industrial enterprise in Afghanistan which is right now being modernized by the Soviet assistance.

It has its own construction department, heavy trucks repairing workshop, sheet metal processing workshop, mechanical machine workshop well equipped in machines such as lathes, grinding machines, boring and drilling machines, a forging shop with a heat-treatment part consisting of few oil-fired and electrical furnaces and the biggest in the country foundry. They do manufacture also oxygen, which is being distributed in high-pressure gas cylinders. The production of this enterprise is getting specialized into a heavy trucks repairing workshop mainly for the trucks KAMAZ, ULAZ and ZIL. They do right now the repairing of those trucks and beside this they are producing mobile tanks for petrol of a capacity

upto 100 cubic meters. They are manufacturing also steel constructions with sheet metal roofs for various purposes. The sheet metal workshop is producing various drawn utilities such as steel and aluminium plates and pots, mess kits and many others. The forging section consisting of one coal-fired forge hearth and three forging hammers of capacities 500 kg, 250 kg and 750 kg. The forging section is used from time to time for covering the factory's own needs. They are forging there some bolts, brackets and some others from imported steel bars of various shapes.

The foundry is sited in a separate building of a surface of about 1,000 square meters. There is also working one overhead bridge crane of a capacity 3 tons, covering the whole area of the foundry. Outside of the main foundry building is a small fettling and cleaning house and an open air scrap-yard with a scrap shear as well as storage yard for returns and outside scrap, as well as coke shelves.

This foundry has been designed and established by the Soviet assistance about twenty years ago and is equipped in:

- one cupola furnace of 300mm diameter,
- one arc furnace of 500 kg capacity with vertical electrodes,
- two oil-fired pit furnaces for non-ferrous metals of 100 kg capacity each,
- two sand mixers and mullers,
- three jolt squeeze moulding machines,
- one core oven,
- one mould drying chamber,
- one shaking out grit,
- one tumbling machine,
- one iron shot blast cabinet,
- two abrasive grinding wheels,
- small hand tools like air-hammers etc.

The foundry is producing about 285 tons per year of various castings of iron, aluminium and bronzes. The vast majority of the castings are cast-iron balls for the cement factories, various fittings for sewage and water supply, Gears, wheels for carriages, plates for kitchen stoves, fire-bars, various spare parts for textile industry etc. From aluminium they produce various small parts as covers for tanks, pots, boilers. The bronze castings are such as supporters, valves, valve's seats and some textile spare parts.

The moulding is done in green sand in the floor as well as in flasks of the size 450 x 450 x 120mm. There are also applied the metal moulds particular for the non-ferrous metals. This foundry is applying single sided metallic pattern plates, particular for the moulding of the cement balls on the jolt squeeze moulding machines. The core-boxes are used for manufacturing of cores. The sand is of various origins. Good quality moulding sand is available in Afghanistan at Koh-i-Alburz and Chashma-Shafa in the Balkh Province, at the Taluqan and Tala Bar Pak in Baghlan Province. But all those deposits are far away from Kabul. The deposit at Koh-i-Alburz is about 500km far from Kabul and Taluqan is 450km far from Kabul. The applied moulding mixture consists of silica sand, loam and molasses as well as some powdered coal. The same kind of mixture is being used for core manufacturing.

The moulding is done by hand as well as by the jolt squeeze moulding machines. The moulding mixture is partially getting rebonded (80% used sand plus 20% new sand) and there is being used the facing sand as well as the backing sand for some moulds.

The metallic raw material consists mainly of returns and purchased own scrap and returned casting which are somehow adjusted to the utilizable shape. The cupola is getting charged with pig-iron and coke, imported from Soviet Union and scrap. Some ferro-alloys as ferro-silico-manganese are also used for some charges in the arc-furnace.

The cooled down castings are shaked out on the grit or just by lifting the flasks by the crane.

The fettling is done by power operated handtools and the cleaning is realized by sand blasting equipment and grinding.

The non-ferrous metals are melted in the pit furnaces and theirs metallic charge consists mainly of scrap of own waste material from the sheet metal processing workshop as well the mechanized workshop, and returnsfrom the foundry.

The Jangalak foundry is working by one-shift 40 hours per week. There are 23 workers employed. The cupola furnace is not working the full-time as does the arc-furnace. Also the two oil-fired pit furnaces are busy in some periods of time, as the need may be.

The Jangalak Mechanical Worksdo have also one central chemical and mechanical-physical testing laboratory as well as a small sand testing laboratory. These laboratories are determining the carbon, sulphur, silicon, manganese and phosphorus contents in the iron-heats by the combustion method. The classical wet-methods are applied for chemical analysis of the current production of the foundry. They do have the equipment for testing the hardness by Vickers and Brinell and the tensile strength up to five tons. The charpy pendulum machine for impact testing is there also available. This laboratory is also equipped in a small metallographic microscope for microstructure testings. The central laboratory is sited in 3 rooms of a total surface of about 65 square meters.

The sand testing laboratory is in the same building with the foundry and is equipped in:

- one sand rammer for preparing the samples of the moulding and core sand mixtures,

- one apparatus for the determination of gas contents and the permeability of sand mixtures. This sand testing laboratory is located in a room of about 24 square meters.

The staff of all the laboratories consists of 3 qualified personnel.

The Jangalak's Foundry is getting to be modernized by the assistance of the Soviet Union. This modernization has to be completed by 1986 and will consist of extending its present working surface by further five thousands square meters. All the equipment has to be exchanged and the whole technological process mechanized so far as to be able to realize the following set-up production programme:

480 tons of cast iron castings

1,600 tons of steel castings (mainly steel balls for cement industry)

20 tons of non-ferreus metals (mainly aluminium and bronze casting).

After completing the modernization of the foundry its production is supposed to increase from present 350 tons to 2,100 tons per year. But it has to be noted that the main production capacities after the modernization will be utilized for the casting of 1,600 tons of balls for the cement industry.

3.7 Foundry at AFGHAN TEXTILE - GUZERGAH

in Kabul - Guzergah

The Afghan Textile factory in Guzergah is a Government owned factory equipped in very old Russian and Japanese machines, some of them produced in 1883, i.e. one hundred years age. Those equipment is working, but there are great problems with the spare parts.

Due to such old textile machines the factory has a big mechanical workshop and also a small foundry for manufacturing some of the necessary spare parts.

The foundry is located at a surface of about 30 square meters and is equipped in two oil-fired pit furnaces.. The capacity of these two furnaces is 30 kg of aluminium each. They do produce there only aluminium castings. The yearly production of this foundry is about 1,200kg of various aluminium castings. The moulding is done in flasks and in the floor, the moulding mixture is consisting of sand brought from Bagram. There are two workers being employed in this foundry.

The metallic charge consists only of scrap, purchased from the bazaars as well as own returns.

The patterns are being produced on the spot usually by applying the old failed part, which has to be casted.

1.2.2.8 The Foundry of CENTRAL MAINTENANCE WORKSHOP of the MINISTRY of DEFENCE

The foundry of CENTRAL MAINTENANCE WORKSHOP of the MINISTRY of Defence is a small foundry working only for the own needs of the maintenance workshop. It is equipped in two induction furnaces of the capacity of 40kg and 100 kg They are melting there from time to time grey iron, steels, aluminium and bronze as well as brass. The metallic charge consists mainly of scrap. The patterns are manufactured of wood at theirs own wood working shop. The moulding is being done in flasks and the moulding sand is of poor quality. The surface of this foundry is about 100 square meters, but there is also the store for patterns as well as the flasks. The casted parts are iron-fittings, valves, coat of arms, stoppers and some others.

This foundry has not been included into the consideration and production datas of the foundry industry in Afghanistan.

Annex 5

PRODUCTION DATA.

CONCERNING the FOUNDRY INDUSTRY

in AFGHANISTAN in the YEAR 1982

1. The capacity of identified and visited by the expert foundries in Kabul area except those belonging to the Ministry of Defence as well as of the two working at present in the provinces is assumed as 700 tons per year i.e. 580 tons Kabul-foundries plus 120 tons Gulbahar - and Kunduz - foundries. The present capacities of the foundries has been assumed as following:

1.	Jangalak's Foundry	350 tons per year
2.	Shafi's Foundry	120 tons per year
3.	Aslami's Foundry	50 tons per year
4.	Common Facility Centre's Foundry	40 tons per year
5.	Bagrami Textile's Foundry	10 tons per year
6.	Hamid's Foundry	4 tons per year
7.	Afghan Textile-Guzergah's Foundry	1 ton per year
	Total foundries in Kabul area Assume this capacity 580 tons per year	575 tons per year.
	and the two active foundries in the provinces i.e.	
8.	Afghan Textile Gulbahar's Foundry	80 tons per year
9.	Spinzar Ginneries and Press Foundry	40 tons per year
	Total foundries in the provinces	120 tons per year

Grant total present capacity of the foundries in Afghanistan is assumed as 700 tons per year (580+120).

Taking in mind the planned modernization of the Jangalak's foundry in the years 1984-1986 and the increasing of its capacity from 350 upto 2,100 tons per year it is assumed that after the modernization will be completed, the total capacity of the foundry industry in Afghanistan will be increased by 1,750 tons per year and reach the value of 2,450 tons per year.

2. The production of all the foundries in Kabul area in the year 1982 has been estimated as 348 tons, where from

295 tons - iron castings

38 tons - aluminium and its alloys castings

15 tons - copper and bronze castings

In the total production of 348 tons of castings participated the following foundries:

1.	Jangalak's Foundry	285 tons i.e. 81.90%
2.	Aslami's Foundry	53.4 tons i.e. 15.30%
3.	Common Facility's Foundry	4.8 tons i.e. 1.40%
4.	Shafi's Foundry	3.5 tons i.e. 1.02%
5.	Afghan Textile - Guzergah Foundry	1.2 tons i.e. 0.35%
6.	Hamid's Foundry	0.1 tons i.e. 0.03%
	Total:	348.0 tons i.e. 100.00%

3. The value of the produced in 1982 castings is estimated as following:

295 tons iron castings of a value	9.440 million Afs.
38 tons aluminium castings of a value	4.674 million Afs.
15 tons of copper and bronze castings of a value	2.865 million Afs.

Total value of 348 tons castings produced in 1982 in Afghanistan is estimated as 16.979 million Afs what equals US Dollar 308,700.

4. As the production of the castings in 1982 was 348 tons and the capacity of those foundries is 580 tons so the available foundry capacities in Kabul area have been utilized in the last year in 60 per cent by one shift work. It has to be noted that in the given above production data concerning the production in Jangalak, are based on the only made to the expert available datas from the year 1980. But the Chief Engineer of Jangalak declared that the production in 1982 was the same as in 1980 so in terms of quantitites as well as qualities and groups of produced castings. So the Jangalak's production from the year 1980 has been assumed as equal to those of the year 1982.

5. The share of the industrial branches in the produced in 1982 castings was the following:

61.7% of the castings - cement industry

14.0% of the castings - engineering construction industry

11.4% of the castings - local market (bazaars)

9.7% of the castings - irrigation

1.7% of the castings - transport and public works

1.5% of the castings - textile and wool industry.

6. The distribution of the produced in 1982 castings by weight ranges was the following:

25.8% of the castings in the weight range 0.2 to 0.5kg.

47.4% of the castings in the weight range 0.51 to 5.0kg.

13.8% of the castings in the weight range 5.1 to 20.0kg.

9.7% of the castings in the weight range 20.1 to 100.0kg.

3.3% of the castings in the weight range 100.1 to 500.0kg

Annex 6

STUDY OF THE FORGE INDUSTRY IN AFGHANISTAN

1. After expert's arrival to Afghanistan he has made much efforts in order to identify the forge industry, as any informations concerning the forge industry have not been available at all.

The expert identified only one industrial forge shop at Jangalak's Mechanical Works in Kabul.

In the bazaars of Kabul such as Jaida Maiwand, Dehdana, Qala-i-Shada and Merwis Maidan the expert identified small forging shops say smithies - which are manufacturing various forged parts for the demand of the local market. The expert has been told that in the villages are also such smithies, which are very similar in size, equipment and the manufactured products to those seen in the bazaars of Kabul.

So it is assumed that the forge industry in Afghanistan consists of the forge shop at Jangalak Mechanical Works and as estimated of about ten thousends of small scale forge shops - smithies - scattered in the villages all over the country.

If in other cities of Afghanistan like Herat, Kunduz, Kandahar, Mazar-i-Sharif and others are also such forging shops it is difficult to say. It may be very probably that they are there, but the expert was not able to move there for theirs identification. It may be also very probably that in the big industrial centres outside of Kabul where are sited the cement industry, the coal mines, the fertilizer factory, the ginneries and presses there may also be forging shops working for the own needs of these industries within the mechanical maintenance departments. But the expert was not able to move there and idnetify it on the spot.

2. The forge shop at Jangalak Mechanical Workshop is located in a separate building of a surface about 800 square meters together with the heat-treatment shop.

This forge shop is equipped in:

- one coal-fired forge hearth of a size 0.6x0.6 meter

  and

- three air forging hammers of the capacities 250kg, 500kg and 750kg.

In fact this forging shop is manufacturing forged parts by free hammering. Any drop - and die - forging is being carried out. The manufactured by this shop forged parts are only for the own use in other departments of Jangalak Mechanical Works, but particular the truck repairing department. There are produced various bolts, brackets, fixtures and other small steel components needed at Jangalak for theirs own production.

As raw materials are usually used round, square, flat, hexagonal and octagonal imported steel bars which are cut by the shearing machine to its prescribed length. Next such cut-off steel parts are getting heated up in the coal fired forge hearth piece by piece and hammered to the required sizes and shapes in one of the air forging hammers. The production is according to the demand for forged parts by the other departments.

The forge shop of Jangalak employs three workers for theirs daily one shift work. Those workers do also the supervising of the heat treatment shop.

The yearly production data as well as its value concerning this forge shop are not available.

3. The small forging shops - smitheries - identified in the bazaars and many others similar to these in the bazaars are located all over the country mainly in the villages. The total amount of the smitheries is assumed as ten thousand in all Afghanistan.

Those seen in the bazaars have a surface of about 6m x 8m with a roof of wood logs covered by mud. In the middle of such a smithery on the floor level is constructed a simple fire place made of bricks and mud usually closed from all sides except the front side. From the back side the fire place is connected with the small chimney in order to take off the waste gases. This fire-place is in fact the forge-hearth and its overall sizes are around 0.3 x 0.4 meters. Usually from one side down the floor is being made a small duct through which air is being supplied from a hand or feet-driven bellows or other manual or electrical driven blower. In front of the open side of the fire place is a wooden block dug in the floor. In this block an anvil is being deep-seated . The top of the anvil has usually the sizes of 200 x200mm is about 250mm above the floor level. The blacksmith as also one or two of his handy-men are positioned around the accessible two or three sides of the anvil. Theirs stands are also dug in the floor at a depth of about 0.8 meter with the square surface of 0.6 x 0.6 meters, so that the floor level is the working level for the blacksmith as well as his handy-men. The black-

smith do have his tools, i.e. the hammers, the tongues as well as others seats and strikers within his hand reach. The blacksmith himself puts the to be forged piece of metal usually steel scrap into the fire, covers it with charcoal and orders the air to be blown. In the meantime as the part is getting heated, be prepares himself the tools. After the part is heated up he takes it out of the fire and cuts it off to the proper length and shapes to the required form by hammer. Sometimes there is required a second reheating before getting the final shape of the forged product. There is none heat-treating being applied in the production processes exept some hardening in water. As raw material are being applied various kinds of automobile scrap such as leaf- springs, gears, plates and shafts.

These smitheries are producing hooks, shovels, pickles, hammers, various kinds of hinges, staples, fire-stands as well as many other agricultural implements. Usually they are doing the products following the received order from some individual persons or some wholesalers.

The yearly production of such a smithery in Kabul is assumed to be at 500kg, but in the villages it is assumed to be around 300 kg only.

In Afghanistan are existing 20,000 villages and it is has been told that each one such a smithery serves in average for two villages. So the amount of all the smitheries in Afghanistan is estimated as ten thousands. As the yearly production of each such smithery is 300kg, the total production of those workshops in Afghanistan is estimated as 3,000 tons per year. The average price of one kilogramme of the forged by them products costs around 160 Afs, so the value of the manufactured production in Afghanistan is estimated as 480 million Afs per year equals US Dollars 8,727,272.

Every of those forge-workshops employees the black-smith and one to two handy-men plus one boy for air blowing so the average manpower is assumed to be in average about 35 thousands for all the country. The raw material for production of about 3,000 tons of forge parts per year is steel scrap, which is available in the country at present and for many years of ahead. The charcoal is also available in Afghanistan, although the blacksmithes in the bazaars are complaining its high price, which is at present 36 Afs. per one kilogramme.

4. The forge industry in Afghanistan consists at present of:

- few forge shops for maintenance purposes established at some big industrial companies (Jangalak) and
- about ten thousands of smitheries (small forge shops) located in the villages and some bazaars.

The forge shops in the factories manufacture forged products only for theirs own use, according to theirs needs and include the forged parts into theirs own production or the maintenance services.

The smitheries manufacture various products mainly agricultural tools and implements for sale in the local market satisfying the needs of the people in this respect in the villages.

The carried out by the expert market study has shown that the demand for forged products in Afghanistan is very limited and consists mainly of agricultural tools and implements. This demand has been estimated as 2,500 tons per year.

The forge industry in Afghanistan is in practice limited only to the ten thousands smitheries, which do satisfy the demand for forged agricultural tools and implements of the rural population of Afghanistan, which shares with 73 per cent in the total population of the country.

It has to be taken in mind that all the raw materials used by the smitheries i.e. steel scrap and charcoal are available in this country and do not need to be imported from abroad.

The smitheries sited all over the country give also employment for about 35 thousands people in the villages, where the employment opportunities are rather limited.

In general at present it seems to be no need for establishing a modern industrial forge industry in Afghanistan exclusively for the production of agricultural tools and implements, for which only the market do exist, because the existing smitheries are manufacturing the agricultural tools and implements in the needed quantities and required qualities and the people in the villages are satisfied with this product.

Annex 7

STUDY OF THE MARKET CONDITIONS FOR CAST AND FORGE PARTS IN AFGHANISTAN

1. At the experts arrival to Afghanistan any data concerning the present and future demand for castings and forged parts were in practice not available. These required data have not been at disposal with the State Planning Committee, the Ministry of Mines and Industries and the Central Statistics Organization.

2. During the first meeting with the Government Authorities at the Planning Department of the Ministry of Mines and Industries the expert was requested at the very beginning of his activities to evaluate the questionnaire "Industrial questionnaire for the year 1360", which was supposed to provide detailed data concerning the present and future demand for castings and forge parts in Afghanistan. This questionnaire is attached here as Annex 8. It has been prepared by the Board for Techno-Economical Studies with the assistance of the United Nations Planning Team in May 1982.

   In August 1982 the Ministry of Mines and Industries requested the most important 43 enterprises in Afghanistan to complete this questionnaire.

3. At expert's arrival to Kabul in October 1982 only eleven enterprises responded to this questionnaire, and the supplied data have been in details studied by the expert. The received data from the eleven enterprises did not contain the expected informations for the study and assessment of the present and future demand for castings and forge parts.

4. In this situation the expert decided to launch a consumer market survey and prepared a new questionnaire "Information concerning the demand and market studies of castings and/or forge parts in the enterprises" covering the period 1982 to 1990. This prepared new questionnaire is attached as Annex 9.

5. In order to get full, exact and quick informations from the enterprises the expert surveyed by himself the most important and some sample representative companies in Kabul area. Others sample representative enterprises outside of Kabul have been asked by mail to supply a prompt back information.

6. This consumer survey has been launched only by the expert, although he has had assigned four counterparts. But the technical and economical background of the counterparts was not sufficient for performing such a consumer survey. The expert did not have enough time to be spend on properly and useful training of his counterparts in all the technical as well as economical aspects of the to be performed consumer survey.

7. In close co-operation with the Ministry of Mines and Industries, the State Planning Committee and the United Nations Planning Team the expert identified the present and future consumer-industries for castings and forge parts in Afghanistan as follows:

1. Mining industry
2. Cement industry
3. Textile and wool industry
4. Construction industry
5. Agriculture
6. Transport and public works
7. Irrigation
8. Rural development for drinking water
9. Local market (Bazaars)
10. Fertilizer industry
11. Cotton ginneries and presses
12. Oil and gas industry

8. As the expert was able to move only within the Kabul - area, he has not realized the consumer survey in the fertilizer factory, the cotton ginnery and press as well as the oil and gas industry.

In order to get the information concerning the demand for castings and forge parts at the fertilizer factory, the cotton ginnery and press as well as the oil and gas industry, which is located in the Mazar-i-Sharif Province, the UNDP - Office in Kabul has been officially asked in January 1983 for authorization of the travelling to Mazar-i-Sharif Province for one of the Expert's Counterpart. As such an authorization has not been granted the Government authorized him to travel there in the end of March and he returned back to Kabul five days before the Expert's departure from Kabul for debriefing.

In such a situation the received information could not be and is not included in the summary of the market studies.

The demand for castings was identified by the Counterpart only for 1983 and is as follows:

- 219 tons at the fertilizer factory
- 33 tons at the cotton ginnery and press
- 1 ton at the oil and gas industry.

The demand for forged parts has been identified there as nil. The received information do not have any considerable effect at the existing high deficiency for castings in the country. They are only increasing the existing and specified below demand for castings of 4,400 tons to 4,650 tons in 1983.

9. Due to the existing situation in Afghanistan, the limited possibilities of survey an appropriate sampling policy, has been established which has taken into consideration among others such main components as the technical level of production and the working machinery and equipment.

10. As the selected for surveying branches of industry are of various and much different types, the consumer market survey in each industry has been performed different.

11. The expert paid more than 130 visits to 60 various Ministries, Government's institutions, offices, organizations and state-owned and private companies and factories in order to identify the demand for castings and forged parts. The detailed specifications of the institutions surveyed by the experts is attached as Annex 10. The expert discussed the market demand for castings and forge parts as well as the development of the foundry industry in Afghanistan with many persons, specified in details in Annex 11.

I. MINING INDUSTRY

12. The mining industry in Afghanistan is divided into the following four divisions:

- division of exploitation
- division of copper mines
- division of oil and gas
- division of coal mines

13. In order to get the required information from the mining industry the expert prepares an additional paper, attached as Annex 12, in which he specified some examples of castings and forge parts being usually used in the mining industry in order to get easier the required information.

14. The survey launched by the expert in the exploitation division resulted in identifying theirs demand in the year 1990 as around 24 tons of castings and none forge parts. At present they have no demand for casted as well as forged parts, due to varicus reasons.

15. The survey at the division of copper mines made it clear that they will not have any outside demand for castings even in 1990, as they will establish in the nearest years theirs own foundry covering theirs own demand at the mine and smelter in AINAK, about 45 km far from Kabul. They declared also no demand for forged parts.

16. The survey at the coal mines division, which is responsible for two coal mine districts outside of Kabul has been done in a different way, as the department did not have any information at hand except contracts for spare parts which have been recently signed. In such a situation expert passed through two contracts and identified the year demand as 9 tons of iron and steel castings for a coal mine of 10,000 tons capacity.

17. As the total coal production in 1983 is planned to be 150,000 tons so the casting demand is estimated for 1983 as 135 tons. In the year 1990 the coal production is expected to be increased by 5.1 times so the casting demand in 1990 is estimated as 693 tons.

The demand for forged parts has not been identified.

II. CEMENT INDUSTRY

18. The cement industry is in the year 1983 in demand for 217 tons of balls for coal crushers in the cement factories and the cement mills. The diameter of the balls varies from 30 to 100mm and the specified material should be high manganese steel.

19. The demand for the year 1990 has been estimated as 1,480 tons of balls in the same size range.

20. The cement industry do not declare any demand for forged parts so in 1983 as also in 1990.

III. TEXTILE AND WOOL INDUSTRY

21. The textile and wool industry in Afghanistan is in a high need for casted spare parts but has no demand for forged parts.

22. The textile and wool industry in Afghanistan consists of many state-owned and private mills located in the Kabul area as well as in the provinces.

The specification of the textile mills and woolen facteries in Afghanistan with theirs number of machines existing in 1983 and planned for 1990 is given in Annex 13.

23. In order to identify the demand for castings in the textile and wool industry a very detailed consumer survey has been launched by the expert in four carefully selected sample factories following the set sampling policy. The selected factories are Bagrami Textile Mill, Afghan Textile Guzergah, Kabul Textile and Wool Industry. All those factories are in Kabul - area.

24. Basing on available catalogues, inspections of the stores of the weaving and knitting shops as well as discussions with the technical staff in the factories - the expert identified the yearly need for casted spare parts piece by piece at all the four sample - factories.

All the identified casted spare parts with unit weights and required numbers per year are given in Annexes 14, 15, 16 and 17 separate for each sample - factory.

The identified demand for casted spare parts is the following:

- Bagrami - 23,328 kg
- Afghan Textile - 9,681 kg
- Kabul Textile - 8,118 kg
- Wool Industry - 12,087 kg

The textile industry is different in character of production from the wool industry, hence diffi[illegible]t in equipment and needed spare parts. The next processing of those data has been done separate for textile industry and separate for wool industry.

25. The estimated quantity of castings needed per one machine in the textile industry is in average 34 kg per machine and 225 kg in the wool industry.

26. The estimated indices have been next multiplied by the total number of machines in Afghanistan for 1983 and 1990 as specified in Annex 13. Finally it has been estimated that in 1983 the whole textile and wool industry in Afghanistan will need 393 tons of casted spare parts, and in the year 1990 the demand will be 599 tons.

IV. CONSTRUCTION INDUSTRY

27. The construction industry in Afghanistan includes few big construction units like Prefabricated Houses Factory, Banai Construction Unit, Helmand Construction Corporation, Afghan Construction Unit, Ministry of Eucation's Construction Unit, Construction Unit of the Ministry of Defence and the Central Authority for Water Supply and Sewerage.

All the construction industry has a great demand for pipes and fittings, which are being imported in big amounts from various countries. But any statistical data concerning the present imported pipes and fittings do not exist in the country.

The demand for forge parts has been declared and identified as non existing.

28. As the construction industry in Afghanistan consists of seven main units in Kabul area, the expert surveyed all of them. The identified and estimated by the expert total demand for casted pipes is 950 tons in 1982 and 1,380 tons in 1990. The identified and estimated need for fittings and radiator plates is 1,625 tons in 1982 and 2,330 tons in 1990.

The detailed break-down of this demand is presented in Annex 18.

29. In Annex 19 is presented the demand for casted parts for the Prefabricated Houses Factory in order to show as an example in which form the demand for pipes and fittings has been identified.

Annex 20 presents also as an example the detailed data identified for casted pipes and fittings at the Ministry of Defence.

V. AGRICULTURE

30. Data concerning the demand for forge parts used for agricultural hand-tools and implements are not available so at the Ministry of Agriculture as others institutions in Kabul. In order to collect such data from the villages it would be necessary to move there, but this is not possible due to the existing situation.

31. The only remained choice for identifying this demand was to forecast the demand on the basis of the present production status of agriculture in Afghanistan. The farms are here usually of the size 2 to 5 ha. Irrigation and soil cultivation is at a limited level. Harvesting, threshing, shelling and cleaning is realized by simple hand operated tools and methods. The crop drying and storage has to be considered as simple natural drying and storing in bags and jars. For such a production status are usually used simple agricultural hand-tools as spades, forks, hoes, sickels, axes. For the manual - and animal draught system of agriculture technology as existing in Afghanistan are also applied some agricultural implements like manual wheel seeders, hand operated rotary threshers, harrows and others. All those tools and implements are in full or partially consisting of forged parts, which are at present produced by the blacksmithes in the villages.

32. Assuming a reasonable life time of each of the tools and implements from 5 to 15 years and the existing in Afghanistan 1.5 millions rural households, the forecast for the needed forge parts is estimated as 1,160 tons of forged hand-tools and 1,400 tons of forged parts for agricultural implements, what makes the total demand as 2,560 tons of forge parts per year.

It is assumed that this total demand of 2,500 tons per year will be the same in 1983 and 1990, as the hand-tools demand will get lower but the demand for implements will increase as the result of the increasing mechanization in the rural areas.

33. Concerning the demand for castings some data were available at the Ministry of Agriculture. The Ministry is introducing the mechanization to the villages. There are already working about one thousand tractors in the provinces and plans are for increasing this amount to around ten thousands in 1990. In order to supply maintenance services for the tractors and its machineries and equipment the Ministry is establishing machine - tractor service stations in various provinces. These service stations are in demand for castings, which are specified by the Ministry as 460 tons in 1983 and 1,150 tons in 1990.

VI. TRANSPORT AND PUBLIC WORKS

34. The expert identified in the Kabul area seven state-owned repair workshops for buses, trucks and road-building machines. All of them have been interviewed by the expert in order to identify theirs demand for forged and casted parts.

35. In all of the surveyed repair-workshops the demand for the forged parts has been declared as nil, although it is expected that such a demand do exist. The workshops are not much willing to accept forged parts being manufactured not by the producer of the repaired vehicle or machine.

36. The demand for casted spare parts has been identified as 150 tons of castings in 1983 and 550 tons in 1990.

37. The surveyed repair workshops have been due to various reasons much reluctant in declaring theirs demand for casted spare parts.

The expert faced many difficulties in identifying the needs for casting in this branch of industry. In some cases in order to identify the demand there was no other possibility as only to perform a technical survey from some technical catalogues of the concerned vehicles.

38. The private sector of the trucks-repair workshops has also been surveyed, but they declared no need for casted as well as forged parts, as they are using only the second hand spare parts from the scraped vehicles. In Kabul area are existing two big scrap-yards, where the second-hand spares for vehicles are available in a well organized way.

VII. IRRIGATION

39. The Ministry of Irrigation is just recently being established. Its main fields of activities are the realization of the dam and irrigation projects all over the country and the maintenance services of pumps for irrigation systems.

40. The expert surveyed all the two fields of theirs activities for demand of forge parts and castings.

The demand for forged parts has been identified as nil. But they do have a demand for castings, which has been identified as 150 tons in 1983 and 350 tons in 1990.

41. The expert discussed with the department of the maintenance services of the pumps, the demand for casted water pump bodies in Afghanistan for irrigation purposes. Such a demand has been identified as practically nil.

The wide variety of water pumps being used in Afghanistan does that the pump bodies are of different design and hence very different castings. The failure of a casted water pump body, requiring a new body does not happen frequently, but even it happens so usually there is a demand for one casting only. In such a case it is more economical justified to import it from the pump manufacturer instead of producing such a casting here in Afghanistan.

VIII. RURAL DEVELOPMENT FOR DRINKING WATER

42. The Rural Development for Drinking Water is a division of the Ministry of Health. It is responsible for the development of drinking water in rural areas and hence it is also responsible for the hand water pumps for drinking water and maintenance.

43. Since ten years ago all hand pumps for drinking water in Afghanistan are being supplied by UNICEF. The supply is about 160 pumps per year. At present the total amount of hand pumps used for drinking water is estimated as 1,500 pieces in the whole country. All those pumps are the Dempster hand pumps made in USA. The Dempster hand pump proved to be the most reliable in the conditions of the Afghanistan villages.

The Indian made water pump MARK II is not much suitable in Afghanistan, as the water level is here very deep.

In the market are still available hand water pumps designed and manufactured up to 1981 at Jangalak Mechanical Works in Kabul. The price for a unit is 5,865 Afs. But the domestic pumps are not reliable in the village conditions and the set price is not accepted by the rural population.

44. After detailed discussions with the Ministry of Health, the State Planning Committee, the WHO and UNICEF offices in Kabul the demand for casted spare parts for the hand pumps for drinking water has been identified as 3.2 tons in 1983 and 14.6 tons in 1990. The demand for forge parts has been identified as nil.

IX. LOCAL MARKET (BAZAARS)

45. In order to find out the demand for casted and forged parts in the local market (bazaars) the expert prepared a specification of casted goods being sold in the bazaars.

The specification included such goods as pressure cookers, bakery's oven plates, kitchen stove plates, stove doors, fire grates, charcoal irons, sewer taps, grits, lavatory plates, valves, taps and weight sets.

46. Next the wholesalers and salesmen of the specified goods have been surveyed in order to get theirs view concerning the present and future demand for such goods, theirs prices and source of manufacturing respectively country of origin. Such a survey has been done with many salesmen in the bazaars as well as the biggest stores in the city.

In order to find out some statistical data concerning the impart of the specified goods the Central Statistical Organization, The Afghan Chamber of Commerce and the Ministry of Commerce have been contacted. The result was rather very limited, as reliable data are there not available due to various reasons and constraints.

47. On the basis of all the received informations and discussions the present and future demand for the goods in the bazaars has been identified as follows:

	Demand in the year	
	1983	1990
Pressure cooker	40,000 kg	100,000 kg
Bakery's oven plate	7,500	10,000
Kitchen stove plate	13,000	20,000
Kitchen stove door	13,000	39,000
Fire grate	8,400	24,500
Charcoal iron	16,000	24,000
Sewer tap	22,000	99,000
Grit with spout	27,000	54,000
Lavatory plate	120,000	210,000
Valves and taps	1,250	2,500
Weight sets	43,850	110,000
	312,000 kg	693,000 kg

ASSESSMENT OF THE MARKET CONDITIONS

FOR CAST AND FORGE PARTS IN AFGHANISTAN

48. The total demand for castings in Afghanistan is estimated as 4,400 tons in 1983 and 9,250 tons in 1990.

The total demand for forge parts is estimated as 2,500 tons in 1983 and 2,500 tons in 1990.

A summary of the market consumer survey for castings and forge parts in Afghanistan specifying the demand in 1983 and 1990 is given in Annex 21.

This demand has to be expected to be a little higher, as some casting consumer as the fertilizer plant, cotton ginnery and the oil and gas industry has not been surveyed due to reasons being out of the expert's control.

49. It has to be noted that the estimated demand for castings, except those from the bazaars and some private textile-mills, was identified at Government-owned enterprises.

50. The present production of the foundry industry in Afghanistan has been identified as 348 tons in 1982. The total value of this production is estimated as around 17 million Afs. equal 308 thousands US dollars.

51. So the demand for 4,400 tons of castings in 1983 will be satisfied only by 350 tons manufactured in the country, i.e. 8 per cent of the demand. All the rest of the demand, i.e. 4,050 tons has to be imported, substituted or simple left as unrealized.

52. Some small quantities of castings, usually imported by private salesmen, are also available at bazaars. This applies mainly to pipes and fittings, but the prices are much higher, than those offered by the foreign suppliers to state-own castings-consumers. The prices in the bazaars are following very exact the market-oriented demand for particular castings for which the state-owned industries are just in need. If such castings are available only in the bazaars the industry frequently do not have any other choice to satisfied its demand as only to buy it from the bazaars at the exorbitant price.

53. The bazaars are getting the castings from abroad. Some are also brought into the country from Iran and Pakistan. The present imported amounts are very limited. The transport costs from the Afghanistan border to Kabul are at present very high and are getting charged regarding the existing safety conditions on the roads.

54. This all does that the market is not always observing and applying the normal economical rules.

55. Below are given the prices charged in the bazaars for some casted goods:

- cast iron weights for scales (bobs)

1 kg - piece	- 59.0 Afs./kg	equals US$ 1.07
0.5 kg - piece	- 78.0 Afs./kg	US$ 1.42
- cast iron kitchen stove door	- 72.0 Afs./kg	US$ 1.31
- cast iron fire grate of the size 400x220x15mm	- 53.1 Afs./kg	US$ 0.97

It has been told that all the given above castings have been manufactured at Jangalak's foundry two years ago.

56. The prices for the casted in Afghanistan spare parts for the textile and wool industry are difficult to estimate as they are frequently machined and the price includes this machining also. The spare parts for the textile industry are ordered usually in few pieces only so the price is expected to be rather high and it is assumed as 105 Afs./kg equals US dollars 1.90.

The price for imported from South Korea casted spare parts for the textile industry has been given at Kabul Textile Mills as yearly 19,000 dollars for 155 machines = 122.5 dollars/machine. It has been estimated in the consumer survey that each one machine in the textile industry consumes per year 34 kg of castings as spare parts. So the price of 1 kg casted spare part imported from South Korea was: 122.5 US dollars divided by 34 kg/machine equals 3.6 US dollars per one kilogramme.

57. In the bazaars cast iron pipes of the size dia. 50x2100mm are charged 98 Afs/kg equals US dollars 1.78.

The fittings of cast iron are being sold in the bazaars at the price of 89 Afs./kg equals US dollars 1.61 and the fittings of bronze at 311 Afs./kg equals US dollars 5.65.

58. The price of iron castings for the agriculture is assumed as 105 Afs./kg equals US dollars 1.90.

59. The price of iron castings for transport equipment and public works machinery as well as irrigation is assumed also as 120 Afs./kg equals US dollars 2.18.

60. The price paid at Jangalak's foundry for spare parts of cast iron for the water pumps for drinking water in 1982 was in average 108 Afs./kg equals US dollars 1.96.

61. Basing on the realized market survey and taking in mind the improved quality of the castings to be manufactured by the Demonstrative Foundry the sales price has been in average estimated as:

- cast iron castings	- 105 Afs./kg	equals US$ 1.90
- non-ferrous metal castings	- 220 Afs./kg	US$ 4.00

62. As a general conclusion to the market studies it may be stated that market for castings would not present any problem for the existing foundries, including the modernized Jangalak's foundry and the planned to be established Demonstrative Foundry, as far as the quantities are concerned; on the contrary, with the establishing of the planned Demonstrative Foundry, the country will still have to import considerable quantities of castings.

63. The market survey as well as the set-up capacity of the Demonstrative Foundry should be checked again after two years at the next stages of project development due to the existing constraints and its influence at the market conditions.

وزارت معادن وصنایع
ریاست پلان
مدیریت عمومی بورد مطالعات تخنیکی واقتصادي

پرسشنامه QUESTIONNAIRE

1 _ Name of factory .....

۱ اسم موسسه

2 &8 field of activity .....
ساحه فعالیت (ازکدام سکتور)

3 _ Ownership .....
شکل حقوقی موسسه (دولتی ـ شخصی ـ مختلط

4 _ Location .....
(موقعیت)

5 _ Year of establishment.....
سال تاسیس

6 _ Start of production .....
تاریخ شروع تولید (بخوه برداري)

7 _ Total number of personal .....

8 _ مجموع پرسونل

A _ Skilled workers .....
کارگران ماهر

9B_ Unskilled labour .....
کارگران غیر ماهر

C _ Semi skilled labour .....
کارگران نیمه ماهر

8 _ Technicaland ot hers staff ...
پرسونل فنی واداري

9 - Foreign experts .....
متخصصین خارجی

10 - No of shifts .....

II - Main production department (1)

تعداد شعبات

شعبات ودستگاه های اساسی تولیدی

a -

b -

c -

d -

e -

f -

دستگاه های کمکی

I2 - Auxiliary department .....

a -

b -

c -

مواد خام ومواد کمکی

I3 - Raw material and intermediates ..

a -

b -

c -

d -

e -

f -

g -

I4 -Source of row mat-erial .....
A - domestic
B - imported

منبع مواد خام ازداخل

ازخـــارج

I5 -main problem of enterprise...

a - Management مشکلهای اساسی موسسه
مدیـــــریت

b - Qualified workers کارگران ورزیـــده

c - Market ing مارکیتـــنگ

d - For-eign co mpet it ion رقابت خارجی

e - Row materials مـــواد خـــام

F - Foriegm exchange اســعار خارجـــی

g -Taxes .... تکـــس هـــا

h - Spare parts پـــرزه جات نا لـــتو

i - Others ..... وغـــیره

If there is spar e parts problems specified t here according to the annex - I - table:

درصورت مشکلات از ناحیه پـــرزه جات نا لـــتو جدول (۱) ضمیمه را معلومات دهـــید .

I6 - Are you satisfied with t he cost ing of your foundry ?

ایا تولیدات دستگاه ریختگیری شما تناسب بخش است . در صورتیکه جواب منفی باشد مشکلات و پرابلمهای مربوط توضیح داده شود .

I -

2 -

3 -

4 -

5 -

6 -

7 -

I7 - Source of spare parts
منبع تهیه پرزه جات فالتو

a- Domistic specified (از کجا) ازداخل کشور

b - Imported (from where) خارج از (کجا)

I8 - List the requirement of spare parts according to the priorities and indicate there specifications .

لست پرزه جات فالتوي مورد ضرورت را به اساس تقدم ترتیب وشخصات انرا مطابق جدول (۱) ضمیمه توضیح فرمائید .

I9 - Do you have your own foundry, if yes what is the main production ?

19 - Do you have your own foundry , if yes what is the main production . ?

درصورتیکه شما خود دستگاه ریخته داشته باشید تولیدات ریخته انرا در ذیل مشخص سازید .

1 -

2 -

3 -

4 -

5 -

20 -How much is yearly expenditure for spare parts in the past 5 years . ?

حجم پرزش سالانه تهیه پرزه جات فالتو را به تفکیک نوع در پنجسال گذشته و پنج سال آینده معلومات دهید .

1 -

2 -

3 -

21 - What are the problems for spare parts !?

الف

انواع مشکلات در تهیه پرزه جات فالتو توضیح داده شود .

الف : از داخل

ب : از خارج

A - Domestic .

B - Imported !

1 -
2 -
3 -
4 -
5 -

INFORMATION
CONCERNING THE DEMAND AND MARKET STUDIES OF
CASTINGS AND/OR FORGE PARTS IN THE ENTERPRISE

Annex 9

1. ARE CASTINGS BEING USED AT YOUR ENTERPRISE? [ ] YES [ ] NO
2. ARE FORGE PARTS BEING USED AT YOUR ENTERPRISE? [ ] YES [ ] NO
3. IF YOU ARE USING OR PLAN TO USE CASTINGS PLEASE SPECIFY THEM IN THE FORM BELOW:

ITEM NO.	DESCRIPTION OF THE CASTING	ESTIMATED UNIT WEIGHT IN KG	APPLICATION	OVERALL SIZES IN MM	KIND OF METAL. MATERIAL NO.	BOUGHT KGS OF CASTING IN THE YEAR		PRICE PAID IN AFS. FOR THE YEAR		ESTIMATED DEMAND IN KG FOR THIS CASING IN THE YEAR	
						1960	1961	1960	1961	1964	1969
1	2	3	4	5	6	7	8	9	10	11	12

4. WHERE ARE YOU BUYING THESE CASTINGS FROM? [ ] LOCAL MARKET [ ] FIRM ABROAD [ ] MANUFACTURING BY YOURSELF
5. IF YOU ARE USING OR PLAN TO USE FORGE PARTS PLEASE SPECIFY THEM IN THE GIVEN FORM:

ITEM NO.	DESCRIPTION OF THE FORGE PART	ESTIMATED UNIT WEIGHT IN KG	APPLICATION	OVERALL SIZES IN MM	KIND OF METAL. MATERIAL NO.	BOUGHT KGS OF CASTING IN THE YEAR		PRICE PAID IN RS. FOR THE YEAR		ESTIMATED DEMAND IN KG FOR THIS CASTING IN THE YEAR	
								1960	1961		
1	2	3	4	5	6			7	10		

6. FROM WHERE ARE YOU BUYING THESE FORGE PARTS ? ☐ LOCAL MARKET ☐ FROM ABROAD ☐ MANUFACTURING BY YOURSELF

7. REMARKS

8. THIS INFORMATION HAS BEEN SUBMITTED BY: Mr. .....

Mr. .....

DATE: _____

Annex 10

MINISTRIES, GOVERNMENT'S OFFICES
INDUSTRIAL ESTABLISHMENTS AND ENTERPRISES
WHICH UNIDO - EXPERT IN FOUNDRY SURVEYED FOR
MARKETING OF CASTINGS AND FORGE PARTS AS WELL AS
THE DEVELOPMENT OF THE FOUNDRY INDUSTRY IN AFGHANISTAN

Item No.	Date	Name of Establishment Enterprise
1	2	3
1.	1.11.82 5.02.83	COMMON FACILITY CENTRE - INDUSTRIAL ESTATE - KABUL /FOUNDRY/
2.	3.11.82 18.12.82 28.12.82	BAGRAMI COTTON TEXTILE FACTORY - KABUL /FOUNDRY/ 30.12.82 2.01.83 3.01.83
3.	6.11.83 5.02.83	SHAFEE'S ENGINEERING WORKS - KABUL /FOUNDRY/
4.	1.11.82	HAMID'S ALUMINUM - KABUL /FOUNDRY/
5.	8.11.82 21.11.82 17.1.83 2.02.83 14.02.83	JANGALAK MECHANICAL WORKSHOP - KABUL /FOUNDRY/
6.	9.11.82 16.11.82 22.11.82 23.11.82 1.12.82 2.12.82 4.12.82 5.12.82	MILLIE-BUS - KABUL /AUTOMOBILE SPARE PARTS/
7.	9.11.82 10.11.82	KAMAZ ENTERPRISE NO. 2 - KABUL /AUTOMOBILE SPARE PARTS/

1	2	3
8.	10.11.82 13.11.82	KAMAZ ENTERPRISE No. 1 - KABUL /AUTOMOBILE SPARE PARTS/
9.	11.11.82	TECHNICAL DEPARTMENT/CENTRAL MECHANICAL WORKSHOP/ OF THE MINISTRY OF MINES AND INDUSTRIES - KABUL
10.	10.11.82	TECHNICAL DEPARTMENT OF THE MINISTRY OF PUBLIC WORKS - KABUL /AUTOMOBILE SPARE PARTS/
11.	13.11.82	CENTRAL MECHANICAL WORKSHOP OF THE MINISTRY OF PUBLIC WORKS - KABUL - AQA-ALI-SHAMS /AUTOMOBILE AND ROAD BUILDINGS MACHINES SPARE PARTS/
12.	13.11.82	ENTERPRISE FOR WATER SUPPLY - KABUL - BAGRAMI /AUTOMOBILE SPARE PARTS/
13.	13.11.82 14.11.82 23.11.82 24.11.82 27.11.82 5.12.82 7.12.82	WATER AND SEWAGE AUTHORITY - KABUL - MIKRO-RAYON /PITTINGS and PIPES/
14.	13.11.82 16.11.82	BANAI CONSTRUCTION UNIT - KABUL /PITTING AND PIPES/
15.	14.11.82 18.11.82	RURAL WATER SUPPLY DEPARTMENT OF THE MINISTRY OF PUBLIC HEALTH - KABUL /CASTINGS FOR HAND PUMPS/
16.	15.11.82	UNICEF - RURAL WATER SUPPLY PROJECT - KABUL /PARTS FOR HAND PUMPS/

1	2	3
17.	15.11.82 6.12.82 9.12.82	AFGHAN CONSTRUCTION UNIT - KABUL /FITTINGS AND PIPES, RADIATORS/
18.	18.11.82 9.12.82	MUNICIPALITY - KABUL /FITTINGS AND PIPES AS SPARE PARTS/
19.	15.11.82 22.11.82 24.11.82 27.11.82 28.11.82	PREFABRICATED HOUSES FACTORY - KABUL /RADIATORS, FITTINGS, PIPES/
20.	18.11.82	WHO/WATER SUPPLY Project/FAMILY HEALTH SERVICES DEVELOPMENT (WHO-executed) Project - KABUL /PIPES AND FITTINGS/
21.	20.11.82	WHO - REGIONAL ADVISER FROM ALEXANDRIA - Mr. BAHR. WATER SUPPLY SYSTEM - Project assisting the WATER AND SEWAGE AUTHORITY in KABUL
22.	18.11.82 24.11.82 25.11.82 1.12.82	HELMAND CONSTRUCTION CORPORATION - KABUL /PIPES AND FITTINGS FOR IRRIGATION/
23.	14.11.82	TRANSPORT AND EQUIPMENT MAINTENANCE ORGANIZATION - CENTRAL WORKSHOP OF THE MINISTRY OF PUBLIC HEALTH /UNICEF assistance/ KABUL
24.	28.11.82	CENTRAL STATISTICS ORGANIZATION - KABUL
25.	29.11.82 6.12.82	CENTRAL AUTHORITY FOR BUILDINGS AND TOWN PLANNING - DEPARTMENT FOR BUILDING PROJECTS - "SHTAPA" - KABUL

1	2	3
26.	29.11.82 30.11.82 1.12.82 10.12.82 12.12.82 22.12.82	CONSTRUCTION DEPARTMENT - MINISTRY OF DEFENCE - KABUL
27.	6.12.82 9.12.82 11.12.82 13.12.82 23.12.82	MAINTENANCE DEPARTMENT - MINISTRY OF DEFENCE - KABUL
28.	15.12.82 18.12.82	MINISTRY OF MINES AND INDUSTRY - PLANNING DEPARTMENT - KABUL
29.	15.12.82	PRIVATE AUTOMOBILE SECOND HANDS SPARES PARTS BAZAARS SHERKAT SARWIS, DARWAZAI LAHORI, BAGH ALI MARDAN - KABUL
30.	19.12.82 21.12.82 27.12.82	AFGHAN TEXTILE - KABUL
31.	19.12.82 28.12.82 4.01.83 6.01.83	WOOLEN INDUSTRY - Puli-Charkhi - KABUL
32.	19.12.82 22.12.82 26.12.82	MURTAZA AMINZADA - TEXTILE MILL - KABUL
33.	19.12.82 26.12.82 15.01.83 17.01.83	KABUL TEXTILE - KABUL

1	2	3
34.	29.12.82 11.01.83	AFGHAN TEXTILE COMPANY - GUZERGAH - KABUL
35.	29.12.82 2.01.83	ASLAMI FOUNDRY
36.	29.12.82 3.01.83 4.01.83	MINISTRY OF MINES Exploitation Department
37.	2.01.83 3.01.83	MINISTRY OF MINES - Gas and Oil Department
38.	3.01.83 6.01.83	MINISTRY OF MINES-COAL MINES Department HERAT DISTRICT
39.	3.01.83	MINISTRY OF MINES - COAL MINES DEPARTMENT MAZAR-I-SHARIF DISTRICT
40.	4.01.83	MINISTRY OF MINES - COPPER DEPARTMENT
41.	4.01.83 6.01.83 10.07.83	MINISTRY OF AGRICULTURE - Department of Planning
42.	9.01.83 13.01.83 20.01.83	MINISTRY of IRRIGATION
43.	10.01.83 15.01.83 16.01.83	MINISTRY OF AGRICULTURE
44.	8.01.83 9.01.83 11.01.83	MINISTRY OF PLANNING - Textile Private Sector Division - Research Department

1	2	3
45.	13.01.83	Ministry of Irrigation - Pumps Maintenance Department
46.	18.01.83	Prime-Ministry Office - Rural Development Department:- UN Project "Strengthening the Rural Development Department"
47.	19.01.83	Planning Committee - Department of Water Supply and Sanitation Department
48.	19.01.83 22.01.83	Afghan Store Bazaars
49.	23.01.83	Bazaars
50.	23.01.83 24.01.83	Afghan Chamber of Commerce - Import Department
51.	29.01.83 31.01.83	Ministry of Defence - Central Workshop of the Construction Department
52.	31.01.83	Central Statistical Organization - Foreign Trade Statistics Department
53.	31.01.83	Ministry of Education - Construction Unit of Ministry of Education
54.	21.01.83	Ministry of Commerce - Department of Foreign Trade
55.	30.01.83	Ministry of Agriculture - Department of Mechanization
56.	1.02.83	State Planning Committee - Department of Agriculture
57.	10.03.83	Ministry of Electrical Energy

1	2	3
58.	9.03.83	Ministry of Finance
59.	12.03.83	Ministry of Transport
60.	12.03.83	Joint Stock Transportation and Forwarding Company "AFSOTR"

Annex 11

LIST OF GOVERNMENT OFFICIALS CONTACTED BY UNIDO-EXPERT IN FOUNDRY FOR DISCUSSIONS CONCERNING THE DEVELOPMENT OF THE FOUNDRY INDUSTRY IN AFGHANISTAN

Item	Date	Name of Official	Position Held	Ministry Department, Establishment or Office
1	22.10.82	K. Azizi	President	Industries, Transport and Communications Department, State Planning Committee
2	25.10.82	E. Kawa	President	Planning Department, Ministry of Mines and Industries
3	26.10.82	B. A. Sultan	Deputy Director	Board for Techno - Economical Studies,
4.	31.10.82	Samimi	Director	Planning Department, Ministry of Mines and Industries
5.	11.10.82	Eng. A. Nasir	General Director	Planning Department, Ministry of Mines and Industries
6.	22.10.82 4.11.82 24.01.83 26.01.83	S. R. Gajowski	UNIDO-Officer-in-Charge	UN-Project "Strengthening Government Capability in Planning and Implementation
7.	22.10.82	E. Semple	UNDP-Programme Officer	UNDP
8.	1.11.82	A. Wahab	President	Common Facility Centre, Industrial Estate Project
9.	3.11.82	G. M. Asarar	President	Bagrami Textile Factory

Item	Date	Name of Official	Position	Ministry Department, Establishment or Office
10	4.11.82 26.01.83 6.03.83	Samander -"- -"-		Planning Department, State Planning Committee
11	6.11.82	Habib	President	Shafi's Engineering Works
12	6.11.82	A. Hamed	President and Owner	Hamed's Aluminum
13	8.11.82 9.11.82 17.01.83	Omar Dr. Banuzai	President Chief Engineer	Jangalak Mechanical Workshop
14	9.11.82		President	MILLIE-BUS
15	23.11.82	Waljerij	Technical Advisor	
16	2.12.82	Atozh	Technical Director	
17	10.11.82	Lal Gul	President	KAMAZ REPAIR WORKSHOP No. 2
18		Ivanov	Technical Advisor	
19	11.11.82	Eng. Yunusi	President	Central Workshop of the Technical Department, Ministry of Mines and Industries
20	10.11.82	Askarjarh Salutin	President Technical Advisor	KAMAZ REPAIR WORKSHOP No. 1
21	13.11.82	Eng. Flydaja Tola Karel	President Technical Advisor	Central Mechanical Workshop of the Ministry of Public Works

Item	Date	Name of Official	Position	Ministry Department, Establishment or Office
22	13.11.82	Saem Moh'd Nakee Bullah	President	Repair Workshop for Trucks - Ministry of Public Works
23	13.11.82	Eng. S. M. Camean	Vice-President	Central Authority for WATER SUPPLY and SEWERAGE
24	14.11.82	Abdul Sattar Orea	President	Central Authority for WATER SUPPLY and SEWERAGE
25	14.11.82	Dr. Eng. F. M. Bagsaad	President	Banai Construction Unit
26	14.11.82	Eng. Sareame	Vice-President	
27	14.11.82	Bareay	Director	
28	14.11.82	G. Akbar	UNICEF-Assistant	UNICEF-Project: Transport and Equipment Maintenance, Ministry of Public Health
29	26.01.83	Eng. Yousef	President	RURAL WATER SUPPLY Department, Ministry of Public Health
30	15.11.82 15.11.82 26.01.83	Eng. Ghulam Rasoul Eng. S. A. Masood	Director WHO-Advisor	
31	15.11.82 26.01.83	M. Omar	UNICEF-Programme Officer	UNICEF-KABUL Office

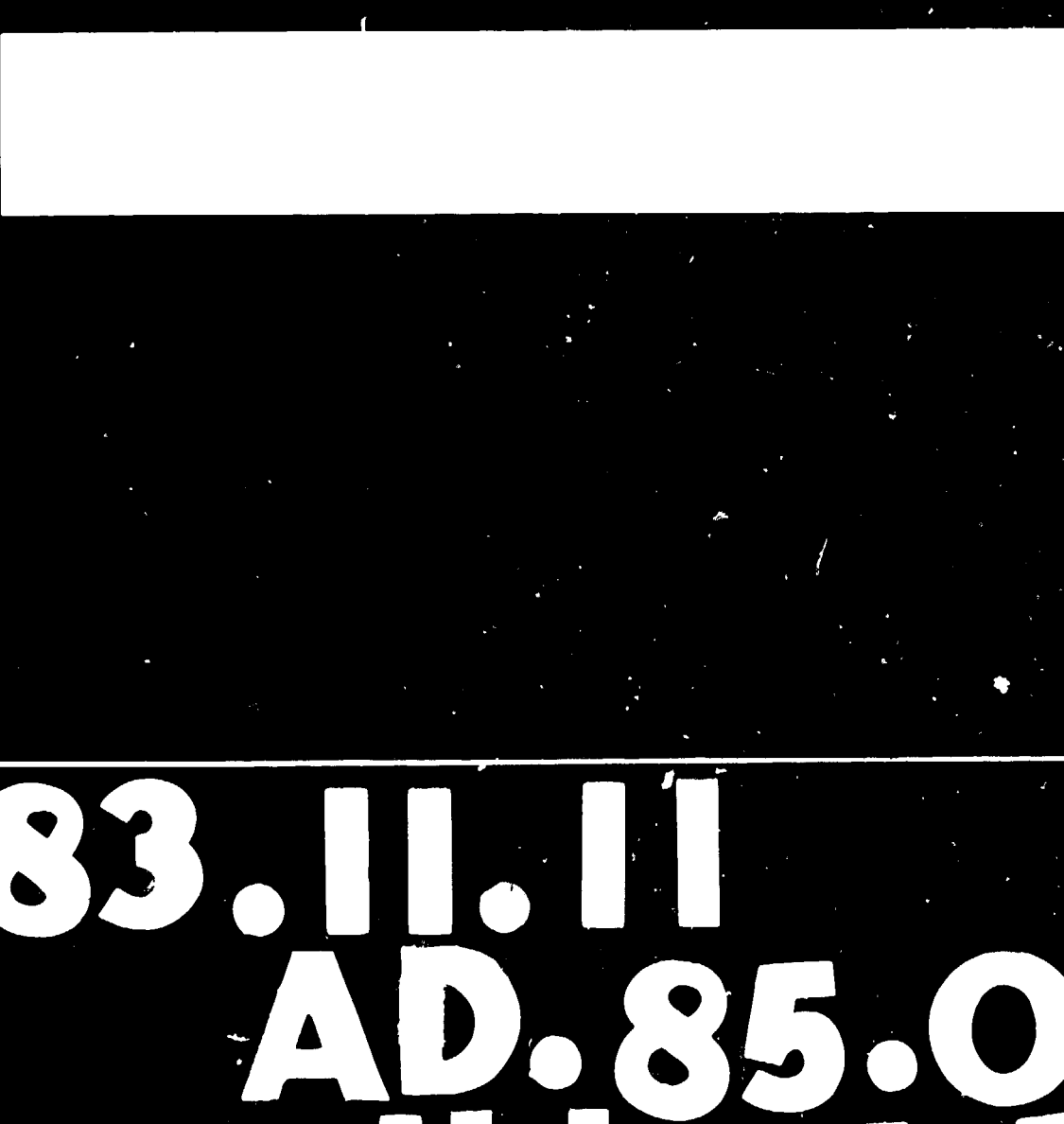
Item	Date	Name of Official	Position	Ministry Department, Establishment or Office
32	15.11.82	M. A. Marmolle	UNICEF-Pump - Technician	UNICEF-WATER SUPPLY AND SANITATION SECTION
33	17.11.82	Eng. M. W. Adin	Technical Vice-President	AFGHAN CONSTRUCTION UNIT
34	18.11.82	DR. H. Barna	Vice-President	Kabul Municipality
35	18.11.82	Dipl. Eng. H. Gharwal	President	Helmand Construction Corporation
36	18.11.82	M. Gulab	Director	
37	18.11.82	Eng. Bahr	WHO-Regional Advisor	WHO-Regional Office in Alexandria /Egypt/
38	22.11.82	Eng. A. Latif	President	PREFABRICATED HOUSES FACTORY
39	28.11.82	Eng. Balooch	Director Technical Department	
40	28.11.82	Eng. Iwanow	Technical Advisor	
41	28.11.82	Tahmas	President	Central Statistics Organization
42	28.11.82	Wahdood	General Director	

Item	Date	Name of Official	Position	Ministry Department, Establishment or Office
43	28.11.82	Dipl. Engr. D. Sorosh	General Director	CENTRAL AUTHORITY for Building and Town Planning "SHTAPA"
44	29.11.82	M. Younus Akhbari	President	
45	29.11.82	J. Pierz-chlewicz	Technical Advisor	
46	29.11.82	Eng. M. J. Ahmedi Eng. M. Sharif	President General Director	Construction Department Ministry of Defence
47	29.11.82	J. Calus	Technical Advisor	
48	9.12.82	Eng. M. A. Rabti	General Director	Housing Maintenance Departmeny, Ministry of Defence
49	11.12.82 25.01.83	Eng. Salim Shah	General Director	Cement Industry Planning Department, Ministry of Mines and Industries
50.	12.12.82	Abdul Fatah	President	Planning Department, Municipality of Kabul
51.	12.12.82	Eng. Abdul T. Berokh	Deputy Minister for Mining	Ministry of Mines and Industries
52.	17.01.83	Eng. Said Amanuddin Amin	President	Afghan Textile Head-quarter

Item	Date	Name of Official	Position	Ministry Department Establishment or Office
53	18.12.82	Eng. Karim	President	WOOL INDUSTRY- PULI-CHARKHI
54	26.12.82	Perai Singm	President	KABUL TEXTILE
55	26.12.82	Momand Singm	Vice-President	
56	23.12.82	Murtaza Aminzada	President	MURTAZA AMINZADA TEXTILE
57	27.12.82	D. Hafar	President	Afghan Textile - Guzergah
58	27.12.82	Eng. Ibra-himkhail	Vice-President	
59	29.12.82	Aslami	President and Owner	ASLAMI'S FOUNDRY
60	3.01.83	Eng. Hafizullah Noabi	President	Oil and Gas Department, Ministry of Mines and Industries
61	3.01.83	Dipl. Eng. H. Nauabe	President	Explcitation Depart-ment, Ministry of Mines and Industries
62	3.01.83	I. Bilabrov	Technical Advisor	
63	3.01.83	Dr. G. A. Mansoor	Vice-President	
64	6.01.83	Eng. M. Nassim	Director	Department of Coal Mines SABZAK in Herat, Ministry of Mines and Industries

Item	Date	Name of Official	Position	Ministry Department Establishment or Office
65	6.01.83	Dipl. Engr. Khalilullah Shuva	Vice-President	Department of Coal Mines SABZAK in Herat, Ministry of Mines and Industries
66	5.01.83	Kohsar	General Director	Private Investment Department, State Planning Committee
67	5.01.83	Mohammad	Director	
68	5.01.83	Asmat	General Director	
69	4.01.83	Dr. Eng. M. Taher	President	Copper Mines Department, Ministry of Mines and Industries
70	4.01.83	Eng. Shekiba	General Director	
71	4.01.83	Dr. Eng. A. Naqshbandi	President	Planning Department, Ministry of Agriculture
72	1.02.83 10.01.83	Vasiunas	Technical Advisor	
73	9.01.83	Eng. M. A. G. Rahimi	President	Planning Department, Ministry of Irrigation
74	9.01.83	Eng. Iqbal	Chief, Technical Department	Machine Department, Ministry of Irrigation
75	13.01.83	Azatolah	Vice-President	
76	13.01.83	Kuzniecov	Technical Advisor	

Item	Date	Name of Official	Position	Ministry Department Establishment or Office
77	13.01.83	Tierakov	Technical Advisor at Ministry	Machine Department, Ministry of Irrigation
78	13.01.83	Simoniwicz	Advisor	Pump's Maintenance Department, Ministry of Irrigation
79	12.01.83 26.01.83 30.01.83	Eng. Nahmat	Director	
80	16.07.83	K. S. Pathak	Water Resources Engineer	UN - Project: Strengthening the Government Capability in Planning and Implementation
81	18.01.83	P.M.Todorov	Irrigation - Engineer- UN Expert	Rural Development Department - UN Project Strengthening the Rural Development Department with the Prime-Minister Office
82	18.01.83 2.02.83	Dipl. Eng. Karime	President	North Coal Mines Department, Ministry of Mines and Industries
83	22.01.83	M. Aman Nauai M. Hassan Nauai	President Vice-President	Afghan Store in Kabul " " " "
84	23.01.83 23.01.83 24.01.83 29.01.83	Mechertshe Worma M. Eshak Moskinmal	President Vice-President for Trade Affairs	Afghan Chamber of Commerce, Import Department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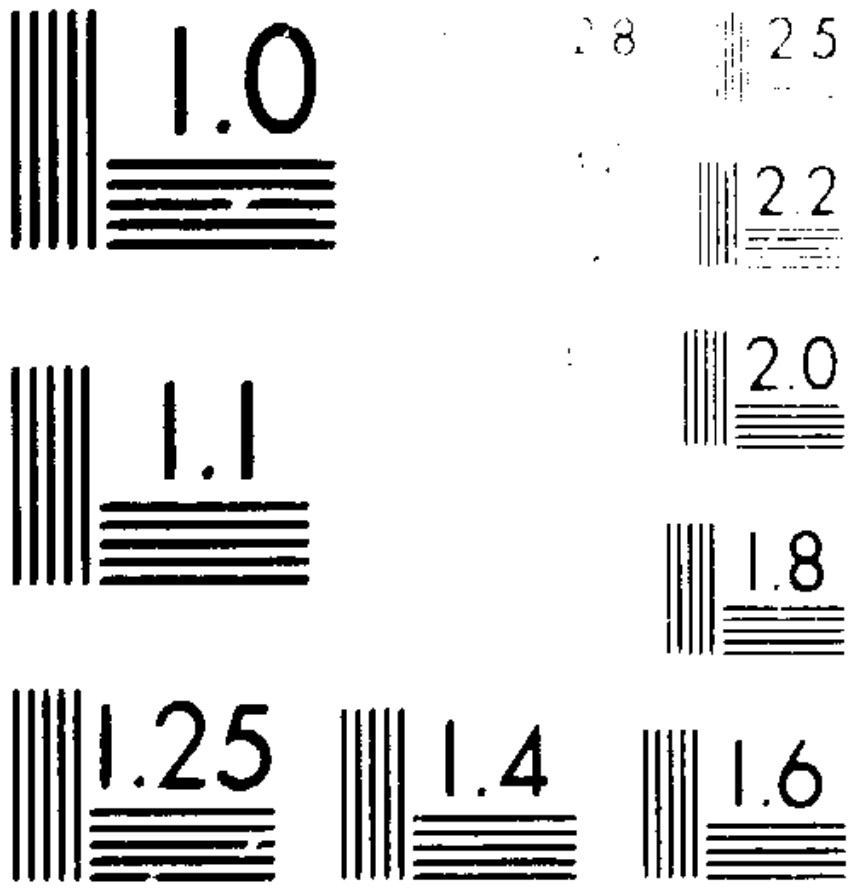
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1.25
1.4
1.6

Item	Date	Name of Official	Position	Ministry Department Establishment or Office
85	29.01.83 30.01.83	Eng. M. Alem	Manager of Planning	Ministry of Defence - Central Workshop of Construction Department
86	30.01.83 1.02.83	Eng. Karim	President	Ministry of Agriculture Department of Mechanization
87	30.01.83	Prof. A. S. Rana	FAO-Advisor	UN - Seed Development Project in Kabul
88	31.01.83 2.02.83	G. A. Sultani	General Director	Foreign Trade Statistics Department, Central Statistics Organization
89	31.01.83	Masumi	Vice-President for Technical Affairs	Construction Unit of the Ministry of Education
90	31.01.83	G. H. Bayat	President of Foreign Trade	Ministry of Commerce
91	31.01.83	Murshidi	President	State Planning Committee Department of Research
92	1.02.83	M. R. Momand	General President /ex Minister of Agriculture/	Central Statistics Organization
93	1.02.83	Rauf	President	State Planning Committee Department for Agriculture

Item	Date	Name of Official	Position	Ministry Department Establishment or Office
94	5.02.83	P. Lapia[V]	Expert in Coal Mines	Ministry of Mines and Industries
95	6.02.83	Dipl. Eng. Taye N. Yarmanel	President	Ministry of Mines and Industries, Department for Norm and Standardization
96	9.03.83	P. Milev	UN-Expert	UN - Planning Team
97	9.03.83	Zuhir	Deputy Minister	Ministry of Electrical Energy
98	9.03.83	E. Badi	General Director	Energy Department, Planning Committee
99	9.03.83	Zadran	President	Planning Department, Ministry of Electrical Energy
100	12.03.83	Satarzai	Director	Energy Department, State Planning Committee
101	9.03.83	Nazifa	-	
102	12.03.83	Dr. Gh. Samedi	President	Joint STOCK TRANSPORTATION and Forwarding Company, AFSOTR
103	12.03.83	I. Mazajov	Advisor	
104	12.03.83	Eng. Habib	President	Road Transport Department, Ministry of Transportation

Annex 12

[illegible]

Would arrange to obtain as possible that a complete information in [illegible] connecting the castings/spare parts needed for the mining industries in Afghanistan in a form which is enclosed here. Further to make it easier, below are given some of the castings and/or forging parts which are used in the mining industry and may be required as spare parts or replacement parts in your mining industry [illegible]. These few examples are the following:

- Ball Crusher Liners / Fine Crushing.
- Jaws for Crushing.
- Lining Manganese-Steapers for Conveyors.
- Drilling Bits.
- Parts of machines for processing Coal.
- Lining and Screen Plates.
- Gears for breakers and conveyors.
- Bearings for crushing Coal [illegible].
- Others not specified here.

[illegible] very much for your cooperation.

[illegible] Manganese Steel. Manganese in Mining plants.

Sincerely yours,

[signature]

[illegible]

Annex 13

WOOL AND TEXTILE INDUSTRY IN AFGHANISTAN

Item	Establishment	Machines in 1982	Machines in 1990
1.	Wool Industry Puli-Charkhi	53	53
2.	Wool Industry Kandahar	800	800
	Grand Total Wool Factories	853.	853
3.	Bagrami Textile (old)	906	906
4.	Bagrami Textile (new)		906
5.	Balkh Textile	228	228
6.	Kandahar Textile		1,315
7.	Herat Textile		606
8.	Afghan Textile Guzergah	214	214
9.	Afghan Textile Gulbahar	2,007	2,007
10.	Afghan Textile Puli-Khumri	1,017	1,017
11.	Afghan Textile Jabal Seraj	50	50
12.	Charikar Textile Mill and Dying Plant		806

13.	Girishk's Cotton Mill		1,315
	Total Government's Textile Mills	4,422	9,370

14.	Total Private Textile Factories	1,508	2,628
	Grand Total Textiles Mills in Afghanistan /Except Wool/	5,930	11,998

Annex 14

YEARLY NEED FOR CASTED SPARE PARTS FOR BAGRAMI TEXTILE IN KABUL

Item	Name of Casting and Material	Unit Weight in kg	Number per year	Total Weight in kg
1	2	3	4	5
1	Fastener - Cast Iron	1.0	200	200.0
2	" - Cast Iron	1.0	200	200.0
3	Pedal for gear box - Cast Iron	0.4	500	200.0
4	Fastener - Cast Iron	0.4	500	200.0
5	Fastener - Cast Iron	1.0	200	200.0
7	Fastener - Cast Iron	1.0	200	200.0
8	Fastener - Cast Iron	1.0	400	400.0
9	Fastener - Cast Iron	1.0	400	400.0
10	Fastener - Cast Iron	0.5	200	100.0
11	Fastener - Cast Iron	0.5	200	100.0
12	Fastener - Cast Iron	0.4	500	200.0
13	Fastener - Cast Iron	0.4	200	80.0
14	Fastener - Cast Iron	0.5	200	100.0
15	Fastener - Cast Iron	0.5	200	100.0
16	Fastener - Cast Iron	0.3	400	120.0
17	Fastener - Cast Iron	0.3	400	120.0
18	Fastener - Cast Iron	0.2	500	110.0
19	Fastener - Cast Iron	0.3	400	120.0
20	Fastener - Cast Iron	0.3	400	120.0
21	Fastener - Cast Iron	0.2	600	120.0

1	2	3	4	5
22	Fastener - Cast Iron	0.4	200	80
23	Fastener - Cast Iron	0.1	400	40
24	Fastener - Cast Iron	0.1	400	40
25	Fastener - Cast Iron	0.5	400	200
26	Fastener - Cast Iron	0.2	200	40
27	Fastener - Cast Iron	0.2	200	40
28	Fastener - Cast Iron	0.1	200	20
29	Fastener - Cast Iron	0.5	200	100
30	Fastener - Cast Iron	0.5	200	100
31	Fastener - Cast Iron	0.5	200	100
32	Fastener - Cast Iron	0.3	200	60
33	Fastener - Cast Iron	0.2	400	80
34	Fastener - Cast Iron	0.5	200	100
35	Fastener - Cast Iron	0.3	200	60
36	Fastener - Cast Iron	0.2	200	40
37	Fastener - Cast Iron	0.2	200	40
38	Fastener - Cast Iron	0.2	100	20
39	Fastener - Cast Iron	0.4	200	80
40	Fastener - Bronze	0.2	400	80
41	Fastener - Cast Iron	0.2	500	100
42	Automat's part - Cast Iron		200	200
43	Fastener - Cast Iron	1.0	100	100
44	Fastener - Cast Iron	1.0	200	200
45	Fastener - Cast Iron	0.3	200	60
46	Fastener - Cast Iron	0.3	200	60

1	2	3	4	5
47	Fastener - Cast Iron	0.2	200	40
48	Fastener - Cast Iron	0.2	200	40
49	Fastener - Cast Iron	0.3	300	90
50	Fastener - Cast Iron	0.2	300	60
51	Automatic Moving Part - Cast Iron	0.3	500	150
52	Automatic Moving Part - Cast Iron	0.2	500	100
53	Automatic Moving Part - Cast Iron	0.3	500	150
54	Stiffener - Cast Iron	1.0	40	40
55	Frame - Cast Iron	0.5	40	20
56	Frame - Cast Iron	0.5	40	20
57	Pedal - Cast Iron	0.4	40	16
58	Frame - Cast Iron	7.0	30	210
59	Frame - Cast Iron	5.0	10	50
60	Frame - Cast Iron	1.0	30	30
61	Stiffener - Cast Iron	1.0	30	30
62	Stiffener - Cast Iron	0.8	40	24
63	Frame - Cast Iron	0.5	40	20
64	Frame - Cast Iron	200.0	1/5	40
65	Stiffener - Cast Iron	1.0	1,000	1,000
66	Stiffener - Cast Iron	4.0	2	8.0
67	Stiffener - Cast Iron	4.0	2	8.0
68	Gear - Cast Iron	10.0	4	40.0
69	Gear - Cast Iron	6.0	4	24.0
70	Copper Casing - Copper	100.0	1	100.0

1	2	3	4	5
71	Gear - Cast Iron	50.0	3	150.0
72	Copper Casing - Copper	90.0	1	90.0
73	Casing - Cast Iron	0.1	20	2.0
74	Casing - Cast Iron	0.1	50	5.0
75	Valve - Cast Iron	3.0	30	90.0
76	Valve - Cast Iron	1.5	30	45.0
77	Valve - Cast Iron	1.5	30	45.0
78	Valve - Cast Iron	1.5	30	45.0
79	Valve - Cast Iron	1.5	30	45.0
80	Valve - Cast Iron	4.0	30	120.0
81	Pulley - Cast Iron	8	18	144
82	Pulley - Cast Iron	5	18	144
83	Checking Nut - Cast Iron	0.2	200	40
84	Pulley - Cast Iron	5.5	500	2,750
85	Pulley - Cast Iron	5.0	1,000	5,000
86	Gauage - Cast Iron	1.0	500	500
87	Automate - Cast Iron	0.8	500	400
88	Cover Plate - Cast Iron	2.0	500	1,000
89	Bardle - Cast Iron	3.0	10	30
90	Pulley - Cast Iron	4.0	10	40
91	Gear - Cast Iron	2.5	10	25
92	Weight - Cast Iron	7.0	10	70

1	2	3	4	5
93	Pulley - Cast Iron	5.0	20	100
94	Cover - Cast Iron	3.5	20	70
95	Pulley - Cast Iron	4.0	10	40
96	Stiffener - Cast Iron	5.0	10	50
97	Gear - Cast Iron	2.0	10	20
98	Stiffener - Cast Iron	5.0	10	50
99	Stiffener - Cast Iron	7..	10	70
100	Stiffener - Cast Iron	7.0	10	70
101	Gear - Cast Iron	0.5	140	70
102	Gear - Cast Iron	0.5	40	20
103	Gear - Cast Iron	0.5	30	15
104	Gear - Cast Iron	2.0	30	60
105	Gear - Cast Iron	1.5	20	30
106	Gear - Cast Iron	1.0	40	40
107	Gear - Cast Iron	0.5	100	50
108	Gear - Cast Iron	0.5	20	10
109	Gear - Cast Iron	0.5	20	10
110	Gear - Cast Iron	0.5	20	10
111	Gear - Cast Iron	0.5	20	10
112	Gear - Cast Iron	0.5	20	10
113	Stiffener - Cast Iron	1.5	40	60
114	Gear - Cast Iron	0.5	20	10
115	Gear - Cast Iron	0.5	20	10
116	Gear - Cast Iron	0.5	40	20
117	Gear - Cast Iron	2.0	20	40

1	2	3	4	5
118	Gear - Cast Iron	1.0	30	30
119	Gear - Cast Iron	0.5	70	10
120	Gear - Cast Iron	0.5	70	10
121	Stiffener - Cast Iron	2.0	40	80
122	Pulley - Cast Iron	3.0	20	60
123	Pulley - Cast Iron	3.0	40	120
124	Pulley Cover - Cast Iron	3.0	10	30
125	Gear Box - Cast Iron	2.0	40	80
126	Pulley - Cast Iron	3.0	10	30
127	Gear - Cast Iron	0.5	40	20
128	Check Nut - Cast Iron	0.5	100	50
129	Stiffener - Cast Iron	3.0	20	60
130	Stiffener - Cast Iron	2.0	140	280
131	Gear - Cast Iron	0.7	500	350
132	Gear - Cast Iron	0.7	100	70
133	Clamp - Aluminium	1.5	50	75
134	Gear - Cast Iron	1.0	500	500
135	Ring - Aluminium	0.2	1,000	200
136	Gear - Cast Iron	0.5	50	25
137	Gear - Cast Iron	0.6	50	30
138	Gear - Cast Iron	0.6	50	30
139	Gear - Cast Iron	3.0	20	60
140	Gear - Cast Iron	3.0	20	60

1	2	3	4	5
141	Gear - Cast Iron	1.5	100	150
142	Gear - Cast Iron	0.5	50	25
143	Stiffener - Cast Iron	0.3	50	15
144	Gear - Cast Iron	0.2	50	10
145	Stiffener - Cast Iron	0.5	50	25
146	Gear - Cast Iron	0.5	100	50
147	Gear - Cast Iron	0.5	50	25
148	Gear - Cast Iron	0.5	50	25
149	Gear - Cast Iron	1.5	50	75
150	Gear - Cast Iron	1.0	50	50
151	Gear - Cast Iron	2.0	50	100
152	Gear - Cast Iron	0.1	50	5
153	Gear - Cast Iron	0.1	50	5
154	Stiffener - Cast Iron	0.5	100	50
155	Stiffener - Cast Iron	0.5	100	50
156	Stiffener - Cast Iron	0.3	200	60
157	Stiffener - Cast Iron	1.5	50	75
158	Handle - Cast Iron	0.8	100	80
159	Stiffener - Cast Iron	0.5	100	50
160	Stiffener - Cast Iron	0.5	100	50
161	Cover Cap - Cast Iron	0.5	100	50
162	Cover - Cast Iron	0.5	100	50
163	Gear - Cast Iron	2.0	16	32
164	Gear - Cast Iron	4.0	20	80
165	Gear - Cast Iron	1.0	66	66

Total Weight 23,328 kg

YEARLY NEED FOR CASTED SPARE PARTS FOR AFGHAN TEXTILE GUZERGAH IN KABUL

Item	Name of the Castings, it Sizes and Material	Unit Weight in Kg.	Number Per Year	Total Weight in Kg.
1	2	3	4	5
1	Easing Motion Lever l = 637mm - Cast Iron	2	15	30
2	Threadle (short) l = 476mm - Cast Iron	3	15	45
3	Threadle (long) l = 495mm - Cast Iron	3	15	45
4	Warp beam flange Ø 495mm - Cast Iron	7	34	238
5	Set Collars for let-off pinion shaft Ø 45mm - Cast Iron	0.5	34	17
6	Let-off Ratchet wheel shaft Ø 22x282mm - Cast Iron	2	20	40
7	Let-off Pinion Shaft Ø 28x435mm - Cast Iron	3	20	60
8	Warp beam Ø 110x 1378mm - Cast Iron	10		200
9	Let-off Side Shaft Ø 29x725mm - Cast Iron	3	15	45
10	Set-Collar for let-off side shaft Ø 40x22mm - Cast Iron	0.3	34	10
11	Let-off Worm Ø 65mm - Cast Iron	2	70	140
12	Let-off Ratchet Wheel Ø 140mm - Cast Iron	4	1	4
13	Friction Disc for let-off ratchet wheel Ø 110mm - Cast Iron	4	70	280

1	2	3	4	5
14	Catch Lever for let-off ratchet wheel - Cast Iron	1	20	20
15	Catch for let-off ratchet wheel (short) 52x42mm - Cast Iron	0.2	70	14
16	Catch for let-off ratchet wheel (medium) 52x45mm - Cast Iron	0.2	70	14
17	Catch for let-off ratchet wheel (long) 52x47mm - Cast Iron	0.2	70	14
18	Ratchet wheel bucket l=102mm - Cast Iron	3.0	34	102
19	Foot lever l = 121mm - Cast Iron			
20	Supporter for T-shape connector l = 68mm - Cast Iron	1	34	34
21	T-shape connector for connecting rod Ø 22x41mm - Cast Iron	0.5	34	17
22	Large bevel gear for let off side shaft Ø 94x84mm - Cast Iron	0.5	34	17
23	Bevel gear for inclined shaft Ø 76x60mm - Cast Iron	0.25	20	5
24	Upper bracket for inclined shaft l = 25mm - Cast Iron	0.25	70	17
25	Bevel gear for let-off side shaft Ø 79x75mm - Cast Iron	0.25	34	17

1	2	3	4	5
26	Bevel gear for let-off side shaft Ø 79x75mm - Cast Iron	0.5	34	17
27	Set collars for ratchet wheel shaft Ø 22x36mm - Cast Iron	0.2	34	7
28	Sector arm - Cast Iron	0.25	34	9
29	Angle connector Ø 28x32mm - Cast Iron	0.2	34	7
30	Front lever stud Ø 16mm - Cast Iron	0.25	34	9
31	Front lever pin Ø 8x29mm - Cast Iron	0.05	34	1.7
32	Angle Connector stud Ø 16x33mm - Cast Iron	0.1	34	3.4
33	Inclined shaft Ø 14x726mm - Cast Iron	0.5	34	17
34	Front stop-cross rod Ø 16mm - Cast Iron	3	15	45
35	Let-off worm set screw Ø 15/110mm - Cast Iron	0.1	45	4.5
36	Weight for regulatory wool l = 70mm -Cast Iron	2.0	15	30
37	Slotted guide for regulating rod l = 140mm - Cast Iron	2.0	34	78
38	Set collars for sector lever Ø 20mm - Cast Iron	0.25	20	5
39	Crankshaft bush half Ø 50x83mm - Cast Iron	0.5	3	1.5

1	2	3	4	5
40	Easing motion cam l = 138mm - Cast Iron	2.0	34	68
41	Tappet shaft gears - Cast Iron	0.5	20	10
42	Plain tappet Ø 467x 39mm - Cast Iron	8	45	360
43	Plain tappet Ø 467mm -Cast Iron	10	45	450
44	Plain tappet Ø 428mm -Cast Iron	10	20	200
45	Plain tappet Ø 171 - Cast Iron	6	34	204
46	Side lever cap bush- ing Ø 38x57mm - Cast Iron	0.5	34	17
47	Picking nose l = 57mm-Cast Iron	0.7	70	49
48	Side lever guide l = 194mm - Cast Iron	4	20	80
49	Side lever bracket l = 121mm - Cast Iron	1	34	34
50	Side Lever bracket l = 121mm - Cast Iron	1	34	34
51	Picking disc Ø 241mm -Cast Iron	7	34	238
52	Tappet shaft Ø 42x 782mm - Cast Iron	15		225
53	Picking bowl Ø 76x 34mm - Cast Iron	0.5	100	50
54	Picking bowl bush Ø 20x35mm - Cast Iron	0.1	100	10
55	Picking bowl stud l = 79mm - Cast Iron	0.5	150	75
56	Picking stick cap l = 155mm - Cast Iron	1	150	150
57	Picking stick cap l = 155mm - Cast Iron	1	150	150
58	Cross common for picking stick - Cast Iron	1	34	34

1	2	3	4	5
59	Adjusting hoop for picking stick spring - Cast Iron	0.5	70	35
60	Picking stick stud l = 176mm - Cast Iron	0.5	180	90
61	Rocking shaft Ø 38x 196mm - Cast Iron		34	272
62	Rocking shaft bush Ø 48x98mm - Cast Iron	1.0	34	34
63	Slay sward bracket - Cast Iron	1.0	20	20
64	Crankshaft Ø 38x 200mm	2	15	30
65	Check strap sliding box - Cast Iron	0.6	300	180
66	Check strap sliding box - Cast Iron	0.6	150	90
67	Check strap bottom plate - Cast Iron	0.6	300	180
68	Check strap guide - Cast Iron	0.1	70	7
69	Buffer spring disc Ø 54x43cm - Cast Iron	0.5	34	17
70	Intermediate wheel Ø 66mm - Cast Iron	0.8	34	27
71	Eccentric wheel Ø 89mm - Cast Iron	1.0	34	34
72	Stand for buffer spring disc Ø 20x74mm -Cast Iron	0.25	150	38
73	Check strap - Cast Iron	3	34	102
74	Shifting arm - Cast Iron	2	70	140
75	Bracket wheel Ø 430 - Cast Iron	8	34	272
76	Starting Connecting rod l = 140mm - Cast Iron	5	34	170

1	2		3	4	5
77	Shifting fork screw Ø 10x28	- Cast Iron	0.05	180	9
78	Clamp for sick lever 92x46mm	- Cast Iron	0.5	300	150
79	Fastening nut	- Cast Iron	0.05	150	8
80	Pushing lever for starting handle	- Cast Iron	1	15	15
81	Take-Off vehicle lever 1 = 152mm		0.6	34	20
82	V-shape pulley	- Cast Iron	2.0	15	30
83	Horn shape lever	- Cast Iron	1.8	20	36
84	Take-off lever stud	- Cast Iron	0.2	15	3
85	Bracket for V-shaped lever	- Cast Iron			
86	Inclined lever stud	- Cast Iron	0.2	34	7
87	V-shaped lever pin Ø 18x49mm		0.1	70	7
88	Starting handle holders	- Cast Iron	0.5	15	7
89	Stud for long collars	- Cast Iron	0.05	70	4
90	Long collars Ø 12x 25	- Cast Iron	0.05	70	4
91	Guide	- Cast Iron	0.35	300	105
92	Weft fork holders weft spindles	- Cast Iron	0.4	300	120
93	Weft hammers lever	- Cast Iron	2	15	30
94	Weft hammer	- Cast Iron	0.5	34	17
95	Sleeve Holder's Bracket	- Cast Iron	0.5	15	8

1	2	3	4	5
96	Lifting lever - Cast Iron	1.0	34	34
97	Bracket for weft for spindle l = 90 x 80mm - Cast Iron	1.3	15	20
98	Sliding hoop for weft forth spindle l = 66 x 26mm - Cast Iron	0.2	20	4
99	Split lifting lever l = 146mm	0.5	20	10
100	Weft feeler bracket l = 118mm - Cast Iron	0.5	18	9
101	Weft feeler bracket l = 118mm - Cast Iron	0.5	18	9
102	Set collar for crose spindle Ø 45mm - Cast Iron	0.1	60	6
103	Set collar for transmissioning rod Ø 16mm - Cast Iron	0.1	50	5
104	Connecting pointers - Cast Iron	0.35	34	12
105	Limiting lever - Cast Iron	0.2	20	4
106	Weft fork holders - Cast Iron	0.2	34	7
107	Auxiliary link 32x 10mm - Cast Iron	0.1	34	3
108	Arm for limiting lever - Cast Iron	0.5	35	18
109	Connecting rod 289x66mm - Cast Iron	2	35	70
110	Outside bracket for front tongue 84x33mm - Cast Iron	0.8	150	120
111	Stop rod bracket l = 122mm - Cast Iron	2	35	70

1	2	3	4	5
112	Inside bracket for front tongue 73x24mm - Cast Iron	0.8	150	120
113	Shaving sward l = 866mm - Cast Iron	2	35	70
114	Stop rod bracket 148 x 95mm - Cast Iron	2	35	70
115	Stop rod sleeve Ø 25 x 98mm - Cast Iron	0.4	35	14
116	Washer Plate for cap 73 x 56mm -Cast Iron	0.4	35	14
117	Bracket for compensator l = 36mm -Cast Iron	0.4	35	14
118	Bend slides bowl lever l = 147mm - Cast Iron	0.4	50	20
119	Catch for bent slides wool lever l = 32mm - Cast Iron	0.3	35	10
120	Shuttle box front guard 514 x 34mm - Cast Iron	2	100	200
121	Front snap guard l = 519mm - Cast Iron	2.5	35	88
122	Thresh Plate 540 x 814mm - Cast Iron	3	70	210
123	Thresh Plate 394 x 81mm - Cast Iron	2	70	140
124	Shuttle box top guard l = 521mm - Cast Iron	1	70	70
125	Stop fingers bracket 58x66mm - Cast Iron	5	35	18
126	Stop fingers bracket 58x66mm - Cast Iron	0.5	35	18
127	Stop finger 92x35mm - Cast Iron	0.3	35	10

1	2	3	4	5
128	Side Wing for stop rod 167x51mm - Cast Iron	0.4	35	14
129	Counter wing for stop rod 92x33mm - Cast Iron	0.4	70	28
130	Stop rod suspenders 64mm - Cast Iron	0.3	35	10
131	Buck hill 80x64mm - Cast Iron	0.35	35	12
132	Bracket for shuttle box top guard l = 106mm - Cast Iron	0.5	15	8
133	Safety spring lever 162x73mm - Cast Iron	0.4	15	12
134	Washer for front mop guard bracket 32 x 25mm - Cast Iron	0.1	70	7
135	Stop finger stud Ø 14x76mm - Cast Iron	0.2	70	14
136	Stop rod for bend slides Ø 24x1327mm - Cast Iron	4	70	280
137	Arm for box fly lock 97x44mm - Cast Iron	0.5	20	10
138	Arm for box fly lock 97x44mm - Cast Iron	0.5	20	10
139	Wood controllers bracket 35x28mm - Cast Iron	0.5	20	10
140	Outside bracket for front guard l = 127mm - Cast Iron	0.4	35	14
141	Front tongue l = 390mm - Cast Iron	1.5	100	150
142	Pressing finger l = 133mm - Cast Iron	0.3	35	12

1	2	3	4	5
143	Front tongue suspenders 68 x 16mm - Cast Iron	0.05	70	4
144	Washers for front tongues 25x16mm - Cast Iron	0.05	140	8
145	Washer for bolt of box 25x25mm - Cast Iron	0.05	140	8
146	Compensator 1=57mm - Cast Iron	0.25	35	9
147	Compensator bracket 38x33mm - Cast Iron	0.3	70	21
148	Connection rod bush Ø 32x50mm - Cast Iron	0.1	140	14
149	Connection rod pin Ø 25x91mm - Cast Iron	0.3	70	21
150	Washer for stop rod suspenders 31x31mm - Cast Iron	0.1	70	7
151	Washer plate with hoods for bent slides 1 = 135mm - Cast Iron	0.3	35	11
152	Shuttle roll 96x26mm -Cast Iron	0.3	35	11
153	Shuttle roll 96x26mm -Cast Iron	0.3	35	11
154	Bracket for box top guard 1 = 140mm - Cast Iron	1.5	70	105
155	Box top guard 1 = 412 - Cast Iron	1.5	35	52
156	Washer Plate 141x66mm - Cast Iron	1.4	35	49
157	Clamp plate for fly wool 70x12mm - Cast Iron	0.2	35	7
158	Sleeves for crauch pen bearing 1=32mm - Cast Iron	0.1	70	7

1	2		3	4	5
159	Stud for bottom wire Ø 8x19mm	- Cast Iron	0.05	70	3.5
160	Living Plate for fly back wood 1 = 108mm	- Cast Iron	0.5	7	3.5
161	Surface roller bracket 76x10mm	- Cast Iron	0.5	7	3.5
162	Surface roller bracket 76x10mm	- Cast Iron	0.5	20	100
163	Pinion Ø 110mm	- Cast Iron	3.0	20	60.0
164	Intermediate gear stud Ø 20x130mm	Cast Iron	1	20	20
165	Change gear stud Ø 20 x 212mm	- Cast Iron	1	35	35
166	Weft tail cutting hammer 1 = 67mm	- Cast Iron	0.5	35	18
167	Taking-up finger's bracket 1 = 44mm	- Cast Iron	0.4	70	28
168	Taking up fingers 2x37mm	- Cast Iron	0.3	35	12
169	Taking up lever 1 = 324mm	- Cast Iron	0.5	35	18
170	Taking up catch 1 = 150mm	- Cast Iron	0.4	35	14
171	Bracket for change gear stud Ø 32x96mm	- Cast Iron	0.3	15	45
172	Ratchet wheel for taking up motion Ø 98mm	- Cast Iron	0.7	35	24
173	Intermediate gear	- Cast Iron	0.8	7	6
174	Slip catch 120x60mm	- Cast Iron	0.4	35	14
175	Intermediate gear	- Cast Iron	1.5	20	30

1	2	3	4	5
176	Intermediate pinion - Cast Iron	0.4	20	8
177	Catch for cloth roller lever 1 = 105mm - Cast Iron	0.4	15	6
178	Surface roller gear - Cast Iron	1.0	20	20
179	Bracket for cloth roller lever 127x64mm - Cast Iron	0.4	7	3
180	Bracket for cloth roller lever 127x64mm - Cast Iron	0.5	20	10
181	Cloth roller lever 300x44 - Cast Iron	1.0	20	20
182	Bracket for cloth roller 94x73mm - Cast Iron	0.5	15	8
183	Temple Bracket 118 x 56mm - Cast Iron	0.5	15	8
184	Temple Bracket 118 x 56mm - Cast Iron	0.5	15	8
185	Temple rod slide 62 x 41mm - Cast Iron	0.2	20	4
186	Temple rod slide 62 x 41mm - Cast Iron	0.3	20	6
187	Twisted rollers bracket 64x50mm - Cast Iron	0.2	20	4
188	Twisted rollers bracket 64x50mm - Cast Iron	0.2	15	3
189	Lifting catch lever 132 x 38mm - Cast Iron	0.2	35	7
190	Bracket for change gear stud 59x32mm - Cast Iron	0.2	15	3
191	Hoop for cloth roller Ø 40x25mm - Cast Iron	0.15	15	2
192	Twist roller Ø22x114 - Cast Iron	2.0	15	30

1	2		3	4	5
193	Temple rod 1054xØ29	- Cast Iron	1.5	15	22
194	Cloth rollers axle Ø 20x175mm	- Cast Iron	0.2	15	3
195	Temple box 143x67mm	- Cast Iron	0.3	35	10
196	Temple cap 150mm	- Cast Iron	0.05	5	2
197	Temple box 138x40mm	- Cast Iron	0.3	35	11
198	Hook bolt for temple rod	- Cast Iron	0.1	70	7
199	Holding catch 12.5x 28	- Cast Iron	0.05	35	2
200	Temple box clamp 41x19mm	- Cast Iron	0.3	15	5
201	Main shaft bearing bracket 186x92mm	- Cast Iron	0.5	30	15
202	Shaft Ø 15mm	- Cast Iron	0.2	35	7
203	Bend slide bracket 1 - 73mm	- Cast Iron	0.4	20	8
204	Spacing plate for shuttle receiving box 1=72mm	- Cast Iron	0.2	40	8
205	Shaft Ø 18 x 762mm	- Cast Iron	0.5	40	20
206	Cloth curtain rod Ø 8x207mm	- Cast Iron	0.2	40	8
207	Bent slides 1 = 132mm	- Cast Iron	0.5	40	20
208	Adjusting hoop for bent 43 x 22mm	- Cast Iron	0.3	40	12
209	Shuttle receiving box supporter 1 = 232mm	- Cast Iron	0.5	7	3.5
210	Upper heald adjusting nut 1=68mm	- Cast Iron	0.2	15	7.5

1	2	3	4	5
211	Heald bar 1 = 1115mm - Cast Iron	1	15	15
212	Lower for heald frame 1 = 146mm - Cast Iron	0.1	35	3.5
213	Lower Heald adjusting nut 1 = 102mm - Cast Iron	0.1	15	1.5
214	Clip for wood ram 1 = 80mm - Cast Iron	0.1	35	3.5
215	Heald clip 1 = 72mm - Cast Iron	0.05	35	1.8
216	Heald clip packing plate - Cast Iron	0.2	20	4
217	Packing plate on heald frame box - Cast Iron	0.05	35	2
218	Packing plate on wood ram 102x12mm - Cast Iron	0.05	35	2
219	Connecting rod for angle connector 1 = 295mm - Cast Iron	0.2	35	7
220	Slide bracket for warp stop box 164mm - Cast Iron	0.3	35	10
221	Middle bracket for warp stop 105mm - Cast Iron	0.3	35	10
222	Combined lever 1=355mm -Cast Iron	0.5	15	8
223	Conversion rod piviot - Cast Iron	0.05	80	4
224	Cap for conversion rod piviot - Cast Iron	0.3	80	24
225	Combined lever bracket 1 = 76mm - Cast Iron	0.2	40	8
226	Warp stop motion cam Ø 136mm - Cast Iron	0.5	35	18

1	2	3	4	5
227	Stop hoop for warp stop rod - Cast Iron	0.1	35	4
228	Oscillating lever 82mm - Cast Iron	0.2	35	7
229	Angle connector 41mm - Cast Iron	0.3	20	6
230	Set collar sleeve holds 13 x Ø 12mm - Cast Iron	0.025	80	2
231	Oscillating shaft sleeve Ø 18x30mm - Cast Iron	0.025	80	2
232	Joint pin for warp stop wool with connecting bar Ø 14x29mm - Cast Iron	0.05	80	4
233	Stud for connecting bar Ø 10x20mm - Cast Iron	0.05	80	4
234	Stud for connecting rod of angle connector Ø 10x22mm - Cast Iron	0.05	80	4
235	Connection rod 355mm - Cast Iron	0.1	80	8
236	Bracket for oscillating shaft 57mm - Cast Iron	0.3	40	12
237	Bracket for warp stop box 114mm - Cast Iron	0.3	15	5
238	Middle bracket for oscillating shaft 54mm -Cast Iron	0.2	40	8
239	Hanger arm for warp stop box 82mm - Cast Iron	2	15	30
240	Hanger arm for warp stop box 82mm - Cast Iron	2	15	30

Total Weight: 9,681.4 kg

YEARLY NEED FOR CASTED SPARE PARTS FOR KABUL TEXTILE MILL IN KABUL

Item	Name of the Castings and Material	Unit Weight in Kg.	Number Per Year	Total Weight in Kg.
1	2	3	4	5
1	Wheel Ø 228mm - Cast Iron	15	30	450
2	Wheel Ø 354mm - Al-Alloy	7	75	525
3	Latch 176x55mm - Cast Iron	0.4	90	36
4	Brake shoe-795x 37mm - Al-Alloy	0.6	180	108
5	Shaft 1322x Ø80mm - Cast Iron	35	45	1575
6	Moving Chuck 610x 220mm - Cast Iron	8	150	1200
7	Moving Lever 389x 250mm - Cast Iron	4	150	600
8	Frame Bushing 1300xØ 45 - Al-Alloy	6	150	900
9	Semi-Round Plate 45x720 - Cast Iron	1	150	150
10	Wheel Ø 50x55mm - Cast Iron	0.3	180	54
11	Shaft Ø 45x585mm - Cast Iron	5	120	600
12	Shaft Ø 38x589mm - Cast Iron	4	120	480
13	Shaped Plate 58x119mm - Cast Iron	0.8	120	96
14	Shaped Plate 89x90mm - Cast Iron	0.8	120	96
15	Shaped Plate 140x35 - Cast Iron	0.8	120	96
16	Shaped Plate 375x90mm - Cast Iron	2.2	120	264
17	Shaped Plate 295x90 - Cast Iron	1.9	120	228

1	2	3	4	5
18	Shaped Plate 270x62 - Cast Iron	1.4	120	168
19	Gear Ø 329/Ø 35mm - Cast Iron	0.8	50	40
20	Gear Ø 270/Ø 35mm - Cast Iron	0.6	50	30
21	Gear Ø 190/Ø89mm - Cast Iron	0.5	120	60
22	Lever L 135x75mm - Cast Iron	0.5	120	60
23	Plate 54x70mm - Cast Iron	0.3	120	40
24	Plate 179x200mm - Cast Iron	0.9	180	162
25	Plate 240x34 - Cast Iron	0.3	300	100

Total Weight 8,118 kg

YEARLY NEED FOR CASTED SPARE PARTS FOR WOOL INDUSTRY IN KABUL

Item	Name of the Casting and Material and Sizes	Unit Weight in kg	Number per year	Total Weight in kg
1	2	3	4	5
1	Worm Ø45x56cm - Bronze	4	8	32
2	Worm Ø60x210mm - Bronze	2	8	16
3	Worm Ø60x200mm - Bronze	2	8	16
4	Gear Ø280mm - Cast Iron	2	4	8
5	Frame 1=250mm -Cast Iron	1	8	8
6	Shaft Ø20x750mm - Cast Iron	4	1	4
7	Frame Ø50mm - Cast Iron	2	20	40
8	Bar Ø160mm - Cast Iron	5	4	20
9	Gear Ø180mm - Cast Iron	8	4	32
10	Gear Ø50mm - Cast Iron	1	10	10
11	Frame 200mm - Cast Iron	2	6	12
12	Frame 1=1000mm-Cast Iron	5	2	10
13	Frame 1=400mm- Cast Iron	4	24	96
14	Gear Ø50mm - Cast Iron	6	20	120
15	Frame - Cast Iron	2	100	200
16	Gear Ø300mm - Cast Iron	3	24	72
17	Gear Ø400mm - Cast Iron	4	4	16
18	Gear Ø80mm - Cast Iron	2	24	48
19	Gear Ø100mm - Cast Iron	2	8	16
20	Gear Ø220mm - Cast Iron	3.5	4	14

1	2	3	4	5
21	Gear Ø990mm - Cast Iron	5	4	20
22	Gear Ø1000mm - Cast Iron	6	4	24
23	Gear Ø160mm - Cast Iron	2	4	8
24	Gear Ø180mm - Cast Iron	2	4	8
25	Gear Ø240mm - Cast Iron	5	4	20
26	Gear Ø6x11mm - Cast Iron	1	4	4
27	Gear Ø6x11mm - Cast Iron	1	4	4
28	Gear Ø3x6mm - Cast Iron	0.5	4	2
29	Gear Ø200mm - Cast Iron	3.0	12	36
30	Gear Ø250mm - Cast Iron	3	12	36
31	Gear Ø100mm - Cast Iron	1	4	4
32	Gear Ø150mm - Cast Iron	2	8	16
33	Gear 9150.mm - Cast Iron	7	4	28
34	Gear Ø100mm - Cast Iron	2	8	11
35	Gear Ø200mm - Cast Iron	4	8	32
36	Gear Ø100mm - Cast Iron	2	4	8
37	Gear Ø150mm - Cast Iron	2	4	8
38	Gear Ø80mm - Cast Iron	1	4	4
39	Gear Ø120mm - Cast Iron	2	4	8
40	Gear Ø150mm - Cast Iron	3	4	12
41	Gear Ø130mm - Cast Iron	3	4	12
42	Gear Ø140mm - Cast Iron	3	4	12
43	Shaft Ø70mm - Cast Iron	1	16	16

1	2	3	4	5
44	Gear Ø 120 mm - Cast Iron	10	4	40
45	Gear Ø 100mm - Cast Iron	2	4	8
46	Plate 200x400mm - Cast Iron	2	40	80
47	Plate 200x500mm - Cast Iron	4	4	16
48	Plate 250x400 - Cast Iron	3	16	48
49	Plate 1000mmx150mm-Cast Iron	5	4	20
50	Plate 400mmx150mm - Cast Iron	4	4	16
51	Plate 450mmx150mm - Cast Iron	6	4	24
52	Plate 350mmx100mm - Cast Iron	3	4	12
53	Plate 350mmx100mm - Cast Iron	4	4	16
54	Plate 1400mm - Cast Iron	10	4	40
55	Plate 1500mm - Cast Iron	3	4	12
56	Plate 1500mm - Cast Iron	10	4	40
57	Plate 200mmx2000mm- Cast Iron	30	4	120
58	Plate 300mmx50mm - Cast Iron	4	4	16
59	Plate 200mm - Aluminium	2	4	8
60	Plate 1000mmx150mm -Cast Iron	20	4	80
61	Plate 250x20mm - Cast Iron	4	8	32
62	Plate 300x10 - Cast Iron	4	4	16
63	Plate 150mm - Cast Iron	2	8	16
64	Plate 250mm - Cast Iron	4	8	32
65	Shaft Ø 60x250mm - Cast Iron	20	20	400
66	Shaft Ø 40x300mm - Cast Iron	1	110	160
67	Bushing Ø 50mm - Cast Iron	1	110	160
68	Shaft Ø 40x250mm - Cast Iron	3	32	96
69	Shaft Ø 150mm - Cast Iron	3	8	24
70	Gear Ø 250x10mm - Cast Iron	15	30	450

1	2	3	4	5
71	Gear Ø 280x20mm - Cast Iron	25	25	625
72	Plate 150x10mm - Cast Iron	10	100	1000
73	Plate 160x20mm - Cast Iron	16	100	1600
74	Plate 150x20mm - Cast Iron	15	100	1500
75	Gear Ø 100mm - Cast Iron	85	6	510
76	Gear Ø 480mm - Cast Iron	64	12	768
77	Gear Ø 800mm - Cast Iron	15	6	90
78	Gear Ø 700mm - Cast Iron	14	7	98
79	Gear Ø 300mm - Cast Iron	5	6	30
80	Frame - Cast Iron	2	16	32
81	Plate - Cast Iron	2	16	32
82	Gear Ø 300mm - Cast Iron	3	6	18
83	Gear Ø 150mm - Cast Iron	1	6	6
84	Gear Ø 300mm - Cast Iron	4	4	16
85	Gear Ø 150mm - Cast Iron	1.5	8	12
86	Gear Ø 100mm - Cast Iron	2	16	32
87	Gear Ø 120mm - Cast Iron	1	24	24
88	Gear Ø 200mm - Cast Iron	2	4	8
89	Gear Ø 160mm - Cast Iron	2	4	8
90	Gear Ø 200mm - Cast Iron	3	6	18
91	Plate 500mm - Cast Iron	21	2	42
92	Plate 400mm - Cast Iron	12	20	240
93	Plate 500mm - Cast Iron	21	4	84

1	2		3	4	5
94	Plate 250mm	- Cast Iron	4	5	20
95	Plate 300mm	- Cast Iron	14	10	140
96	Plate 120mm	- Cast Iron	40	4	160
97	Plate 600mm	- Cast Iron	14	2	28
98	Plate 1300mm	- Cast Iron	50	4	200
99	Gear Ø 1000mm	- Cast Iron	30	4	120
100	Gear Ø 100-200mm	- Cast Iron	3.0	200	600
101	Gear Ø 400mm	- Cast Iron	14	2	28
102	Plate 300mm	- Cast Iron	21	4	84
103	Plate 200mm	- Cast Iron	14	6	84
104	Plate 400mm	- Cast Iron	14	2	28
105	Plate 250mm	- Cast Iron	4	8	32
106	Gear Ø 300mm	- Cast Iron	3	2	6
107	Gear Ø 300mm	- Cast Iron	4	4	16
108	Gear Ø 300mm	- Cast Iron	3	4	12
109	Gear Ø 200mm	- Cast Iron	4	100	400
110	Gear Ø 144x25mm	- Cast Iron	2.5	8	20
111	Gear Ø 204x50mm	- Cast Iron	3.0	4	12
112	Disc Ø 124mmx32	- Cast Iron	2.5	5	13
113	Frame 65x105mm	- Cast Iron	0.6	15	10
114	Gear Ø 160mmx40	- Cast Iron	5	2	10
115	Disc Ø 180mmx50mm	- Cast Iron	7	8	56
116	Gear Ø 750mmx95	- Cast Iron	21	1	21
117	Plate 96x32mm	- Cast Iron	2	15	30
118	Plate 500x61mm	- Cast Iron	6	5	30
119	Plate 400x61mm	- Cast Iron	6	4	24

Total Weight: 12,087 kg

DEMAND FOR CASTED PIPES AND FITTINGS IN AFGHANISTAN FOR THE CONSTRUCTION INDUSTRY /TONS/

Annex 18

Item	Construction Unit	Cast Iron Pipes			Cast Iron Fittings			Iron Radiator Plates			Bronze Fittings		
		1982	1985	1990	1982	1985	1990	1982	1985	1990	1982	1985	1990
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Prefabricated Houses Factory	64.0	96.0	144.0	87.0	131.0	196.0	91.0	137.0	205.0	1.6	2.5	3.6
2	Banai Construction Unit	-	-	-	8.9	21.0	27.0	-	-	-	-	-	-
3	Helmand Construction Corporation	95.0	130.0	155.0	153.0	161.0	190.0	-	-	-	-	-	-
4	Central Authority for Water Supply and Sewerage	-	-	-	100.0	110.0	125.0	-	-	-	-	-	-
5	Afghan Building Construction Unit ACUC	59.5	83.3	130.9	92.0	117.6	184.8	87.5	122.5	192.5	1.7	2.5	3.8
6	Construction Unit Ministry of Defence	67.1	67.1	83.8	73.1	73.1	91.3	105.0	105.0	131.0		-	-
7	Construction Maintenance Unit Ministry of Defence	420.0	480.0	520.0	733.0	800.0	860.0	30.5	33.6	37.0	10.1	12.2	13.9
8	Construction Unit Ministry of Education CUME	240.0	-	336.0	39.0	-	55.0	8.0	-	11.0	10.0	12.0	14.0
Total Construction		945.6	856.4	1369.7	1276.0	1413.7	1729.1	322.0	398.1	566.0	23.4	29.2	35.3

Annex 19

DEMAND FOR CASTED PARTS FOR THE PREFABRICATED HOUSES FACTORY

1. Cast Iron Pipes in lengths from 500 to 2,100mm

Diameter Ø 50mm - 40x15+24x14+13x23 = 1,235 assume: 1,250m

Ø 100mm - (41+51)x15+(37+45)x14+(30+43)x13+
+(37+45)x10 = 4,297m
4,297+10 percent of 4,297 = 4,727m

assume: 4,750m

Ø 150mm - assume: 1,000m

Unit weight of 1 meter of each diameter is:

Diameter 50mm - 6.0kg

100mm - 14.0kg

150mm - 22.0kg

This means the demand in 1985 will be:

Ø 50mm - 1,250m x 6.0kg/m = 7,500kg

Ø 100mm - 4,750m x 14.0kg/m= 6,500kg

Ø 150mm - 1,000m x 22.0kg/m= 22,000kg

Total: 96,000kg = 96 tons

The future demand will be:

1985	1986	1987	1988	1989	1990
96 tons	106 tons	115 tons	125 tons	135 tons	144 tons

2. Cast Iron Fittings for Sewage

There are required many types such as:

Tee	100/100mm	100/50mm	50/50mm
Bow	100mm	50mm	

In 1985 will be required:

400 x 15 housing units = 6,000 pieces

300 x 14 housing units = 4,200 pieces

172 x 23 housing units = 3,956 pieces

Total: 14,156 pieces assume 14,500 pieces

of various types of fittings. As representative has been chosen a Tee 100/100mm, which has a unit weight of 7.7kg, so the total demand in 1985 will be:

14,500 x 7.7kg = 116,500kg = 117 tons

117 tons + 10% of 117 = 128.7 tons assume 130 tons

The future demand will be:

1985	1986	1987	1988	1989	1990
130 tons	143 tons	156 tons	169 tons	182 tons	195 tons

3. Cast Iron Fittings for Cold and Hot Water Supply

diameters:

Ø 25mm - 10x15 = 150 pieces

- 10x13 = 130 pieces

- 5x23 = 115 pieces

Total = 395 + 10% of 395 = 435 pieces

40 mm - 60 pieces

Assume as representative the diameter Ø 25mm, so there are 500 pieces of a diameter Ø 25mm. The unit weight of a representative fitting Ø 25mm is 1.75kg.

So that the total demand will be 500x1.75 kg = 875kg=0.9 tons

The future demand will be

1985	1986	1987	1988	1989	1990
0.9 ton	1.0 ton	1.1 ton	1.2 ton	1.3 ton	1.4 ton

4. Bronze Fittings for Cold and Hot Water Supply

Diameters:

Ø 15mm	60x15+60x14+45x13+45x10	= 2,775 pieces
Ø 20mm	2x23	= 46 pieces
Ø 25+Ø32+Ø40mm		= 60 pieces
	Total:	2,881 pieces

assume 2,900 pieces

As representative fitting is considered a tap Ø 15mm of bronze having a weight of 0.4 kg.

So the total demand will be:

2900 x 0.4kg = 1,152kg = 1.2 tons

The future demand will be:

1985	1986	1987	1988	1989	1990
1.2 tons	1.3 tons	1.4 tons	1.6 tons	1.7 tons	1.8 tons

5. Bronze Fittings For Central Heating

Diameters:

Ø 15mm - 32 + 13 = 45 x 15 = 675 pieces

Ø 20

Ø 25 - 54 x 14 + 37 x 23 = 756 + 851 = 1,607 pieces

Ø 32 675 + 1,607 = 2,282 pieces

assume: 2,300 pieces

As representative is considered tap Ø 20mm with the unit weight 0.5kg

So the demand will be:

2,300 x 0.5kg = 1,350kg = 1.3 tons

1	2	3	4	5	6	7	8
Pipes	5	Centrifugally casted pipe Ø 50mm	grey iron - 25.0	Ø 50x2,100	2,000	12.50	25,000
	6	Centrifugally casted pipe Ø 100mm	grey iron - 224.9	Ø 100x2,100	7,650	29.4	224,910
	7	Centrifugally casted pipe Ø 150mm	grey iron - 90.1	Ø 150x2,100	1,950	46.2	90,090
Fittings	8	Stop cocks Ø 25	Bronze - 3.1	100x145	2,584	1.2	3,100
	9	Tee 50/50	Malleable Cast iron - 14.2	110x170	4,734	3.0	14,200
	10	Bow 50/90°	Malleable cast iron - 21.0	90x130	10,000	2.1	21,000
	11	Bow 50/135°	Malleable cast iron - 16.0	90x120	10,000	1.6	16,000
	12	Bow 100/90°	Malleable cast iron - 25.5	140x165	5,000	5.1	25,500

1	2	3	4	5	6	7	8
	13	Gate valve Ø 65	grey cast iron - 72.0	250x270	6,000	12.0	72,000
	14	Gate vale Ø 80	grey cast iron - 85.0	275x280	5,000	17.0	85,000
	15	Gate vale Ø 100	grey cast iron - 100	300x320	4,000	25.0	100,000
	16	Flange Ø 50	grey cast iron - 13.4	200x25	1,175	11.4	13,400
	17	Pipe saddle	grey cast iron - 19.8	50x176	3,000	6.6	19,800
Agriculture	18	Crop protection equipment	Bronze - 22.0	80x140	2,750	8.0	22,000
	19	Pump cover	Aluminium Alloy - 2.5	150x350	714	3.5	2,500
	20	Piston	Aluminium alloy - 8.0	Ø 150x200	4,000	2.0	8,000
	21	Cast iron wheel for hand hoe	Malleable cast iron - 20.0	Ø 100	10,000	2.0	20,000

1	2	3	4	5	6	7	8
	22	Cast iron wheel for animal drawn harrow	Malleable cast iron - 17.0	Ø 150	4,857	3.5	17,000
	23	Cast iron wheel for animal drawn plough	Malleable cast iron - 21.0	Ø 150	6,000	3.5	21,000
	24	Lift cover	Malleable cast iron - 6.0	Ø 130	2,000	3.0	6,000
	25	Front hubs	grey cast iron - 11.7	Ø 185	1,950	6.0	11,700
	26	Brake drums	grey cast iron - 20.0	Ø 160	2,000	10.0	20,000
	27	Filter cover	grey cast iron - 16.8	Ø 155	1,527	11.0	16,800
Transport and Public Works	28	Discs Ø 200/120	Durala-minium - 9.5	Ø 200	9,500	1.0	9,500
	29	Lifting jack	Durala-minium - 2.4	Ø 200x300	1,200	2.0	2,400

1	2	3	4	5	6	7	8
	30	Pump cover	Duralaminium - 2.5	150x300	2,500	1.0	2,500
	31	Piston	Aluminium-alloy - 10.0	ø 160x200	5,000	2.0	10,000
	32	Connecting rod	Malleable cast iron - 1.8	50x300	450	4.0	1,800
	33	Brake drum	grey cast iron - 45.0	ø 400	563	80.0	45,000
	34	Brake drum	grey cast iron - 16.8	ø 150	1,500	11.2	16,800
	35	Front brake	grey cast iron - 10.6	ø 200	803	13.2	10,600
	36	Casing	grey cast iron - 80.4	ø 300	2,680	30.0	80,400
	37	Filter	grey cast iron - 11.0	ø 300	1,000	11.0	11,000
Irrigation	38	Sleeve	Bronze - 9.0	ø 150x400	290	31.0	9,000

1	2	3	4	5	6	7	8
	39	Nut	Bronze - 3.4	Ø 200x50	261	13.0	3,400
	40	Penstock gate wheel	Malleable cast iron - 9.0	Ø 600x350	26	350.0	9,000
	41	Guide rollers	grey cast iron - 9.0	Ø 200x70	500	18.0	9,000
	42	Seal block	grey cast iron - 32.0	700x400	200	160.0	32,000
	43	Guide shoe	grey cast iron - 17.6	300x250	471	38.0	17,600
Rural development for drinking water	44	Pump handle	Malleable cast iron - 4.8	900x140	1,200	4.0	4,800
	45	Connection	Malleable cast iron - 1.2	80x35	6,000	0.2	1,200
	46	Pump top	grey cast iron - 4.0	190x50	2,000	2.0	4,000
	47	Pump base	grey cast iron - 4.0	700x250	500	8.0	4,000

1	2	3	4	5	6	7	8
	48	Spout	grey cast iron - 1.0	200x150	500	2.0	1,000
Local Market (Bazaars)	49	Pressure Cooker's Pot	Aluminium alloy - 8.8	Ø200x350	2,525	3.5	8,840
	50	Pressure cooker's cover	Aluminium alloy - 1.3	Ø220	2,520	0.5	1,260
	51	Plate for baker's oven	grey cast iron - 10.0	Ø250x300	1,000	10.0	10,000
	52	Plate for kitchen stove	grey cast iron - 11.0	500x200	1,000	11.0	11,000
	53	Door for kitchen stove	grey cast iron - 8.0	350x200	1,000	8.0	8,000
	54	Fire grate	grey cast iron - 18.9	300x200	2,700	7.0	18,900
	55	Sewer tap	grey cast iron - 22.0	340x220	2,000	11.0	22,000

1	2	3	4	5	6	7	8
	56	Grid with spout	Grey cast iron - 22.5	250x150	2,500	9.0	22,500
	57	Lavatory's plate	Grey cast iron - 35.0	700x700	1,000	35.0	35,000
	58	Weight	Grey cast iron - 12.5	140x90	1,250	11.0	12,500
Total:					315,142		1,500,000

The Future Demand will be:

1985	1986	1987	1988	1989	1990
1.3 tons	1.4 tons	1.5 tons	1.6 tons	1.7 tons	1.8 tons

6. Cast Iron Radiator Plates

For all types of buildings in 1985 required 1,200 plates x 15 = 18,000 plates

The Unit Weight of one plate is 7.6 kg. (type M - 140 A2 /)

So the demand will be:

18,000 plates x 7.6 kg = 136,800 kg assumed 137 tons

Future demand will be:

1985	1986	1987	1988	1989	1990
137 tons	150 tons	164 tons	178 tons	192 tons	205 tons

ANNEX 20

NEED FOR CASTED PIPES AND FITTINGS FOR CONSTRUCTION DEPARTMENT OF THE MINISTRY OF DEFENCE

1. Cast Iron Pipes for Sewerage

Ø 150mm - 1000m x 23kg/m = 23 tons

Ø 100mm - 2000m x 13kg/m = 26 tons

Ø 75mm - 400m x 9kg/m = 3.6 tons

Ø 50mm - 2500m x 5.8kg/m = 14.5 tons

CAST IRON PIPES TOTAL

1982 - 67.1 Tons

1985 - 67.1 Tons

1990 - 83.8 Tons

2. Cast Iron Fittings

Ø 150/Ø 100 Reducer	- 200 pieces	- 0.88 tons
Ø 100/Ø 75 Reducer	- 100	- 0.33
Ø 100/Ø 50 Reducer	- 250	- 0.55
Ø 150/Ø 150 Tee 45°	- 60	- 0.82
Ø 100/Ø 100 Tee 45°	- 500	- 3.9
Ø 100/Ø 50 Tee 45°	- 1000	- 5.3
Ø 50/Ø 50 Tee 45°	- 1000	- 3.0
Ø 150/Ø 100 Tee 90°	- 50	- 0.43
Ø 100/Ø 100 Tee 90°	- 100	- 0.77
Ø 50/Ø 50 Tee 90°	- 500	- 1.35
150mm Bend 135°	- 80	- 0.46
100mm Bend 135°	- 500	- 1.75
50mm Bend 135°	- 1600	- 2.56

2. Cast Iron Fittings (Continued)

150mm Bend	90°	- 120 pieces	1.13 tons
100mm Bend	90°	- 500	2.56
50mm Bend	90°	- 1,600	3.4
100mm Check plate		- 250	2.0
50mm Check plate		- 100	0.3
50mm Floor grid		- 1,000	7.0
80mm Valves		20	0.34
50mm Valves		20	0.16
40mm Valves		20	0.08
32mm Valves		120	0.32
25mm Valves		100	0.17
20mm Valves		1,000	1.10
15mm Valves		1,000	0.75

CAST IRON FITTINGS TOTAL

1982	73.1 tons
1985	73.1 tons
1990	91.3 tons

3. RADIATOR PLATES

15,000 plate x 7kg/plate = 105 tons

1982	105 tons
1985	105 tons
1990	131 tons

SUMMARY OF THE MARKET CONSUMER-SURVEY FOR CASTINGS AND FORGE PARTS IN AFGHANISTAN

Item	Branch of Industry	Demand for 1983 in tons		Demand for 1990 in tons	
		Castings	Forge Parts	Castings	Forge Parts
1.	Coal Mines	135		700	
2.	Cement	220		1,480	
3.	Textile and Wool	395		600	
4.	Construction and Buildings Pipes Fittings	 950 1,625		 1,380 2,330	
5.	Agriculture	460	2,500	1,150	2,500
6.	Transport and Public Works	150		550	
7.	Irrigation	150		350	
8.	Rural Development for Drinking Water Supply	3		15	
9.	Local Market (Bazaars)	312		695	
	Total	4,400	2,500	9,250	2,500

FUTURE DEVELOPMENT OF THE FOUNDRY AND FORGE INDUSTRY

1. The demand for castings has been estimated as 4,400 tons in 1983 and 9,250 tons in 1990.

The present production capacity of the working foundries in 1983 have been estimated as 695 tons and the forecasted production capacity for 1990 is estimated as 2,455 tons without the planned to be established Demonstrative Foundry Plant. It is assumed that only Jangalak will increase its capacity by 1,760 tons after 1986.

2. The demand for forge parts has been estimated as 2,500 tons in 1983 and forecasted as 2,500 tons in 1990.

The present and future production capacities of the forge industry in Afghanistan (smitheries) have been estimated as 3,000 tons per year for 1983 and 1990.

3. Following the forecast for 1990 the demand for castings will be satisfied only in 26.5 per cent, but those for forge parts will be even less than the production capacities of the forge industry in the villages.

4. Taking in mind the market conditions and capacities of the forge industry so at present there is no need for further development of the forge industry.

5. As far as the foundry industry is concerned there is a fully justified need and demand for increasing the forecasted for 1990 foundry capacities in Afghanistan by establishing a new foundry plant which should rather be a demonstrative foundry.

6. After careful investigation the functions of the planned demonstrative foundry should been defined as:

(a) - providing the engineering and technical knowledge and testing facilities to assist other existing foundries in solving problems of quality, methods and materials. The foundry should develop and demonstrate the application of modern techniques and technologies for producing high-grade castings;

(b) - producing special and critical castings intended for the maintenance of the existing machines and equipment;

(c) - serving as the source of technically trained foundry engineers as well as skilled technicians, such as moulder, melters and core-makers.

(d) - serving as the standardizing agency for establishing purchasing specifications for all locally produced and imported production materials and for establishing inspection procedures to ensure consistency in the quality of castings;

(e) - collecting and disseminating regularly all available data and technical information to the local commercial foundries and to assist in updating practices and improving the product;

(f) - serving as a consulting, testing and central laboratory for the casting used and the foundry industry. Once such as industry is operating successfully, the demonstrative foundry should not remain in competition with commercial foundries.

7. In order to meet these functions the demonstrative foundry should provide full flexibility consistent with efficient performance and quality production. The foundry should be equipped for the output of castings ranging widely in weight, in type of metal and in metallurgical properties.

8. It is more than obvious, based on the figures resulting from the market survey, that setting up a Demonstrative Foundry Plant in Afghanistan - from the point of view of present and future demand is fully justified.

9. It should be clear that with the implementation of the planned DFP the country would, by no means, become more independent from importing still considerable quantities of castings, this need will persist for many years ahead. However, the establishment of the DFP would have extremely beneficial effects on the country's economy but particular the existing foundries including the modernized Jangalak.

10. When determining the production capacity of the planned new Demonstration Foundry such as the minimum economic size and equipment constraints, the investment and production cost, national objectives, resources and input constraints, the market penetration and others have been very carefully analyzed, evaluated and considered.

11. Having in view all the above and the existing situation the capacity of the Demonstrative Foundry was set at 1,500 tons per year of good castings. The actual capacity (by working more than one shift) would, however, be much higher.

12. The demand for castings has been identified as very high in the present market conditions of Afghanistan. But the existing foundry industry is much behind the demand for castings and it is fully justified to make much efforts for development of the foundry industry and increasing the foundry capacities in the country.

With this in mind the establishment of a new demonstration foundry plant of a capacity 1,500 tons per year could much contribute for the further development of the foundry industry and the castings - consuming industries like the textile, wool and construction industries as well as agriculture, transport, public works and others.

QUANTITATIVE AND QUALITATIVE SPECIFICATIONS OF THE CASTINGS RECOMMENDED FOR FUTURE MANUFACTURING

1. Before establishing the production programme for the Demonstrative Foundry (DFP) the forecasted production plan for the Jangalak and all other existing foundries in Afghanistan for 1990 has been prepared, assuming that the types of castings will not substantial changed and will be produced for the similar branches of industry in 1982. This forecasted production plan of the foundries for 1990 is attached as Annex 24.

2. On the basis of the summary of the market consumer - survey for castings (Annex 21) the quantities of castings to be imported in 1990 for the various branches of industry have been estimated and are as follows:

coal mines	-	700 tons
cement plants	-	nil
textile and wool	-	439 tons
construction		
pipes	-	1,380 tons
fittings	-	2,045 tons
agriculture	-	1,150 tons
transport and public works	-	455 tons
irrigation	-	95 tons
rural development for drinking water	-	15 tons
local market (bazaars)	-	531 tons
Total		6,810 tons

The production of the DFP has to be established on the basis of the to be imported castings only i.e. from the 6,810 tons to be imported in 1990.

3. While establishing the production programme of the DFP has been taken into consideration that this foundry should be much flexible with an efficient performance, producing high quality castings, ranging widely in size and weight, and type of metal. The set-up production programme should also give a preference for castings for such branches of industry which face a very limited supply from the domestic foundries, although theirs demand is rather high like mining, textiles, construction, agriculture, transport and public works and bazaars.

4. Taking in view all the above considerations the production programme for the DFP has been established as follows:

textile and wool	-	210 tons
pipes	-	340 tons
fittings	-	370 tons
agriculture	-	145 tons
transport and public works	-	190 tons
irrigation	-	80 tons
rural development for drinking water	-	15 tons
local market (bazaars)	-	150 tons
Total		1,500 tons

5. The castings for the coal mines, although theirs forecasted demand is high have not been included into the production programme of the DFP, and have to be imported. This is due to the fact that although the demand is identified as 700 tons in 1990, the already signed contracts are providing the coal mines industry in the needed casted spare parts for many years ahead.

This is the main reason that the coal mines need has not been included into the production programme of the DFP.

6. The demand for castings for the cement industry will be realized in full by Jangalak's foundry after its modernization. It has to be noted that the production plan of Jangalak's foundry in 1990 calls for production of 1,600 tons although the identified demand is only 1,480 tons. But as there are still left so many castings for import, so the free capacities

may be utilized for other to be imported castings.

7. Detailed quantative and qualitative specifications of the castings recommended for future manufacturing within the production programme of the DFP are given in Annex 25.

8. It has to be noted that the castings for the textile and wool industry are in Annex 25 specified as representative casted spare parts within each of the established weight group of castings. This is due to the fact, that as seen from Annexes 14, 15, 16 and 17 the specified their casted spare parts are comming up to 549 items and it would be difficult to specify all of them. So there has been applied the principle of the average-representative casting for each weight group.

9. In Annex 25 are specified only the kinds of metals, from which the casting should be manufactured, i.e. the malleable cast iron, the grey cast iron, the bronze and the aluminium and its alloys. A more detailed technical specifications are given below.

10. The malleable cast iron should follow in general the technical specification of the German standard DIN-1692. The to be used grades should correspond to GTW45 and GTW55 according the German standards with the granular pearlite and temper carbon (GTW45) and fine grained pearlite and tempered carbon (GTW55) as characteristic features of structure. It may also correspond to the American standards ASTM A220 or others equivalents like Indian standards IS1030, Russian GOST etc.

11. The grey cast iron (cast iron with lamellar graphite) should be in line with the technical requirements of the German standard DIN 1691 or others equivalents like ISO/R 185. The to be used grades should be as GG20, GG25 and GG35 according to German standards.

12. Aluminium and its alloys are required to be applied in the castings of the spare parts for the textile and wool industry, agriculture, transport and public works and the bazaars.

The aluminium alloy used for the castings of the textile and wool industry usually is an aluminium-silicon alloy having the designation number 4032 of the Aluminium Association. For pistons is usually applied as aluminium - copper - silicon alloy like designation number 222.0. The Duraluminium to be applied for automative castings should be in line with the

requirements of the designation number 242.0. The pressure-cookers pot and cover should be casted of an aluminium alloy corresponding to the designation number A 514.0, which is an alloy of aluminium, magnesium and zinc.

13. The bronze being applied for casting of stop cocks as well as the crop-protecting equipment should be of the designation number 854 of the Copper Department Association. Sleeves and nuts for irrigation should be manufactured from manganese bronze having the designation number 861.

14. In Annexes 26, and 27 is done the break-down of the production of DFP by weight groups and sizes of castings.

15. The distribution of the production of the DFP by kinds of metals is the following:

grey cast iron	-	1,100 tons	- 73.4 per cent
malleable cast iron	-	300 tons	- 20.0 per cent
bronze	-	40 tons	- 2.6 per cent
aluminium and its alloys	-	60 tons	- 4.0 per cent

It has to be noted that the market survey identified also a demand for steel castings. But the very high deficiency of electricity existing in Kabul at present and for many years ahead (upto at least the 1990's) makes it impossible to apply electric furnaces for steel manufacturing may this be an induction or arc furnace. This is the main reason, while steel castings have not been included in the production programme of the DFP, although it is well understood that the introducing of steel castings would much contribute to the development of this industry. But if in further steps of the development of this project the energetic situation should be changed it is highly advisable to review the set-up production programme and include into it also steel castings, for which the market do exist.

16. In Annex 26 is shown the break-down of the DFP's production due to application and types of castings.

17. The establishment of the Demonstrative Foundry Plant of the capacity of 1,500 tons and the recommended production programme (Annex 25) will with no doubt much contribute to the development of the Afghanistan's foundry industry so in terms of quantity as well as quality of the manufactured castings. This foundry will introduce for the first time the domestic production of malleable cast iron much superior to the grey cast iron in terms of mechanical properties as well as the centrifugally casted pipes which are much superior in quality as compared with the casted in sand pipes.

The implemented demonstration foundry will decrease the qualities of castings which have to be imported and so assists in the Government's efforts for improving the balance of payment in free currency exchange.

Annex 24

FORECASTED PRODUCTION PLAN OF THE FOUNDRIES IN AFGHANISTAN IN THE YEAR 1990

in Tons

Item	Industrial Branch	Forecasted Demand for 1990	Production Plan in 1990			Remained to be Imported
			Jangalak	All other Foundries except Jangalak and Demonstrative Foundry	Demonstrative Foundry	
1	Coal Mining	700	-	-	-	700
2	Cement Industry	1,480	1,600	-	-	-
3	Textile and Wool	600	15	146	210	229
4	Construction:					
	Pipes:	1,380	-	-	340	1,040
	Fittings:	2,330	225	60	370	1,675
5	Agriculture	1,150	-	-	145	1,005
6	Transport and Public Works	550	5	90	190	265
7	Irrigation	350	250	5	80	15
8	Rural Development for Drinking Water	15	-	-	15	-
9	Local Market	695	15	149	150	381
	Total	9,250	2,110	450	1,500	5,310

Annex 25

RECOMMENDED PRODUCTION PROGRAMME
FOR THE TO BE ESTABLISHED DEMONSTRATIVE FOUNDRY IN AFGHANISTAN

Branch of Industry	Item	Name of the Casting	Technical Specifications and quantity in tons	Sizes in millimeters	Number of Castings	Unit Weight kg	Total Weight of Castings kg
1	2	3	4	5	6	7	8
Textile and Wool	1	Representative casted spare part - weight group 0.2 - 0.5 kg	Malleable cast iron - 20.0 grey cast iron - 7.4 Aluminium - 2.0	Ø 35	94,839	0.31	29,400
	2	Representative casted spare part weight group 0.51 - 5.0 kg	Malleable cast iron - 70.0 grey cast iron - 26.2 Bronze - 2.5	Ø 60	57,719	1.71	98,700
	3	Representative casted spare part - weight group 5.1 - 200 kg	Malleable cast iron - 52.6 grey cast iron - 7.4 Aluminium - 3.0	Ø 105	8,400	7.50	63,000
	4	Representative casted spare part - weight group 20.1-100.0 kg	grey iron - 18.9	400x600	654	28.90	18,900

Annex 26

PRODUCTION OF THE DEMONSTRATIVE FOUNDRY
DUE TO WEIGHT GROUPS /EXCEPT PIPES/

Group	Weight Range kg	Average Casting Weight kg	Yearly Production		Number of Castings
			tons	Per cent	
I	0.2 to 0.5	0.3	32	2.7	103,359
II	0.51 to 5.0	1.9	272	23.5	137,483
III	5.1 to 20.0	9.6	509	43.9	52,816
IV	20.1 to 100.0	31.7	306	26.4	9,658
V	100.1 to 500.0	181.4	41	3.5	226
Over-All Average		3.82			
TOTAL			1,160	100.0	303,542

PRODUCTION OF THE DEMONSTRATIVE FOUNDRY DUE TO SIZES OF CASTINGS /EXCLUDING PIPES/

Item	Maximal Overall Dimension of Casting mm	Castings by		Yearly Production	
		Numbers	Per Cent	Tons	Per Cent
1	upto 50	94,839	31.2	29.4	2.5
2	51 to 100	76,303	25.2	123.0	10.6
3	101 to 200	88,707	29.2	372.2	32.1
4	201 to 300	25,321	8.4	306.5	26.4
5	301 to 500	14,792	4.8	225.2	19.4
6	501 to 800	2,380	0.8	98.9	8.6
7	801 to 1,000	1,200	0.4	4.8	0.4
	Total	303,542	100.0	1,160	100.0

TYPES OF CASTINGS TO BE PRODUCED IN THE DEMONSTRATIVE FOUNDRY

Item	Type of Casting	Yearly Production Tons	Share by Weight Per cent
1	Valves and Fittings	370	24.6
2	Pipes	340	22.6
3	Automotive Engine and Road Building Machines Parts	190	12.6
4	Agriculture Implements	145	9.7
5	Household Equipment /Local Market/	150	10.0
6	Textile and Wool Machinery Replacement Parts	210	14.0
7	Irrigation Equipment	80	5.5
8	Hand Pumps Replacement Parts	15	1.0
	Total	1,500	100.0

PRE-INVESTMENT ASSESSMENT OF ESTABLISHING THE DEMONSTRATIVE FOUNDRY

1. The study and assessment of the market conditions for castings in Afghanistan for the year 1983 and 1990 (Annex 7) identified a nigh demand for castings. The domestic production of all the foundry industry in Afghanistan, including the modernization of Jangalak, is estimated for 1990 as 2,560 tons but the demand calls for 9,250 tons. So there will have to be imported 6,690 tons of castings in 1990.

2. In order to improve this high deficiency counting upto 72 percent of castings, the production capacities of the local foundry industry have to be substantially increased.

All the biggest foundry in the country - Jangalak is being right now modernized so there is no other choice as only to establish a new preferable demonstrative foundry /DFP/ of a capacity of 1,500 tons of good castings per year. This new to be established DFP will not supplement in full this high deficiency, but will much contribute for its decreasing.

The establishing of such a foundry is fully justified due to the forecasted for the year 1990 demand as well as the high needs in 1983, which have to be satisfied by a huge amount of castings to be imported. It has to be taken in mind that in Afghanistan are available big quantities of basic raw material for the foundry industry i.e. the iron scrap, which could be best utilized in the additional foundry capacities of the DFP.

3. Beside the main goal of the DFP i.e. the manufacturing of 1,500 tons of castings per year, this new foundry should also take an active part in the development of the local foundries.

In particular the DFP should:

(a) providing the engineering and technical knowledge and testing facilities to assist the other existing local foundries in solving problems of quality, methods and materials. This foundry should develop and demonstrate the application of modern techniques and technologies for producing high-grade castings;

(b) manufacturing special and critical castings intended for the maintenance of the existing machines and equipment in various branches of domestic industry;

(c) serving as the source of technically trained foundry engineers, as well as skilled technicians such as moulders, melters and core-makers;

(d) serving as the standardizing agency for establishing purchasing specifications for all locally produced and imported production materials and for establishing inspection procedures to ensure consistency in the quality of castings;

(e) collecting and disseminating regularly all available data and technical information to the local commercial foundries and to assist in updating practices and improving the product;

(f) serving as a consulting, testing and control laboratory for the casting consumers and the foundry industry. Once such an industry is operating successfully, the demonstration foundry should not remain in competition with commercial foundries.

4. In order to meet this function the demonstrative foundry should provide full flexibility consistent with efficient performance and quality production. The foundry should be equipped for the output of castings ranging widely in weight, in type of metal and metallurgical as well as mechanical properties.

5. It is more than obvious, based on the figures from the market survey, that setting up the DFP in Afghanistan - from the point of view of present and future demand - is fully justified.

6. It should be clear that with the implementation of the planned DFP the country would, by no means, become more independent from importing still considerable quantities of castings; this need will persist for many years ahead. However, the establishment of the DFP would have extremely

beneficial effects on the country's economy, but particular the foundry industry.

Market Position

7. As mentioned above a study of the present market for castings has been carried out and a detailed information is given in Annex 7. It may be here said only that the demand for castings has been estimated as 4,400 tons in 1983 and as 9,250 tons in 1990. This demand will be satisfied by the existing domestic foundry capacities only in 13 percent in 1983 and 27.6 percent in 1990. After establishing the new DFP the demand for castings in 1990 could be satisfied by the foundry industry in 43.9 per cent.

8. At present the production index of castings per capita in Afghanistan is 0.023 kg. It is a very low one as compared with some other countries like Ethiopia (0.14 kg), Egypt (1.6 kg), Iraq (2.9 kg). After the modernization of Jangalak will be completed, this index per capita will get improved up to 0.129 kg (assuming an average yearly population growth rate in Afghanistan as 2.5 per cent). But after the DFP will be implemented this index for 1990 will increase from the present 0.023 kg up to 0.208 kg. Achievement of this goal would render Afghanistan more favourably comparable to a number of other developing countries being about the same level of development.

Plant Capacity

9. The present production capacities of the foundry industry in Kabul area have been estimated as 500 tons, and the production was in the last year 348 tons. The estimated casting demand for 1983 is 4,400 tons and it will be satisfied only in 13 per cent by the domestic foundry industry. All the rest of the demand i.e. 87 per cent (4,052 tons) will have to be supplied from abroad.

10. In such a situation it has to be made very clear that the new to be established demonstration foundry can not have due to various very substantial technical as well as economical reasons, a capacity of around 4,000 tons, which could take over the quantities of all the to be imported castings. It has to be taken in mind that the biggest Jangalak's foundry is manufacturing at present only 285 tons per year, and after modernization is supposed to increase its capacity up to 2,150 tons, whereby gross, nearly 75 per cent of this capacity, will be utilized for a very simple castings as are the balls for the cement industry.

11. Having all this in view as well as the existing here present conditions of the foundry industry, after very carefully consultations and considerations taking in mind all the various technical and economical aspects the capacity of the new to be established demonstrative foundry has been estimated as 1,500 tons per year. This production should consist of:

- 1,100 tons of grey iron castings including 340 tons pipes
- 300 tons of malleable iron castings
- 60 tons of aluminium alloys castings
- 40 tons of bronze castings.

A detailed production programme with all the technical specifications is given in Annex 25.

Materials and Inputs

Iron Scrap

12. There is no doubt that the availability of huge quantities of iron scrap, scattered all over the country, represents a second major prime mover - beside the existing and growing demand on castings in the country - pushing the Government of Afghanistan towards exploring the feasibility of establishing a new foundry in the country.

In 1979 has been carried out a wide and thoroughly assessment of the availability of the iron and steel scrap in Afghanistan due to quantities as well as qualities. This assessment has been done in connection with the studies of the Mini Steel Plant.

13. That assessment says that about 200,000 tons of steel and iron scrap has been located in the Kabul City, in Helmand Province and in several Northern Provinces of Afghanistan. However, it may be assumed with great probability that even in and around Kabul, in other towns, localities, factories, scrap-yards etc., scattered all over the country, at least 100,000 more tons of iron and steel scrap does exist, but probably as much as 200,000 tons.

14. Presently there is only a minor quantity of process scrap recurring in Afghanistan. One of the bigger producers

of such scrap is the Jangalak Mechanical Works in Kabul, whose own process scrap (i.e. by-product of sheet metal working operations) amounts about 100 tons a year. There might be altogether about few hundreds tons per year of process scrap available in Afghanistan with a trend towards increasing in the years ahead, as the engineering, metal working and akin industries will further develop.

15. The third category of metal scrap - the circulating or revert scrap - would also be available from the steel rolling mills - if and after they will be restablished.

16. According to the free estimate the total average yearly recurring of iron and steel scrap (capital and process scrap) in Afghanistan, might stand around two thousand tons.

Collection of Scrap in Afghanistan

17. Beside some street collectors of metal scrap and probably a few merchants who buy such scrap from street collectors, it appears that no broad based, specialized enterprise - be it private or state-owned to deal in metal scrap-does exist in Kabul or indeed in Afghanistan. Certain exception to this fact represent the specialised dealers in "second hand spare parts" mainly automative as found in Kabul and probably in other major towns throughout the country. This fact, i.e. the lack of a specialized state agency or a commercial enterprise in Afghanistan for collecting, sorting and preparing metal scrap for further processing to a form adaptable for melting units at foundries, respectively at the planned to be established mini steel plant, definitely represents a drawback in the overall planning and implementing the foundry and steel industry in Afghanistan. Namely, such specialized agencies or enterprises do exist in all developed and many developing countries, where iron and steel industry has been established. This rule will definitely have to be followed if and when the metallurgical industry has to be set up in Afghanistan.

18. Taking in mind the determination of the Government of Afghanistan for establishing a strong metallurgical industry in this country - which should include the Demonstration Foundry beside Jangalak as well as a planned to be established Mini Steel Plant - it has to made very clear that in Afghanistan do exists at present enough iron scrap for operation of a modern foundry as well as the modernized Jangalak's foundry and all the others foundries with a total capacity of 2,600 tons including modernized Jangalak for at least fifteen to twenty years ahead.

Prices of Iron Scrap in Afghanistan

19. . Prices (and indeed the cost) of the basic raw material and the main input for the Demonstration Foundry - the iron scrap - being of crucial importance for the economic viability of the DFP - was given here particular consideration.

20. Many sources have been contacted in order to obtain a realistic up-to-date price for iron scrap, including the small metal scrap dealers in the bazaars. This task was not easy to perform due to the fact that apparently there does not exist a real, organized iron and steel scrap market in Afghanistan and the existing right now situation here makes this task much more difficult. For instance from Jangalak Industries the official information has been received that they are purchasing now iron scrap at a charge of 6,150 Afghanis per ton equals US$ 111.8

21. In the bazaars (private market) in Kabul it has been told that those iron scrap which can not be sold as "spare parts" or be otherwise used by private people in the construction of houses, in metal working shops as well as the smitheries, etc., they are selling at 7,000 Afghanis per ton equals US$ 127

21. Presently the real price of iron scrap in Afghanistan on a "where it is, as it is" basis (no sorting, no compacting, no cutting etc. being usually done by dealers) has been assumed 6,150 Afghanis per ton.

22. However, it has to be noted that in order to arrive at the actual cost of scrap at the foundy site, the cost of scrap preparation, transportation, handling and overhead charges has to be added to the basic price. It is expected that this additional costs will be rather nigh, particular as the transport costs within Afghanistan are charged as 2.3 Afghanis per one ton along the one kilometer route.

It has to be taken in mind that in Afghanistan does exist only the road transport and there are no railways or any other transport means available. This problem has to be considered in details at the further stages of the development of this project.

23. The iron and scrap being available in Afghanistan after being processed to the suitable form is considered here the basic raw material for the production of 1,400 tons of iron castings in the DFP. The consumption of iron scrap for this production as set out in the manufacturing process of the castings in the DFP - is assumed a 1,000 tons per year.

Pig Iron

24. For achieving the appropriate metallurgical, chemical and other characteristics of the liquid irons required for the castings, it is necessary to add to the metallic charge pig iron usually of the hematite grade. It consumption for the set down production of 1,400 tons of good iron castings is estimated as 600 tons per year. This pig iron will have to be imported from abroad. For Jangalak Works at present the pig iron is being supplied from the Soviet Union.

The present price of pig iron, being imported to Jangalak is identified as 9,000 Afghanis per ton equals US$ 163.64.

Coke

25. Coke is being used in a cupola and its quality reflects all the technological as well as the economical aspects of the iron melting process.

The coke is not available in Afghanistan and it has to be imported. The present price of the coke loco Kabul is 16,000 Afghanis per ton equals US$ 290.90 as given by Jangalak's foundry. The yearly demand for coke is estimated as 360 tons.

Afghanistan has coal mines located in two northern districts. The production of coal in 1982 was 140,000 tons and the plans for 1990 are specifying it as 700,000 tons. Such a high, as compared with the present production amount of coal, could well improve the existing deficiency of energy of the country.

Due to various technical reasons coke is not expected to be produced in Afghanistan in the years ahead and so it will have still to be imported also for the demand of the foundry industry including the planned to be implemented demonstration foundry.

Limestone

26. Limestone is added to the cupola as a fluxing agent. There is a number of limestone querries around Kabul as well as in other parts of the country. The limestone may be provided from the querries surrounding Kabul. Its price is 1,000 Afs per ton equals US dollars 18.18. The yearly consumption of the limestone is estimated as 65 tons

Charcoal and Covers

27. Charceal and covers are being used in the melting processes of non-ferrous metals for protecting the metallic charge against oxidation. Sometimes the covers are also used for some refining processes in order to improve the quality of the heat. The amounts are not are not high, as the total production of non-ferrous metals is 100 tons per year. The charcoal will be mainly used for the aluminium and its alloys (60 tons) and the covers like bottle glass and others rather for the bronzes. As the total amount counts upto 5 tons, and the charcoal makes the majority, it has been assumed that charcoal will be representing in this price considerations also the covers like bottle glass, which is available in the country too. The yearly demand for charcoal and covers is estimated as 5 tons. Charcoal is available in the country and its present price is identified as 36,000 Afs per ton equals US$ 654.55.

Refractories

28. Refractories are required for the lining and relining of the melting furnaces and the ladles. These refractory lining-mixtures are such as high-graded silica grains, high-graded alumina bricks and powders of various grain fineness, fire-clay, magnesite fire bricks, chamotte grains as well as dinas-bricks. Here are also included the to be imported graphite crucibles for the non-ferrous metals. All the refractories have to be imported from abroad.

Although magnesite deposits are identified in Afghanistan and its exploitation is planned to be established, it is difficult to say right now if its refractoriness, fire-and heat-resistance will be in line with the required specifications. The costs of refractories is 36,000 Afghanis per ton equals US dollars 654.5 based on the information as received from local foundries. The yearly consumption of refractories is estimated as 160 tons.

Silica Sand (Moulding Sand)

29. Silica sand consisting mainly of silica is used for preparing of moulds and cores in the green sand moulding technology, which has been chosen as the most suitable. In Afghanistan are identified at least two sites, where good quality quartz moulding sand is available. These sites are:

1 - Koh-i-Alburz and Chashman - Shafa in the Balkh Province (reserves are estimated at 110,000 tons of fine grained moulding sand with low clay content corresponding to grade T016 according GOST 2138-56). The distance from Koh-i-Alburz to Kabul is about 500 km.

2 - Toluqan and Tala Bar Fak in Baghlan Province about 440 km for from Kabul. There is kaolinite clay corresponding to grade F-1 according GOST 3226-57. The res rves there are estimated at 150,000 tons. This sand is being also the source of raw material for the ceramic factories in Kunduz and in Kabul.

30. At present time due to the existing constraints the foundries in Kabul are using the sand for moulding mixture as well as core mixture from Bagram as well as Begerawan, sites located each at about 60 km distance from Kabul. This sand has a very low silicon contents of about 73 per cent only, so it is not much suitable for iron castings. But this sand is rather suitable for bronze and aluminium alloys.

The yearly consumption is estimated at 1,700 tons. The price of the sand from Bagrami is 1,200 Afs. per ton equals US dollars 21.82 as given by the Jangalak's Foundry. The suitable moulding sands from Kho-i-Alburz and Taloqan will be much more expensive than those from Bagram and Begerawan as the transport costs will be much higher and are estimated at around 1,500 Afs per one ton equals US dollars 27.27. But this has to be taken into consideration at the next stages of the development of this project. In the present considerations the price of the silica sand as taken 1,200 Afs per ton.

Bentonite

31. Bentonite is used as a component of moulding sand. So far it is not exploited in Afghanistan and should be imported. The consumption is estimated as about 150 tons per year. The price is estimated as 8,250 Afghanis per ton equals US dollars 150.0 as given in the bazaars.

Coal Dust

32. Coal dust is being used for moulding processes. It should be of a high graded coal, containing a very low level of ashes. Such coal dust is available in Afghanistan at the coal deposits of Sabzak coal mines. The yearly demand is estimated as 30 tons and its price in Kabul is 1,000 Afs per ton equals US$ 18.18 as identified at Jangalak's foundry.

33. Iron Ore

Iron ore in the amounts of 50 tons per year will be used for the heat-treating of the malleable cast iron. The iron ore, particular the grades used for the heat-treating of the malleable cast iron should be of high iron content.

It is assumed that the locally available iron ore from the Haji Gak deposit will fit for this purpose, but in the next stages of the development of this project this should be rechecked. It will have to be collected manually in an open pit operation. Should the quality of the local iron ore turn not to be satisfactory, it will have to be imported as it is done right now at Jangalak's Foundry from Soviet Union. The cost of the locally mined iron ore is assumed to be 800 Afs per ton equals US dollars 14.54 at the foundry's site.

Bronze scrap

34. Bronze scrap has to be the basic raw material for the production of bronze castings. The yearly consumption of the purchased scrap is estimated as 42 tons.

As there is no organization dealing with the scrap in Afghanistan except few small dealers in the bazaars the only source of supply will be the bazaars.

The existing only in the bazaars of Kabul amounts of bronze scrap are estimated as 800 tons at present, with the trend to get increased in the comming years as the development of the country goes on. The present price of bronze scrap in 60,000 Afs per ton equals US dollars 1,090.90

Aluminium Scrap

35. Aluminium scrap makes the main part of the metal charge for the castings of aluminium and its alloys. The yearly consumption of the purchased aluminium scrap is estimated as 63 tons. The estimated stock of aluminium scrap only in the bazaars of Kabul is at present around one thousand tons. The present price of aluminium scrap is 80,000 Afs per ton equals US$ 1,454

Steel shot

36. Steel shot is being used for abrasive blasting equipment in which hardened steel-shot of the diameter 0.4 to 2.5mm is directed at high-velocity against the casting to be cleaned. The steel shot demand has been estimated as 40 tons per year. Its price has been identified as 35,000 Afs per ton equals US$ 636. The steel shot will have to be imported.

Auxiliary materials

37. In addition to the basic raw materials the production process of the foundry requires also small amounts of various auxiliary materials such as various dressing materials, adhesives, sealent, breakdown agents, addatives, parting agents, exothermic compounds and others for moulding processes. All those materials will have to be imported. The variety of the auxiliary materials is in the foundry industry very big and is estimated as 80 tons per year. The price loco Kabul is estimated as 35,000 Afs per ton equals US$ 636.

Utilities

38. Next group of inputs to any process are the utilities. The demand in this respect for the demonstrative foundry is specified below.

Electricity

39. The electricity is being right now and for some years ahead/up to 1990's/to be the most crucial and decisive factor in the industrial development of Afghanistan. Information received from the Ministry of Electrical Energy, the Planning Committee, the Ministry of Mines and Industries and the Common Facility Centre for the Industrial Park Area in Kabul made it clear that the availability of electrical energy for new industrial developments including the demonstrative foundry will be possible only after the planned to be established new overhead transmission line 220kV from the Soviet Union will be completed and commissioned. This electrical high-voltage transmission line is expected to supply electrical energy to Kabul not before the year 1990, although the plan calls for its completing in 1987.

There are plans for establishing an additional gas - turbine of the capacity around 45 MW in 1984, what will improve, but not in a decisive way the existing high electrical energy deficiency existing in Kabul, particular for industrial enterprises.

The existing in Kabul area very critical situation concerning the available electric power, makes it clear and in full understandable that the to be established demonstrative foundry should consume as low electrical energy as possible. This reflects very much the production programme and the selected equipment as well as the production processes of this foundry and does that steel castings have to be dropped out, as the consumption of the electrical energy in the steel manufacturing is very high and without electrical furnaces the steel production is not possible.

The power consumption of the demonstrative foundry including the electrical furnace for steel and iron manufacturing was estimated as 650 kW, where from 270kW are required for all the equipment excluding melting and heat-treating units.

So instead of the electrical induction furnaces for steel and iron manufacturing has been foreseen an 450 kg capacity oil fired reverbratory furnace for cast iron only.

After making such reductions in the requirements for electrical energy the Demonstration Foundry's demand for electrical power still remains at 270 kW.

Hence it appears that the immediate setting-up of the Demonstrative Foundry in Kabul area would presently not be practicable due to shortage of electric power. However, since the planning and implementation of the Demonstrative Foundry will require at least three to four years it is assumed that the amount of only 270 kW for this foundry will be made available at the time of its commissioning due to some corrections and modifications in the central distribution of the electric energy in Kabul area.

Discussions done with the Industrial Facility Centre for the Industrial Park Area in Kabul - Puli Charkhi assumed that the required 270 kW could be under some circumstances made available to the demonstration foundry around 1987.

In a case that more than 270 kW of electrical power could be made available for the demonstration foundry, the production programme of this foundry could be increased by producing also steel castings. The space of establishing in future an electrical induction furnace in this foundry, which could be supplementing the oil fired revebratory furnace, should be taken in mind at the next stages of the foundry design.

The price of electricity in Kabul is at present 1.17 Afs/kWh equals US cents 2.13 for industrial customers and the yearly requirement for DFP is estimated as 550,000 kWh. This price is subsidized by the Government. This factor also may adversely affect the operation of the future Demonstrative Foundry. The issue of power supply and the price of one kWh of energy for the planned Demonstrative Foundry, will have to be discussed in all details with the concerned authorities, during the next stages of the project development.

Water

40. Though water is generally scarce in Kabul area, particularly during the summer months but it has been told by the President of the Common Facility Centre for Industrial Park Area in Kabul - Puli-Charkhi, who is responsible for all the utilities in the industrial park area that the planned demonstrative foundry could get supplied the estimated amount of water i.e. 8m^3/hour in the industrial area. The price of water for industrial use is taken 10 Afs/m^3 equals US dollars 0.16 in accordance with the information as received from the Ministry of Irrigation.

Compressed Air

41. The requirements on compressed air are extimated as 1.3 millions m^3 per year at a delivery pressure 5 to 6 kg/cm^2. A central compressed air station would be provided and a distribution net-work laid down as required.

Fuel-oil

42. It is envisaged that the revebratory melting furnace, the tilting non-ferrous metal crucible melting furnace and the furnace for heat-treatment of pipes and malleable cast iron castings as well as the core-oven and the ladle heating-stand will be operated by fuel-oil. The estimated quantities required are 400 tons per year. The fuel-oil is at present in Kabul at the price of 17,000 Afs per ton equals US$ 309.09. At present there is none production of fuel-oil in the country. All quantities of fuel-oil as well as petrol are imported by road transport from abroad, at present exclusively from Soviet Union, There are plans for establishing domestic mineral oil refinery, but its establishment is still not to be expected in the nearest few years. At present the fuel oil supply is irregular and there are shortages from time to time in Kabul.

Import regulations for industrial raw materials imported from abroad for the demonstrative foundry

43. The production of the demonstrative foundry - as set in the production programme has to be realized by domestic available raw materials as well as raw materials to be imported. The main raw materials to be imported are the following:

- pig iron - 660 tons per year
- coke - 360 tons per year
- refractory materials - 160 tons per year
- bentonite - 150 tons per year
- steel shot - 40 tons per year
- auxiliary materials - 80 tons per year

The total amount of the raw materials to be imported is 1,450 tons per year, and it makes 33 percent by weight of the total amount of raw materials required. The cost of the to be imported materials is estimated as 21,637,500 Afs equals US$ 393,409 what makes 52 per cent of the total cost of all the raw materials.

44. As the amount of raw materials to be imported is around one third of the total required amount the presently being applied import regulations should be taken also into consideration.

45. The present in force import regulations /Customs Law/ in Afghanistan specify that each Government establishment has to pay customs duties, and additional other charges like fix tax, fees for the Red Cross, service charges as well as handling fees on all goods, commodities and equipment imported from outside of Afghanistan. But for some vital for the national economy projects are granted exemptions of the customs duties. Such a case is assumed to be with the machinery and equipment for the demonstrative foundry.

All the charges to be paid are:

- The fix tax is charged as six per cent of the invoice price plus the value of the customs duties.

- The fees for the Red Cross are charged as one per cent of the customs duties.

- The service charges are specified as two per cent of the customs duties plus the fees for the Red Cross.

- The handling fees of the Customs Office are calculated on the weight basis and are 0.05 Afs per one kilogramme of goods, commodities or machines.

In general could be considered that the custom duties on imported raw materials and goods as given in the Customs Tariff are to be increased by around nine per cent due to additional charges and fees.

46. The customs duties are charged following the Customs Tariff published by the Ministry of Finance, General Customs Department of 20 June 1974 and still in force. The rates for the to be imported raw materials for the production of the demonstrative foundry are from 15 to 35 per cent of the unit price expressed in Afghanis per kg or as specified in the invoice. The rate for imported machineries for casting is set as 20 percent, while others machineries like conveyors, cranes and some others are charged by 35 per cent.

The rate of the customs tariff for the to be imported raw materials is the following:

- pig iron - 25 per cent
- coke - 15 per cent
- refractory materials - 20 per cent
- bentonite - 20 per cent
- steel shot - 35 per cent
- auxiliary materials - 25 per cent (estimated).

Transport conditions of industrial raw materials imported from abroad for the demonstrative foundry

47. For importation of raw materials, plants and machinery, spare parts etc. there are three modes of tranport.

a. In container over surface route through U.S.S.R. or ship to Karachi and thence to Kabul.

b. By surface route (non-container) through U.S.S.R.

c. Non-container, by ship, through Karachi, and thence to Kabul.

Container transport is the most expensive on per ton basis but for certain types of goods, it is the only safe way and for expensive goods, the per ton cost is not critical. Maximum net weight carried in a container is limited to 17.5 tons (gross 20 tons maximum crane capacity in U.S.S.R. transshipment yards being 20 tons). The transportation cost from western Europe to Sherkhan Bander or Hairatan are as follows:

For a pair of containers (8.4 tons net) from Germany to Kabul the transport charge is 18 to 19 thousand Deutsche Marks equals US$ 7,500 to 7,900 equals 412,500 Afs to 434,500 Afs (equivalent to 49 to 50 thousand Afs. per metric ton).

For the second mode of transport, the cost is approximately US$ 110-120 (Afs. 6,050 to 6,600) per ton. For non-container traffic, the rate is uniform per ton and does not depend upon the value of the goods (unlike the sea-transport cost). It is therefore cheaper to use this transport where the value of the goods is high.

As is well-known, the transport cost by ship goes by classification and is based on the philosophy of what the traffic can bear. After the goods reach Karachi, they are railed to Peshawar. The rail-freight depends upon the classification of the goods (the rate being what the traffic can bear) and sent to Kabul by road.

For a shipment consigment of 90 tons of drums from the USA to Kabul via Karachi the cost paid at present is US$ 283.00 equals 15,565 Afs.

48. At present the container goods from Western Europe are mainly transported by one of the given below ways:

a) combined sea-land way over Soviet seaport via Termez-Hairaton /frontier in Afghanistan/;

b) combined sea/land way over Soviet seaport via Kushka-Turghundi /frontier in Afghanistan/;

c) direct railway via Termez-Hairaton /frontier in Afgnanistan/;

d) direct railway via Kushka-Turghundi /frontier in Afghanistan/.

The railway transport along the route through Poland /Malaszewicze/Brest is the most favourable. But sometimes this roadside is closed and the goods have to pass the railway route over Czechoslovakia /Cierna nad Tisou /Chop/.

49. The raw materials for the demonstrative foundry such as pig iron and coke are usually transported without containers. Refractory materials are usually packed in plastics and are palletized. Bentonite is packed in drums and also palletized similar as the steel shot. The auxiliary materials are usually also not supplied in containers, as the quantities are rather small.

50. All goods have to be transported from the Afghanistan border to Kabul by road and the distances from the main border crossings in Afghanistan to Kabul are the following:

- from Sherkhan Bander /in the north close to Kunduz/ - 435 km
- from Hairatan /in the north close to Mazar-i-Sharif/ - 480 km
- from Turghundi /in the north close to Herat/ - 1,093 km
  but by the Central South-West route - 966 km
- from Islam-quala /in the west/ - 1,210 km
- from Spin-Boldak /in the south-east/ - 625 km
- from Torkham /in the east to Peshawar/ - 220 km

The present charges approved by the Ministry of Transport are 2.3 Afghanis per kilometer per ton.

51. Due to the existing situation and constraints the road transport is suffering much and goods are getting supplied irregular what has its reflection in the efficiency of some industries. Beside this at present the vast majority of the imported goods is comming via Soviet Union and the three existing border crossings are much overloaded what makes also the supplying of goods out of schedule.

Location and site

52. Particular consideration was given to the selection of the optimum plant location and site. Many institutions and Government's officials have been consulted in this connection, among them the following:

- Ministry of Mines and Industries
- State Planning Committee
- Ministry of Irrigation
- Ministry of Electrical Energy

53. In considering the optimum location and site, the unanimous opinion was expressed that the demonstrative foundry should be located in the Kabul industrial park area of Puli-Charkhi.

Many aspects have been discussed and considered such as the availability of scrap-yards in Kabul providing this foundry in the basic raw material, the availability of other infrastructural facilities such as road transportation, housing, telecommunications etc., availability of the existing and working foundry industry,, for which the demonstrative foundry should serve as assisting unit, the availability of building and construction materials as well as the construction units, the climatic conditions and the oxistance of a developed industrial park in Puli-charkhi.

54. Last but not least, the relative vicinity of the Haji Gak iron ore deposits which may sometime in the future turn to fit quite well into a bigger metallurgical complex, as for instance one proposed in the joint CREUSOT-LOIRE ENTERPRISE/DEMAG feasibility study done in 1974. This study has provided for a pig-iron plant, a steel making plant and a rolling mill.

55. After considering all the given above aspects - the location and site for the to be established demonstrative foundry has been chosen as the at present best location option the Puli-charkhi industrial area of Kabul.

Project engineering

56. The backbone of this pre-investment assessment is the technical concept i.e. the ways and means of processing the raw materials and converting them into the finished castings, for which the high demand does exist in the market.

The foundry's processes and facilities

57. Following the market study - the capacity and the production programme of the demonstrative foundry have been established. The demonstrative foundry should have a capacity of 1,500 tons of good castings which are:

- grey iron castings	1,100 tons per year
including centrifugally casted pipes	340 tons per year
- malleable iron castings	300 tons per year
- non-ferrous metals castings	100 tons per year

The full production is estimated to be reached in a period of five years, with production starting in the second year of operation.

58. This foundry should consist of an iron foundry producing mainly the grey and malleable iron castings including the centrifugally casted pipes and a small non-ferrous foundry.

There will be also two workshops adjoining the casting facilities such as:

- a pattern - making workshop and
- a machining department for machining of the rough castings (upto maximal 50 per cent of the foundry output).

59. The demonstrative foundry should be a plant with the fenced area of 38,400 square meters. The surface of the total covered area should be 6,000 square meters. A general lay-out of the demonstrative foundry is shown in Annex 30.

The main foundry's buildings should have the size 88m x (2x16m) and the pattern-making - and machining as well as maintenance-shop including the stores should be housed in the building of the sizes 88mx16m. The height of the buildings due to the technological processess performed there, should be diversified but particular the melting bay should be 16m high, the foundry bay 12m and the cleaning room 9m. The height of the pattern-making, machining, maintenance and store-building should be 9m. The offices should be housed in a separate two floors building of the size 20m x 12,5m.

60. The cost of the land in Puli-charkhi industrial park area, the development of this site as well as the construction of the buildings has been estimated as 64,050,000 Afs equals US$ 1,164,545.

61. At full production this demonstrative foundry should employ 156 workers, seven supervisory and managerial staff as well as five secretarial staff-members.

63. The introduced since January 1983 working time regulations for Government employees, published by the Ministry of Justice, stipulates that each Government employee has to work forty hours per week or 160 hours per month as an average of the whole year. That means that for the calculations of the capacities should be considered 160 hours per month x 12 months per year equals 1,920 working hours per year.

The working time of the to be established demonstrative foundry has been assumed as 1,920 hours per year at one shift work.

The demonstrative foundry should consist of the four main divisions:

1 - the pattern-making workshop

2 - the iron foundry with

- melting department (one cupola and one oil fired revebratory melting furnace)

- moulding department (two jolt-squeeze machines, a continuous mixer, a pit hand moulding area) equipped with rolling conveyors;

- sand plant for green and special sand moulding;

- fettling and finishing facilities;

- centrifugal pipe casting equipment

3 - the non-ferrous metals foundry

4 - the rough - castings machining and maintenance division.

64. The main estimated production stages and chosen facilities for the manufacturing processes of the demonstrative foundry with theirs description are specified below.

ESSENTIAL PRODUCTION STAGES AND FACILITIES OF THE DEMONSTRATIVE FOUNDRY

1. The Iron Foundry

Production stages		Main Equipment	Notes
1		2	3
PATTERNS (the same as aluminium)		Wood machines (1 lathe, 1 thicknessing machine, 1 honing machine, 2 marking-off benches, 2 milling machines, 1 copy milling machine, 1 buzz planer, 1 surface sand papering machine, 1 belt saw, 1 drilling machine, 1 grinder, 7 carpenter's benches.	In addition to repairs of used patterns, construction of new wood patterns has been foreseen, as well as the possibility of plastic duplication; application of metal parts and finally preparation of metalpatterns may be also accomplished in a subsequent stage.
MOLDS	TYPES OF STAMPING	In flask (600x600) on 2 jolting and pressure machines (30 moulds per hour).	For castings up to 10 kgs. In general 20 to 30 kg weight of castings may be produced in each mould.
		Production of flaskless moulds with cold self-hardening sands (continuous mixer) (6 to 10 moulds per hour).	In general, castings between 10 and 100 kg are produced at a rate of 3-4 casting/mold. Handling is carried out manually.
		Manual production in pit or on floor	Experimental castings of special or very large size (assembly of preformed parts).

1	2	3
SAND	Sand reclaiming unit for green sand has been designed, supplying the 2 jolt/squeeze machines with nearly 8 tons/h of prepared sand. Other sources of used sand are, at present, of no interest (owing to their low volume), for regeneration. Pneumatic conveyance is used to transfer the new sand to the continuous mixer.	Utmost importance is given to cooling of used sand to be regenerated (owing both to climate and shortness of runs): the job is carried out by special devices. The continuous mixer is completely separated, and at this stage of saturation only new sand is foreseen to be used.
CORES	Cores are requested in a amount of 2,500 kg /day. Two 100 kg batch capacity core sand mullers with rubber tired wheels will be available.	Large size cores can be manufactured by continuous mixer; medium small size cores by the core blowers or on core benches.
LIQUID METAL	1 cold wind cupola installation (2 tons/h) with two shells and a fore hearth as well an 450 kg capacity oil-fired revebratory furnace (0.5 tons per hour) is planned.	When malleable cast iron is produced, the duplex process may be applied.
PIPES CASTING	One centrifugally casting machine (14 pipes per hour) for pipes is planned	Metal mould with inlaid lining of green sand.

1	2	3
ASSEMBLY POURING CASTING DRAWN OUT	Cores assembly and mold closing is carried out on roll tracks or on ground. Casting is drawn out on a shaker or by means of cranes. Manual pouring is accomplished using an overhead crane or other hoisting devices.	The assembly lines are fitted with continuous rolls for higher productivity; cores and flaskless moulds handling for medium size casting is accomplished through several manual operations. In case of manual stamping, each movement is carried out by the worker (whether assisted or not by a crane by means of pneumatic tools.
CASTING CONDITIONING	Knock-down apron. Sand-blasting machines, grinders. Diesel trolleys for production handling.	All operations are performed by workers operating or controlling machines. No automation (except for safety stops).
HEAT-TREATING INSPECTION	Oil fired heat-treating furnace. Optical pyrometers and gauge have been foreseen for size checking, and sand checking equipment. Small microscope.	Heat-treating for malleable cast iron and centrifugally casted pipes. Inspecting for malleable cast iron and non-ferrous metals as well as iron castings.

2. The non-ferrous metals foundry

Production stages	Main Equipment	Notes
1	2	3
PATTERNS	The workshop is in common with cast iron foundry	
MOULDS	Bench for manual moulding (3-4 moulds/h)	Castings up to 2 kg (various types of flasks)
	Jolt machine rammed with pneumatic tools (10 mould/h)	Castings heavier than 2 kg
	Two small benches for gravity casting.	In general for aluminium pistons and brass fittings
SAND	It is not expected for the time being to reclaim used sand (only 10 tons of sand/ day is used)	Ventilation of sand is essential after mixing with binders.
CORES	Benches for hand stamping of self hardening (no bake) sand have been foreseen	By selecting various types of sand in the iron foundry it is possible to use core blowers both for cast iron and aluminium. The iron foundry mixer can produce large size cores for aluminium.
LIQUID METAL	1 double crucible liquid fuel furnace 100 kg of copper is used	After proper preparation, the furnace can melt both brass and aluminium using different crucibles.

1	2
POURING	Moulds assembly and pouring are performed on floor: castings are drawn out and knock-out is carried out by means of simple manual tools. Gravity castings are also hand operated.
INSPECTION	The laboratory checking sand can employ the same equipment used in the cast iron foundry: for safety parts, a radiographic equipment has been foreseen. The laboratory is equipped with normal means to check compositions, mechanical and dimensional characteristics of different types of castings.
GRINDING	Knock-down is carried out by means of band saws: other operations are manually carried out by means of grinding wheels or chi sels.

3. ROUGH-CASTINGS MACHINING DIVISION

The shop is equipped with means for machining rough castings and for maintenance services. Approximately fifty percent of foundry output may be machined.

65. The estimated machinery and equipment necessary for the to be applied manufacturing processes of the demonstration foundry with their costs is specified in the list of equipment attached here as Annex 31. The cost of the machinery has been estimated at European price level.

66. For the given above main production stages and facilities is given below the summarized specification with the investment's costs.

DEPARTMENT OR DIVISION	Costs (1,000 Afs.)		Total Cost
	Equipment	Freights + Installations	
Melting + emission control	12,925	6,985	19,910
Sand plant	17,820	7,150	24,970
Moulding	11,820	1,760	13,585
Core room	1,925	550	2,475
Fettling-cleaning	4,950	1,870	6,710
Non-ferrous foundry	5,830	1,760	7,700
Overhead bridge cranes	4,950	1,375	6,325
Heat-treatment, inspection and laboratory testing	5,500	825	6,325
Pattern making	9,350	1,375	10,725
Machining and maintenance	33,130	4,895	38,025
Exhaust and dust collection system	5,000	1,800	6,800
Total	113,205	30,345	143,550

67. The basic raw materials required for the production of the demonstrative foundry has been estimated as follows:

Description	Yearly Consumption tons	Total cost in Afs. for	
		Materials avaialable in the country	Materials to be imported
Pig iron	660		5,940,000
Purchased iron scrap	1,000	6,150,000	
Coke	360		5,760,000
Limestone	65	65,000	
Charcoal and covers	5	180,000	
Refractory Materials	160		5,760,000
Silica sand	1,700	2,040,000	
Bentonite	150		1,237,500
Coal dust	30	30,000	
Iron ore	50	40,000	
Purchased bronze scrap	42	2,520,000	
Purchased Aluminium scrap	63	5,040,000	
Steel shot	40		140,000
Auxiliary materials	80		2,800,000
Total	4,405	16,065,000	21,637,500

68. The estimated yearly demand for utilities for the demonstrative foundry is:

- electric power	-	550,000 kWh
- fuel-oil	-	400 tons
- compressed air	-	1,300,000 Nm^3
- water	-	10,000 m^3

Manpower

69. It has to be noted that at present do exist a very deficiency of labour in Afghanistan, but particular in the Kabul area. This is among others one of the main obstacle being complained by all the private foundries except the Government-owned Jangalak. The main reason for the persistently lack of labour is the existing situation and its constraints. It is difficult to say how far the availability of the manpower in Kabul will develop in the next few years, while the demonstrative foundry would have to be established. But in this consideration it is assumed that generally the labour will be available in Kabul after few years as the demonstrative foundry will be implemented. But semi-skilled and skilled workers are assumed to be not readily available. Hence considerable efforts, time and money will have to be invested in order to train labour and also the staff, for their future responsibilities of the demonstrative foundry.

Manpower requirements

70. A thoroughly study was made in order to come to a realistic conclusion on the labour and staff requirements, in terms of both their number and qualifications.

The estimated personnel for the demonstrative foundry at full production of 1,500 tons per year is the following:

1. Staff and supervisors including:	-	12
- general management	-	2
- secretarial staff	-	2
- accounting and administration	-	3
- engineers	-	5

2. Labour - 156
including:

- skilled workers - 46
- semi-skilled workers - 57
- unskilled workers - 53

71. The break-down of the labour for the main production division is as follows:

	Skilled	Semiskilled	Unskilled	Total
Iron and non-ferrous foundries	30	48	52	130
Pattern-making workshop	10	5	1	16
Machining and maintenance workshop	6	4	-	10

72. The number of workers being direct involved in the production of castings is estimated as 84 and indirect productive workers are 72.

Wages and Salaries

73. The following wages and salaries, incentives and benefits are assumed for the future employees of the demonstrative foundry:

labour -

- skilled workers (grade 3) 3,320 Afs.per mont
- semi-skilled workers (grade 5) - 2,600 Afs per mont
- unskilled workers (grade 8) - 1,490 Afs per mont

staff -

- supervisory and managerial staff - 3,900 Afs per mont
- secretarial staff - 1,750 Afs per mont

It has to be noted that the workers are following the present rules, being paid not per hour but per month, consisting in average of 160 hours.

74. There are at present being paid to the Government employees some additional incentives, benefits and allowances as food coupons, degrees allowances, lunch fees, transport benefits insurance, retirement benefits and some others. These subcharges on wages and salaries have been estimated as 180 per cent.

Foreign technical assistance

75. For the next stages of the development of this project a considerable foreign technical assistance will be required in planning, designing, establishing and commissioning.

It may be possible for the Government authorities to arrange for some or most of the foreign technical assistance to be on a bi-lateral technical co-operation basis, with the friendly countries of the region, being considered as the most appropriate ones to this aid.

Training requirements

76. It is assumed that while the demonstrative foundry will be implemented the country will still face lack of skilled and semi-skilled labour. So there will be the need for a comprehensive training programme to be realized.

77. As some foundries do at present exist in Afghanistan and in a three years time the biggest in the country foundry at Jangalak Mechanical Works will have completed its modernization, a very comprehensive training programme for the demonstrative foundry's workers could be realized with a strong and effective assistance of the Jangalak Mechanical Works in Kabul. Such assistance would be accepted by the Jangalak Mechanical Works and it was freely discussed without any obligations with the Chief Engineer of Jangalak's Mechanical Works.

The cost of the local training has been estimated as 2.8 million Afs. It is considered as one of the components of the pre-investment capital costs and has been included into the fixed capital investments costs. The exact estimation of this cost will much depend upon the assistance and co-operation of Jangalak's Mechanical Works in this matter. More detailed considerations and assessments should have to be worked-out at the next stages of the development of this project.

78. An overseas group training for the staff of a four months duration should be included into the training programme at the next stages of the project development. This overseas training programme cost is assumed to be financed by outside sources and is here not included. The cost of the overseas training is estimated as 21,450,000 Afs equals US$ 390,000.

Financial and economical evaluation

79. The financial analysis basically has proved that the commercial profitability of the demonstrative foundry plant project may be acceptable.

80. The total investment cost for the demonstrative foundry is estimated as 250,052,000 Afs of which fixed capital 214,005,000 Afs and working capital 36,047,000 Afs. Within the total investment cost the foreign exchange makes US$ 2,843,008. The demonstrative foundry after getting implemented will produce 1,500 tons of iron and non-ferrous castings of a total sales value 169,000,000 Afs per year.

- The estimated total production cost is 117,830,000 Afs.
- The net profit is estimated as 39,843,000 Afs.
- This foundry should employ 168 labour and staff.

81. The commercial profitability of this foundry is described by the following estimated figures:

- rate of return - 25,93 per cent
- repayment period - 3.0 years
- capital return - 4.33 years
- break-even point - 56.57 per cent

82. The detailed estimations concerning the financial analysis such as: total investment cost, total production cost, manpower requirements, direct materials and inputs, utilities, yearly sales and taxes are given in Annex 32, which is attached hereby.

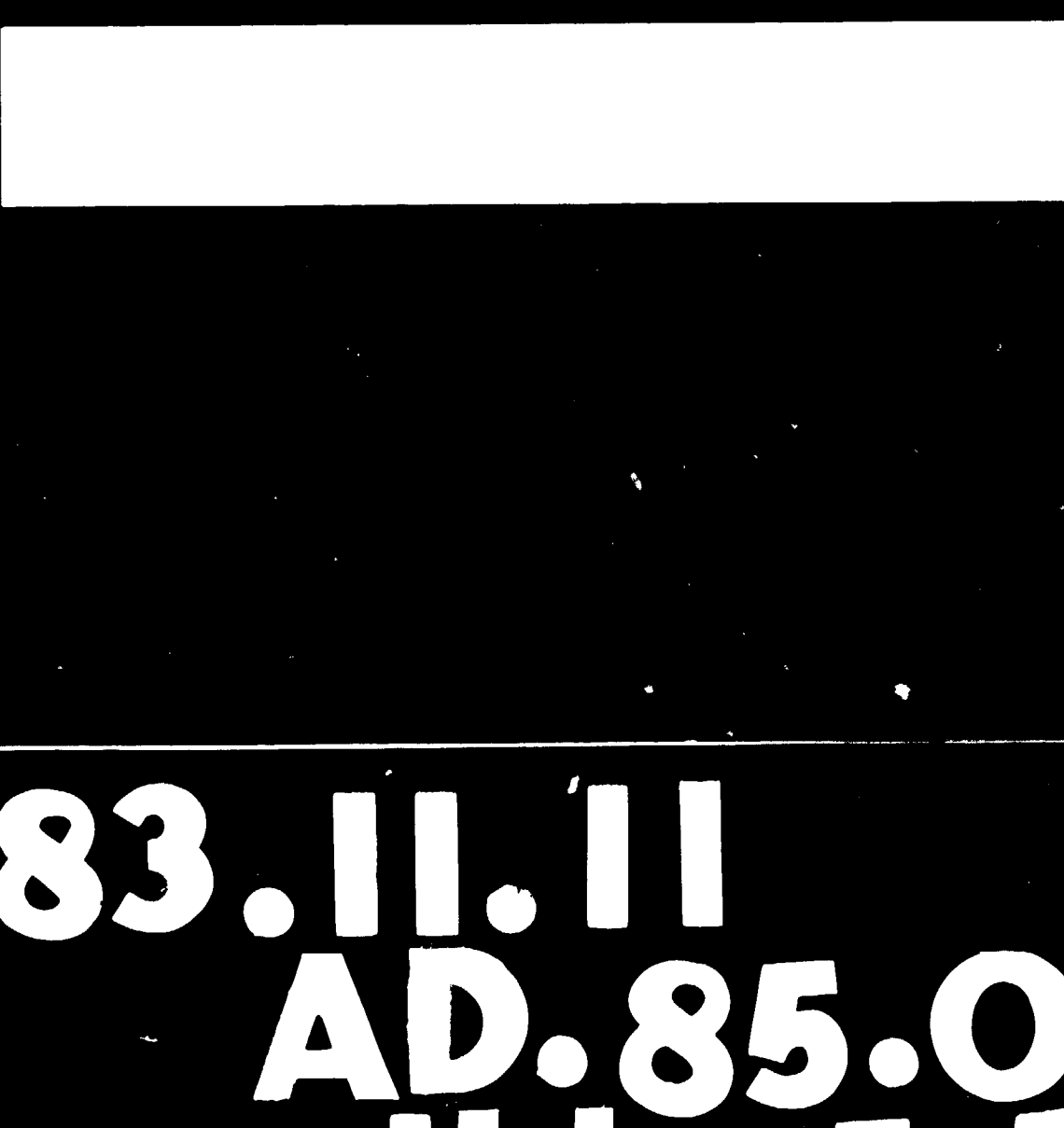
83. This financial and economical evaluation has been done at the pre-investment stage of the project development and should be rechecked within the feasibility studies.

Project financing

84. At this stage of project development and under the prevailing circumstances it is impossible to envisage firm financial arrangements for funding the demonstrative foundry project in Afghanistan. Presently a number of obstacles and constraints do exist towards undertaking a serious initiative aimed at negotiating the financial assistance.

85. One of the possible financing is given below:

- 45 per cent of long-term soft loan to the Government of Afghanistan, based on bi-lateral arrangements and covering the supply of major portion of equipment, machinery and installation. The possibility of a joint venture should not be ruled out;
- 10 per cent supplier's commercial credit covering those equipment, machinery and installations, which would not be obtainable through the long-term loan arrangements;
- 30 per cent coverage from the regular Government development budget, as equity participation, to be mainly used for disbursement of local costs (civil works);
- 15 per cent working capital, to be obtained on a short-term loan basis, from a local bank.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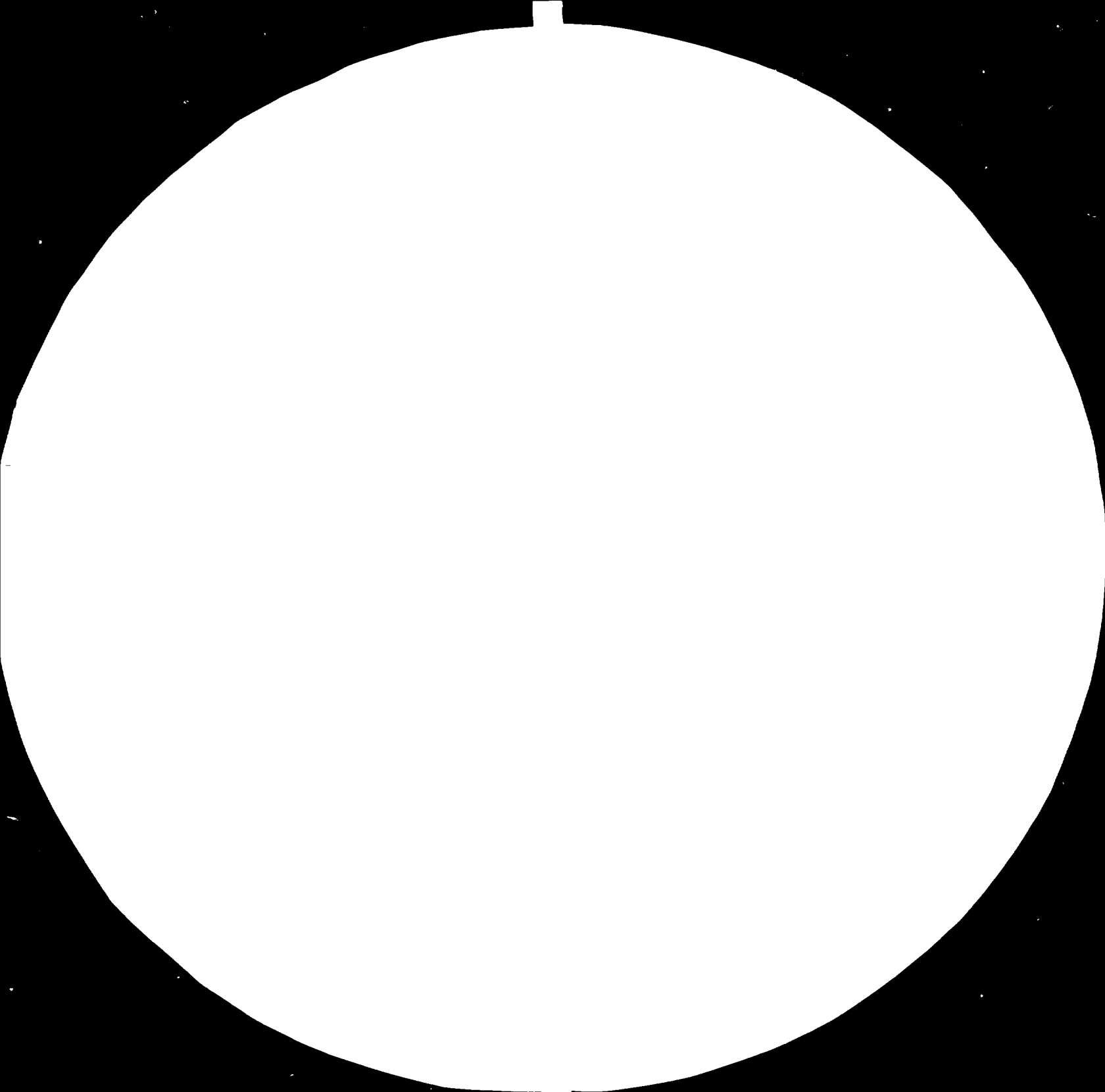

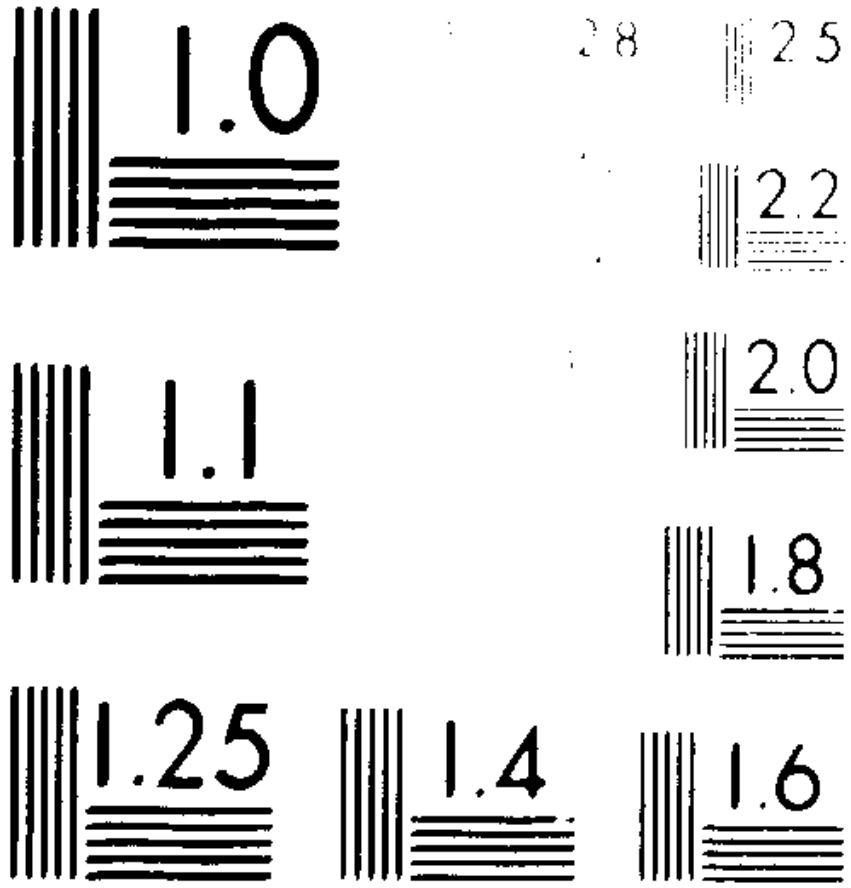
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86. The life of the demonstrative foundry is taken twenty years, being normal for developing countries and for that type of plants.

National economic benefits

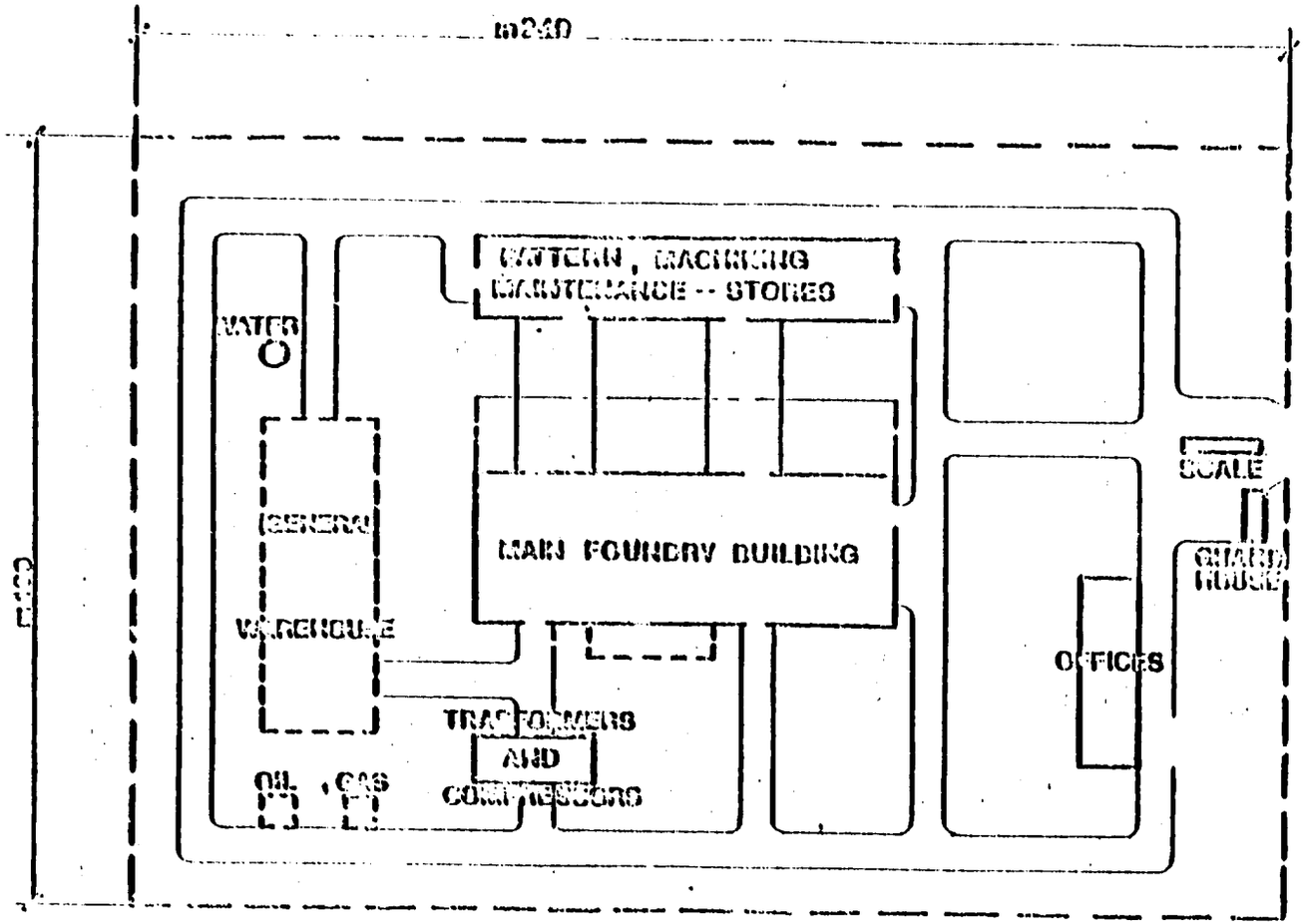
87. This project - if implemented will bring certain economic benefits at the national level. These benefits could be used to compare it with other development projects and enable the Government to establish further priorities.

88. Three of the main economic benefits arising from this project - if implemented are:

- production of 1,500 tons of castings
- foreign exchange savings estimated US$ 2,108,000 Annex 33, and
- job creation,

89. Other general social and economic benefits expected to be derived from the demonstrative foundry plant may be quoted as:

- indirect positive effects on other casting - consuming sectors of economy such as textile, construction, agriculture, transport, public works and irrigation industries, etc.
- utilization of a raw material (metal scrap) which is relatively abundant in the country and which otherwise could gradually be degraded in value due to the influence of natural and human factors.



GENERAL LAY-OUT OF THE DEMONSTRATIVE FOUNDRY

Annex 30

LIST OF EQUIPMENT FOR THE DEMONSTRATIVE FOUNDRY OF 1,500 TONS CAPACITY PER YEAR

1. IRON FOUNDRY

Department	Machinery or Equipment	Cost 1,000 Afs.
1	2	3
MELTING and POURING	Cold blast cupola (2 shells) 2 t/h Weighing and charging devices. No heated forehearth. Blowers - Blowed air control equipment. Molten iron tapping and weighing means. Emission control. Pouring monorail.	
	Total cupola plant	4,730
	Oil fired revebratory melting furnace (capacity 450kg) Output 0.545 tons per hour Oil consumption 130 litres per hour Acid lining	
	Total oil fired revebratory furnace	3,575
	Centrifugally pipe casting machine Metal mould with inlaid lining of green sand. Output 15 pipes per hour Maximal pipe length 2,100mm	
	Total	4,125
	Ladle heating station Scrap and alloy bins Pouring ladles and various equipment	495
	TOTAL MELTING AND POURING	12,925

1	2	3
SAND PLANT New sand	Floor grit, bins, elevator for feeding store silo with new sand 1 silo (65 m^3) Pneumatic conveyance	
	Total new sand	1,815
Green sand (8 tons/h) and special sands for hand moulding	Vibrating shake-out unit. Belts for conveying used sand Electromagnetic separators. Elevators. Rotating breaker screeens. Silos for used sand. Sand cooling devices. Reclaimed sand hoppers with volume-metric dosing. Screw feeders for binders. Sand muller (8 t/h). Special sands mixer. Aerators Prepared sand distributing to bind for jolt/squeeze machines. Grits and belts for spill sand. Carrying network structures.	
	Total green sand, special sands for nand moulding	15,015
No bake sand	Vibrating shake out. Belt for used sand. Elevator and hopper for used sand removing.	
	Total no bake sand	990
	TOTAL SAND PLANT	17,820

1	2	3
MOULDING Green sand moulding (normal, small castings)	2 jolt squeezing machines: max squeezing pressure (static) 8,000 kg (6 atm.); max flask size 700 x 850. Hoisting devices. Rollers conveyor Rollers transfer tables. 80 x 2 600 x 600 x 200 ← 200 moulding boxes	
	Total green sand moulding	8,250
No bake sand moulding (continuous mixer) for medium castings	New sand silo. No. 1 continuous mixer (3-4 tons/h). No. 1 new sand storage bin. Vibrating table. Roller conveyors mt. 90. Transfer tables. Hoisting device for moulds handling.	
	Total no bake moulding sand	3,300
Pit moulding	Hand tools. Pit with movable panels. Pneumatic hammer.	
	Total pit moulding	275
	TOTAL MOULDING	11,825

1	2	3
CORE ROOM	2 core sand mullers. 1 manually operated self hardening sand core machine (gas automatically controlled) (2.5 lt) 1 bench core blower (5 lt). 1 core blower 12 lt. with mechanised core drawing devices. 4 core benches with sand hoppers. 1 core oven with heater unit (two compartments). Core racks for oven baking. Manual low bed lift truck for oven charging.	
	TOTAL CORE ROOM	1,925
FETTLING and CLEANING ROOM	Endless apron shot blast machine. Air blast cabinet. Pedestal grinders. Abrasive cut - off machine Benches for deburring. Swing-frame grinder. Snag grinders (portable). Arc welding. (to be used only later) Other portable tools.	
	TOTAL FETTLING AND CLEANING ROOM	4,950
OVERHEAD BRIDGE CRANES	1 bridge crane (14.5 mt. 5/1 ton) (controlled by the floor) warehouse. 2 overhead bridge cranes for the two bays (14.5 mt. span - 3/1 tons) controlled by the floor). 1 overhead bridge crane for furnaces bay (14.5 mt. 10/3 tons).	
	TOTAL OVERHEAD BRIDGE CRANES	4,950

2. NON-FERROUS FOUNDRY

Installations	Machinery and equipment	Cost 1,000 Afs.
For melting	1 fuel oil crucible furnace (135 lt) with control equipment. 3 ladles and heating station. Linings and refractory maintenance.	
For moulding	1 moulding jolt machine for sand castings. Hoppers, mixer, elevators, areators for sand moulding. 1 bench for hand moulding. 2 gravity die castings benches with manual operating sequences. Flasks and related equipment.	
For cores making	Cores room. Mixer, hopper, core benches for 2 work station with no bake process. Ancillary equipment.	
For cleaning	Fettling shop. 1 belt saw, knock out and fettling benches. 2 grinders - shop fixture and equipment.	
For inspecting	Sand and castings inspection laboratory equipment.	
Hoist devices	2 service hoisting equipments for tapping and pouring.	
	TOTAL NON-FERROUS CASTING	5,830

3. ANCILLARY FACILITIES AND PATTERN MAKING SHOP

Department	Machinery and equipment	Cost 1,000 Afs.
HEAT-TREATMENT, INSPECTION and LABORATORY TESTING	Oil-fired heat-treatment furnace No. 1 marking off bench. No. 1 equipped marking - off bench. Microscope and micrographic equipment. Laboratory equipment for analysis and sand control. Inspection equipment.	
	TOTAL HEAT-TREATMENT, INSPECTION AND LABORATORY TESTING	5,500
PATTERN MAKING (wooden or resin patterns)	2 milling machines. 1 copy milling machine. 1 buzz planer. 1 surface sand papering machine. 1 honing machine. 1 belt saw. 1 lathe. 1 thicknessing machine. 1 drilling machine. 1 grinder. 2 marking off benches. 7 carpenter's benches	
	TOTAL PATTERN MAKING	9,350

4. ROUGH-CASTING MACHINING AND MAINTENANCE WORKSHOP

Department	Machinery and Equipment	Cost 1,000 Afs.
MACHINING AND MAINTENANCE WORKSHOP	1 center lathe (center gap 2,000/250mm) 1 universal milling machine table (1,300/300 mm) 1 front surface grinder (250/1,000 mm). 1 radial drilling machine (1,000 mm range). 2 column drilling machine (Ø 35 and 50 mm). 1 bench sensitive drilling machine (Ø 15 mm). 1 back sawing machine (Ø 150 mm). 1 double grinding machine (Ø 250 mm). 2 horizontal turret lathes (Ø 100 and 250 mm). 1 15 ton press. 1 universal sharpening machine	
	Total	13,255
	1 arc welding machine 7 kw. 1 portable oxyacetylene welding station. 1 set of portable drilling and lapping machine. 1 equipped reference table (1,500x 1,500) 8 benches for fitter with vice. 5 sets of wrenches of every type, files, miscellaneous equipment. 3 sets of tools and electrical instrument for maintenance	
	Total	2,350
	Tools and fixtures	8,010
	Gauges	1,925
	Shelvings, containers, supporting frames, etc.	7,590
	TOTAL MACHINING and MAINTENANCE WORKSHOP	33,130

5. GENERAL INSTALLATIONS

Purpose	List of Main Items	Cost 1,000 Afs.
EXHAUST and DUST COLLECTION SYSTEM	Furnaces' emission control (included in melting department's costs) Sand plant: wet dust collector - 1,000 m^3/min. (with complete equipment). Shake outs: wet dust collector (sludge tank). Shot blast dry-bag system (150 m/min.) Grinders dry-bag system (200 m/min.) Other foundry areas	
	TOTAL EXHAUST AND DUST COLLECTION SYSTEM	5,000

DETAILED FINANCIAL EVALUATION

SUMMARY

1.	Yearly Sales		
	Iron castings 1,400 tons - sales		147,000,000 Afs.
	Non-ferrous metal castings 100 ton - sales		22,000,000
		Total sales	169,000,000 Afs.
		equals US$	3,072,727
2.	Total Production Costs		
	Total production costs including fixed costs (factory overhead plus administrative overheads + sales and distribution costs plus financial overhead costs plus depreciation)		117,830,000 Afs.
		equals US$	2,142,364
3.	Gross Profit:		
			51,170,000 Afs.
		equals US$	930,364
4.	Net Profit:		
			39,843,000 Afs.
		equals US$	724,418
	Personnel		
	Total personnel		168 persons
	including		156 labour
6.	Total investment cost		250,052,000 Afs.
	including	equals US$	4,546,400
	- fixed capital		214,005,000 Afs.
	- working capital		36,047,000 Afs.
	of which foreign exchange	equals US$	2,843,068

7. Capital return (CR) — 4.33 years

Capital Return: $\frac{\text{Total investment cost}}{\text{net profit + depreciation}}$

8. Profit variation ratio (PVR) — 0.542

$PVR = \frac{\text{Fixed costs and net profit}}{\text{total sales}}$

9. Break-even point /BP/ — 95,601,476 Afs.

Break even point = $\frac{\text{fixed cost}}{\text{profit variation ratio}}$ / equals US$ 1,728,209

10. Break-even point /BP/ — 56.57 %

as percent of year sales

11. Rate of return — 25.93 %

Rate of return = $\frac{\text{net profit + financial over head costs}}{\text{total investment costs}}$

12. Repayment period — 3.0 years

Repayment period = $\frac{\text{total investment costs}}{\text{net profit + financial overhead costs + depreciation}}$

I. TOTAL INVESTMENT COST

FIXED CAPITAL

1. Fixed investments

a - Land and site development		
Total land		38,400 square meters
Cost of total land 250 Afs. x 38,400 =		9,600,000 Afs.
Site preparation and development		4,950,000 Afs.
b - Buildings and civil works		
Total covered area		6,000 square meters
Total cost of buildings and construction including civil works 8,250 Afs. x 6,000 =		49,500,000 Afs.
Sub-total		64,050,000 Afs.
c - Plant machinery and equipment		
Machinery including freight, issuance and installation		128,975,000 Afs.
Equipment		14,575,000 Afs.
Sub-total		143,550,000 Afs.

2. Pre-production capital costs

Salaries of personnel engaged during preproduction period, preparatory installations, pre-procuction promotion costs, fees payable to external institutions, training costs	6,405,000 Afs.
Total Fixed Capital	214,005,000 Afs
equals US$	3,891,000

WORKING CAPITAL

Direct materials and inputs

Raw material (for six months)	20,736,000 Afs.
Material handlings (patterns moulding boxes, process tests, etc.)	6,875,000 Afs.
Wages and salaries (for six months)	8,436,000 Afs.
Total:	36,047,000 Afs.

Total Working Capital 36,047,000 Afghanis = US$ 655,400

TOTAL INVESTMENT COST:

250,052,000 Afs. equals US$ 4,546,400

including foreign exchange 156,368,750 Afs. equals US$ 2,843,068.

II. TOTAL PRODUCTION COSTS

	Cost item	Total Afs.
I.	Direct materials and input	41,473,000
II.	Manpower: labour, staff and subcharges on wages and salaries	16,872,000
III.	Utilities	7,669,000
IV.	Factory overheads:	
	- auxiliary materials	1,500,000
	- repair and maintenance	2,600,000
	FACTORY COSTS	70,114,000
V.	Administrative overheads	1,400,000
VI.	Sales and distribution costs	3,500,000
	OPERATING COSTS	75,014,000
VII.	Financial overhead costs: interest (10 per cent of total capital)	25,005,000
VIII.	Depreciation:	
	Buildings (4 per cent) - 25 years	1,999,000
	Machinery (10 per cent) - 10 years	12,897,000
	Equipment (20 per cent) 20 years	2,915,000
	TOTAL PRODUCTION OR MANUFACTURING COSTS	117,830,000

TOTAL YEARLY PRODUCTION COST:

117,830,000 Afs. equals US$ 2,142,000

III. MANPOWER REQUIREMENTS

	Wages/ Salaries Per Year in Afs.	No. of Workers Staff	Total Afghanis
I. Labour			
Direct Productive Workers	39,840.	84	3,346,560
Indirect productive workers	31,200	72	2,246,400
Total labour			5,592,960
II. Staff			
Supervisory and managerial staff	46,800	7	327,600
Secretarial staff	21,000	5	105,000
Total staff			432,600
Total Wages and Salaries		168	6,025,560
III. Surchages on wages and salaries 180 per cent (insurance, incentives and benefits)			10,846,008
Total Manpower:			16,871,568

ASSUME TOTAL MANPOWER

16,872,000 Afs. equals US$ 300,760

IV. DIRECT MATERIALS AND INPUTS (RAW MATERIALS)

Description	Unit Price Loco Kabul Afs.	Yearly Consumption tons	Total Cost Afs.
Pig iron	9,000	660	5,940,000
Purchased iron scrap	6,150	1,000	6,150,000
Coke	16,000	360	5,760,000
Limestone	1,000	65	65,000
Charcoal and covers	36,000	5	180,000
Refractory materials	36,000	160	5,760,000
Silica sand	1,200	1,700	2,040,000
Bentonite	8,250	150	1,237,500
Coal dust	1,000	30	30,000
Iron ore	800	50	40,000
Purchased bronze scrap	60,000	42	2,520,000
Purchased aluminium scrap	80,000	63	,000
Steel shot	35,000	40	140,000
Auxiliary materials	35,000	80	2,800,000
Total			37,702,500
Unforeseen costs 10%			3,770,250

TOTAL DIRECT MATERIALS AND INPUT (raw materials) 41,472,750

ASSUME 41,473,000 Afs.

= equals US$ 754,000

V. UTILITIES

Description	Unit	Unit Price Afs	Yearly Consumption	Total Afs.
Electric power	kwh	1.17	550,000	643,500
Fuel oil	tons	17,000	400	6,800,000
Compressed air	Nm^3		1,300,000	65,000
Water	m^3	10.0	16,000	160,000
Total				7,668,500

ASSUME 7,669,000 Afs.

equals US$ 139,436

VI. YEARLY SALES

Iron castings 1,400,000kg per year x 105 Afs. per kg =

= 147,000,000 Afs.

equals US$ 2,672,727

Non-ferrous castings 100,000kg per year x 220 Afs per kg =

= 22,000,000 Afs

equals US$ 400,000.

Total sales of the demonstrative foundry per year

169 millions Afs equals US$ 3,072,727.

VII. TAXES

At present the Government-owned enterprises are paying the following taxes:

- 6 per cent on durable machines and equipment
- 2 per cent of the gross profit
- 1 per cent of the yearly sales

In the case of the demonstrative foundry those taxes are:

- 6 per cent of 143,550,000 Afs = 8,613,000 Afs
- 2 per cent of 51,170,000 Afs = 1,023,400 Afs.
- 1 per cent of 169,000,000 Afs = 1,690,000 Afs.

Total taxes = 11,326,400 Afs.

ANNUAL FOREIGN EXCHANGE SAVINGS RESULTING FROM THE ESTABLISHMENT OF THE DEMONSTRATIVE FOUNDRY

Import substitution	million US$	3.072
Depreciation (machinery 12,897,000 Afs + equipment 2,915,000 = 15,812,000 Afs = = US$ 257,490 US$	million US$	0.287
Interests (10% of US$ 2,843,068 = = US$ 284,307	million US$	0.284
Current imports of raw materials (21,637,500 Afs = US$ 393,409 =	million US$	0.393

FOREIGN EXCHANGE SAVINGS

3.072 - (0.287 + 0.284 + 0.393) = US$ 2,108,000

Annex 34
DRAFT
3 April 1983

UNITED NATIONS DEVELOPMENT PROGRAMME

PROJECT OF THE GOVERNMENT OF THE DEMOCRATIC

REPUBLIC OF AFGHANISTAN

PROJECT DOCUMENT

Title: Technical Assistance to Establishment of the Demonstration Foundry

Number: DP/AFG/83/xxx **Duration:** 3.5 years

Primary Function: Direct Support

Secondary Function: Institution Building

Sector: (Govt. Class) **UNDP Class and Code:**

Sub-sector: (Govt. Class) **UNDP Class and Code:**

Government Implementing Agency: Ministry of Mines and Industries, Planning Department

Executing Agency: United Nations Industrial Development Organization - UNIDO

Estimated Starting Date: 1 January 1984

Government inputs: 720,000 Afs (in kind) **UNDP Inputs:** 818,000 (US dollars)

Approved:

_____ _____

on behalf of the Government Date

_____ _____

on behalf of the Executing Agency Date

_____ _____

on behalf of UNDP Date

Annex 34
DRAFT
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Approved:

_____ _____

on behalf of the Government Date

_____ _____

on behalf of the Executing Agency Date

_____ _____

on behalf of UNDP Date

PART I. LEGAL CONTEXT

This Project Document shall be the instrument referred to as such in Article I, paragraph 2, of the Assitance Agreement between the Government of Afghanistan and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme, signed by the Parties on 21 February 1956.

PART II. THE PROJECT

A. Development Objectives

Within the development of the industrial sector of the Democratic Republic of Afghanistan, the project aims at the strengthening the country's economy by increasing the casting capacities of the foundry industry and decreasing the import of castings, thus contributing to the currency balance of the country.

Up-grading the skill of technical staff will be among other benefits.

B. Immediate Objectives

The immediate objectives of the project is to establish and commissioning a demonstration foundry with a capacity of 1,500 tons per year of ferrous and non-ferrous castings, but particular:

(i) subcontracting the techno-economic feasibility study;

(ii) subcontracting the project engineering design with the technical documentation;

(iii) assisting in engineering supervision of the construction and commissioning of the plant;

(iv) training of the technical staff.

C. Special Considerations

The successful implementation of the project would noticeable contribute in the Government's efforts for providing the modern engineering and technical knowledge to the foundry industry and for assisting the existing foundries in solving problems of quality, methods and materials.

D. Background Information and Justification

In view of the rapidly growing demand of castings especially for construction and building industries, agriculture, textile and wool industry, local market, irrigation and public works, the Government has given high priority to the establishment of a modern foundry.

Further demand for ferrous and non-ferrous castings do exist also in the rural areas for the development of drinking water as well as the mining cement and fertilizer industries and cotton ginnery and press.

Before such a foundry could be established it would require a reasonably clear assessment of the present and future products mix, in terms of casting size, type, metal, quantity, etc. This type of data, however, was lacking and should be developed before planning and establishing the new foundry.

The Government has recognized this deficiency and officially requested such assistance.

At the end of 1982, a small-scale UNIDO-sponsored SIS project has been initiated aiming at examine the status of the foundry industry in the country and to assess the need for cast and forge parts in various sectors of industry, as the need may be. One expert has carried-out a six month duration field mission in Kabul and has made the studies of the foundry and forge industry and launched a market-consumer/survey concerning the demand for castings and forged parts.

The present demand for castings has been identified as 4,400 tons. The forecasted demand for castings in 1990 has been estimated as 9,250 tons.

The existing foundry industry has a present production capacity of 700 tons per year and is expected to get increased up to 2,560 tons after 1986.

So there is existing a very high demand for castings, which cannot be satisfied by the existing foundry industry due to lack of capacities. The present deficiency of casting capacities identified as 3,700 will increase in 1990 upto 6,600 tons, regardless of the modernization of the biggest foundry in the country.

The identified high deficiency of production capacities in the domestic foundry industry which can be covered only through import of castings from abroad, justifies in full the establishment of a new modern foundry in Afghanistan.

The pre-investment assessment of establishing a new foundry has been carried-out within the small-scale UNIDO-sponsored SIS project in April 1983.

The new planned to be established foundry should be a demonstration foundry with a capacity of 1,500 tons per year. The Government is keen to establish such a demonstration foundry.

It is clear from the above, that international technical assistance is required to be provided, on a systematic, long term basis, The Government is requesting such assistance, but particular for the techno-economical feasibility study, the project design, the assistance in supervision of the construction and commissioning and the training of the technical staff.

E. Project Outputs

The outputs of the project, as related to the immediate objectives are the following:

1. Completing the formulation stage (techno-economic feasibility study) of the pre-investment phase and the engineering designs with the technical documentation of the investment phase for the establishment of the demonstration foundry of the capacity 1,500 per year.

2. Establishing a [illegible]ystem of assistance in supervising the construction wo[illegible]sioning of the demonstrative foundry plant.

3. Providing the de[illegible]oundry in adequately trained technical staff which will [illegible] perform satisfactorily all the technological and manageria[illegible]ks required for the efficient operation of that plant.

F. Project Activities

The following project activities are envisaged:

1. Subcontract

An internationally re[illegible]nown-reliable firm/organization will perform under subcontractual arrangement, the following main activities:

a. Carry-out the techno-economic feasibility study for the to be established demonstration foundry

b. Preparing an engineering design for this foundry with all the technical documentation.

c. If appropriate, render technical advice and assist the Government's authorities in the negotiating and contracting of the machines and equipment for a smooth performing of the engineering design. This includes participation of relevant sub-contractor's experts in the project travels for negotiations and/or contracting of machinery and equipment to be procured.

2. Chief Technical Adviser-International Project Co-ordinator

A highly qualified well-re-nown expert in industrial foundry's design and industrial casting - technology as well as in supervising the construction of the foundry plants including its commissioning, will be assigned to the project for 33 months, after the feasibility study has been completed. Within his terms of reference, the following main activities are envisaged.

a. In the initial few weeks in the field, jointly with the Government officials concerned and in close co-operation with the subcontractor, as well as the domestic construction units, to draw up a detailed work plan, combining in a well-balanced manner, in term of time and resources, the activities of the national counterparts and the international subcontractor experts, to secure achievement of the project objectives.

b. To provide a day-to-day technical and techno-economic guidance and co-operation during the negotiating, contracting and design phase as well as the construction and commissioning of the plant.

c. To carry out, when required, project travels abroad, together with the national counterparts to headquarters of equipment suppliers.

d. To train the national staff, which shall be attached to him, through a daily consultancy and advise, thus achieving self-reliance in their future activities.

e. To prepare the training plans for the staff to be trained abroad, through establishing appropriate training programmes and preparing the trainees for the best training results to be achieved.

f. To assist in supervising the construction phase of the demonstration foundry in close cooperation with his national counterparts.

g. To assist in supervising of the commissioning of machinery and equipment as well as its earlier proper erecting in order to provide a smooth self-dependent run of this plant.

3. Equipment

Selection and assistance in procurement of machinery and equipment with all the required materials for a smooth self - dependent run of the foundry is also envisaged within the project activities; the machinery, equipment and the materials will be paid entirely by the national counterparts.

G. Project Inputs

1. Government Inputs

a. Government Input in Kind

The Government institutions concerned and the national counterparts shall ensure that personnel and material resources and services as well as facilities are available for timely implementation of this project at the construction works and commissioning stages.

Other Government's capital investment inputs will be included in the investment cost but are not taken into consideration in this project document.

b. National Staff

Counterpart officials from the Ministry of Mines and Industries, Planning Department, will be assigned to attend to the project implementation. Other relevant staff shall be also assigned to the project by the national enterpreneurs.

c. Facilities

The Government and, respectively, the national counterparts, will provide the necessary office accommodation for the UN personnel and for the subcontractor's team, the transportation within the country as required and all other related facilities, to ensure their best performance.

2. UNDP Inputs

a. Personnel

UNIDO, as the implementing agency, will recruit the Chief Technical Adviser - International Project Co-ordinator as per PART II F. Paragraph 2, above. For this expert's services, an amount of US$ 292,000 is envisaged within the UNDP input.

b. Project Travel

An amount of US$ 20,000 is earmarked within the UNDP input, to ensure the international travels of the Chief Technical Adviser, as required, as set out in PART II. F. Paragraph 2 (c), above.

c. Subcontract

One engineering firm/organization will be engaged on subcontractual basis by UNIDO, as the implementing agency, to provide the services as described in PART II. F. Paragraph 1, above.

An amount of US$ 240,000 is earmarked within the UNDP input, as proforma price of this subcontract.

d. Training

Overseas training for the national staff as fellowships and study tours will be organized by UNIDO, as the implementing agency as described in PART II F, Paragraph 2, above.

An amount of US$ 203,000 is earmarked within the UNDP input.

f. Equipment

An amount of US$30,000 is envisaged within the UNDP input, for the purchase, of a project vehicle, to ensure the local transport accomodation for the Chief Technical Adviser, through his official activities as well as covering other equipment expenses of the project office's such as copying, drawings, etc.

g. Other Personnel Costs

A staff mission is envisaged, to be financed from the project, for UNIDO's participation in the Tripartite Reviews. An amount of US$ 9,000 is earmarked for this purpose.

h. Miscellaneous

Operational costs, for the project vehicle, reports, translations, some technical documentation, as required, and other sundries, are envisaged to be covered by the project budget, and US$ 12,000 is allocated for this purpose.

Standard project budget sheets are attached hereto as Annex II.

H. Project Work Plan

A detailed Project Work Plan will be prepared by the International Project Co-ordinator, jointly with the national counterparts, within the first weeks of the former's field work, to be approved also by UNDP and UNIDO. In the course of the project implementation, this plan will be reviewed from time to time. This Project Work Plan will be made Annex I of the present Project Document, and will constitute an integral part of it.

A detailed plan of implementation is attached hereto as Annex III.

I. Prior Obligations and Pre-Requisites

One of the main pre-requisites for the success of the project is timely solution by the Government of all legal problems pertaining to the project's implementation.

J. Future UNDP Assistance

Although it is premature to consider future UNDP assistance, such is very likely to be required.

PART III - SCHEDULE OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Meetings

The project will be subjected to periodic review in accordance with the Policies and Procedures established by UNDP for monitoring project implementation. Specifically, a final Tripartite Review will take place at the end of the UN experts' field work to review the project activities and discuss follow-up activities.

Other review meetings also not foreseen at the present time, will be undertaken on an ad-hoc basis if and whenever necessary or beneficial as regards the project implementation.

B. Evaluation

The project will be subjected to evaluation in accordance with the Policies and Procedures established for this purpose by UNDP.

The organization and the timing of the evaluation will be decided by the Government, UNDP and UNIDO, the executing agency for this project.

C. Progress and Terminal Reports

Progress reports will be prepared in accordance with the UNDP Policies and Procedures Manual and as agreed with the Government authorities and the Executing Agency. Specifically, it is foreseen that the Chief Technical Adviser-International Project Co-ordinator will prepare his first project progress report within the first 6 weeks of his field work. The expert will be [illegible] expected to prepare the Draft Project Terminal Report in time to be available for the final Tripartite Review.

UNIDO

ANNEX II

3. COUNTRY	4. PROJECT NUMBER AND AMEND.	5. SPECIFIC ACTIVITY
AFGHANISTAN	DP/AFG/83/	
0. PROJECT TITLE	Technical Assistance to Establishment of the Demonstration Foundry	

5. INTERNATIONAL EXPERTS (functional titles required except for line 11-50)	16 TOTAL		17 1984		18. 1985		19. 1986		20. 1987	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
11-01 CTA-Int.Project Coordinator	33	292,000	3	23,000	12	102,000	12	109,000	6	58,000
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
11-50 Short term consultants										
11-99 Sub-total - International experts a/	33	292,000	3	23,000	12	102,000	12	109,000	6	58,000

11. REMARKS

a/ If more than 16 experts are required check here ☐ and attach continuation sheet 1A. This sub-total must include all experts.

PROJECT NUMBER DP/AFG/83/	16. TOTAL		17. 1984		18. 1985		19. 1986		20. 1987	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
OPAS EXPERTS (functional titles required)										
12-01										
12-02										
12-03										
12-99 Sub-total - OPAS experts b/										
ADMINISTRATIVE SUPPORT PERSONNEL										
13-00 Clerks, secretaries, drivers		12,000		2,000		4,000		4,000		2,000
13-50 Freelance Interpreters (non-UNDP PROJ)										
13-99 Sub-total - Admin support personnel										
UN VOLUNTEERS (Functional titles required)										
14-01										
14-02										
14-03										
14-04										
14-99 Sub-total - UN Volunteers b/										
15-00 Project travel		20,000		4,000		8,000		8,000		3,000
16-00 Other personnel costs (including UNIDO staff mission costs)		9,000		-		3,000		3,000		
NATIONAL EXPERTS (functional titles required)										
17-01										
17-02										
17-03										
17-04										
17-05										
17-99 Sub-total - National experts b/										
19-99 TOTAL - PERSONNEL COMPONENT	33	333,000	3	29,000	12	117,000	12	124,000	6	63,000

b/ If additional individual budget lines are required, check here ☐ and attach continuation sheet 1A.
These sub-totals must include other lines listed on page 1A.

15. PROJECT NUMBER DP/AFG/83/	16. TOTAL		17. 1984		18. 1985		19. 1986		20. 1987	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
SUBCONTRACTS 21-00 Subcontracts		240,000		100,000		140,000				
TRAINING 31-00 Individual fellowships	80	176,000			30	66,000	50	110,000		
32-00 Study tours; UNDP group training	12	27,000					12	27,000		
33-00 In-service training										
34-00 Non-UNDP group training										
35-00 Non-UNDP meetings										
39-99 TOTAL - TRAINING COMPONENT	92	203,000			30	66,000	62	137,000		
EQUIPMENT 41-00 Expendable equipment										
42-00 Non-expendable equipment										
43-00 Premises										
49-99 TOTAL - EQUIPMENT COMPONENT		30,000		10,000		10,000		8,000		2,000
MISCELLANEOUS 51-00 Sundries		12,000		3,000		3,000		3,000		3,000
55-00 Hospitality (non-UNDP projects)										
51-00 Support costs (CC and DC Proj.only)										
59-99 TOTAL MISCELLANEOUS COMPONENT		12,000		3,000		3,000		3,000		3,000
SURPLUS/DEFICIT 91-00 Surplus/Deficit (ADM/PS use only)										
99-99 PROJECT TOTAL		818,000		142,000		330,000		272,000		68,000
c/ COST SHARING (UNDP/IPF projects only)										
c/ NET UNDP CONTRIBUTION										

c/ For information only - not for PAD input

ANNEX III

DETAILED PLAN OF IMPLEMENTATION OF THE PROJECT

"TECHNICAL ASSISTANCE TO ESTABLISHMENT OF THE DEMONSTRATION FOUNDRY"