# BASIC DESIGN STUDY REPORT
# ON
# THE PROJECT FOR SUPPORTING
# THE CIVIL DEFENSE ADMINISTRATION WITH FIRE TRUCKS
# IN
# THE ARAB REPUBLIC OF EGYPT

**MARCH 2004**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**FIRE PROTECTION EQUIPMENT AND SAFETY CENTER OF JAPAN**

# PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a basic design study on the Project for Supporting the Civil Defense Administration with Fire Trucks in the Arab Republic of Egypt and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Egypt a study team from November 15 to December 9, 2003.

The team held discussions with the officials concerned of the Government of Egypt, and conducted a field study at the study area. After the team returned to Japan, further studies were made. A draft basic design was discussed through JICA Egypt office, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the teams.

March 2004

Kunimitsu YOSHINAGA
Vice President
Japan International Cooperation Agency

March 2004

# LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for Supporting the Civil Defense Administration with Fire Trucks in the Arab Republic of Egypt.

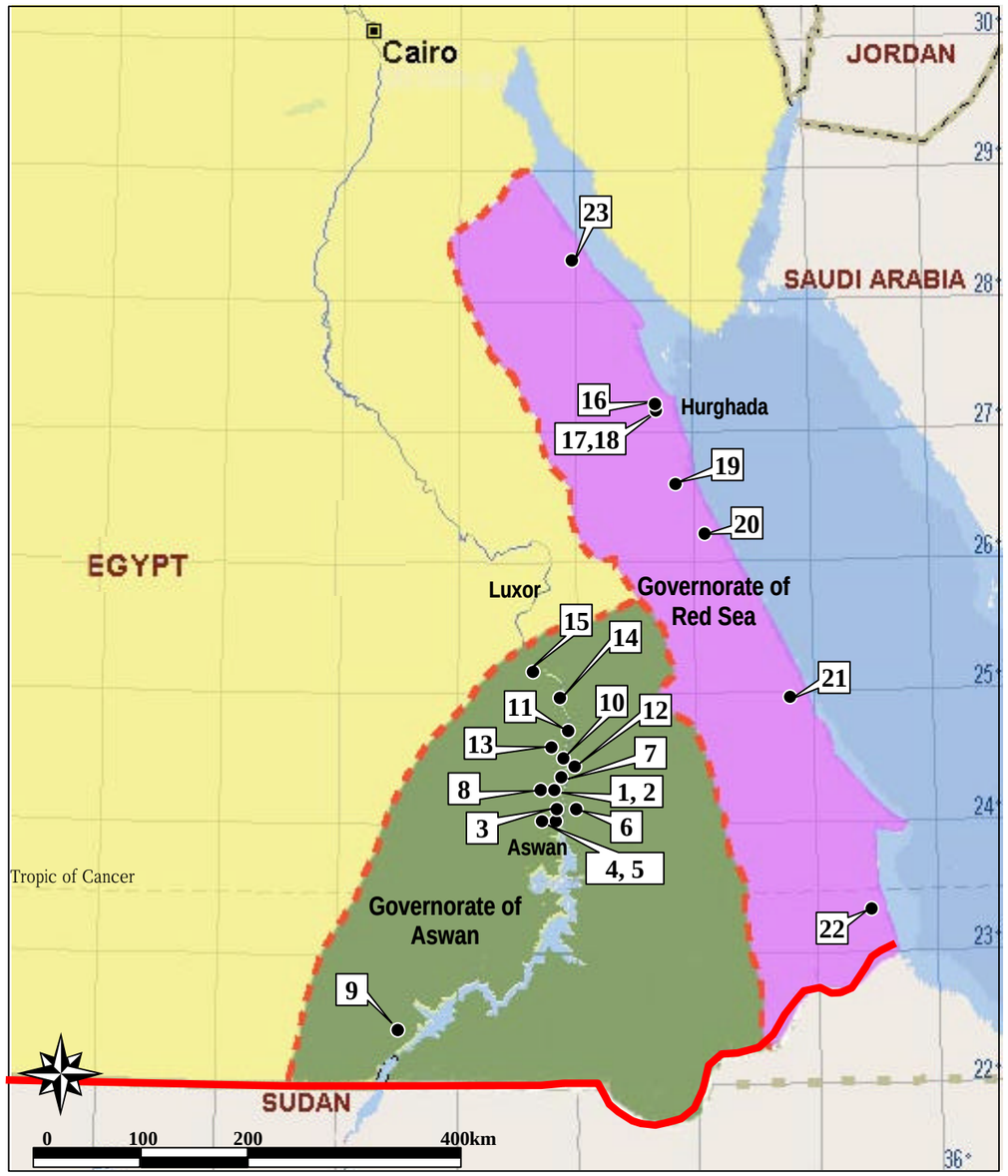
This study was conducted by Fire Protection Equipment & Safety Center of Japan, under a contract to JICA, during the period from November 2003 to March 2004. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Egypt and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

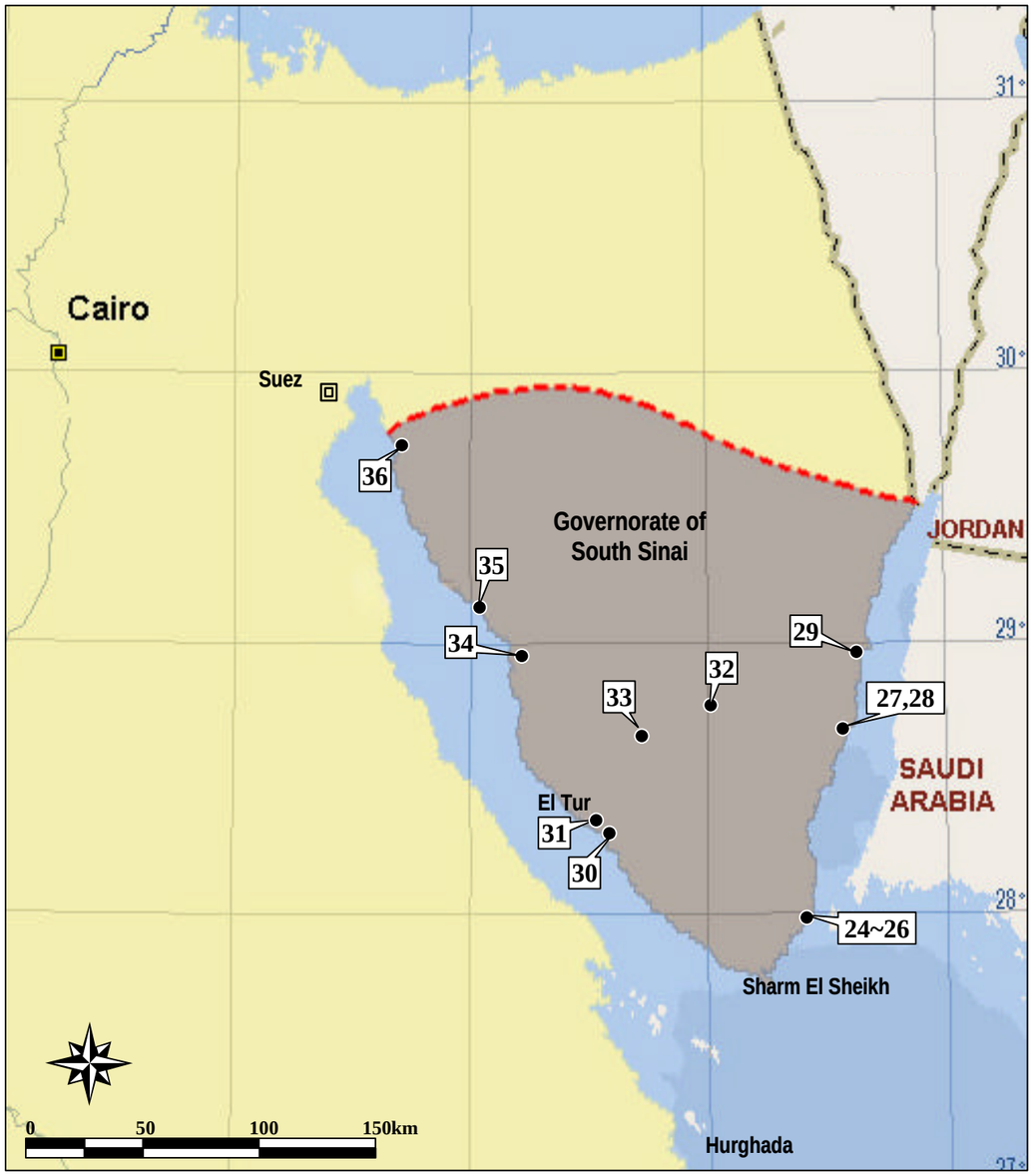
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Ken SAITO
Project Manager,
Basic design study team on
the Project for Supporting the Civil Defense Administration with Fire Trucks in the Arab Republic of Egypt
Fire Protection Equipment & Safety Center of Japan


Location Map




| Governorate of Aswan | | | |
|---|---|---|---|
| No. | Fire Station | No. | Fire Station |
| 1 | El Sel | 9 | Abu Simble |
| 2 | Atlas | 10 | Kom Ombo |
| 3 | Aswan Dam West | 11 | Nasr El-Noba |
| 4 | Aswan High Dam West | 12 | Daraw |
| 5 | Aswan High Dam East | 13 | Banban |
| 6 | Kima Chem. Factory | 14 | Idfu |
| 7 | Abu El-Reash | 15 | El Sibayya |
| 8 | Aswan West | | |

| Governorate of Red Sea | |
|---|---|
| No. | Fire Station |
| 16 | Hurghada (HQ) |
| 17 | Hurghada City Point |
| 18 | Hurghada Magawish |
| 19 | Safaga |
| 20 | Quseir |
| 21 | Marsa Alam |
| 22 | Shaalaten |
| 23 | Ras Gharib |

| Governorate of South Sinai | | | |
|---|---|---|---|
| No. | Fire Station | No. | Fire Station |
| 24 | Sharm El Sheikh Hataba | 31 | El Tur (HQ) |
| 25 | Sharm El Sheikh Naama | 32 | St. Chatherine |
| 26 | Sharm El Sheikh Al Roessat | 33 | Oasis of Feiran |
| 27 | Dahab City Point | 34 | Abu Rudeis 1 |
| 28 | Dahab Masabat | 35 | Abu Zenima |
| 29 | Nuweiba El Muzeina | 36 | Ras El Sudr |
| 30 | El Gabriel | | |

# Site Map

# LIST OF FIGURES AND TABLES

# ABBREVIATIONS

| | |
|---|---|
| CDA | Civil Defense Authority |
| E/N | Exchange of Notes |
| FESC | Fire Protection Equipment & Safety Center of Japan |
| HF | High Frequency |
| HQ | Headquarters |
| IMF | International Monetary Fund |
| JICA | Japan International Cooperation Agency |
| JIS | Japanese Industrial Standard |
| LE | Egyptian Pounds |
| VHF | Very High Frequency |
| WHO | World Health Organization |

# SUMMARY

# SUMMARY

In the Arab Republic of Egypt (hereinafter referred to as "Egypt"), implementation of the reform of the economic structure in pursuit of a market economy since 1991 has improved such macroeconomic indicators as the economic growth rate, fiscal deficit, rate of inflation and amount of foreign currency reserves. Since the late 1990's, however, the national economy has begun to lose momentum, leaving such problems as a high level of unemployment and the insufficient development of powerful export industries, etc. unsolved. In an effort to solve these problems, the Government of Egypt formulated a 20 year plan (Egypt in the 21st Century) in 1997 in which tourism, mining and manufacturing are given priority to achieve its goals, including economic growth and reduction of the fiscal deficit. The Fifth Five-Year Plan for Socio-Economic Development (2002 - 2007) also lists the promotion of tourism as a priority target to improve the economic growth rate. One measure to achieve the promotion of tourism is the development of infrastructure, including the sewerage system, power plants and emergency medical facilities in the major tourism areas.

The Governorates of Aswan, Red Sea and South Sinai (hereinafter referred to as "the three target governorates") are world wide famous tourist resorts visited by several million tourists from not only Europe but also from the rest of the world every year by regular as well as charter flights and other means. The importance of these areas for the domestic economy is also illustrated by the existence of well-developed petroleum, mining and manufacturing industries in these areas. While 46 chemical trucks and water tank trucks which are the main vehicles for fire-fighting activities are deployed in the target governorates, 13 vehicles are out of use and 26 have problems despite their operable status, leaving only 7 vehicles which do not have any problems, out of which 4 vehicles are leased from the Civil Defense Authority (CDA) of the Ministry of Interior. Although the three target governorates have procured new fire trucks, such as chemical trucks, water tank trucks and water tankers, within their limited budget, the extremely tight fiscal situation of these governorates has only allowed each governorate to procure one truck a year at best, making it impossible to renew the fire trucks originally deployed in the early 1980's. Consequently, despite the increasing trend of the number of fires in recent years in the three target governorates, it is difficult to respond to the situation with a flexible fire service strength due to the shortage of fully operational fire trucks.

Under these circumstances, the Government of Egypt made a request to the Government of Japan for the provision of grant aid for the procurement of 27 medium size fire trucks and spare parts to strengthen the fire service strength in the three target governorates for the

purposes of protecting the lives and assets of local people in these governorates as well as visiting tourists from fires and other disasters.

In response to this request, the Government of Japan decided to conduct a basic design study and the Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team to Egypt for the period from 15th November to 9th December, 2003. The Study Team confirmed the contents of the request through discussions with the Egyptian side and also studied and gathered information on the 36 fire stations under the jurisdiction of the Civil Defense Administrations of the three target governorates. The Study Team subsequently examined the necessary as well as optimal contents and scale of the Project, estimated the project cost and finally compiled the Basic Design Study Report following explanation of and discussions on the Basic Design (Summary) with the Egyptian side via the JICA Egypt Office.

For the planning of the deployment of the fire trucks, the necessary indexes (regarding the service area, population, number of tourists, number of fires and number of operable fire trucks, etc.) have been established based on the indexes used by the Fire and Disaster Management Agency of the Japanese Ministry of Public Management, Home Affairs, Posts and Telecommunications as standards for the development of the fire service strength. The 36 local fire stations in the three target governorates are then classified into three ranks: Rank A (headquarter and primary stations: fire stations requiring new fire trucks), Rank B (secondary stations: fire stations requiring the redeployment of existing fire trucks) and Rank C (the other stations: fire stations neither deployment nor redeployment required). The new fire trucks will be planned for Rank A stations.

The types of fire trucks selected have both the versatility to deal with various types of disasters and the mobility of acting alone in view of the facts that a fire truck may be forced to deal with a fire, etc. alone because of the limited number of fire stations and fire personnel in the three target governorates and that the service areas of some fire stations has sloping land, unpaved roads, uneven land and farmland, etc., forcing fire trucks to battle against poor road conditions.

The contents and specifications, etc. of the planned equipment are shown in the following table.

# List of Main Equipment

| Equip. Code | Name | Main Specifications or Configuration | Planned Quantity | Purpose of Use and Suitability of Equipment Level |
|---|---|---|---|---|
| 1 | Fire Truck | | | |
| 1-1 | Medium Size Chemical Truck (I) | Drive : 4 x 2 (rear wheel drive)<br>Cabin : double cabin<br>Discharge rate : 2,500 – 3,500 liters/min<br>Tank capacity : ≧ 3,500 liters (stainless steel)<br>Foam tank capacity : ≧ 350 liters<br>Others : various accessories | 14 | For general and oil fires; acts as the leading fire truck for fire-fighting at a fire scene |
| 1-2 | Medium Size Chemical Truck (II) | Drive : 4 x 4 (four wheel drive)<br>Cabin : double cabin<br>Discharge rate : 2,500 – 3,500 liters/min<br>Tank capacity : ≧ 3,500 liters (stainless steel)<br>Foam tank capacity : ≧ 350 liters<br>Others : various accessories | 13 | For general and oil fires; acts as the leading fire truck for fire-fighting at a fire scene, serving those fire stations of which the activities are often hampered by unpaved roads, uneven land and farmland, etc. |
| 2 | Fire Suit Set | Helmet, coat, trousers, safety belt, boots and gloves | 108 sets | To assist fire-fighting activities by ensuring the safety of fire-fighters |
| 3 | Breathing Apparatus | Cylinder material : carbon fiber<br>Cylinder capacity : 300 kg/cm$^2$ x 6 liters or 200 kg/cm$^2$ x 9 liters<br>Accessories : reserve cylinder, etc. | 54 sets | To assist fire-fighting activities by ensuring the proper breathing of fire-fighters at a fire scene filled with dense smoke and heat or at a site with an oxygen shortage |
| 4 | Truck-Mounted Radio | | | |
| 4-1 | VHF Mobile Radio Transmitter | Frequency : 150 - 174 MHz<br>Output : 40 W or higher<br>Number of channels : 12 or more<br>Accessories : mobile VHF antenna; noise filter; 24 V - 12 V DC converter | 9 | To be mounted on the new fire trucks for communication or command between a fire team at the scene and the HQ of Civil Defense Administration of Governorate and between fire teams |
| 4-2 | HF Mobile Radio Transmitter | Frequency : 2,000 - 24,000 KHz<br>Output : 40 W or higher<br>Number of channels : 12 or more<br>Accessories : mobile HF antenna; noise filter; 24 V – 12 V DC converter | 9 | To be mounted on the new fire trucks for communication or command between a fire team at the scene and the HQ of Civil Defense Administration of Governorate and between fire teams |
| 5 | Fire Hose | Diameter : 2.5”<br>Length : 30 m<br>Type : 13 kg/cm$^2$ type | 270 | To be used to discharge water during fire-fighting activities |
| 6 | Fire Hose | Diameter : 1.5”<br>Length : 30 m<br>Type : 13 kg/cm$^2$ type | 270 | To be used to discharge water during fire-fighting activities |

The deployment plan for the planned fire trucks is shown in the next table.

# Deployment Plan for New Fire Trucks

| Civil Defense Admin. | Fire Station | Conditions of Existing Fire Trucks | | | Planned No. of New Fire Trucks | | Reason for Deployment of 4 x 4 Truck |
|---|---|---|---|---|---|---|---|
| | | Good | Relatively Poor | Poor | 4 x 2 | 4 x 4 | |
| Gov. of Aswan | El Sel | 1 | | 2 | 2 | | |
| | Atlas | 1 (1) | | | 1 | | |
| | Aswan West | | | | 1 | | |
| | Abu Simble | | | | | 1 | Sloping land and uneven land |
| | Kom Ombo | | 1 | 1 | | 1 | Farmland |
| | Nasr El-Noba | | | | 1 | | |
| | Daraw | | 1 | 1 | | 1 | Farmland |
| | Idfu | | 1 | | | 1 | Farmland |
| | Other Stations | | 8 | | | | |
| | Sub-Total | 2 (1) | 11 | 4 | 5 | 4 | |
| | Total | 17 | | | 9 | | |
| Gov. of Red Sea | Hurghada (HQ) | 1 (1) | 1 | | 2 | | |
| | Hurghada City Point | | 1 | | 1 | | |
| | Hurghada Magawish | | | 1 | 1 | | |
| | Safaga | | | 2 | | 1 | Sloping land and uneven land |
| | Quseir | | 2 | | | 1 | Sloping land and uneven land |
| | Marsa Alam | | | 1 | | 1 | Sloping land, uneven land and unpaved roads |
| | Shaalaten | | | 1 | 1 | | |
| | Ras Gharib | | 1 | 1 | | 1 | Uneven land and unpaved roads |
| | Sub-Total | 1 (1) | 5 | 6 | 5 | 4 | |
| | Total | 12 | | | 9 | | |
| Gov. of South Sinai | Sharm El Sheikh Hataba | | 2 | 1 | 1 | | |
| | Sharm El Sheikh Naama | | 1 | | 1 | | |
| | Dahab City Point | | | | | 1 | Uneven land and unpaved roads |
| | Nuweiba El Muzeina | | 1 | | | 1 | Uneven land and unpaved roads |
| | El Tur (HQ) | 3 (2) | | | 2 | | |
| | St. Chatherine | | | 1 | | 1 | Sloping land |
| | Abu Rudeis 1 | | 1 | | | 1 | Uneven land and unpaved roads |
| | Ras El Sudr | | 1 | | | 1 | Uneven land and unpaved roads |
| | Other Stations | 1 | 4 | 1 | | | |
| | Sub-Total | 4 (2) | 10 | 3 | 4 | 5 | |
| | Total | 17 | | | 9 | | |
| Grand Total | | 7 (4) | 26 | 13 | 14 | 13 | |
| | | 46 | | | 27 | | |

Good : number of operational fire trucks without any problems
Relatively poor : operational fire trucks despite some problems; can fall in the category of poor at any time
Poor : non-operation fire trucks due to serious problems
4 x 2 : rear wheel drive
4 x 4 : four wheel drive
( ) : number of fire trucks leased from the CDA

If the Project is implemented with grant aid provided by the Government of Japan, it will take 12 months to complete, consisting of approximately three months for the detailed design, tender and placement of orders for the equipment and nine months for the manufacture, transportation and installation of the equipment and guidance on handling. The total project cost is estimated to be ¥747 million (Japanese portion of ¥747 million and Egyptian portion of ¥0.25 million).

The implementation of the Project is expected to have the following direct effects.

- Will improve the ratio of fully operational fire trucks to operational fire trucks which are the main fire trucks for fire-fighting in the three governorates from 7% (3 out of 46) to 65% (30 out of 46) to enable much more effective fire-fighting activities.
- Will reduce the time required to reach the scene of a fire by a much faster traveling speed, limiting the spread of fire as well as fire damage.

As the Project basically aims at the replacement of existing fire trucks, neither any recruitment of new personnel nor an increase of the operation and maintenance cost will be required.

Based on the above, the implementation of the Project with grant aid provided by the Government of Japan is evaluated as appropriate.

The Government of Egypt should conduct the following activities to ensure the effective as well as efficient implementation of the Project.

- Training of operation and maintenance skills for the new fire trucks, etc.
- Promotion of comprehensive fire-fighting measures
- Fire prevention publicity and guidance using fire trucks

# CONTENTS

# CHAPTER 1

# BACKGROUND OF THE PROJECT

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The three target governorates are important areas for the Egyptian economy not only because of the several million visiting tourists every year from Europe and the rest of the world using regular as well as charter flights but also because of the development of petroleum, mining and manufacturing industries in these governorates. The extremely tight fiscal situation of these governorates, however, has made the procurement of new fire trucks very difficult despite the fact that the fire trucks deployed in the early 1980's are now due for renewal, forcing the governorates to rely on antiquated fire trucks for fire-fighting activities.

Accordingly, the three target governorates are finding it difficult to provide versatile fire services to secure the safety of people's live in the face of a prospective increase of the number of tourists and the recent increasing trend of the number of fires.

Under these circumstances, the Government of Egypt has made a request to the Government of Japan to provide grant aid consisting of 9 medium size fire trucks for each of the three governorates, totaling 27medium size fire trucks, and sets of spare parts to improve the fire service strength in these governorates based on past Japanese assistance of procuring fire trucks and a fire service radio communication system, etc. for the Governorate of Cairo and the Governorate of Giza.

# CHAPTER 2

# CONTENTS OF THE PROJECT

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## 2.1 Basic Concept of the Project

### 2.1.1 Development Plan and Project Objective

In its 20 year plan (Egypt in the 21st Century), the Government of Egypt gives priority to the development of tourism, mining and manufacturing to achieve such targets as economic growth and reduction of the fiscal deficit. Meanwhile, the Fifth Five-Year Plan for Socio-Economic Development (2002 - 2007) lists the promotion of tourism as one of the priority areas for improvement of the economic growth rate and calls for the improvement of infrastructure, including the sewerage system, power plants and emergency medical facilities, in major tourism areas to facilitate tourism. As part of the development plan, the Project objective is enhancing the fire service strength to protect the lives and assets of local residents as well as tourists from fires and other disasters in the three target governorates with major tourism sites and well-developed petrochemical, mining and manufacturing industries.

### 2.1.2 Outline of the Project

The Project intends the procurement of a total of 27 medium size chemical trucks for those fire stations in urgent need of fire truck deployment in areas under the jurisdiction of the Civil Defense Administrations in the three target governorates in order to achieve the objective mentioned in 2.1.1.

## 2.2 Basic Design of Requested Japanese Assistance

### 2.2.1 Design Policy

#### 2.2.1.1 Basic Policy

(1) Project Scope

The Project objective is to improve the fire-fighting system and fire service strength in the three target governorates by procuring and deploying an appropriate number of fire trucks at those fire stations in urgent need of fire truck deployment out of the 36 fire stations in the three governorates and, therefore, the scope of the Project is the procurement of the necessary fire trucks. In addition to the fire trucks, equipment

required for fire-fighting and rescue activities will be included in the scope as accessories together with essential spare parts required for the maintenance of the fire trucks. Furthermore, the following training will be included in the scope to further enhance the effects of the assistance and will be held prior to the handing over of the equipment.

1) Training on an appropriate maintenance procedure and skills for the fire trucks and equipment
2) Training on operating skills for the fire equipment and fire suppression techniques

(2) Selection of Sites

Because of the absence of standards for the improvement of fire stations and fire trucks, etc. in Egypt, based on the indexes for the standard of fire service strength used by the Fire and Disaster Management Agency of the Japanese Ministry of Public Management, Home Affairs, Posts and Telecommunications, indexes (regarding the service area, population, number of tourists, number of fires and number of operational fire trucks, etc.) are determined to classify the fire stations in the three target governorates into three ranks and to formulate the fire truck deployment plan.

- Rank A (headquarter and primary stations): fire stations requiring new fire trucks (sites of the deployment plan)
- Rank B (secondary stations): fire stations requiring the redeployment of existing fire trucks
- Rank C (the other stations): fire stations neither deployment nor redeployment required

Although examination of the fire service strength commonly involves comprehensive analysis of the strategic locationing of fire stations, required number of fire trucks (chemical trucks, water tank trucks) and fire personnel, etc., in the case of the Project it is a precondition not to change the present number of fire stations and the number of fire personnel.

(3) Equipment Design

1) Design of Fire Trucks, etc.

The types of fire trucks (chemical trucks, water tank trucks, ladder trucks and rescue trucks, etc.), their sizes (large, medium and small) and loaded equipment depend on the characteristics of the service areas in which each fire station is located, types of fires and other disasters, fire fighting capability and fire-fighting tactics.

The fire services in the three target governorates are characterized by the limited number of fire trucks and fire personnel, on the other hand by the need for each fire station to deal with various types of fires and disasters without reinforcement by other stations due to their vast service areas. This means fighting by a single fire truck is to be assumed, making it necessary for the fire trucks to be versatile and capable of dealing with different types of disasters alone. Given this situation, the design of the fire trucks to be procured under the Project will take the following points into consideration.

- Improve the fire fighting capability at the sites and produce a highly beneficial effect.
- Have a maneuverability capable of coping with the road conditions and topography, etc. of the service areas of the fire stations.
- Have the functions not only to deal with fires, including oil fires and other disasters, but also to conduct rescue activities with limited vehicle and manpower.
- Be capable of conducting basic fire-fighting activities alone without the support of other fire companies.

#### 2.2.1.2 Policies Regarding Natural Conditions

(1) Temperature

At the time of fire-fighting activities, the fire pump output must be continually maintained at 100%. While the power for the fire pump is structurally conveyed from the engine of the fire truck, the radiator efficiency of a fire truck in a parking position during fire-fighting activities is much lower than that during traveling. Consequently, in the case of the sites of the Project where the outside temperature is very high (the monthly average maximum temperature is 41.4°C at Aswan, 36.6°C at Hurghada and 33.7°C at El Tur), the engine is liable to over-heating. The use in high temperature area shall be taken into consideration for design. An endurance test will be added to the list of pre-shipment factory test to confirm the capability of the engine to withstand long operation under a high temperature.

(2) Others

The very high level of conductivity of fire fighting water sources of 1,500 μs/cm or more has been measured at Shaalaten and Dahab, indicating a high level of metal corrosiveness. Accordingly, the material for the water tanks on the fire trucks will be determined so as to ensure a sufficient corrosion resistance performance.

#### 2.2.1.3 Policy Regarding Socio-economic Conditions

The maintenance cost for the fire trucks has been allocated from the limited budget of the Civil Defense Administrations in the three target governorates. In view of such limited budget, efforts to reduce the maintenance cost will be made by means of adopting a design which basically opts for general use and loaded equipment which can be interchanged with existing equipment.

#### 2.2.1.4 Policy Regarding Procurement

(1) Permits, Approvals and Laws Related to Project Implementation

1) Radio Transmitters

Radio transmitters to be mounted to fire trucks are generally subject to control under the Radio Communication Act and the Wireless Telegraphy Act. However, no special permit or approval is required when radio transmitters equivalent to the existing truck-mounted radio transmitters are procured for an existing radio communication system.

2) Emission Control

As Egypt has no emission control regulations for diesel engine vehicles, the present Japanese or EU control values will be used.

(2) Design Standards to be Followed

The frequency ranges of the new radio transmitters to be mounted to the fire trucks will be the same as those of the existing radio communication systems, i.e. VHF in the Governorate of Red Sea and HF in the Governorate of South Sinai. For the fittings for the suction hoses of the fire trucks, BS standards which are compatible with the existing equipment will be used as the design standards.

#### 2.2.1.5 Policy Regarding Operation and Maintenance Capability of Project Implementing Organization

Special attention will be paid to the compatibility of the new equipment with existing equipment so that the operation and maintenance of the new equipment can be easily conducted with the relevant capability of the fire personnel working at the fire stations.

#### 2.2.1.6 Policy Regarding Equipment Grades, etc.

The planned equipment should include general usability, solidity and easy maintenance to ensure the sustainability of the Project effects. In view of these requirements, the basic policy for selecting the equipment is proven technology with reliable manufacturing and operation records instead of employing the latest advanced technologies.

#### 2.2.1.7 Policy Regarding Procurement Method and Schedule

(1) Procurement Method

The equipment to be procured must satisfy the requirements described in 2.2.1.6 above and the following procurement sources will be considered.

- Excellent fire truck design, manufacturing and quality management capability
- Excellent durability and solidity of the manufactured fire trucks
- Well acquaintance with the local situation based on the past delivery of fire trucks to Egypt
- Availability of a reliable after-service system, including the presence of an agent, in Egypt
- Capability to meet the procurement conditions and technical specifications

(2) Schedule

The project implementation schedule will be determined so as to complete all stages up to the handing over of the equipment after on-site testing in a single fiscal year.

### 2.2.2 Basic Plan

#### 2.2.2.1 Planning Processes for Basic Plan

The planning processes for the basic plan are shown in Fig. 2-2-2-1. Firstly, the existing fire service strength of the existing fire stations in each area is verified in view of the particular environment (local characteristics) of the area and is compared with the principles and criteria of the basic design. Secondly, examination of fire-fighting tactics and deployment of fire companies, etc., are added and desirable fire service strength will be reflected to the deployment plan. Equipment planning does not merely aim to replace the superannuated

equipment, but it finds out the types, specifications and sizes of the minimum required equipment to keep the proper fire service strength level.

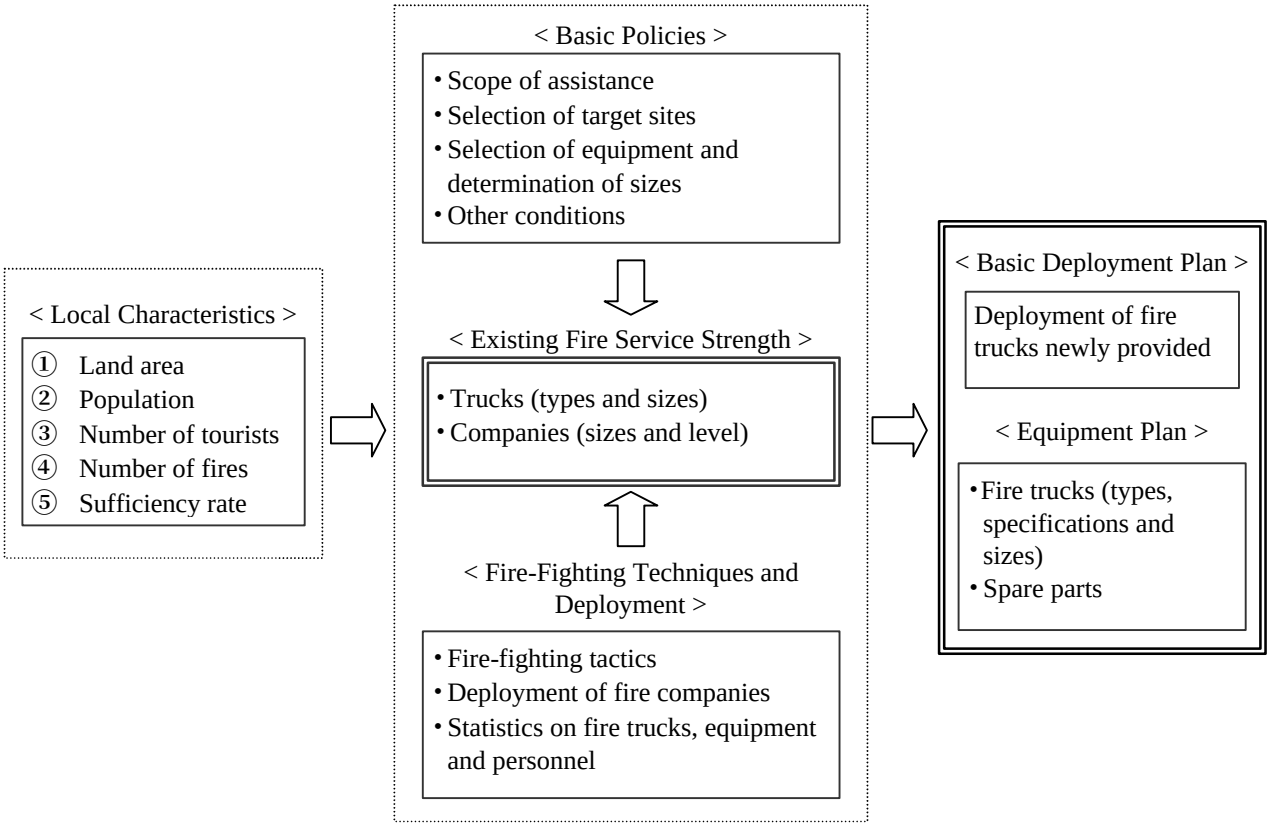



Fig. 2-2-2-1 Planning Processes for Basic Plan

### 2.2.2.2 Planning of Deployment of Fire Trucks

(1) Existing Fire Trucks

The site survey results on the current conditions and number of existing fire trucks by fire station for which assistance has been requested are shown in Table 2-2-2-1. In the three target governorates, there is a total of 46 chemical trucks and water tank trucks which are owned by the Civil Defense Administrations of these governorates and which are the main vehicles for fire-fighting activities. 13 of these are non-operational (poor) while 26 are operation with some problems (relatively poor), leaving only 7 which are fully operational (good) (out of which four are leased from the CDA). In short, the Civil Defense Administrations in the three target governorates have only three fully operational chemical trucks/water tank trucks even though there are 36 fire stations.

Here, the ratio of fire trucks of which the condition is judged to be either “good” or “relatively poor” to the total number of existing fire trucks is calculated as the sufficiency

rate (excluding those leased from the CDA). The calculation formula for the sufficiency rate is shown in Fig. 2-2-2-2.

Sufficiency Rate = (good pumpers + relatively poor pumpers x 0.5 + good water tankers x 0.2 + relatively poor water tankers x 0.1 + pump trucks x 0.2) ÷ total number of existing fire trucks deployed at fire stations

| | | |
|---|---|---|
| Pumpers | : | chemical trucks and water tank trucks |
| Water tankers | : | water tankers with small fire pump |
| Pump Trucks | : | light weight trucks loaded with small fire pump |
| Currently deployed numbers | : | The number of fire trucks currently deployed at fire stations |

* As the discharge capacity of water tankers and pump trucks is approximately 0.5 $m^3$/min, i.e. 20% of the discharge capacity of pumpers (approximately 2.5 $m^3$/min), a multiplication factor of 0.2 is used for these types of fire trucks in the sufficiency rate calculation.

Fig. 2-2-2-2 Calculation Formula for Sufficiency Rate

The calculation results show that the sufficiency rate is extremely low for those fire stations with fire service strength maintained barely by the temporary CDA trucks and for those stations keeping only fire trucks judged to be “poor”. The sufficiency rate calculation results are shown in Table 2-2-2-1.

## Table 2-2-2-1 Conditions of Existing Fire Trucks by Fire Station

| Civil Defense Admin. | Fire Station | Chemical Truck, Water Tank Truck | | | | Water Tanker | | | Pump Truck (5) | Current Number (6) | Sufficiency Rate | Requested Number (4x2) | Requested Number (4x4) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Good | | Relatively Poor (2) | Poor | Good (3) | Relatively Poor (4) | Poor | | | | | | |
| | | Own (1) | CDA | | | | | | | | | | | |
| Gov. of Aswan | El Sel | 1 | | | 2 | | | 1 | | 4 | 25% | 2 | | |
| | Atlas | | 1 | | | | | | | 1 | 0% | 1 | | |
| | Aswan Dam West | | | 2 | | | | | | 2 | 50% | | | Belongs to Aswan High Dam Authority |
| | Aswan High Dam West | | | 1 | | | | | | 1 | 50% | | | Belongs to Aswan High Dam Authority |
| | Aswan High Dam East | | | 2 | | | | | | 2 | 50% | | | Belongs to Aswan High Dam Authority |
| | Kima Chemical Factory | | | 2 | | | | | | 2 | 50% | | | Belongs to Ministry of Industry |
| | Abu El-Reash | | | | | | | | 1 | 1 | 100%* | | | Garage too small |
| | Aswan West | | | | | | | | 1 | 1 | 20% | 1 | | |
| | Abu Simble | | | | | 1 | | | 1 | 2 | 20% | | 1 | |
| | Kom Ombo | | | 1 | 1 | | | | | 2 | 25% | | 1 | |
| | Nasr El-Noba | | | | | 1 | | | | 1 | 20% | 1 | | |
| | Daraw | | | 1 | 1 | | | | | 2 | 25% | | 1 | |
| | Banban | | | | | | | | 1 | 1 | 100%** | | | Roads in the service area are very narrow |
| | Idfu | | | 1 | | | | | | 1 | 50% | | 1 | |
| | El Sibayya | | | 1 | | | | | | 1 | 50% | | | |
| | Gov. of Aswan Total | 1 | 1 | 11 | 4 | 2 | 0 | 1 | 4 | 24 | | 5 | 4 | |
| Gov. of Red Sea | Hurghada(HQ) | | 1 | 1 | | | | 1 | | 3 | 17% | 2 | | |
| | Hurghada City Point | | | 1 | | | 1 | | | 2 | 30% | 1 | | |
| | Hurghada Magawish | | | | 1 | | 1 | | | 2 | 5% | 1 | | |
| | Safaga | | | | 2 | | | | | 2 | 0% | | 1 | |
| | Quseir | | | 2 | | | | | | 2 | 50% | | 1 | |
| | Marsa Alam | | | | 1 | | | | | 1 | 0% | | 1 | |
| | Shaalaten | | | | 1 | | | | | 1 | 0% | 1 | | |
| | Ras Gharib | | | 1 | 1 | | | | | 2 | 25% | | 1 | |
| | Gov. of Red Sea Total | 0 | 1 | 5 | 6 | 0 | 2 | 1 | 0 | 15 | | 5 | 4 | |
| Gov. of South Sinai | Sharm El Sheikh Hataba | | | 2 | 1 | | | | | 3 | 33% | 1 | | |
| | Sharm El Sheikh Naama | | | 1 | | | | | | 1 | 50% | 1 | | |
| | Sharm El Sheikh Al Roessat | 1 | | 1 | | | | | | 2 | 75% | | | |
| | Dahab City Point | | | | | | 1 | | | 1 | 10% | | | |
| | Dahab Masabat | | | 1 | | | | | | 1 | 50% | 1 | | |
| | Nuweiba El Muzeina | | | 1 | | | | | | 1 | 50% | | 1 | |
| | El Gabriel | | | 1 | | | | | | 1 | 50% | | | |
| | El Tur(HQ) | 1 | 2 | | | | | | | 3 | 33% | 1 | | |
| | St. Chatherine | | | | 1 | | 1 | | | 2 | 5% | | 1 | |
| | Oasis of Feiran | | | | | | 1 | | | 1 | 10% | | | |
| | Abu Rudeis1 | | | 1 | | | | | | 1 | 50% | | 1 | |
| | Abu Zenima | | | 1 | 1 | | | | | 2 | 25% | | 1 | |
| | Ras El Sudr | | | 1 | | | | | | 1 | 50% | | 1 | |
| | Gov. of South Sinai Total | 2 | 2 | 10 | 3 | 0 | 3 | 0 | 0 | 20 | | 4 | 5 | |
| Total | | 3 | 4 | 26 | 13 | 2 | 5 | 2 | 4 | 59 | | 14 | 13 | |
| Grand Total | | 46 | | | | 13 | | | | 59 | | 27 | | |

Own : Fire trucks owned by the Civil Defense Administration of Governorate
ODA : Fire trucks owned by the CDA
Current Number : Number of fire trucks currently deployed at the fire station
Sufficiency Rate=((1)+(2)×0.5+(3)×0.2＋(4)×0.1＋(5)×0.2) ÷(6)

* : The garage is very small and the existing pump truck is considered to be sufficient.
** : Roads in the service area are very narrow and the existing pump truck is judged to be sufficient.

(2) Deployment Plan for Fire Trucks

Table 2-2-2-2 shows the comprehensive evaluation results on the importance of each of the 36 fire stations in the three target governorates based on five criteria: service area, population, number of tourists and number of fires in the service area and the sufficiency rate shown in Table 2-2-2-1. Based on such data, the deployment of fire trucks has been determined as described below.

1) Rank A Fire Stations (Sites for Deployment Plan)

(a) Headquarter Stations

A fire station which is situated at the headquarters of the governorate office and which is responsible for important facilities and areas is the most important type of fire station in terms of the disaster relief activities and deployment of fire companies. Such stations are, therefore, designated as “headquarter fire station” and will be provided with 2 new fire trucks each.

(b) Primary Stations

Among fire stations which are responsible for areas with a large population and large service area and many important or tourism facilities and where there is a high risk of fire or where the number of fires has been increase, those for which the total score for Evaluation Items 1 through 5 in Table 2-2-2-2 is 30 or higher are designated as “primary fire stations” and will be provided with 1 new fire truck each.

2) Rank B Fire Stations

(c) Secondary Stations

Those stations of which the importance is slightly lower than that of primary fire stations are designated as “secondary fire stations” and will be provided with one fire truck each through the relocation of a “good” fire truck among the existing fire trucks owned by the Civil Defense Administrations in the three target governorates.

3) Rank C Fire Stations

(d) The other Stations

Those fire stations which are not classified under (a) through (c) above and fire stations which are not under the jurisdiction of the Civil Defense Administrations in the three target governorates are designated as “the other stations” and it will be necessary for these fire stations to cope with the existing fire trucks.

# Table 2-2-2-2 Evaluation Table (Governorate of Aswan)

| Civil Defense Admin. | [1] | Fire Station | Service Area ($km^2$) | Score 1 | Population (persons) | Score 2 | No. of Tourists (persons/yr) | Score 3 | Average No. of Fires/yr | Score 4 | Sufficiency Rate (%) | Score 5 | Total Score 1 –5 | Fire Station Category | No. of Fire Trucks Requested (4 x 2) | No. of Fire Trucks Requested (4 x 4) | Planned No. of New Fire Trucks (4 x 2) | Planned No. of New Fire Trucks (4 x 4) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Governorate of Aswan | 1 | El Sel | 6,611 | 15 | 65,718 | 11 | 169,600 | 15 | 52 | 13 | 25 | 12 | 66 | HQ | 2 | | 2 | | |
| | 2 | Atlas | 6,611 | 15 | 44,316 | 8 | 92,000 | 14 | 35 | 7 | 0 | 15 | 59 | Primary | 1 | | 1 | | |
| | 3 | Idfu | 972 | 6 | 318,724 | 15 | 92,000 | 14 | 73 | 14 | 50 | 9 | 58 | Primary | | 1 | | 1 | |
| | 4 | Kom Ombo | 77 | 2 | 268,870 | 14 | 92,000 | 14 | 85 | 15 | 25 | 12 | 57 | Primary | | 1 | | 1 | |
| | 5 | Nasr El-Noba | 565 | 4 | 75,050 | 12 | 1,710 | 10 | 48 | 12 | 20 | 12 | 50 | Primary | 1 | | 1 | | |
| | 6 | Kima Chem. Factory | 6,611 | 15 | 49,352 | 9 | 0 | 0 | 39 | 9 | 50 | 9 | 42 | Tertiary | | | | | As the fire truck of this station belongs to the Ministry of Industry, this fire station is omitted from the scope of deployment. |
| | 7 | Abu Simble | 6,611 | 15 | 2,390 | 1 | 18,200 | 11 | 23 | 3 | 20 | 12 | 42 | Primary | | 1 | | 1 | |
| | 8 | Aswan West | 6,611 | 15 | 12,516 | 3 | 0 | 0 | 40 | 10 | 20 | 12 | 30 | Primary | 1 | | 1 | | |
| | 9 | Daraw | 565 | 4 | 79,442 | 13 | 0 | 0 | 36 | 8 | 25 | 12 | 37 | Primary | | 1 | | 1 | |
| | 10 | Aswan High Dam East | 6,611 | 15 | 34,999 | 7 | 0 | 0 | 28 | 5 | 50 | 9 | 36 | Tertiary | | | | | As the buildings and fire trucks belong to the Aswan High Dam Authority, these fire stations are omitted from the scope of deployment. |
| | 11 | Abu El-Reash | 6,611 | 15 | 57,157 | 10 | 0 | 0 | 45 | 11 | 100 | 0 | 36 | Tertiary | | | | | As the garage is small, the deployment of a medium size fire truck is impossible. |
| | 12 | Aswan High Dam West | 6,611 | 15 | 32,733 | 6 | 0 | 0 | 26 | 4 | 50 | 9 | 34 | Tertiary | | | | | As the buildings and fire trucks belong to the Aswan High Dam Authority, these fire stations are omitted from the scope of deployment. |
| | 13 | Aswan Dam West | 6,611 | 15 | 7,302 | 2 | 0 | 0 | 6 | 2 | 50 | 9 | 28 | Tertiary | | | | | As the buildings and fire trucks belong to the Aswan High Dam Authority, these fire stations are omitted from the scope of deployment. |
| | 14 | El Sibayya | 972 | 6 | 14,835 | 5 | 0 | 0 | 3 | 1 | 50 | 9 | 21 | Secondary | | | (1) | | Relocation of a “good” existing fire truck. |
| | 15 | Banban | 77 | 2 | 13,802 | 4 | 0 | 0 | 29 | 6 | 100 | 0 | 12 | Tertiary | | | | | |
| | Total | | 62,727 | | 1,077,206 | | 465,510 | | 569 | | | | | | 5 | 4 | 5(1) | 4 | Figures in brackets indicate the number of existing fire trucks |
| | | | | | | | | | | | | | | Total Fire Trucks | 9 | | 9(1) | | Figures in brackets indicate the number of existing fire trucks |

Ranking

| Service Area | Score 1* | Population | Score 2* | No. of Tourists | Score 3* | No. of Fires | Score 4* | Sufficiency Rate (%) | Score 5 | Total Ranking Score | Fire Station Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 1 | 15 | 1 | 15 | 1 | 15 | 0-19 | 15 | 30≦ | Primary |
| 2 | 14 | 2 | 14 | 2 | 14 | 2 | 14 | 20-39 | 12 | 26 – 29 | Secondary |
| 3 | 13 | 3 | 13 | 3 | 13 | 3 | 13 | 40-59 | 9 | ≦25 | Tertiary |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | 60-79 | 6 | | |
| 13 | 3 | 13 | 3 | 13 | 2 | 13 | 3 | 80-99 | 3 | | |
| 14 | 2 | 14 | 2 | 14 | 1 | 14 | 2 | 100 | 0 | | |
| 15 | 1 | 15 | 1 | 15 | 0 | 15 | 1 | | | | |

* Figures in brackets indicate the number of existing fire trucks. Given 15 fire stations, each station is ranked from 1st (15 points) to 15th (1 point). For those fire stations where the number of tourists is nil, the evaluation score for this item is also nil (0)

## Table 2-2-2-2 Evaluation Table (Governorate of Red Sea)

| Civil Defense Admin. | [1] | Fire Station | Service Area ($km^2$) | Score 1 | Population (persons) | Score 2 | No. of Tourists (persons/yr) | Score 3 | Average No. of Fires/yr | Score 4 | Sufficiency Rate (%) | Score 5 | Total Score 1 –5 | Fire Station Category | No. of Fire Trucks Requested (4 x 2) | No. of Fire Trucks Requested (4 x 4) | Planned No. of New Fire Trucks (4 x 2) | Planned No. of New Fire Trucks (4 x 4) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Governorate of Red Sea | 16 | Safaga | 5,950 | 8 | 33,000 | 10 | 113,000 | 10 | 533 | 16 | 0 | 16 | 60 | Primary | | 1 | | 1 | |
| | 17 | Hurghada (HQ) | 5,000 | 6 | 27,000 | 8 | 403,000 | 14 | 500 | 14 | 17 | 16 | 58 | HQ | 2 | | 2 | | |
| | 18 | Hurghada Magawish | 3,000 | 4 | 25,000 | 6 | 403,000 | 12 | 215 | 12 | 5 | 16 | 50 | Primary | 1 | | 1 | | |
| | 19 | Marsa Alam | 26,400 | 14 | 17,000 | 4 | 60,000 | 6 | 157 | 8 | 0 | 16 | 48 | Primary | | 1 | | 1 | |
| | 20 | Hurghada City Point | 925 | 2 | 40,000 | 12 | 403,000 | 16 | 81 | 4 | 30 | 12 | 46 | Primary | 1 | | 1 | | |
| | 21 | Quseir | 11,000 | 10 | 41,000 | 14 | 60,000 | 8 | 140 | 6 | 50 | 8 | 46 | Primary | | 1 | | 1 | |
| | 22 | Ras Gharib | 15,300 | 12 | 75,000 | 16 | 8,000 | 4 | 68 | 2 | 25 | 12 | 46 | Primary | | 1 | | 1 | |
| | 23 | Shaalatem | 66,425 | 16 | 13,000 | 2 | 0 | 0 | 163 | 10 | 0 | 16 | 44 | Primary | 1 | | 1 | | |
| | Total | | 134,000 | | 271,000 | | 1,450,000 | | 1,857 | | | | | | 5 | 4 | 5 | 4 | |
| | | | | | | | | | | | | | | Total Fire Trucks | 9 | | 9 | | |

Ranking

| Service Area | Score 1* | Population | Score 2* | No. of Tourists | Score 3* | No. of Fires | Score 4* | Sufficiency Rate (%) | Score 5 | Total Ranking Score | Fire Station Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 1 | 16 | 1 | 16 | 1 | 16 | 0-19 | 16 | 30≦ | Primary |
| 2 | 14 | 2 | 14 | 2 | 14 | 2 | 14 | 20-39 | 12 | 26 – 29 | Secondary |
| 3 | 12 | 3 | 12 | 3 | 12 | 3 | 12 | 40-59 | 8 | ≦25 | Tertiary |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | 60-79 | 4 | | |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 80-99 | 2 | | |
| 7 | 4 | 7 | 4 | 7 | 4 | 7 | 4 | 100 | 0 | | |
| 8 | 2 | 8 | 2 | 8 | 0 | 8 | 2 | | | | |

* Given 8 fire stations, each station is ranged from 1st (8 points) to 8th (1 point) for each evaluation item and the score for each station is doubled to match the scores for the fire stations in the other two governorates. For those fire stations where the number of tourists is nil, the evaluation score for this item is also nil (0).

# Table 2-2-2-2 Evaluation Table (Governorate of South Sinai)

| Civil Defense Admin. | 1 | Fire Station | Service Area ($km^2$) | Score 1 | Population (persons) | Score 2 | No. of Tourists (persons/yr) | Score 3 | Average No. of Fires/yr | Score 4 | Sufficiency Rate (%) | Score 5 | Total Score | Fire Station Category | No. of Fire Trucks Requested (4 x 2) | No. of Fire Trucks Requested (4 x 4) | Planned No. of New Fire Trucks (4 x 2) | Planned No. of New Fire Trucks (4 x 4) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Governorate of South Sinai | 24 | El Tur (HQ) | 10,500 | 12 | 65,400 | 13 | 12,900 | 5 | 148 | 13 | 33 | 9 | 52 | HQ | 1 | | 2 | | |
| | 25 | Sharm El Sheikh Hataba | 1,760 | 6 | 26,500 | 9 | 472,400 | 13 | 120 | 11 | 33 | 9 | 48 | Primary | 1 | | 1 | | |
| | 26 | St. Chatherine | 17,000 | 13 | 16,100 | 6 | 37,100 | 7 | 66 | 8 | 5 | 13 | 47 | Primary | | 1 | | 1 | |
| | 27 | Ras El Sudr | 9,500 | 11 | 40,000 | 11 | 49,600 | 9 | 108 | 9 | 50 | 6 | 46 | Primary | | 1 | | 1 | |
| | 28 | Nuweiba El Muzeina | 900 | 5 | 19,600 | 8 | 114,600 | 10 | 130 | 12 | 50 | 6 | 41 | Primary | | 1 | | 1 | |
| | 29 | Sharm El Sheikh Naama | 330 | 3 | 35,300 | 10 | 472,400 | 13 | 10 | 2 | 50 | 6 | 34 | Primary | 1 | | 1 | | |
| | 30 | Dahab City Point | 3,125 | 9 | 9,500 | 2 | 20,700 | 6 | 61 | 7 | 10 | 9 | 33 | Primary | | | | 1 | |
| | 31 | Abu Rudeis 1 | 2,295 | 8 | 12,600 | 3 | 0 | 0 | 109 | 10 | 50 | 9 | 30 | Primary | | 1 | | 1 | |
| | 32 | Oasis of Feiran | 3,600 | 10 | 18,400 | 7 | 0 | 0 | 27 | 3 | 10 | 9 | 29 | Secondary | | | (1) | | Relocation of a “good” existing fire truck |
| | 33 | Dahab Masabat | 385 | 4 | 14,300 | 4 | 44,600 | 8 | 43 | 4 | 50 | 6 | 26 | Secondary | 1 | | (1) | | Relocation of a “good” existing fire truck in view of the relatively small service area, population and number of fires |
| | 34 | Sharm El Sheikh Al Roessat | 2,250 | 7 | 8,800 | 1 | 472,400 | 13 | 7 | 1 | 75 | 3 | 25 | Tertiary | | | | | |
| | 35 | El Gabriel | 24 | 1 | 43,600 | 12 | 0 | 0 | 47 | 5 | 50 | 6 | 24 | Tertiary | | | | | |
| | 36 | Abu Zenima | 53 | 2 | 15,900 | 5 | 0 | 0 | 51 | 6 | 25 | 9 | 22 | Tertiary | | 1 | | | The deployment of a new truck is judged to be unsuitable in view of the small service area, population and number of fires |
| | Total | | 51,722 | | 326,000 | | 1,696,700 | | 928 | | | | | | 4 | 5 | 4(2) | 5 | Figures in brackets indicate the number of existing fire trucks |
| | | | | | | | | | | | | | | Total Fire Trucks | 9 | | 9(2) | | Figures in brackets indicate the number of existing fire trucks |

Ranking

| Service Area | Score 1* | Population | Score 2* | No. of Tourists | Score 3* | No. of Fires | Score 4* | Sufficiency Rate (%) | Score 5 | Total Ranking Score | Fire Station Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 1 | 13 | 1 | 13 | 1 | 13 | 0-9 | 13 | 30≦ | Primary |
| 2 | 12 | 2 | 12 | 2 | 12 | 2 | 12 | 10-39 | 9 | 26 – 29 | Secondary |
| 3 | 11 | 3 | 11 | 3 | 11 | 3 | 11 | 40-59 | 6 | ≦25 | Tertiary |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | 60-79 | 3 | | |
| 11 | 3 | 11 | 3 | 11 | 2 | 11 | 3 | 80-99 | 1 | | |
| 12 | 2 | 12 | 2 | 12 | 1 | 12 | 2 | 100 | 0 | | |
| 13 | 1 | 13 | 1 | 13 | 0 | 13 | 1 | | | | |

* Given 13 fire stations, each station is ranked from 1st (13 points) to 13th (1 point) for each evaluation item. For those fire stations where the number of tourists is nil, the evaluation score for this item is also nil (0).

### 2.2.2.3 Equipment Planning

(1) Fire Trucks

1) Type of Fire Trucks

The conditions of water availability in the Governorate of Aswan situated in the catchment area of the Nile differs from that in the Governorate of Red Sea and Governorate of South Sinai, both of which are situated in the desert area. In all governorates, however, the basic principle is using a medium size fire truck(s) for initial fire-fighting from the viewpoints listed below:

- As the service area is very large, a high level of mobility is required.
- A large fire truck cannot enter many urban areas because of the narrow roads.
- A large fire truck may find it difficult to travel in desert areas where the road conditions are not good.
- A medium size fire truck has an excellent traveling performance and maneuverability and can carry the fire-fighters, equipment and fire fighting water sources required for fire-fighting activities.

This principle is considered to be appropriate and, therefore, medium size fire trucks will be deployed.

2) Pumping Capacity

The three target governorates have many large facilities, such as hotels and factories, and fire-fighting activities lasting many hours may be necessary to put out a fire. As each fire station has, in principle, only one medium size fire truck, it is required for the truck to be capable of the continual discharge of water for a long period of time. In Japanese regulations, all fire pumps of fire trucks shall have the capability for the continuous operation for more than 8 hours at the parking position. To satisfy the above requirement it is necessary to strengthen a cooling capability for the engine. Therefore this requirement such as Japanese regulations shall be reflected in the technical specifications.

3) Driving Method of Fire Trucks

The main roads in the three target governorates are generally well maintained. Once away from such roads, however, there are many fire stations of which the service area includes sloping land, unpaved roads and uneven land. In the catchment basin

of the Nile, fire trucks may have to travel on unpaved farm roads in cultivated areas. To quickly reach the fire scene to commence swift fire-fighting activities in such areas, the introduction of four wheel drive fire trucks is essential because of their high level of mobility and traveling performance on diverse terrain. Although the high chassis from the ground of four wheel drive fire trucks causes some restrictions in regard to fitting out, their excellent traveling ability to negotiate poor roads makes them suitable for areas with poor conditions (sloping land and unpaved roads, etc.). A four wheel drive fire truck will, therefore, be deployed at those fire stations which serve the following areas.

- Rural areas in Governorate of Aswan

  The groundwater level is relatively high and the ground is soft in rural areas along the Nile. Lengthy fire-fighting activities may result in loosening of the ground, causing a fire truck to be stuck. Imperfect paved roads are also observed.

- Mountainous areas in Governorate of South Sinai

  The roads in or leading to urban areas are very steep.

- Desert areas in each governorate

  Considered for areas with many unpaved roads and areas where an urban area has been established on a slope or plateau.

Meanwhile, a rear wheel drive is excellent in terms of the traveling performance on paved roads and easy maintenance and, therefore, is used for fire trucks serving urban areas. Rear wheel drive fire trucks will, therefore, be deployed at those fire stations serving areas with good road conditions.

The planned deployment of four wheel drive (4 x 4) or rear wheel drive (4 x 2) fire trucks by each fire station is shown in Table 2-2-2-5.

4) Fire Truck Specifications

The initial fire-fighting activities of a medium size fire truck require water discharge for approximately 3 minutes at a rate of 1 $m^3$/min until the arrival of a water tanker to supply water. Accordingly, the basic requirement is a water tank with capacity of 3.5 $m^3$ or more. The planned fire trucks are medium size chemical trucks equipped with a foam tank and a mixing device as these are currently used due to their

effectiveness in dealing with oil fires. The outline specifications of the planned fire trucks are shown in Table 2-2-2-3.

Table 2-2-2-3 Specifications of Medium Size Chemical Truck

| Driving Method | Overall Length (mm) | Overall Width (mm) | Overall Height (mm) | Max. Speed (km/hr) | Gross Weight (tons) | Engine Output (BHP/ton) | Pumping Capacity (liters/min) | Tank Capacity (liters) | Foam Tank Capacity (liters) |
|---|---|---|---|---|---|---|---|---|---|
| Rear wheel drive (4 x 2) | 7,000 – 7,500 | ≦ 2,500 | 2,800 – 3,500 | ≧ 100 | 11 – 18 | ≧ 14 | 2,500 – 3,500 | ≧ 3,500 | ≧ 350 |
| Four Wheel drive (4 x 4) | As above | As above | 3,000 – 3,500 | ≧ 80 | 13 – 18 | As above | As above | As above | As above |

The following issues are reflected in the equipment specification in view of the special natural conditions in the three governorates :

- Pumping operation under a high ambient temperature

  Strengthening of the radiator

- Highly corrosive fire fighting water sources

  Stipulation of the material for the water tank and the plate thickness

- Fire stations located near the coast

  Stipulation of the paint specifications (paint quality and paint thickness, etc.); stipulation of the rust-proofing for equipment

(2) Main Loaded Equipment

The minimum requirements for equipment loaded on a fire truck to ensure safe and effective fire-fighting activities by fire-fighters are as planned below.

- Fire suit sets

  Essential clothing to protect fire-fighters from heat at the scene of a fire with dense smoke and heat. Four sets will be procured for each fire truck procured under the Project.

  Helmet : FRP shell with clear plastic face guard and neck flap
  Fire coat : Heat-resistant and non-combustible synthetic fiber

Gloves : Heat-resistant and tear-resistant material
Boots : Rubber with a steel shank and anti-prick sole plate
Safety belt : Some 1,200 mm in length and a 1.5 m long rope with a karabiner

Air-breathing apparatus

Ensures the proper breathing of fire-fighters at the scene of a fire with dense smoke and heat or at a site devoid of oxygen. Two sets will be procured for each fire truck procured under the Project.

Cylinder material : Light weight carbon fiber
Cylinder capacity : 300 kg/cm$^2$ x 6 liters or 200 kg/cm$^2$ x 9 liters
Spare cylinder : One for each set

(3) Truck-Mounted Radio

To be used for radio communication between a fire truck and fire station or between fire trucks. This equipment is essential to create a system which is capable of coordinated fire-fighting activities through the effective use of fire companies, thereby improving the fire-fighting efficiency and enhancing the overall fire-fighting capability. While a radio communication system is in place in the Governorate of Red Sea (150 – 174 MHz, VHF) and the Governorate of South Sinai (2,000 – 24,000 KHz, HF), it is not yet available in the Governorate of Aswan. Accordingly, radio equipment suitable for the existing radio communication systems in the Governorates of Red Sea and South Sinai will be mounted on the fire trucks for the two Governorates to be procured under the Project. The specifications of this equipment will be similar to those of the radio equipment currently used.

(4) Spare Parts

The availability of certain spare parts is essential to constantly maintain the fire trucks which face more severe driving conditions than ordinary vehicles in a state of readiness for a quick response given the extremely harsh road, topographical and weather conditions in the three target governorates.

While spare parts and consumables which are interchangeable between different models can be relatively easily obtained in Egypt, the procurement of spare parts and pump parts which are specific to certain models in the domestic market is difficult. Considering the country's limited foreign currency reserve, the urgent procurement of these parts appears impossible.

Accordingly, for the selection of the spare parts to be procured under the Project, those parts which are likely to require replacement in 3 – 5 years time will be added to the spare parts which constitute the minimum requirement for initial activities as recommended by the fire truck manufacturers.

Table 2-2-2-4 shows the list of spare parts requested by the Egyptian side (excluding those required for initial operation) and their examination results. For this examination, (i) the interview results with the Tokyo Fire Department which has the largest number of fire trucks in Japan and (ii) the operating conditions and environment for fire trucks in the three target governorates are used to reach the final decision.

Table 2-2-2-4 Spare Parts Requested by Egyptian Side and Likelihood of Their Use Within Five Years

| | Item | | Examination Result* |
|---|---|---|---|
| 1 | Pump Kit | | ○ |
| 2 | Generator | | ○ |
| 3 | Starter Assembly | | ○ |
| 4 | Power Take Off (PTO) Assembly | | × |
| 5 | Priming Pump Assembly | | ○ |
| 6 | Pump Proportioner Assembly | | ○ |
| 7 | Fan (Radiator Fan) | | ○ |
| 8 | Water Pump Assembly | | ○ |
| 9 | Fuel Pump Assembly | | ○ |
| 10 | Crank Shaft and Metal | Crank Shaft | × |
| | | Metal | ○ |

*: ○ indicates the likelihood of use in five years.

As one set will be sufficient to serve four or five fire trucks and four to five units of rear wheel drive (4 x 2) trucks and of four wheel drive (4 x 4) trucks will be deployed to the three target governorates, the quantity of the spare parts to be procured will be six sets in total. The procurement of these spare parts will improve the operating rate of the procured fire trucks and will enhance the prospect of the sustainability of the effects of the planned assistance.

### 2.2.2.4 Equipment Deployment Plan

Table 2-2-2-5 shows the equipment deployment plan for the three target governorates as examined in 2.2.2.2 – Planning of Deployment of Fire Trucks. Except for the part of the deployment plan for the Governorate of South Sinai, the equipment deployment plan under the Project is the same as the requested deployment by the CDA.

Table 2-2-2-5 Equipment Deployment Plan

| Civil Defense Admin. | Fire Station | No. of Fire Trucks Requested (4 x 2) | No. of Fire Trucks Requested (4 x 4) | Planned No. of New Fire Trucks (4 x 2) | Planned No. of New Fire Trucks (4 x 4) | Reason for 4x4 Deployment |
|---|---|---|---|---|---|---|
| Gov. of Aswan | El Sel | 2 | | 2 | | |
| | Atlas | 1 | | 1 | | |
| | Idfu | | 1 | | 1 | Farmland |
| | Kom Ombo | | 1 | | 1 | Farmland |
| | Nasr El-Noba | 1 | | 1 | | |
| | Abu Simble | | 1 | | 1 | Sloped Land/Unlevelled Land |
| | Aswan West | 1 | | 1 | | |
| | Daraw | | 1 | | 1 | Farmland |
| | Sub-total | 5 | 4 | 5 | 4 | |
| | Total | 9 | | 9 | | |
| Gov. of Red Sea | Safaga | | 1 | | 1 | Sloped Land/Unlevelled Land |
| | Hurghada (HQ) | 2 | | 2 | | |
| | Hurghada Magawish | 1 | | 1 | | |
| | Marsa Alam | | 1 | | 1 | Sloped Land/Unlevelled Land/Unpaved Roads |
| | Hurghada City Point | 1 | | 1 | | |
| | Quseir | | 1 | | 1 | Sloped Land/Unlevelled Land |
| | Ras Gharib | | 1 | | 1 | Unlevelled Land/Unpaved Roads |
| | Shaalaten | 1 | | 1 | | |
| | Sub-total | 5 | 4 | 5 | 4 | |
| | Total | 9 | | 9 | | |
| Gov. of South Sinai | El Tur (HQ) | 1 | | 2 | | |
| | Sharm El Sheikh Hataba | 1 | | 1 | | |
| | St. Chatherine | | 1 | | 1 | Sloped Land |
| | Ras El Sudr | | 1 | | 1 | Unlevelled Land/Unpaved Roads |
| | Nuweiba El Muzeina | | 1 | | 1 | Unlevelled Land/Unpaved Roads |
| | Dahab City Point | | | | 1 | Unlevelled Land/Unpaved Roads |
| | Sharm El Sheikh Naama | 1 | | 1 | | |
| | Abu Rudeis 1 | | 1 | | 1 | Unlevelled Land/Unpaved Roads |
| | Dahab Masabat* | 1 | | | | |
| | Abu Zenima** | | 1 | | | |
| | Sub-total | 4 | 5 | 4 | 5 | |
| | Total | 9 | | 9 | | |

Notes: 1. 4x2 means rear wheel drive.
2. 4x4 means four wheel drive.
3. *The redeployment of a currently good fire truck is judged to be appropriate because of the relatively small service area, population and number of fires.
4. **The deployment of a new fire truck is judged to be inappropriate because of the small service area, population and number of fires.

Total Number of Planned Fire Truck Deployment

| Fire Service Dept | Requested Number (4x2) | Requested Number (4x4) | Planned Number (4x2) | Planned Number (4x4) |
|---|---|---|---|---|
| Governorate of Aswan | 5 | 4 | 5 | 4 |
| Governorate of Red Sea | 5 | 4 | 5 | 4 |
| Governorate of South Sinai | 4 | 5 | 4 | 5 |
| Sub-total | 14 | 13 | 14 | 13 |
| Total | 27 | | 27 | |

### 2.2.2.5 Outline of Main Equipment

Table 2-2-2-6 outlines the main equipment to be procured under the Project, including the fire trucks.

Table 2-2-2-6 Outline of Main Equipment

(1) Fire Truck

| Item | Medium Size Chemical Truck (4 x 2) | Medium Size Chemical Truck (4 x 4) |
|---|---|---|
| Overall Length (mm) | 7,000 – 7,500 | 7,000 – 7,500 |
| Overall Width (mm) | ≤ 2,500 | ≤ 2,500 |
| Overall Height (mm) | 2,800 – 3,500 | 3,000 – 3,500 |
| Minimum Ground Clearance (mm) | ≥ 240 | ≥ 240 |
| Gross Vehicle Weight (kg) | 11,000 – 18,000 | 13,000 – 18,000 |
| Engine Output (BHP/ton) | ≥ 14 | ≥ 14 |
| Drive | 4 x 2 (rear wheel drive) | 4 x 4 (four wheel drive) |
| Steering | Left hand drive (power steering) | Left hand drive (power steering) |
| Cabin | Double cabin | Double cabin |
| Seating Capacity | 6 | 6 |
| Pumping Capacity (liters/min) | Water discharge rate: 2,500 – 3,500 | Water discharge rate: 2,500 – 3,500 |
| Tank Capacity (liters) | ≥ 3,500 (stainless steel) | ≥ 3,500 (stainless steel) |
| Foam Tank Capacity (liters) | ≥ 350 | ≥ 350 |
| Accessories | Red rotation lamp, electric siren with PA system, search light, suction rubber hose, fire hose, multi-purpose branch pipe, air foam nozzle, sliding three section ladder, collecting head, dividing head, crowbar, axe, adapter, suction hose wrench, strainer for suction hose, fire extinguisher (ABC), fire extinguisher ($CO^2$), manual spotlight, spare tyre, chassis standard tool set, spare packing, paint and compound for repair, pump tool set, operation manual, repair manual and parts catalogue | Red rotation lamp, electric siren with PA system, search light, suction rubber hose, fire hose, multi-purpose branch pipe, air foam nozzle, sliding three section ladder, collecting head, dividing head, crowbar, axe, adapter, suction hose wrench, strainer for suction hose, fire extinguisher (ABC), fire extinguisher ($CO^2$), manual spotlight, spare tyre, chassis standard tool set, spare packing, paint and compound for repair, pump tool set, operation manual, repair manual and parts catalogue |
| Body Color | Red | Red |
| Special Specification for Hot District | Incorporation of a sub-radiator | Incorporation of a sub-radiator |
| Quantity | 14 | 13 |

(2) Fire Suit Sets

| | |
|---|---|
| Helmet | Glass fiber or resin to withstand falling objects (JIS Standards) with a protective face guard and neck flap |
| Coat | Half coat-type using a non-combustible fiber with a sufficient heat protection performance (with reflector) |
| Trousers | Trousers using a non-combustible fiber with a sufficient heat protection performance (with reflector and suspenders) |
| Safety Belt | Length: approx. 1,200 mm; width: approx. 50 mm; with a 1.5 m long rope and karabiners |
| Boots | Rubber boots with a steel shank (JIS approved) and anti-pricking sole plate (JIS approved) |
| Gloves | Using a heat-resistant and tear-resistant fire |
| Quantity | 4 sets per fire truck; total: 108 sets |

(3) Breathing Apparatus

| | |
|---|---|
| Specifications | Carbon fiber cylinder with a reserve cylinder; pressure and capacity: 300 $kg/cm^2$ x 6 liters or 200 $kg/cm^2$ x 9 liters |
| Quantity | 2 sets per fire truck; total: 54 sets |

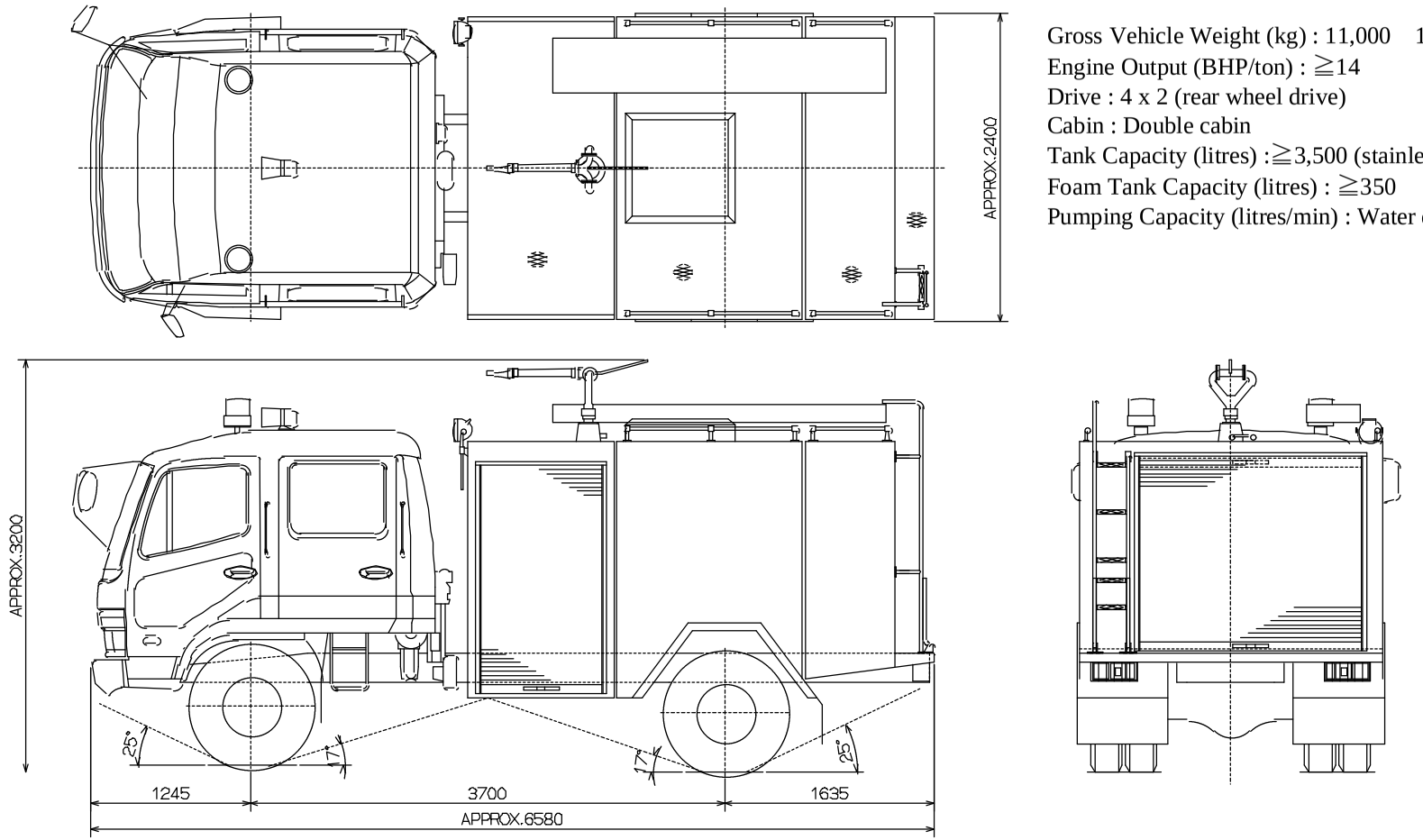
(4) Truck-Mounted Radio (Mobile Communication System)

| Type | VHF Mobile Radio Transmitter (Governorate of Red Sea) | HF Mobile Radio Transmitter (Governorate of South Sinai) |
|---|---|---|
| Specifications | Frequency range: 150 – 174 MHz; output: 40 W or higher; number of channels: 12 or more; mobile VHF antenna; noise filter; 24 VDC-12VDC converter etc. | Frequency range: 2,000 – 24,000 KHz; output: 40 W or higher; number of channels: 12 or more; mobile HF antenna; noise filter; 24 VDC-12VDC converter etc. |
| Quantity | 9 | 9 |

### 2.2.3 Basic Design Drawings

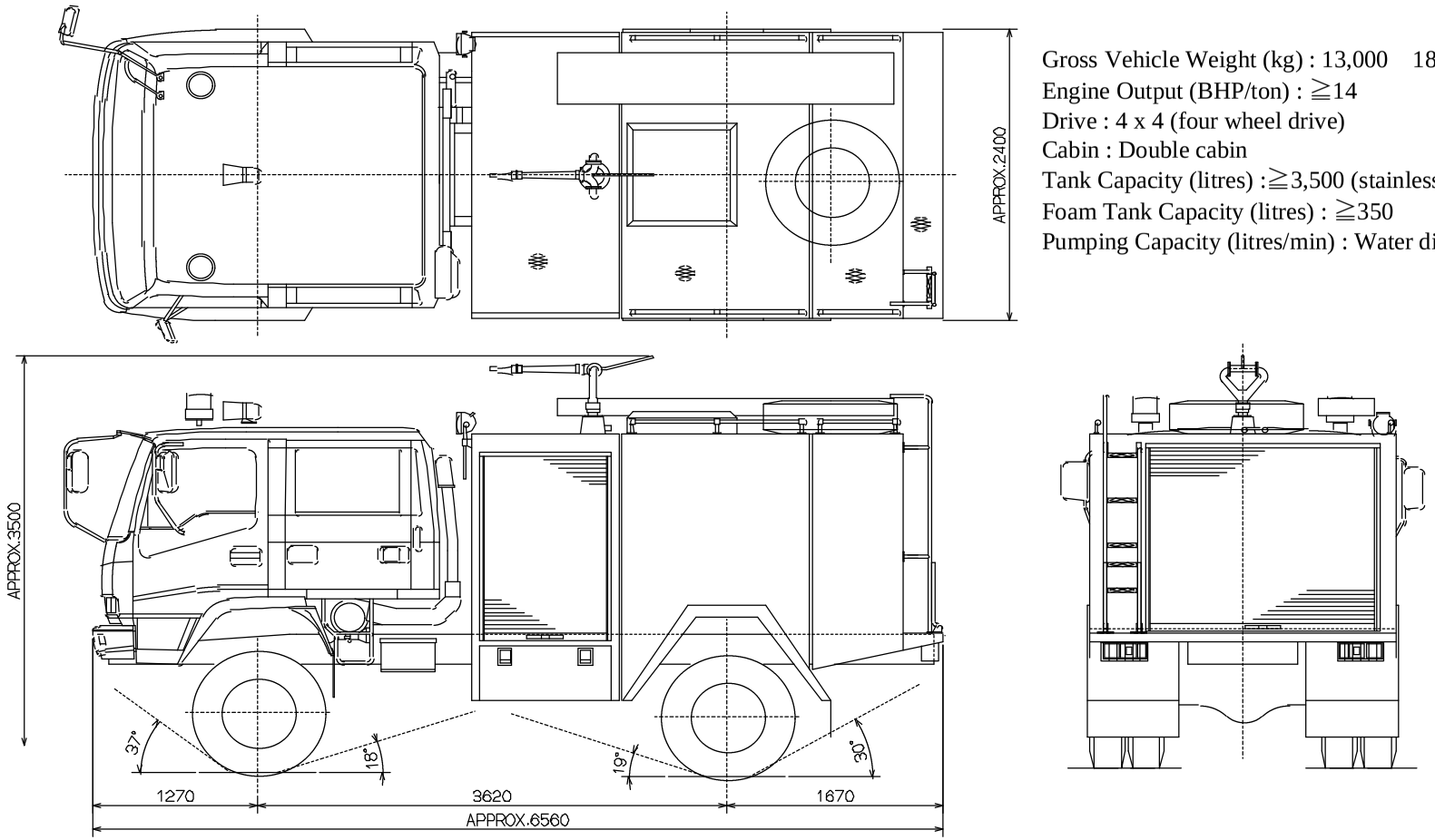
Basic Drawings of Fire Trucks

Fig. 2-2-3-1 Basic Drawing of Medium Size Chemical Truck (4 x 2)
Fig. 2-2-3-2 Basic Drawing of Medium Size Chemical Truck (4 x 4)




Gross Vehicle Weight (kg) : 11,000　18,000
Engine Output (BHP/ton) : ≧14
Drive : 4 x 2 (rear wheel drive)
Cabin : Double cabin
Tank Capacity (litres) :≧3,500 (stainless steel)
Foam Tank Capacity (litres) : ≧350
Pumping Capacity (litres/min) : Water discharge rate: 2,500-3,500

Fig. 2-2-3-1　Basic Drawing of Medium Size Chemical Truck (4 x 2)




Gross Vehicle Weight (kg) : 13,000　18,000
Engine Output (BHP/ton) : ≧14
Drive : 4 x 4 (four wheel drive)
Cabin : Double cabin
Tank Capacity (litres) :≧3,500 (stainless steel)
Foam Tank Capacity (litres) : ≧350
Pumping Capacity (litres/min) : Water discharge rate: 2,500-3,500

Fig. 2-2-3-2　Basic Drawing of Medium Size Chemical Truck (4 x 4)

### 2.2.4 Implementation Plan

#### 2.2.4.1 Implementation Policy

(1) Basic Policy

The Project will be implemented in a single budget year. To be more precise, the Project will be implemented in accordance with the guidelines for the of Japanese Grant Aid as described below.

1) Following the decision by the Cabinet of the Government of Japan, the Exchange of Notes (E/N) regarding the grant aid project in question will be signed by the Government of Japan and the Government of Egypt.
2) After the signing of the E/N, a design and supervision contract will be concluded between the Government Egypt and a Japanese consultant who will immediately commence the contracted work as soon as the contract has been validated by the Ministry of Foreign Affairs of the Government of Japan.
3) A tender for equipment supply will be held for Japanese equipment suppliers.
4) Although the project implementation organization on the Egyptian side will execute this tender, the consultant will provide full cooperation for the tender under the guidance of the JICA.
5) The equipment supplier with the successful bid will conclude a procurement contract with the Egyptian side and will immediately commence the said work as soon as the contract has been validated by the Ministry of Foreign Affairs of the Government of Japan.

(2) Equipment Procurement Policy

Eligible countries for procurement under the grant aid cooperation scheme are, in principle, Japan and the recipient country. However, third country procurement is possible when both governments acknowledge the necessity for third country procurement and if certain conditions are met.

(3) Project Implementing Organization

The implementing organization of the Project is outlined below.

1) The project implementation body is the CDA of the Ministry of Interior.

2) The Civil Defense Administration of the three target governorates will be responsible for the operation and maintenance of the fire equipment to be procured under the Project.

Fig. 2-2-4-1 shows the project implementation scheme and the relationship between the Japanese and Egyptian organizations involved in the Project.

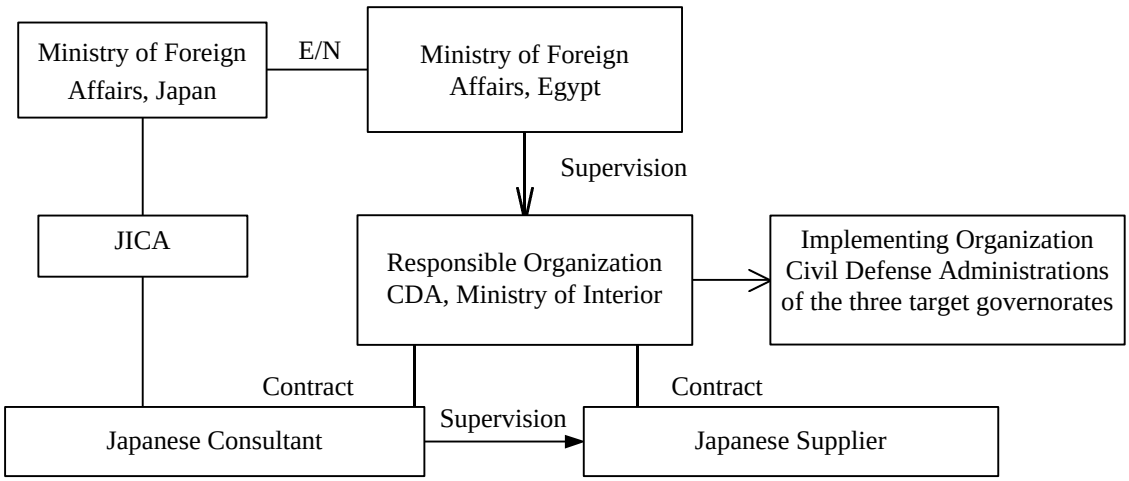



Fig. 2-2-4-1 Project Implementation Scheme

### 2.2.4.2 Implementation Conditions

For procurement, the equipment transportation conditions will be carefully examined to allow the smooth transportation and handing over of the equipment while ensuring the smooth completion of tax exemption measures, import and customs clearance procedures and registration of fire trucks by the Egyptian side.

### 2.2.4.3 Scope of Works

Regarding the fire equipment to be procured under the Project, the responsibility of the Japanese side will be up to the handing over of the equipment to the Egyptian side in Cairo. The Egyptian side will then be responsible for its inland transportation from Cairo to the fire stations in the three governorates and also for its maintenance after handing over. The division of responsibilities between the two sides is outlined in Table 2-2-4-1.

Table 2-2-4-1 Division of Responsibilities

| | Item | Japanese Side | Egyptian Side |
|---|---|---|---|
| 1 | Provision of buildings for the installation or storage of equipment | | ● |
| 2 | Provision of spare parts storage | | ● |
| 3 | Procurement, test operation and adjustment of the fire trucks; training on operation, handling and maintenance | ● | |
| 4 | Procurement of the equipment to be located on fire trucks; guidance on the handling of such equipment | ● | |
| 5 | Procurement of and guidance on the handling of spare parts | ● | |
| 6 | Provision of power sources, water supply and drainage system required by procured equipment | | ● |
| 7 | Tax exemption and customs clearance of the procured equipment | | ● |
| 8 | Registration of the fire trucks | | ● |
| 9 | Transportation of the procured equipment to Cairo | ● | |
| 10 | Driving of the fire trucks from Cairo to their destinations (i.e. fire stations) | | ● |

### 2.2.4.4 Consultant Supervision

In accordance with the implementation procedure for grant aid cooperation set forth by the Government of Japan, the Japanese consultant will conclude a design and supervision agreement for the Project with the Government of Egypt and will conduct the contracted service after validation of the said contract by the Government of Japan. The scope of service for the consultant is described next.

(1) Design Service for Implementation

1) Detailed Design

Based on the Basic Design Study results and the contents of the E/N, the consultant will conduct a final check of the project contents, review the equipment specifications and prepare the tender documents.

2) Tender-Related Service

The consultant will discuss such matters as the selection of possible bidders and the tender method with the project implementing organization on the Egyptian side and will conduct the tender on behalf of the said organization. There is a range of tender-related service as listed below.

- Preparation of the tender documents
- Public notice of the tender

- Distribution of the tender documents
- Witnessing of the tender
- Evaluation of the bidding results

(2) Supervision Service

The consultant will supervise such matters as (i) whether or not the procurement by the equipment supplier is conducted in an appropriate manner, (ii) whether or not the work is progressing in line with the planned schedule and (iii) whether or not the procured equipment meets the technical specifications. As the procurement under the Project involves fire trucks, equipment to be loaded on to fire trucks, truck-mounted radio equipment and spare parts, the expert supervisors appointed by the consultant must control the manufacturing schedule and quality of the various types of equipment in question. They will also liaise with and explain the progress situation to the project-related organizations. The consultant will dispatch one supervisor (engineer) to the CDA of the Ministry of Interior as field representatives (to conduct spot supervision) to (i) witness the test operation and commissioning of the equipment by the supplier prior to handing over and training of the Egyptian fire crews by the supplier, (ii) issue the completion certificate and (iii) prepare the final report.

In Japan, the consultant will witness the performance test and inspection at the factory, etc. to ensure the quality control of all of the equipment to be procured under the Project.

#### 2.2.4.5 Procurement Plan

(1) Equipment Supplier

The equipment supplier must conduct the design, manufacture, painting, shop inspection and tests, packaging and transportation of the equipment in accordance with the specifications prepared by the consultant and will hand the equipment over to the Egyptian side after confirming the quantity and operability through field tests and inspection. The supplier will prepare the references required to obtain permits regarding the site of handing over and inland transportation and will discuss them thoroughly with the CDA. The Egyptian side will be responsible for actually obtaining the said permits.

(2) Supply Sources of Fire Trucks and Others

Third countries which have supplied fire trucks to Egypt in the past are Italy, Austria and Germany and, because of their geographical proximity to Egypt, the manufacturers have established an after-service system, including a local agent. Based on the above findings,

Japan, Egypt, Italy, Austria and Germany are considered to be eligible countries for fire truck procurement. The possible supply sources of the main equipment are shown in Table 2-2-4-2.

Table 2-2-4-2 List of Possible Supply Sources of Equipment, etc.

| | Item | Possible Supply Source | |
|---|---|---|---|
| | | Japan/Egypt | Third Country |
| 1 | Medium Size Chemical Truck | ● | ● |
| 2 | Loaded Equipment to Fire Truck | ● | ● |
| 3 | Truck-Mounted Radio | ● | ● |
| 4 | Spare Parts | ● | ● |

(3) Transportation Plan

The transportation of the equipment to Alexandria will take the form of maritime transportation. For the inland transportation from Alexandria to Cairo, the fire trucks will be driven on the road.

### 2.2.4.6 Implementation Schedule

The project implementation schedule is shown in Fig. 2-2-4-2. This schedule assumed that the procurement and installation work under the Project will be implemented in the most efficient manner.

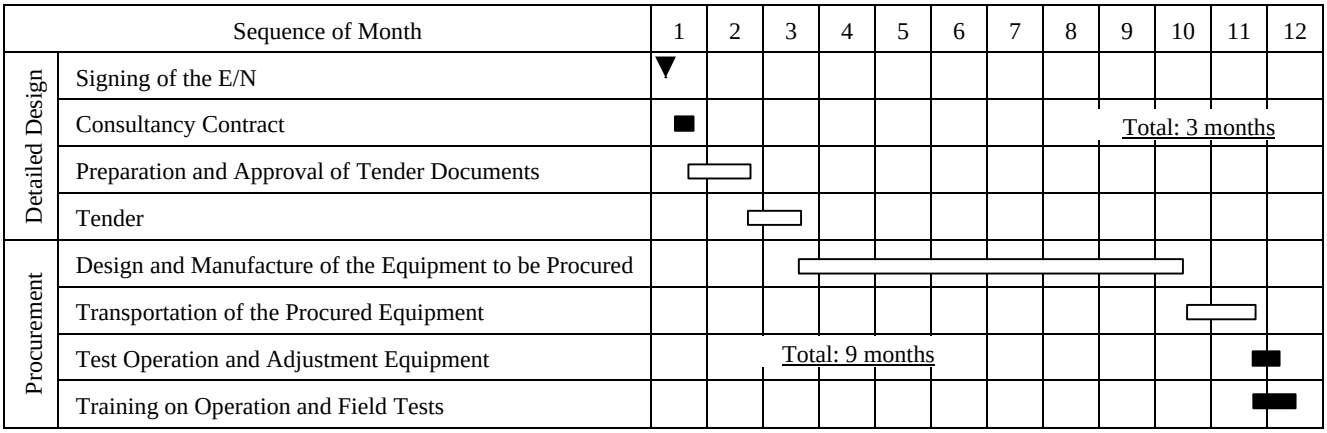



Fig. 2-2-4-2 Project Implementation Schedule

## 2.3 Obligations of Recipient Country

The Government of Egypt shall undertake the following work should the Project be implemented as a grant aid project of the Government of Japan.

### 2.3.1 Procedural Matters to be Undertaken by Recipient Country

(1) Registration of Fire Trucks

The Egyptian side must complete the necessary vehicle registration procedure, including the obtaining of number plates, to allow the fire trucks to be driven on ordinary roads.

(2) Tax Exemption

The Egyptian side must exempt Japanese nationals entering Egypt for the purpose of procuring equipment and performing their work based on the procurement contract under the Project from customs duties, internal taxes and other fiscal levies imposed in Egypt. The Egyptian side must also ensure the smooth customs clearance of the equipment procured abroad and transported to Egypt and exempt such equipment from taxes.

(3) Provision of Conveniences

The Egyptian side must guarantee the provision of all necessary conveniences for Japanese nationals entering Egypt and staying therein for the purpose of procuring services relating to the equipment to be provided under the validated contract.

(4) Banking Agreement and Issue of A/P

The Egyptian side must open an account in the name of the Government of Egypt at a bank in Japan, issue the A/P to the said bank and pay the fees relating to the A/P and remittance based on the banking agreement.

(5) Ratification of the E/N

The Egyptian side shall take necessary procedures concerning the ratification of the Exchange of Notes (E/N) by the Egyptian concerned authorities immediately after signing of the E/N.

### 2.3.2 Scope of Work by Recipient Country

(1) Provision of Building to Store Fire Trucks

Securing of a building to house the fire truck(s) at each fire station based on the fire truck deployment plan under the Project.

(2) Spare Parts Storage

Securing of a lockable storage for the storage of spare parts.

(3) Infrastructure Development

Development of infrastructure, including power sources, water supply and drainage, required for the procured equipment.

(4) Inland Transportation of Fire Trucks

Inland transportation of the fire trucks from Cairo to their respective fire stations after their handing over at Cairo.

## 2.4 Project Operation Plan

(1) Maintenance

The routine inspection of the fire trucks will be carried out at each fire station as in the presence case while periodic inspection/maintenance and repair will be the responsibility of an engineer dispatched to the fire station from the workshop in each governorate. However, major maintenance or repair work, such as overhauling, which cannot be conducted on the spot, will be executed in the workshop. As there is no plan to build a large-scale workshop facility in the near future, any repair work which cannot be dealt with by the workshop must be entrusted to a local agent of the manufacturer. No special change of the existing maintenance system is believed to be necessary following the implementation of the Project.

(2) Spare Parts Management

The spare parts required for the initial operation will be stored at each fire station where a fire truck is deployed. Spare parts which are likely to be in demand in 3 – 5 years time as requested by the Egyptian side will be stored by the Civil Defense Administration in each governorate to ensure the effective use of these parts.

## 2.5 Other Relevant Issues

### 2.5.1 Estimated Cost of Requested Japanese Assistance

The breakdown of the estimated project cost based on the division of work between the Japanese and Egyptian sides and also on the estimation conditions described in (3) is shown below. This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

(1) Japanese Portion

Table 2-5-1 Japanese Portion of the Project Cost

(Unit: ¥ million)

| Cost Item | | | Estimated Project Cost | |
|---|---|---|---|---|
| Equipment | Governorate of Aswan | Medium Size Chemical Truck (4 x 2) | 112 | 240 |
| | | Medium Size Chemical Truck (4 x 4) | 98 | |
| | | Other Equipment | 30 | |
| | Governorate of Red Sea | Medium Size Chemical Truck (4 x 2) | 112 | 242 |
| | | Medium Size Chemical Truck (4 x 4) | 98 | |
| | | Other Equipment | 32 | |
| | Governorate of South Sinai | Medium Size Chemical Truck (4 x 2) | 90 | 247 |
| | | Medium Size Chemical Truck (4 x 4) | 123 | |
| | | Other Equipment | 34 | |
| Detailed Design and Procurement Supervision | | | 18 | |
| Total | | | 747 | |

(2) Egyptian Portion

Table 2-5-2 Egyptian Portion of the Project Cost

| Cost Item | Cost |
|---|---|
| 1. Inland Transportation (Cairo to Each Fire Station) | LE 6,980 (¥132,000) |
| 2. Vehicle Registration Fee | LE 6,750 (¥127,000) |
| Total | LE 13,730 (¥259,000) |

(3) Estimation Conditions

Table 2-5-3 Estimation Conditions of the Project Cost

| Item | Conditions |
|---|---|
| 1. Date of Estimation | November 2003 |
| 2. Foreign Exchange Rates | US$ 1 = ¥116.12<br>LE1 (Egyptian Pound) = ¥18.88 |
| 3. Procurement Period | The Project will be completed in a single fiscal year. The detailed design and equipment procurement periods will be those given in the implementation schedule (Fig. 2-2-4-2) |
| 4. Others | The Project will be implemented in accordance with the grant aid scheme of the Government of Japan |

# CHAPTER 3

# PROJECT EVALUATION AND RECOMMENDATIONS

# CHAPTER 3
# PROJECT EVALUATION AND RECOMMENDATIONS

## 3.1 Project Effects

Here, the expected concrete outputs (effects) of the implementation of the Project are separately described in terms of the direct effects and indirect effects in view of the declared project goal.

### 3.1.1 Direct Effects

The expected direct effects of the Project are shown in Table 3-1-1.

Table 3-1-1 Direct Effects of the Project and Degree of Improvement

| Present Situation and Problems | Improvement Measures Under the Project | Project Effects and Degree of Improvement |
|---|---|---|
| 1. (Number of operational fire trucks)<br>Out of 46 fire trucks which are the main fire trucks for fire-fighting activities in the three target governorates, only seven are fully operational without any problems (four of which are leased from the CDA), making flexible use of the fire service strength extremely difficult. | Twenty-seven Medium Size Chemical Trucks will be deployed at those fire stations in urgent need of improvement of the fire service strength in the three target governorates. | The deployment of the new fire trucks will improve the ratio of fully operational fire trucks from 7% (3 out of 46) to 65% (30 out of 46), making flexible fire-fighting activities possible. |
| 2. (Arrival time of a fire company at a fire scene)<br>As most of the existing fire trucks have exceeded their expected life, the maximum traveling speed at the time of an emergency is around 40 km/hr, making quick arrival at a fire scene difficult. | Deployment of the Trucks of which the maximum traveling speed is 80 km/hr or faster | The substantial shortening of the arrival time of a fire company at the scene of a fire will improve the initial fire-fighting system, reducing fire damage. |

### 3.1.2 Indirect Effects

Fire damage has been showing a steadily increasing trend in the three target governorates where tourism, petroleum, mining and manufacturing industries are active due to the development of these industries and population growth. However, the weak fire-fighting

system has been a stumbling block to the smooth development of these governorates as occasional large-scale disasters cannot be sufficiently contained.

The major progress of the development of the fire service strength due to the deployment of new fire trucks under the Project will protect the lives of local residents as well as tourists from fires and other disasters and will also reduce economic loss, resulting in the development of various local industries and contributing to the overall economic growth of Egypt.

## 3.2 Recommendations

The following recommendations are made to further enhance and sustain the various effects of the Project for a long-term.

(1) Training of Operation and Maintenance Skills for the Medium Size Chemical Trucks, etc.

An effective maintenance procedure and preservation of sufficient technical capability will be essential to constantly maintain the fire equipment in fully operational condition for a long period of time. Meanwhile, fire crews must be familiar with modern fire-fighting tactics and the necessary skills to handle fire equipment.

While the current equipment operation and maintenance skills in Egypt are of an acceptable level, training is necessary in view of the further improvement of these skills.

(2) Promotion of Comprehensive Fire-Fighting Measures

For the more effective use of fire equipment, ① the installation of fire hydrant and other fire fighting water sources, ② improvement of the fire protection performance of buildings and ③ enhancement of the fire prevention system at workplaces and the fire prevention awareness of local residents are important. Various measures designed to achieve these targets should be systematically implemented over many years.

For this reason, comprehensive fire-fighting measures should be promoted, including such measures reflecting the local situation as the creation of fire prevention groups at workplaces and in communities, publicity activities (support activities for initial fire-fighting, rescue and relief, evacuation and operation by fire companies, etc.) in addition to the improvement of fire equipment.

(3) Fire Prevention Publicity and Guidance Using Fire Trucks

The active implementation of fire prevention publicity and guidance using fire trucks is desirable as a measure corresponding to (2)-③ above. These activities can be expected to improve the interest of local residents and people at workplaces in fire-fighting and the awareness of and need for fire prevention and concrete actions by these people.