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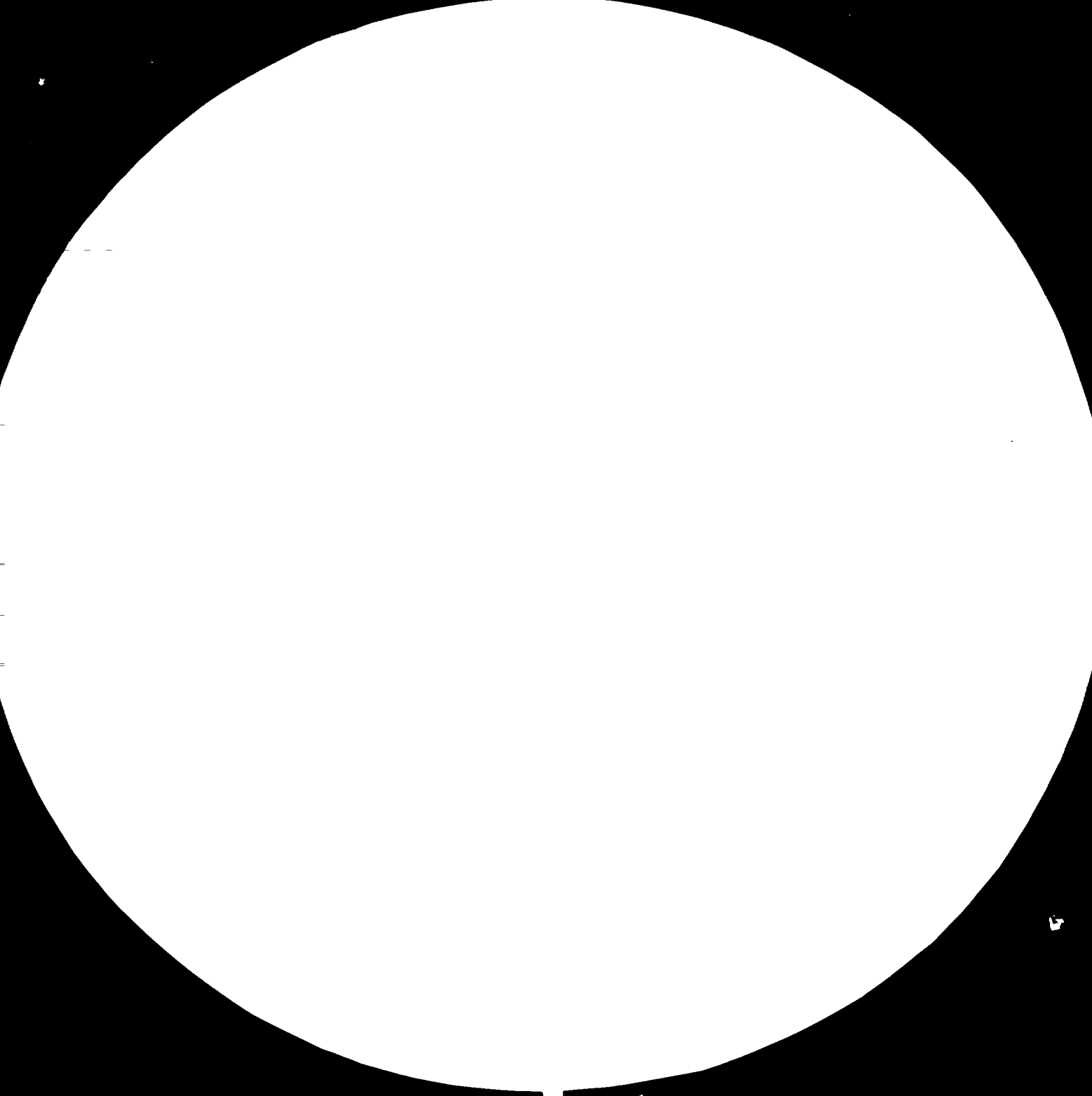
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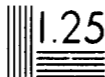
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E n g l i s h

Syria.

ASSISTANCE TO THE SHIPBUILDING -  
AND SHIPREPAIR INDUSTRY

SI/SYR/82/802/11-01

- SYRIAN ARAB REPUBLIC -

Final Report

Prepared for the Government of the Syrian Arab Republic  
by the United Nations Industrial Development Organization,  
executing agency for the United Nations Development Programme.

Based on the work of Jacques W. Prins, B.Sc., Naval Architect,  
shipyard advisor and expert in shipbuilding / shiprepair.

United Nations Industrial Development Organization  
V i e n n a

This report has not been cleared with the United Nations  
Industrial Development Organization which does not there-  
-fore necessarily share the views presented.

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**I - SUMMARY**

There is practically no existing shipyard industry in the Syrian Arab Republic. The country has only one small mechanical slipway ( which needs urgent to be repaired ), together with adequate workshops and stores at Lattakia commercial port, serving only the repair- and maintenance requirements for the Government-owned floating port equipment; but these facilities are quite insufficient to serve the need for drydocking and repairs of the Syrian commercial fleet and foreign commercial ships calling at Syrian ports.

Consequently Syrian commercial ships are obliged to call at foreign shipyards for drydocking and simultaneously repairs.

This is an unacceptable situation - as well economically as practically.

Based upon the findings and observations in this report and related to the continuously expanding maritime activities in Syria together with the statistics on ships and shipping in Syrian ports it is positively justified to establish small to medium ranged shipyard industries in Syria, consisting of a medium range shipyard at Lattakia, a medium range shipyard at Tartous and a number of small shiprepair facilities at the other Syrian small ports.

Because there is not sufficient know-how in shipyard operation available nor qualified personnel for the management and the proper operation of shipyards it is necessary such personnel to be trained simultaneously with the design and the building of the shipyards.

Besides the above there is an immediate need for the training of ship- and engine surveyors to keep up with the rules and regulations of Classification Societies and for the proper application of international conventions on shipping.

Considerable assistance ( f.e. UNIDO ) on technical expertise, training of personnel and financing will be needed for the implementation of the recommendations; also large Gov't input is <sup>needed.</sup>

It is anticipated that after the realization of the recommendations in this report the shipyard industry in Syria will develop increasingly during the next decades and will consequently stimulate the development of ancillary industries.

## II INTRODUCTION

A. Project background and justification.

1. The Syrian coast extends along the East Mediterranean part for 140 km. The Syrian Arab Republic possesses two main cargo ports: Latakia and Tartous. These ports are very busy with particularly coasters and medium capacity general cargo vessels calling at them. In addition to these activities there are two major tanker terminals in Tartous and Baniyas as focal points for transportation of Syrian and Iraqi crude oil.

Despite the fact that Syria plays a rather significant role in connecting Europe and Mediterranean countries with the countries of the Gulf region, the industrial capacity for handling the growing shipping traffic is at a low position. First of all it concerns the state with shipbuilding and shiprepair industry, one of which shipbuilding practically does not exist and the shiprepair branch can handle only small and at the utmost medium repairs.

The situation leads to the fact that repair and maintenance of the ships and coasters is presently carried out in other ports of the Mediterranean. This is also the case with Syrian owned ships sailing under Syrian flag and/or under foreign flags.

The country has only one small slipway (marine railway) of less than 1000 tons capacity. There is a great need for training in proper application of international standards and conventions on shipsurveying, inspection and certification.

The importance of establishing up-to-date shipbuilding/shiprepair industries in the Syrian Arab Republic is also reflected by its direct relationship to its economic problems and to the social problems which are an integral part of the general employment development. The country wishes to develop its national fleet and to control foreign exchange outflow in order to benefit from the it generates. The present situation cannot be tolerated any more.

The Republic urgently needs assistance in solving current problems and formulating a viable policy towards development of shipbuilding and shiprepair in the country.

2. In 1966 a study on the subject has been carried out by foreign private companies (Burmaister & Wain / Kampsax Ltd., Denmark).

This project was supposed to be carried out in 3 stages:

1. Preparation of site, construction of 1<sup>st</sup> 1000 tons slipway (marine railway), construction of 80,000 tons drydock.
2. Installation of 3000 tons floating dock, construction of 2<sup>nd</sup> 1000 tons slipway.
3. Workshops, equipment, machinery, stores, etc.

Duration: 3 years.

No follow-up or implementation of that study ever occurred. Circumstances have considerably changed during the past 12 years; consequently the findings and recommendations in that study are no longer in force.



### B. Official Arrangements.

1. Assistance was requested by the Syrian Government on 16 June 1981 - letter of the State Planning Commission 4840/3002 FA; and on 22 October 1981 - letter of SIFFA, Damascus. The project was cleared on 13 Nov. 1981 and further approved by Mr. M.A.Siddiqui, PC.
2. The project became operational on 19 September 1982 and lasted one month and 15 days, including travel time, briefing and debriefing

### C. Contributions.

1. UNIDO Contribution: US\$ 9.800,=-
2. Government Contribution: in kind ( See Annex I ).

### D. Objectives and Project Outputs.

#### 1. Objectives.

The development objective is to establish well balanced ship-building/shiprepair industries in the country.

The immediate objectives of the project are the following:

- to evaluate the present state and to make recommendations on improvements and upgrading of the existing facilities;
- to assist in formulating the Government's policy towards ship-building/shiprepair industries in connection with shipping;
- to advise in practical application of rules and regulations of international classification societies and international conventions.

#### 2. Project Outputs.

The project is expected to:

- contribute to the formulating of a sound policy in the field of shipbuilding/shiprepair;
- produce viable recommendations on the improvements and the expansion of the existing facilities;
- assist in upgrading knowledge and in perfecting application of rules and regulations of international classification societies toward surveying hulls and onboard machinery and devices. This applies also for international conventions (p.e. SOLAS) on shipping.

### 3. Job Description.

On request from the Government of the Syrian Arab Republic for UNIDO Special Industrial Services the expert was given following description of activities:

#### Purpose of the project:

To assist the Government in formulating the present state - and in formulating policy towards Shipbuilding and Shiprepair industries in connection with shipping.

#### Specific items:

1. Survey and study the existing facilities in the Syrian ports.
2. Collect and study data on ships calling at the ports and possibly make projections for the traffic growth.
3. Prepare practical recommendations for improvements and up-  
grading of facilities and technology in the field of shipbuilding and shiprepair at the ports.
4. Provide market estimates and promote a development programme for establishment of shipbuilding-, drydocking and shiprepairing in general in terms of scale, types, etc.
5. Review the present maritime transport activities in the country as a whole in the light of availability of ancillary industries and skilled manpower.
6. Assist the Government in evaluating already available proposals and studies and in formulating a viable policy and guidelines in shipbuilding / shiprepair development in the country.
7. Propose training programmes for local staff for the shipyards and for training in practical application of rules and regulations at international classification societies for upgrading the level of surveying of hulls, onboard machinery, etc.

#### Final report:

The expert will 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.

### III- ACTIVITIES

#### A. Collection and preparation of informations on:

##### 1. Shipping and ships.

- Statistics of all ships calling at Syrian ports.
- Statistics of Syrian merchant ships
- Statistics of Syrian fishery ships
- Statistics of Syrian auxillary vessels (tugs, floating cranes etc.)

##### 2. Ports: plans and functions.

- Commercial ports.
- Petroleum terminals.
- Fishery ports.
- Capacity of the various ports.
- Facilities: floating & land based.

##### 3. Existing shiprepair facilities.

- At the General Directorate of Ports. (Gov't.)
- At Port Companies. (Gov't.)
- At oil terminals. (Gov't)
- Others.

##### 4. Projects included in the 1981 / 1985 Syrian 5-year plan related to shipping and ship-maintenance facilities.

- New ships (commercial) { 4 x 6.000 TDW general cargo  
3 x 60.000 TDW tankers
- Auxillary vessels / floating port-equipment ( tugs, floating cranes, barges, etc.)
- Shiprepair facilities:
  - New facilities
  - Modernization of existing facilities.

#### B. Programme.

##### 1982

- Sep. 19 Travel from Holland to Vienna.
- Sep. 20 Briefing at UNIDO, Vienna.
- Sep. 21 Travel from Vienna to Damascus, S.A.R.

- Sep. 22 - Briefing at UNDP office, Damascus.  
 - Introduced to the Director of Planning, Ministry of Transport, Mr. Malik Tannous. Short meeting in connection with the project.  
 - Travel from Damascus to duty station Lattakia by Gov't car, accompanied by counterparts.
- Sep. 23 - Reception at the office of the General Director of Ports, Admiral M.M. Shihaby. Short meeting in connection with the project.  
 - Introduction to other Gov't officers related to the project;  
 - Starting preparation of informations, statistics etc.
- Sep. 24 - Continuation of preparation of informations.  
 - Translation and explanation of plans, documents, statistics etc. (See Annex II, III, IV).
- Sep. 25 - Introduction to the Heads of project-related Departments of the General Directorate of Ports:  
 Technical Affairs Dep't : Eng. Taha Khaleel.  
 Port Affairs Dep't : Master Mariner Ahmad Ashkar.  
 Marine Inspection Dep't : Master Mariner Louay Fansa.
- Sep. 26 - Study on the obtained information and translated documents. Starting report activities.
- Sep. 27 - Cont'd Sep. 26. Exchange of views with 1st. counterpart.
- Sep. 28 - Cont'd Sep. 27.
- Sep. 29 - Cont'd Sep. 28.
- Sep. 30 - Cont'd Sep. 29.
- Oct. 2 - Study on plans of fishery harbour Lattakia.  
 - Visit to the fishery harbour Lattakia.
- Oct. 3 - Cont'd Oct. 2. Discussions with counterpart and officers involved.
- Oct. 4 - Cont'd Oct. 3.  
 - Visit to Syrian coaster with 1st counterpart to observe surveying activities.
- Oct. 5 - Visit to the Lattakia main port with shiprepair workshops, stores, slipway (marine railway), etc.
- Oct. 6 - Study on obtained information.  
 Continuation of report activities.

- Oct. 7 - Study on obtained informations, preparing report.
- Oct. 9 - Preparing report.
- Oct. 10 - Visit to Banias harbour.
- Oct. 11 - Visit to Jebleh harbour.
- Oct. 12 - Visit to Tartous port and Tartous authorities.  
Visit to Arwad harbour and harbourmaster.
- Oct. 13 - Con't 12 Oct.  
Visit to Tartous oil-terminal
- Oct 14 - Study on obtained information; preparing report.
- Oct. 16 } - Visit to some Shipping Corporations at Lattakia.
- Oct. 17 } Visit to some Syrian ships.
- Oct. 18 } Visit to Technical High School.
- Oct. 19 } Obtaining various information in connection  
with the project.  
Study on informations and preparing report.
- Oct. 20 - Study on informations and preparing report.
- Oct. 21 - Cont'd 21 Oct.
- Oct 23 - Preparing final report and discussions on the  
project with the various officers at the General  
Directorate of Ports.
- Oct. 24 - Cont'd.
- Oct. 25 - Cont'd.
- Oct. 26 - Cont'd.
- Oct. 27 - Cont'd.
- Oct' 28 - Travel to Damascus.
- Oct. 30 } - Visit Ministry of Transport, Damascus.
- Oct. 31 } - Debriefing at UNDP - office, Damascus.
- Nov. 1 - Departure from Damascus to Vienna.

## IV - FINDINGS

In the course of the mission the expert had ample opportunity to visit all Syrian ports and harbours, to observe the related operations and facilities and to have interviews with the port-authorities.

A. Compacted observations stated as follows:

Lattakia port.

This is a very busy port with steadily increasing commercial shipping activities ( see Annex III, IV). The port suffers from congestion, but a large port-extension project is now under construction and the completion of the 1st stage of this project is to be expected by 1983/84.

Such will relieve port operations and also the waiting time for commercial ships will decrease.

A new fishery- and pleasureboat harbour, located at the northern part of the planned 2nd stage port-extension project is still under construction but only partly completed (see Annex II).

This fishery harbour is also planned to accommodate small commercial ships (coasters) calling at Lattakia - such relieving the main port from these small vessels.

Apart from the usual port-operation activities there is a small facility for the repair and maintenance of the Gov't owned floating port equipment, existing of a 900 tons slipway (marine railway) - which urgently needs repair and rehabilitation - and adequate well equipped workshops and stores. This facility is skillful runned by technical director Mr.Mohammad Hallag of the Lattakia Port Company and covers the repair- & maintenance requirements of the mentioned floating port-equipment but is not suitable to serve this need for the commercial fleet.

This shiprepair facility is confined to the old part of the port on a limited site and can not be extended.

The lack of any drydock- and repairfacility for commercial ships often hampers the loading- or unloading procedures and annoyes shipowners.

Observations aboard some older Syrian ships have shown a very unsatisfactory state of maintenance below any standard.

But there are simply no means nor facilities for a proper service to these commercial ships.

It is clear that this situation can not be longer accepted.

- Major Projects Administration ( Lattakia Office ) of the  
Ministry of Construction and Building.

This office is in charge of the implementation of the Lattakia port-extension project.

In the course of a visit to the Director, Mr. Mouin Amran it was made clear so far the planned 2nd stage of the project is still enough flexible to integrate a medium sized shipyard in the proposed site.

- Jableh Harbour.

At Jableh the new fishery harbour ( see Annex II ) for the local fishingboats is only partly completed.

The (limited) landbased site is still undevelopped and offers possibilities to integrate a small shiprepair unit.

So far there are no facilities for repair and maintenance of the local fishery fleet ( see Annex IV ) nor for pleasureboats calling at this harbour.

There is an obvious need for such facilities to serve small wooden and steel boats up to approx. 300 tons.

Also it is desirable to establish a small trainig school for that purpose and to encourage further boatbuilding activities.

- Banias Harbour.

At Banias the new fishery harbour ( see Annex II ) for the local fishery boats - but also planned to accommodate pleasure vessels and small commercial ships/coasters up to 1.000 tons - is only partly completed.

There are no repair- nor maintenance facilities whatsoever.

The land-based site is still under planning and offers enough possibilities to integrate an urgently needed small shiprepairyard for drydocking, repair and maintenance of the abovementione' boats and vessels.

- Tartous Port.

Tartous has a very busy port with steadily increasing commercial shipping activities ( see Annex III ).

Also at this port there are no drydocking- nor shiprepair facilities available which often hampers port operations and annoyes ship-owners.

About 16 years ago this port has been extended and modernized. A site of approx. 120.000 M<sup>2</sup> is still reserved for a shipyard, but that plan has never been brought into effect.

The mentioned site offers ample space for a sizable shipyard. It is very obvious that also in Tartous a great need exists for such a facility.

During a visit at various Tartous Authorities ( Mayor Danho Daoud-, director of Tartous Port Cy. Mr. Ali Amran-, Harbourmaster Mr. Salah Haj Housein) it was mentioned that a plan was submitted to the Government for the construction of a new fishery and pleasure boat harbour - for which exists an obvious need.

Such a harbour should - of course - also contain a small boat repair facility.

- Arwad Port.

The island of Arwad has a small and very crowded fishery- and pleasure boat harbour.

On the island exists a surprisingly potential of wooden boatbuilders constructing fisheryboats with 1st class workmanship and an excellent quality.

There are also small repairfacilities but they have very limited capacities and poor equipped.

Obviously there exist an urgent need for more and adequate facilities. A project for a new and larger harbour with enough space to match the need is underway.

- Oil terminals at Tartous and Banias.

The Syrian oil-terminals are of great importance for the national economy, and a considerable fleet of Syrian and foreign tankers are continuously calling at those terminals (see Annex IV).

However operations are often hampered due to breakdowns of essential ships equipment (p.e. pumps, winches, piping, derricks, rigging etc.) which can not easily be repaired because there are no facilities nor parts available. ( "first line repairs").

Frustrations and annoyance of shipowners aggravate this unacceptable situation increasingly.

Also the non-availability of reception facilities for oil-polluted residues in ballasttanks of calling tankers hinders efficient terminal operations.

Government surveyors are confronted with considerable troubles and problems because SOLAS - regulations can not be implemented due to the lack of facilities.



- Visits to some Syrian Shipowners and Shipping Agents.

Directors and Technical Superintendents of various Syrian ship-owners and shipping-agents made identical statements: there exists a great need of good drydocking- and shiprepairfacilities in Syria.

Due to lack of qualified shipyards and survey-capacity the Syrian shipowners are obliged to have their ships surveyed, drydocked and repaired at foreign drydock companies.

Because Syria is the home-port for Syrian ships and consequently these ships will usually discharge their full cargo in a Syrian port it would be very attractive and economic to carry out the annual- and special surveys and repairs at a Syrian drydock - company.

However, and of course: also a Syrian drydockcompany has to meet optimal international standards with relation to:

- the price,
- the timing,
- the quality,

which of course is a sound commercial principle.

- Visit to Marine Inspection Department, General Directorate of Ports.

The Marine Inspection Department ( Director Mr. Louay Fansa) is responsible for a very important task in relation to Syrian shipping: the surveying, - the inspection and the certification of ships in accordance with the existing international rules, regulations and conventions.

The department is understaffed. Recruitment procedures seem to be very difficult and there is a shortage of qualified and experienced personnel. Besides that the general lack of know-how influences a prompt settlement of certification- and related activities.

Out of date regulations are still practised because there is no time nor personnel available for revision.

It need not to be said that urgent upgrading of the department is very necessary.

The proper application of the existing rules, regulations and the conventions on ships for the purpose of renewing of certificates on safety, on ship-performances, on seaworthyness etc. is an international agreed necessity to guarantæ the safety of ship, crew and cargo - mainly for reasons of insurance.

Normally there is a good co-operation needed between the shipowner/crew; the surveyor and the shipyard.

Before ordering the repairs to the dockyard it is useful that the shipowner checks with the surveyor which items he wishes to inspect and/or to be repaired - in order to include those in the repairlist.

For the proper state of seaworthiness and safety of the ship the shipowner is first responsible party and he has to order the required work to be done, either by the dockyard or by the crew.

For the proper execution and good workmanship to the satisfaction of the surveyor for the work ordered the shipyard will be responsible - and ultimately the surveyor is responsible for the acceptance of the work done, - because he has to issue the certificates.

The "Rules and Regulations" of Lloyd's and all other international Classification Societies include special and appropriate chapters with regard to the time-intervals and the items which have to be inspected by the surveyor.

The "know-how" of the proper execution of the survey procedures is merely a matter of qualifications and experience as well of the surveyor as of the shipyard.

It is advised that the Inspection Department subscribes on the "Lloyd's Rules and Regulations" including the yearly amendments just to keep up with the international developments in the branch. The same applies for the related international conventions.  
( and/or other Classification Societies )

It is also advised that modern testing equipment be purchased to facilitate accurate measuring at hull-, engine-, electrical-, etc. surveys.

- International Classification Societies.

At this moment there are no officially authorized offices representing one of the international reputed Classification Societies in Syria.

By the time a new drydockcompany will open business the presence of such office will be a necessity.

B. General remarks.

Launching a modern shipyard industry in Syria, starting from zero, is a formidable task. It will require the mobilization of national effort and resources and will call for the attraction of substantial bi-lateral and multilateral assistance and foreign know-how.

However the obvious need for such industry certainly justifies the efforts. Syrian shipowners state that the establishment of adequate drydocking- and repair facilities - together with a proper survey- and inspection department - would be very attractive.

Normally a ship has to be unloaded before drydocking, survey and repair, so the attractiveness of dockyard facilities near the "turning point" of ships is a clear matter. No shipowner will likely be happy to deviate his ship far from the normal route for repairs unless really big savings on repair are possible. Consequently a shipowner will look for a repairyard near the "turning point" of the ship where it will be empty.

Professional quick-wittedness of a shiprepair yard is most important to the client. A repairyard never presents a constancy in volume and type of work and demands multi-purpose machine-tools of a large range capacity. The character of a modern well equipped repairyard will be most effected by unexpected various types of repairs at different sizes and types of ships and has to be very flexible to that respect. The repair must be prepared for anything - day and night.

The marketing of repair services to ships accents the service-contract, the inspection- and survey opportunities, negotiations between shipowner and superintendent, flexibility in workshop facilities, quality, technical job-engineering expertise, speed and price.

Because of the demands of flexibility in shiprepairs and the wide variety of small jobs that are required, shiprepairing is rather labour-intensive and requires a large variety of skills. Lack of such specialized skills in Syria requires extensive training programmes "on the job" at every level of the proposed shipyards.

### C. Conclusions.

Based upon the findings, the observations, the statistics on ships and shipping in Syria and other related information it is very clear that due to an unacceptable lack of shiprepair facilities - resulting in difficult and often poor maintenance conditions of the ships and annoyance of shipowners - it is positively justified to establish modern shiprepair facilities in Syria to serve the national commercial fleet and calling foreign vessels.

Together with the establishment of the shipyards there is a big need for training and upgrading of personnel for such yards and for the ship-inspection and survey departments.

Also the lack of repair- and maintenancefacilities for the numerous local fishingboats and calling pleasureboats needs urgently to be relieved.

Creating such facilities will require extensive national input and considerable foreign assistance - as well technical as financial.

Such assistance and support can be applied for in different ways and at many sources; p.e.:

U.N.Agencies, Bi-lateral and/or Multilateral Technical Assistance Programmes, World Bank, I.M.F., private investors, foreign shipyard concerns, etc., - or, by negotiations, through some complicated combinations of such sources.

The rendering of Government initiated special monetary facilities and privileges to the new industry will be indispensable.

The realization of drydocking- and shiprepair facilities in Syria as recommended in chapter V of this report will ultimately support the Syrian economy and stimulate the development of ancillary industries.

Making a sensible estimate for the proposed drydocking- and ship repair facilities needs considerable more time and expertise than being available in this very short mission.

For example: the price of a drydock is very much dependent on soil conditions and without a preliminary soil investigation no contractor will likely be able to submit a reliable offer.

Quotations for a complete shipyard have to be based upon well prepared specifications and be obtained by tender from concerns specialized in soil investigation, drydockconstruction and shipyard-machineries. Only a very rough estimate with great reservation and merely relied on previous projects could indicate that the proposed units at Lattakia and Tartous will run to \$ 200.000.000. each.

The total project including the small units will certainly amount to more than \$ 500.000.000. ( ---See \*APPENDIX\* , 2 --- )

## V - RECOMMENDATIONS

Based upon the findings and the observations in this report as well as in relation to the continuously expanding maritime activities in Syria, together with the statistics of ships and shipping in Syrian ports it is positively justified to establish small to medium ranged shipyard industries in Syria, consisting of a medium range shipyard at Lattakia, a medium range shipyard at Tartous and a number of small shiprepair facilities at the other Syrian small harbours.

The building of such shipyard units should be integrated with the implementation of already existing port-extension projects and also be combined with the necessary training of personnel for the management and the proper operations of the shipyards.

Considerable UNIDO support on technical expertise, training of personnel and financing will be needed for the implementation of the recommendations.

Recommended are the following items:

1: Port - extensions.

The implementation of the port extension projects as stated in the Syrian 5-year plan 1981/1985 at all Syrian ports and harbours.

These projects to be co-ordinated with the following shipyard - proposals as stated sub. 2:

2: Shipyards.

- a. At Lattakia: a medium range shipyard, to be integrated in the second stage extension area of Lattakia port. The shipyard to be located opposite the main port entrance in order to assure favourable nautical access conditions.

Sufficient shipyard area to be reserved for:

Shiprepair Dep't. (See \*APPENDIX\*, 2 )

- a drydock 1.500 Tons DW.
- a drydock 10.000 Tons DW.
- outfitting quays, crane tracks, roads.
- workshops (plate-, welding-, mechanical-, electr.-, carpenter-, outfitting-, pipe-, rigging-, etc.) with adequate machinery and tools to match.
- stores, administration- & multipurpose buildings, public services, fencing etc.

NOTE: This shiprepairyard should also serve the off-shore repair needs of tankers calling at Lattakia oil terminal and

nearby Banias oil terminal and consequently has to be equipped with machinery and stores for such purposes.

Ship newbuilding Dep't. ( future development) up to 10.000 TDW.

Area to be reserved for:

- plate- and profile stockyard,
- modern flow-line panel fabrication and sub-assembly halls,
- assembly area,
- building berths, outfitting quays, roads,
- crane tracks, multi purpose building, etc.

The above proposed shipyard to be implemented in 3 steps:

- Step 1: 1.500 Tons drydock, outfitting quays, workshops and other buildings to match; crane tracks, roads.
- Step 2: 10.000 Tons drydock with facilities to match.
- Step 3: the new-building dep't (ship fabrication facilities).  
This step to be reconsidered at a later point of time.

- b. At Jableh: a small shipyard to be integrated in the second stage extension area of this port.

Because the available site is limited due to adjacent promenade and public road it is advised to equip this facility with a 300 tons shiplift (type "Syncrolift") in stead of a drydock. Installation of such a shiplift together with a railway cradle system creates repair facilities for several ships simultaneously.

Sufficient area to be reserved for:

- a 300 tons shiplift (type "Syncrolift"),
- railway cradle system for several ships,
- multi purpose workshop equipped with adequate machinery and tools for small wooden boats and small steel coasters,
- stores and administration building.

- c. At Banias: a small shipyard to be integrated in the second stage area of the port extension project.

Because due to congestion at nearby Tartous commercial port also small commercial ships (coasters) will call at this harbour it is advised to provide for shiprepair facilities as follows:

- a 1.000 tons drydock - - - , or alternative:
- a 1.000 tons shiplift (type "Syncrolift") with railway cradle system.

NOTE: the abovementioned alternatives to be re-considered in connection with the flexibility of the second stage port-extension area.

- a multi purpose workshop equipped with machinery and tools for ship- and engine repairs to match, electr. repairs, stores, office, public services, hoisting equipment, etc.

d. At Tartous: a medium range ship repairyard to be established at an already reserved area of approx. 120,000 M<sup>2</sup> at the southern part of Tartous port.

This area offers large enough space for:

- a drydock 1,500 tons DW.
- a drydock 10,000 tons DW.
- outfitting quays, crane tracks, roads, fencing,
- workshops (plate-, welding-, mechanical-, electr-, carpenter-, outfitting-, pipe-, rigging-, etc.) with adequate machinery and tools to match.
- stores, administration- and multipurpose buildings,
- public services etc.

NOTE: This shipyard should also serve the off-shore repair needs of tankers calling at nearby Tartous- and Baniyas oil terminals and consequently has to be equipped with machinery and stores to match such purposes.

The above proposed shipyard to be implemented in 2 steps:

- Step 1: 1,500 tons drydock, outfitting quays, workshops and other buildings to match, crane tracks, roads, etc.
- Step 2: 10,000 tons drydock with facilities to match.

e. At Arwad:

1. A plan has been submitted by the Tartous authorities to the Government for the construction of a new fishery- and pleasureboat harbour at Arwad.

It is recommended that a small shiprepair facility will be integrated in this plan to serve the needs for repairs and maintenance of the numerous small boats calling at this port.

Proposed is a duplicate of the Jableh shiprepair unit.

2. For the time being mobile hoisting equipment for fishing boats and pleasure vessels, together with mobile cradles as well as a small multi purpose repairshop, equipped with adequate machinery and tools for repair and maintenance of mainly wooden boats and engines, will relieve the existing need. This facility to be located at the existing jetty in Arwad harbour.

3. General repair facilities for small boats.

There is an urgent need at all Syrian fishery harbours to offer repair facilities for the numerous small sized wooden fishing boats and for the continuously increasing number of yachts and small pleasure boats. The availability of adequate repair - facilities will attract more pleasure boats and will also

stimulate the new construction of such small boats.

Recommended is to equip each of the existing and projected fishery- & pleasure harbours at: Lattakia, Jableh, Baniyas, Tartous and Arwad; with suitable equipment to serve the purpose.

Proposed facilities:

- mobile hoisting equipment with cradle to lift small fishery boats, yachts and pleasure vessels,
- some cradles to move the boats to the workshop,
- a multi purpose repairshop, sufficiently equipped with adequate machinery and tools for engine repairs and hull repairs and the maintenance of small wooden boats.

#### 4. Training of personnel.

The credibility of a new and modern shipyard's performances and the effectiveness of a ship- and engine survey department responsible for certification, the proper application of international rules, regulations and conventions on ships and shipping are mainly dependent on the

- professional qualifications
- the training
- the experience

of the personnel involved.

Because there is not sufficient experienced personnel available in Syria such personnel has to be trained in order to guarantee the smooth and proper operation of the units and departments.

#### Personnel for the medium sized shipyards.

**Directors:** qualified naval architect or marine engineer with additional knowledge of business administration and obvious commercial capacities. Sufficient management experience.

**Shiprepair managers:** qualified naval architect with several years experience in shiprepair.

**Engineering managers:** qualified mechanical- or marine engineer with several years experience in ships engines and electrical repairs.

There are no graduation possibilities in Syria in naval architecture. Therefore it is recommended to have suitable Syrian candidates study and graduate at foreign universities. Subsequent practical experience to be obtained through fellowships at established modern shiprepairyards abroad or at related institutions.



**Dockmasters:** preferably qualified mates with sufficient knowledge and experience in ship's strength and stability. Training through fellowships at medium range well established shiprepairyards abroad for at least one year.

**Chief-foremen shiprepair:** graduated at a technical school in steel-construction / electric welding (preferably in ship-construction). Experience to be obtained through fellowships at established shiprepairyards in the medium range for at least one year.

**Chief-foremen engine repair:** graduated at a technical school in general marine- or mechanical engineering. Experience to be obtained through fellowships at established medium range shiprepairyards abroad for at least one year.

**Chief-foremen electricians:** graduated at a technical school in electro technics (preferable marine electrotechnics). Experience to be obtained through fellowships abroad at established medium range shiprepairyards for at least one year.

**Skilled labour:** It will be very difficult to find sufficiently professional skilled labour for the shiprepair branch in Syria. Therefore it is strongly recommended to organize group training courses in shiprepairs (hull-, engine-, electrical) for approx. 25 / 30 people through fellowships abroad.

An excellent opportunity to start with such training is -par example- the UNIDO - Project US/UP/INT/81/219 : "In-Plant Group Training Programme in the field of Repair and Maintenance of Medium/Small Ships"; scheduled start in March 1983 at Antwerp, Belgium.

Personnel for the small shiprepair - units.

Very likely it is possible to find sufficient skilled personnel at the local labourmarket for the operation of the proposed small shiprepair units.

These small yards have no business with specified repairs under "Lloyd's" etc. classification and to my observations there is enough and very good workmanship available to serve the requirements.

Up to now there is only lack of the proper means, tools and facilities.

Personnel for a training-centre in boatbuilding at Jableh harbour.

It is recommended to establish a small training centre for wooden boatbuilding. This will support and encourage the existing private activities in that branch. Personnel for this centre: from local sources with assistance of existing technical schools.

Personnel for Survey- and Certification Dep't.

The application of the Rules and Regulations of the various Classification Societies and the proper implementation of the various international conventions on ships and shipping is indeed lectured at a University for Shipbuilding and Naval - Architecture, but only in theory and usually very superficially.

For a proper performance in the field a broad experience is an absolute must, which can only be achieved during a thorough training "on the job".

Such training courses are given at the established Classification Societies (Lloyd's etc.). Candidates for these courses are requested to be graduated in shipbuilding and/or marine engineering. After completion of the courses the "junior" surveyor usually is assigned to a "senior" surveyor for a certain period to build up his experience in the field.

Fellowships for such courses to be obtained through the appropriate channels. See \*APPENDIX\* ,Ia and I b.

There is a great need for ship- and engine surveyors in Syria. It is recommended to start with the training at short notice.

5. Repair and maintenance of specialized ship-equipment.

Special equipment aboard ships, such as navigation instruments, radar, wireless, but also refrigeration units etc. is usually satisfactorily maintained and tested by specialized private enterprises having many subsidiaries all over the world.

It is advised to invite such enterprises to open such service - subsidiaries at Lattakia and / or at Tartous simultaneously with ( or even before) the opening of the proposed shipyards.

6. UNIDO - assistance.

For the implementation of the establishment of shipyard industries in Syria it will be necessary (apart from substantial Gov't input) to request UNIDO - assistance as follows:

- a. A design team of experts ( hydraulic- and civil engineers, shipyard experts) for:
  - soil investigation,
  - design and lay-out with complete specifications of all the proposed medium- and small ranged shipyards,
  - quotations and estimates for each of the units,
  - advise and settling of the financing of the projects,
  - advise and organize the training of personnel.
- b. After approval of the projects and safeguarding of the financing:
  - A construction team of experts to assist the government with the implementation of the projects.

NOTE: Extensive Gov't input is to be expected: in kind, financial, sub-contractors, counterparts, staff, draughtsmen, typists, office accommodation, transport, etc.

7. Special monetary facilities and privileges for shipyards.

To assure quick-wittedness to ships under repair it is strongly advised that the Government renders "tax-free" and special smooth customs facilities and privileges for the purchase and import of parts and materials ( for shiprepair purposes ) .

Also quick and guaranteed foreign-exchange procedures should be rendered for that purpose.

ANNEX Ii. Government Contribution.

During the mission in the Syrian Arab Republic every facility was offered and all possible co-operation was given to the expert.

I wish to express, in this context, my most sincere gratitude to the Ministry of Transport, and in particular to the Government Counterpart Agency, the General Directorate of Ports, Lattakia.

The General Director of Syrian Ports, Admiral M.M. Shihaby provided excellent assistance by making available full time counterpart personnel and official transportation facilities.

Very much appreciated help and co-operation was rendered by the 1 st. counterpart, Mr. Issa Ali Ghadeer ( Marine- and shipbuilding engineer at the General Directorate of Ports, Lattakia). Mr. Ghadeer has considerably contributed to the project not only by being 100 % involved but also by translating statistics and other information from Arabic into English, often in his own time.

2. Counterparts.

The Ministry of Transport, Damascus.

Executing Agency:

The General Directorate of Ports, Lattakia.

1 st. counterpart: Mr. Issa Ali Ghadeer, (100% available)  
marine- and shipbuilding engineer.

2 nd. counterpart: Mr. Nasser Ali Nassar, Shipbuilding  
Engineer.

3 rd. counterpart: Mr. Abdul Kader Rajbouj, Planning Officer.

## ANNEX II

Extract from Syrian 5 - years plan 1981 - 1985.

The following items regarding projects for the General Directorate of Ports are stated in the Syrian 5 - years plan 1981 - 1985 :

Introduction.

The steadily increasing number of vessels ( pleasure boats, fishery boats, small commercial cargoships / coasters up to 1000 Tons DW), calling at the existing large commercial ports at Lattakia and Tartous, in addition to the increasing congestion at the abovementioned ports, justifies urgent improvement of port facilities and services to ships, shiprepair facilities and encouragement of fishingboat construction.

Projects.

1. Lattakia: Construction of pleasure- and fishery harbour and partly application of this harbour for small commercial ships.
2. Baniyas: Construction of pleasure- and fishery harbour and partly application of this harbour for small commercial ships.
3. Djebleh: Completion of fishery- and pleasure harbour.
4. (Tartous: not mentioned in the 5-year plan)

Targets of the projects.

1. Economic: Reception and quick professional handling of small cargo-ships up to 1000 Tons DW carrying cement, paper, timber, fruits, vegetables etc. etc.  
Decreasing of congestions at the existing main commercial ports at Lattakia and Tartous.  
Encouragements of fishery  
Improvement of local construction of small wooden boats.
2. Social: Establishment of shiprepair/shipbuilding facilities will create new employment possibilities.

Equipment for Lattakia fishery- and pleasure harbour.

- Mechanical slipway (marine railway)
- Workshops, stores, administration building.
- Bridge crane and cradles for (de)launching of small boats.
- All necessary public services, communication equipment, lighthouses.
- Service boats.
- Quays with fendering, mooring equipment, etc.

Equipment for Baniyas fishery- and pleasure harbour.

- Bridge crane and cradles for (de)launching of small boats.
- Workshops, stores, multipurpose buildings.
- All necessary public services, communication equipment, lighthouses.
- Service boats.
- Quays with fendering, mooring equipment, etc.

## ANNEX III

List of Syrian cargo ships (incl. auxiliary vessels); Sep.1982.

| Type of ship                    | Number of ships | Gross Tonnage | Total Tonnage | Age in years            | Owner               |
|---------------------------------|-----------------|---------------|---------------|-------------------------|---------------------|
| General cargo                   | 30              | under 500     | 12.200        | over 15                 | Private             |
| Salvage ships and harbour-tugs  | 10              | under 500     | 2.700         | 5 over 15<br>5 under 15 | Gov't.              |
| Service ships for oil-terminals | 2               | 400           | 800           | new                     | Gov't.              |
| General cargo                   | 1               | 500 - 1000    | 600           | over 15                 | Private             |
| Floating crane                  | 4               | 500 - 1000    | 3000          | 2 over 15<br>2 under 5  | Gov't.              |
| General cargo                   | 5               | 1000 - 3000   | 9.500         | over 15                 | Gov't. 3<br>Priv. 2 |
| General cargo                   | 2               | over 3000     | 10.700        | new                     | Gov't.              |
| Planned:<br>General cargo       | 3               | 6.000         | 18.000        |                         | Gov't.              |

List of cargoship movements at Syrian main commercial ports.

| Name of port | Year | Calling Nr. | Net Tonnage | Leaving Nr. | Net Tonnage |
|--------------|------|-------------|-------------|-------------|-------------|
| LATTAKIA     | 1980 | 1928        | 3.367.463   | 1656        | 3.010.225   |
|              | 1981 | 2022        | 3.637.707   | 1831        | 3.592.758   |
| TARTOUS      | 1980 | 2179        | 5.591.875   | 1913        | 4.596.174   |
|              | 1981 | 2182        | 3.136.533   | 2031        | 3.257.018   |
| ARWAD        | 1980 | 464         | 124.302     | 447         | 120.917     |
|              | 1981 | 314         | 79.578      | 297         | 79.378      |

Note: In 1981 non-Syrian (foreign flag) ships calling at Syrian ports totalled 2171 nr.

## ANNEX IV

Fishing boats, pleasure boats, service vessels,  
Registered at all Syrian Ports ( 6.2.1982 )

| Name of Port       | Total Nr. | Number of boats | Gross Tonnage             |
|--------------------|-----------|-----------------|---------------------------|
| Lattakia           | 597       | 518             | 5 - 10                    |
|                    |           | -               | 10 - 30                   |
|                    |           | 7               | 30 - 50                   |
|                    |           | 40              | 50 - 80                   |
|                    |           | 32              | over 80<br>(barges, tugs) |
| TARTOUS            | 100       | 68              | 5 - 10                    |
|                    |           | 13              | 10 - 30                   |
|                    |           | 4               | 30 - 50                   |
|                    |           | 15              | 50 - 80                   |
| ARWAD              | 423       | 402             | 5 - 10                    |
|                    |           | 15              | 10 - 30                   |
|                    |           | 4               | 30 - 50                   |
|                    |           | 2               | 50 - 80                   |
| BANIAS             | 138       | 80              | 5 - 10                    |
|                    |           | 8               | 10 - 30                   |
|                    |           | 50              | 30 - 50                   |
|                    |           | -               | 50 - 80                   |
| JABLE              | 71        | 70              | 5 - 10                    |
|                    |           | 1               | 10 - 30                   |
|                    |           | -               | 30 - 50                   |
|                    |           | -               | 50 - 80                   |
| TOTAL<br>ALL PORTS | 1329      |                 |                           |

List of Tankers calling at Syrian Oil-Terminals (1981)

| Name of Port | Calling Nr. | Net Tonnage | Leaving Nr. | Net Tonnage |
|--------------|-------------|-------------|-------------|-------------|
| Lattakia     | 77          | 179.891     | 51          | 112.562     |
| Tartous      | 90          | 2.307.895   | 84          | 2.119.629   |
| Banias       | 220         | 5.801.745   | 205         | 6.177.318   |

## APPENDIX

Appendix to the report SI/SYR/82/802/II-0I d.d. 28 Oct.1982  
(Syrian Arab Republic) \*Assistance to the Shipbuilding & Shiprepair  
Industry\*

- - - -

The following additions to the abovementioned report have been  
prepared for the Counterpart Agency:

I: Marine Inspection Department.

Ref.: Page 12/13 \*Marine Inspection Department\*, and page 21,

\*Personnel for the Survey- and Inspection Department\*

a: The Director of the Marine Inspection Department has emphasized

that his department is unable to keep up with the practical application of the requirements of the \*SOLAS\* Convention 1974 in a satisfactory manner. Therefore the Director urgently requests:

- An Expert Shisurveyor, specialized in the practical application of the Regulations of \*SOLAS\* Convention 1974.

Duties: 1. Inspection of all Syrian commercial ships (54) in connection with the \*SOLAS\* Convention.

2. Specify all relevant shortcomings per ship.

3. Recommend measures to be taken per ship.

4. Simultaneously train a selected group of local surveyors \*on the job\*.

Duration: 6 month.



b: Though already repeatedly stated in the report:

- page I: \*Summary\*
- page I2 and I3: \*Marine Inspection Department\*
- page I5: \*Conclusions\*
- page 2I: \*Personnel\*,

the Director is obviously in very great need for more experienced Surveyors. Therefore it is strongly recommended that training-programmes be started for IO selected local surveyors.

The relevant fellowships for these training courses to be applied for through the appropriate channels, for surveyors on:

|  |   |
|--|---|
| - Loadline and Tonnage                       | 2 |
| - Construction, Deck equipment and<br>Safety | 2 |
| - Marine Engineering                         | 2 |
| - Electrical Equipment                       | 2 |
| - Navigation- and Nautical Equipment         | 2 |

The above recommended fellowships have to be attended at established Insitutions (International Classification Societies, or Marine - Inspection Departments in countries with established advanced technology in the branch).

Duration: one year.

2. Provisional approach to the proposed shipyard at Latakkia, ±120.000 M<sup>2</sup>.

I: Estimate Ist. stage.

|                                  |                |                |
|----------------------------------|----------------|----------------|
| A. Soil Investigation and Tests  |                | \$ 400.000.-   |
| B. Dredging and disposing of mud | \$ 6.000.000.- |                |
| Dumping of stones (lower layer)  | \$ 1.600.000.- |                |
| Reclaiming work                  | \$ 6.000.000.- |                |
|                                  | <hr/>          | \$13.600.000.- |

C. Quays.

|  |                 |                 |
|--|-----------------|-----------------|
| Quays 750 meter, without cranes, pipes<br>and cables | \$ 23.000.000.- |                 |
| Piping and electrical services on quays              | \$ 3.000.000.-  |                 |
|  |                 | \$ 26.000.000.- |

D. Cranes for quays and Ist. drydock.

|                                |                |                |
|--------------------------------|----------------|----------------|
| one crane 10 Ton for quay      | \$ 1.500.000.- |                |
| two cranes for drydock, 5 tons | \$ 2.000.000.- |                |
|                                |                | \$ 3.500.000.- |

E. Docking Unit.

|  |                 |                 |
|--|-----------------|-----------------|
| Graving drydock 1500 TDW, excluding<br>dockdoor, cranes, pumping equipment,<br>installations, etc. | \$ 30.000.000.- |                 |
| - Dock door  | \$ 2.000.000.-  |                 |
| Pumping- and other equipment   | \$ 3.000.000.-  |                 |
|  |                 | \$ 35.000.000.- |

F. Buildings, excluding machinery and installations, including cables  
and piping.

|   |                |  |
|---|----------------|--|
| Transformer and compressed air station  | \$ 500.000.-   |  |
| Multi purpose workshop, containing :<br>machineshop, platers- & weldingshop,<br>electr.- and fitters shop, including<br>machine foundations | \$ 5.000.000.- |  |
| Pipe shop and pipe storage  | \$ 1.000.000.- |  |
| Toolshop and toolstores   | \$ 500.000.-   |  |
| Carpentershop, timber storage, dust-<br>exhauster, drying oven -  | \$ 1.000.000.- |  |
| Dock multipurpose building, containing<br>riggers, painters, sailmakers, garage,<br>central stores, dock office, etc.                       | \$ 500.000.-   |  |
| Surface treatment building (degreasing,<br>gritblasting, galvanizing, painting)   | \$ 1.000.000.- |  |
| Oxygene plant   | \$ 500.000.-   |  |
| Acetylene plant   | \$ 500.000.-   |  |
| Yard administration building including<br>medical department  | \$ 500.000.-   |  |
| Canteen & wash-/locker rooms  | \$ 1.000.000.- |  |
| Training centre   | \$ 500.000.-   |  |

|                                |              |                 |
|--------------------------------|--------------|-----------------|
| Gatehouse and guards dormitory | \$ 500.000.- |                 |
|                                |              | \$ 13.000.000.- |

G. Shop equipment, Tools, Inventory of:

|  |                |                  |
|--|----------------|------------------|
| Electric power station                           | \$ 1.000.000.- |                  |
| Compressor station                               | \$ 500.000.-   |                  |
| Machinshop, electr. shop, fitters, incl. cranes. | \$ 5.000.000.- |                  |
| Pipe shop and pipe stores                        | \$ 1.000.000.- |                  |
| Carpentershop                                    | \$ 500.000.-   |                  |
| Toolshop and toolstores                          | \$ 1.000.000.- |                  |
| Dock multi purpose building                      | \$ 500.000.-   |                  |
| Platers- & welding shop, incl. cranes            | \$ 1.000.000.- |                  |
| Oxygene cutting tools                            | \$ 100.000.-   |                  |
| Air tools  | \$ 200.000.-   |                  |
| Hoisting equipment, electr. tackles,-            | \$ 500.000.-   |                  |
| Welding units                                    | \$ 200.000.-   |                  |
| Hoses, pipes-, miscellaneous                     | \$ 300.000.-   |                  |
| Steel stockyard incl. crane and straightener     | \$ 1.000.000.- |                  |
| General transport, trucks, lorries, cars,        | \$ 600.000.-   |                  |
| Scaffolds, electr. or pneumatic platforms        | \$ 500.000.-   |                  |
| Yard administration building + medical dept.     | \$ 150.000.-   |                  |
| Wash-/locker rooms, canteen, kitchen             | \$ 400.000.-   |                  |
| Fire fighting equipment                          | \$ 600.000.-   |                  |
| Surface treatment and galvanizing equipment      | \$ 300.000.-   |                  |
| Oxygen plant                                     | \$ 300.000.-   |                  |
| Acetyleen plant                                  | \$ 200.000.-   |                  |
| Training school                                  | \$ 50.000.-    |                  |
|  |                | \$ 15.9000.000.- |

H. Site Installation and Distribution Systems.

|                                    |                |                |
|------------------------------------|----------------|----------------|
| Electric cables                    | \$ 600.000.-   |                |
| Compressed air distribution system | \$ 400.000.-   |                |
| Freshwater distribution system     | \$ 400.000.-   |                |
| Roads incl. drainage               | \$ 1.000.000.- |                |
| Yard lighting                      | \$ 100.000.-   |                |
| Yard telephone system              | \$ 100.000.-   |                |
| Fencing and gates                  | \$ 350.000.-   |                |
| Gardens                            | \$ 50.000.-    |                |
|                                    |                | \$ 3.000.000.- |

TOTAL FIRST STAGE - - - - - \$ 110.400.000.-

P.M. Tugboats, offshore floating workshop, barges, etc.\$ P.M.

II Estimate 2nd. stage.

Dock unit.

|                                       |                 |                 |
|---------------------------------------|-----------------|-----------------|
| Graving drydock 10.000 TDW.           | \$ 75.000.000.- |                 |
| Dock door                             | \$ 3.000.000.-  |                 |
| Pump ing equipment,installations,etc. | \$ 5.000.000.-  |                 |
|                                       |                 | \$ 83.000.000.- |

Cranes.

|                         |                |                |
|-------------------------|----------------|----------------|
| one quay crane 10 tons  | \$ 1.500.000.- |                |
| two dock cranes 10 tons | \$ 3.000.000.- |                |
|                         |                | \$ 5.500.000.- |

Machineshop, platers-& weldingshop

|                                  |                |  |
|----------------------------------|----------------|--|
| Extens ion of machines and tools | \$ 3.500.000.- |  |
|----------------------------------|----------------|--|

TOTAL SECOND STAGE - - - - - \$ 90.000.000.-

III. Assumptions and P.M.

It is assumed that sheetpiles or other heavy steel profiles can be driven into the rocky underlayer for the purpose of drydock construction.

The graving drydocks are assumed to be gravity structures. If drainage-docks can be executed considerable savings are possible. An extensive soil-investigation and exploration is required to determine whether such a structure is feasible.

The proposed facilities for hull repairs are moderate and housed in the combined wor-kshop. In case extensive hullrepairs or shipmodifications are expected a separate platers- & weldingshop will be requir.ed.

IV. Proposed major tools and equipment.

Steel stockyard.

magnetic crane  
plate-straightening machine

Plater shop.

hydraulic press with hoists  
guillotine shear  
folding machine

bending machine

cold frame bender with trolleys

overhead crane

Machine shop

horizontal boring- and milling machine 100 mm.

centre lathe 400 x 1000 mm.

centre lathe 500 x- 3000 mm.

centre lathe 900 x 6000 mm.

horizontal milling machine 100 mm.

portal planer 1000 x 750 x 4000 mm

shaper , stroke 750 mm.

radial drilling machine 3 inch.

turret lathe

slotting machine stroke 400 mm

horizontal lathe

hack saw

universal grinding machine

bench drilling machine

column drilling machine

marking-off plate 3000 x- 1500 mm.

hand presss

oberhead cranes

V. Employment

First stage: 150

Second stage: 250

VI. Depreciation.

Graving drydocks 100 years.

Buildings 50 years

Equipment & machinery 25 years

Inventory 10 years.

VII. Estimate of the volume of repairwork.

There is no drydocking- nor adequate shiprepairfacility available in Syria. Therefore it is to be expected that the proposed shiprepair- industry will attract the periodical dockings, the surveys and repairs- of the majority of the Syrian commercial fleet (under Syrian - and foreign flag), and - capacity permitting - a share of the foreign ships

calling at Syria-n ports.

The following estimate should be appreciated as a provisional approach, and unforeseen disaster- repairs can change the picture:

|   |     |
|---|-----|
| Number of dockings per annum, per dock                          | 50  |
| Number of dockdays per annum, at an average<br>of 6 per docking | 300 |
| Total dockdays available per annum-                             | 365 |
| Load coefficient  | 82% |

It is assumed that such a load coefficient can be obtained by alert acquisition activities, high standard of work and protective incentives by the Government. The prices per docking per type of ship should be competitive in comparison with other dockyards in the eastern mediterranean.

#### VIII. Final remarks .

Once more it has to be emphasized that the duration of this mission has been too short for detailed investigations, specifications and quotations.

Such activities require considerable more time and expertise (see page 15 \*Conclusions\*), which is to be sought as recommended on page 21 \*UNIDO - assistance\*.

