BASIC DESIGN STUDY REPORT

ON

THE PROJECT FOR PROVIDING

FIRE FIGHTING TRUCKS AND EQUIPMENT

FOR ISLAMABAD

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

FEBRUARY 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

No.

BASIC DESIGN STUDY REPORT

ON

THE PROJECT FOR PROVIDING

FIRE FIGHTING TRUCKS AND EQUIPMENT

FOR ISLAMABAD

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

FEBRUARY 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

G R S
C R (1)
92 — 016

PREFACE

In response to a request from the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a basic design study on the Project for Providing Firefighting Trucks and Equipment for Islamabad and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Pakistan a study team headed by Mr. Koichi Miyoshi, Director of Second Basic Design Study Division, Grant Aid Study & Design Department, JICA, from November 11 to November 25, 1991.

The team held discussions with the officials concerned of the Government of Pakistan, and conducted a field study at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

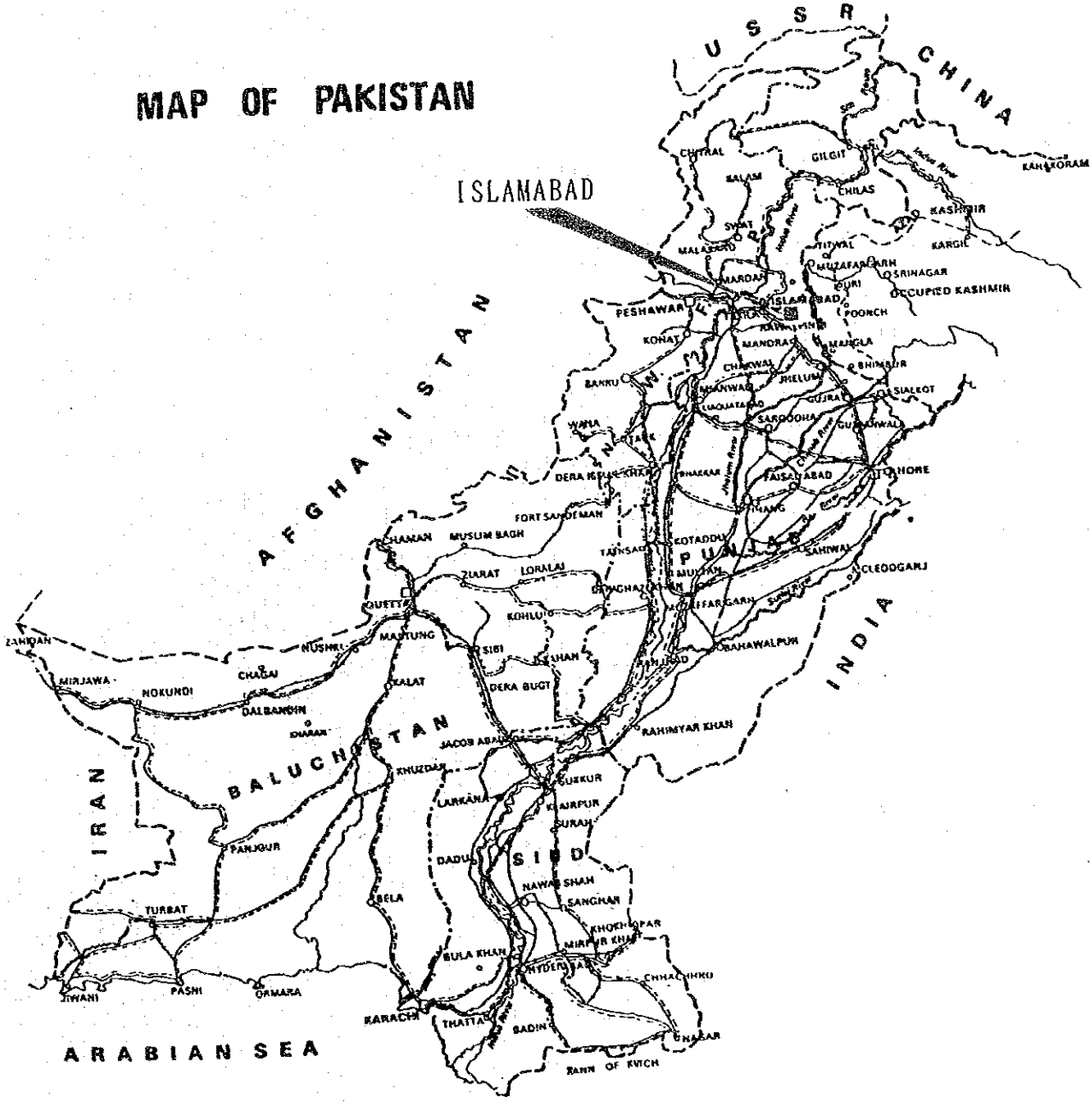
I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

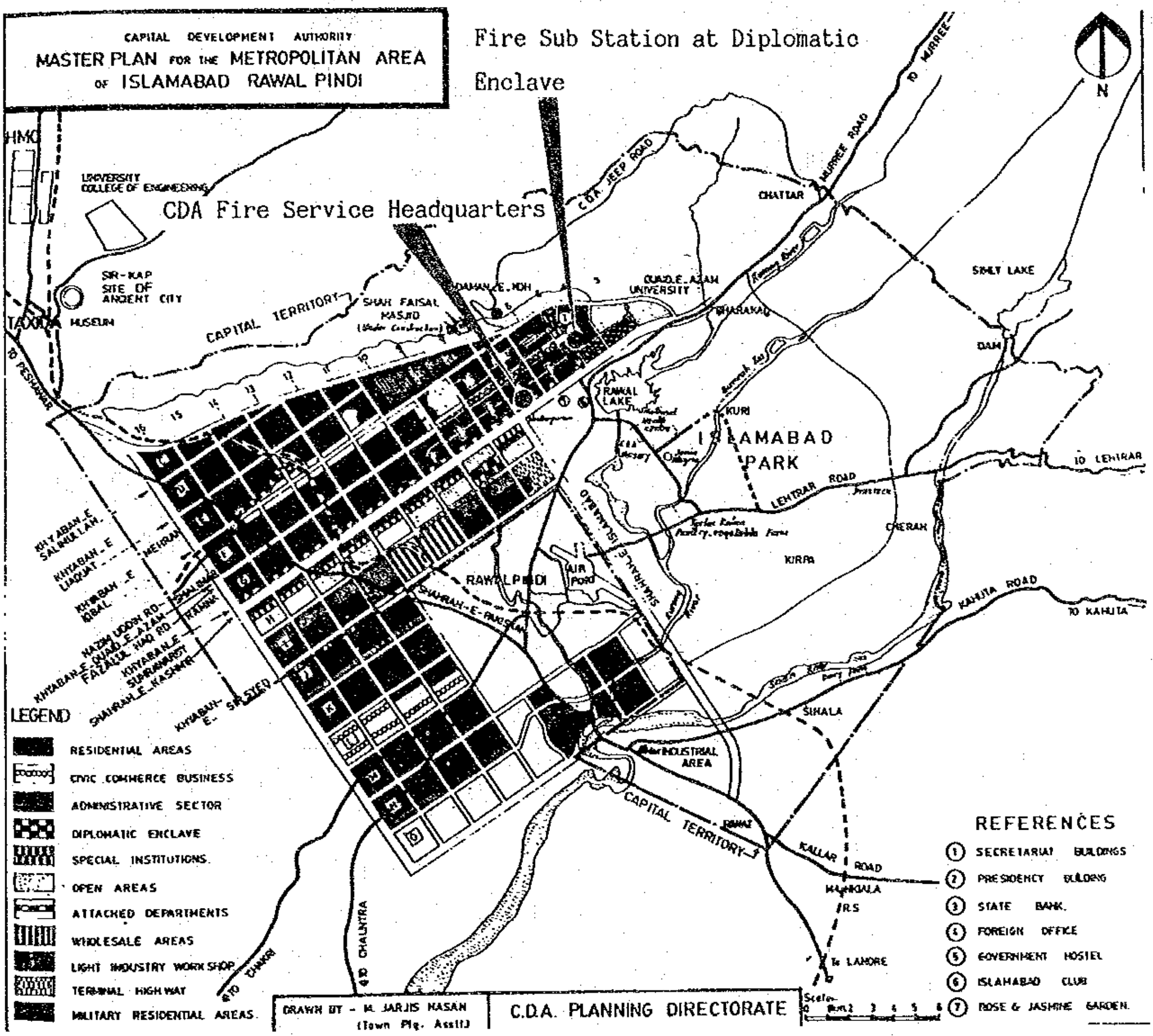
I wish to express my sincere appreciation to the officials concerned of the Government of the Islamic Republic of Pakistan for their close cooperation extended to the team.

February 1992

Kensuke Yanagiya

Kensuke Yanagiya
President
Japan International Cooperation Agency


MAP OF PAKISTAN
ISLAMABAD
U S S R
CHINA
AFGHANISTAN
IRAN
INDIA
ARABIAN SEA
BALUCHISTAN
SIND
PUNJAB
CHITRAL
GILGIT
SKARDU
KHUNJERAB PASS
KARAKORAM
SWAT
KASHMIR
KARGIL
SRINAGAR
OCCUPIED KASHMIR
MUZAFFARABAD
PESHAWAR
KOHAT
BANNU
MARDAN
RAWALPINDI
MANDRA
MANGLA
CHAKWAL
JHELUM
SIALKOT
GUJRAT
SARGODHA
LAHORE
FAISALABAD
MULTAN
SAHIWAL
BAHAWALPUR
RAHIMYAR KHAN
SUKKUR
KHAIRPUR
NAWABSHAH
SANGHAR
MIRPUR KHAS
HYDERABAD
KHOKHROPAR
CHHACHHRO
KARACHI
THATTA
BADIN
UMARKOT
RANN OF KUTCH
DADU
LARKANA
JACOBABAD
KHUZDAR
PANJGUR
TURBAT
BELA
ZHOB
QUETTA
CHAMAN
FORT SANDEMAN
MUSLIM BAGH
ZIARAT
LORALAI
KOHLU
MASTUNG
SIBI
KALAT
DERA BUGTI
NUSHKI
CHAGAI
DALBANDIN
NOKUNDI
MIRJAWA
ZAHIDAN
DERA ISMAIL KHAN
TANK
BANNU
WANA
JACOBABAD
JIWANI
PASNI
ORMARA



CAPITAL DEVELOPMENT AUTHORITY
MASTER PLAN FOR THE METROPOLITAN AREA OF ISLAMABAD RAWAL PINDI
Fire Sub Station at Diplomatic Enclave
CDA Fire Service Headquarters
CAPITAL TERRITORY
ISLAMABAD PARK
RAWAL LAKE
RAWALPINDI
LEGEND
RESIDENTIAL AREAS
CIVIC COMMERCE BUSINESS
ADMINISTRATIVE SECTOR
DIPLOMATIC ENCLAVE
SPECIAL INSTITUTIONS
OPEN AREAS
ATTACHED DEPARTMENTS
WHOLESALE AREAS
LIGHT INDUSTRY WORKSHOP
TERMINAL HIGHWAY
MILITARY RESIDENTIAL AREAS
REFERENCES
1 SECRETARIAT BUILDINGS
2 PRESIDENCY BUILDING
3 STATE BANK
4 FOREIGN OFFICE
5 GOVERNMENT HOSTEL
6 ISLAMABAD CLUB
7 ROSE & JASMINE GARDEN
C.D.A. PLANNING DIRECTORATE

The Whole View of The Planned Capital City, Islamabad

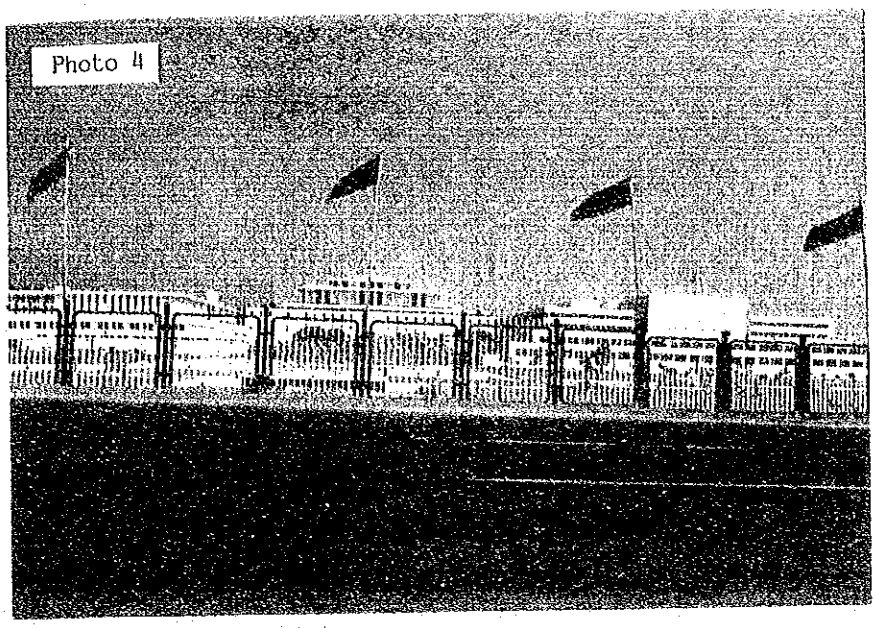
Photo 1

Photo 2

Photo 3

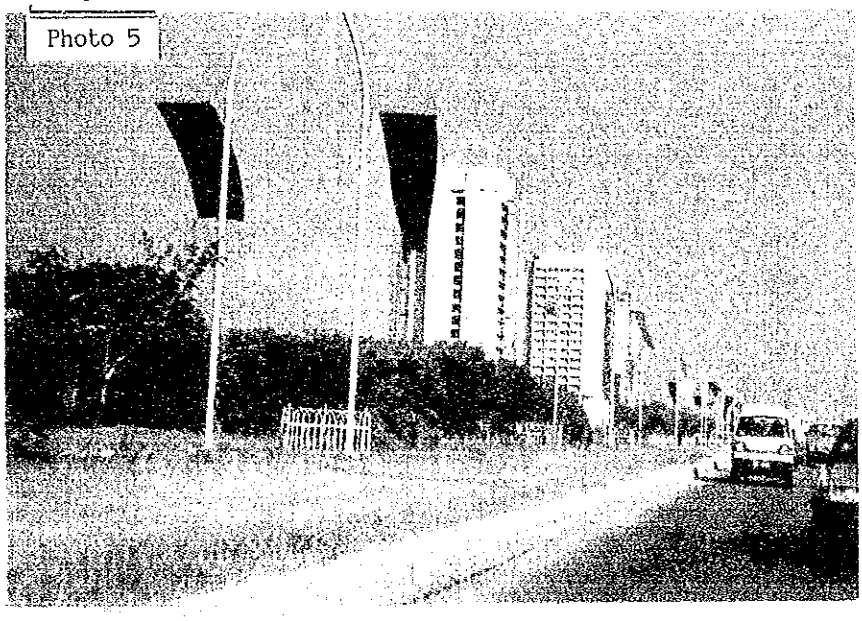
The President House and The Parliament House

Photo 4



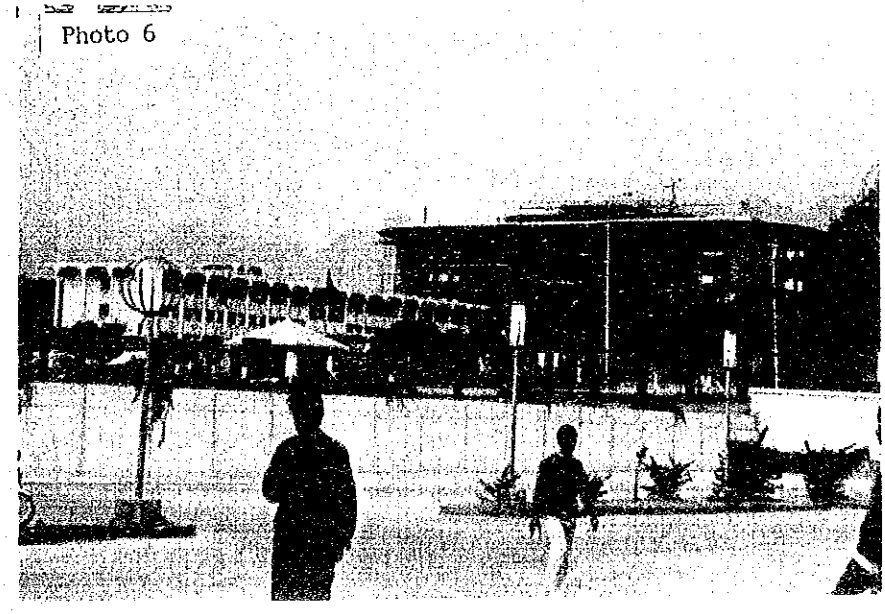
High-rise and Medium-rise Buildings on the Iqbal Street

Photo 5

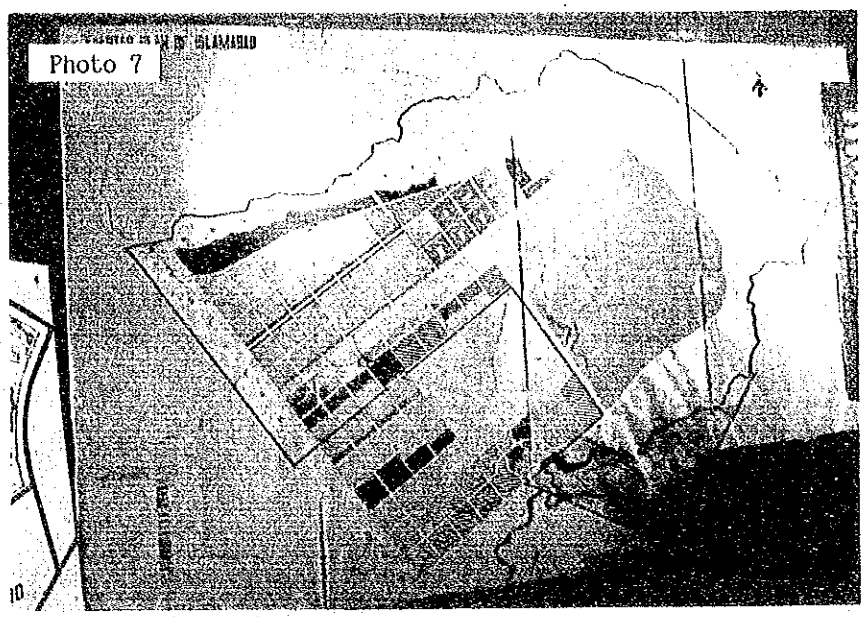


A Medium-rise Building under Construction

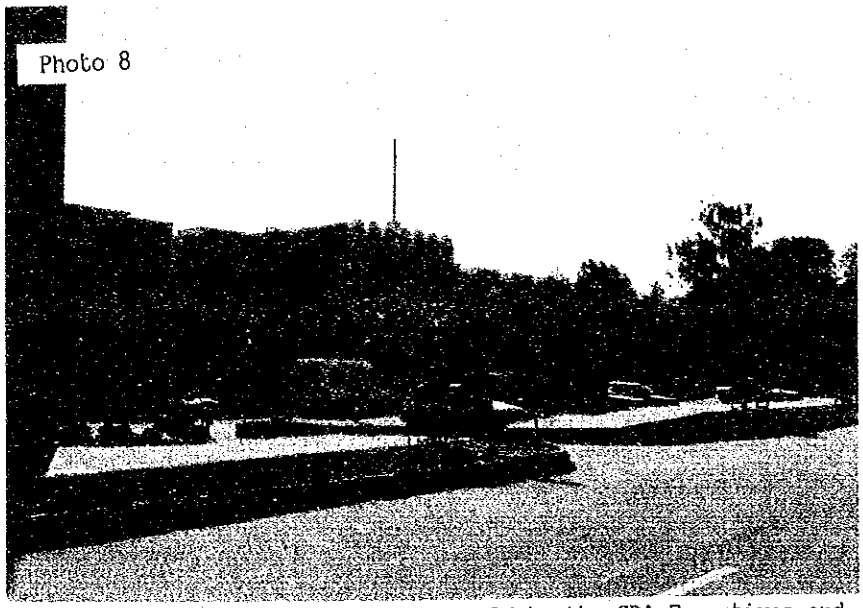
Photo 6



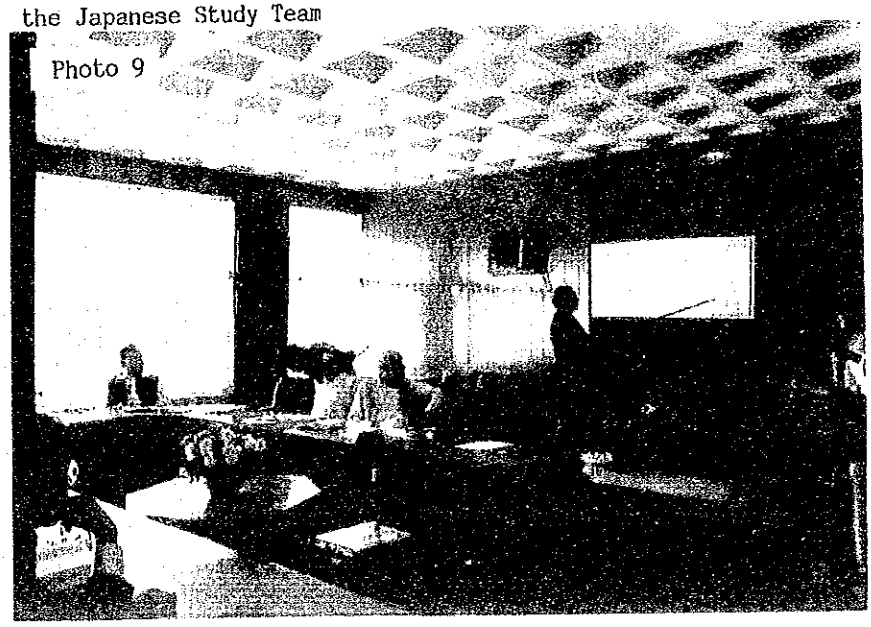
Master Plan of Islamabad



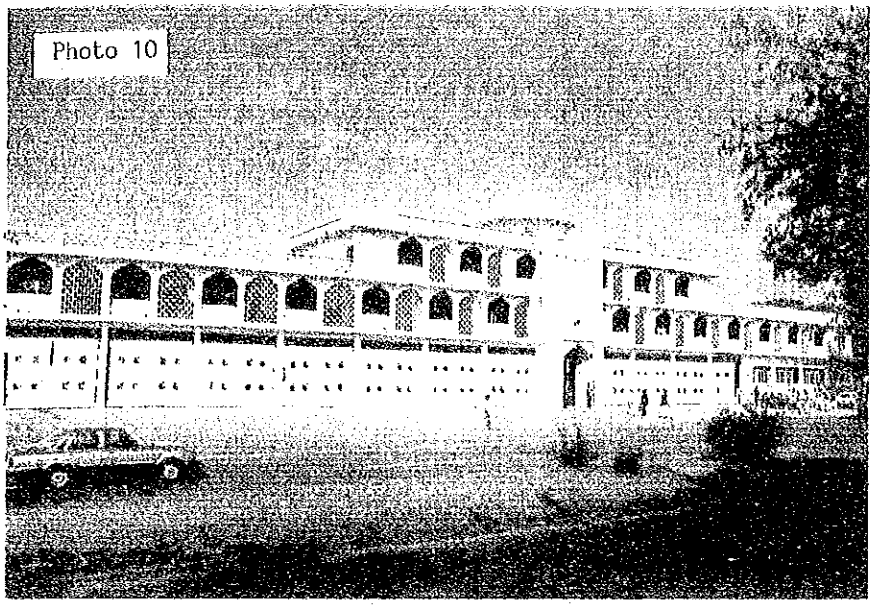
The Headquarters of the Capital Development Authority (CDA)



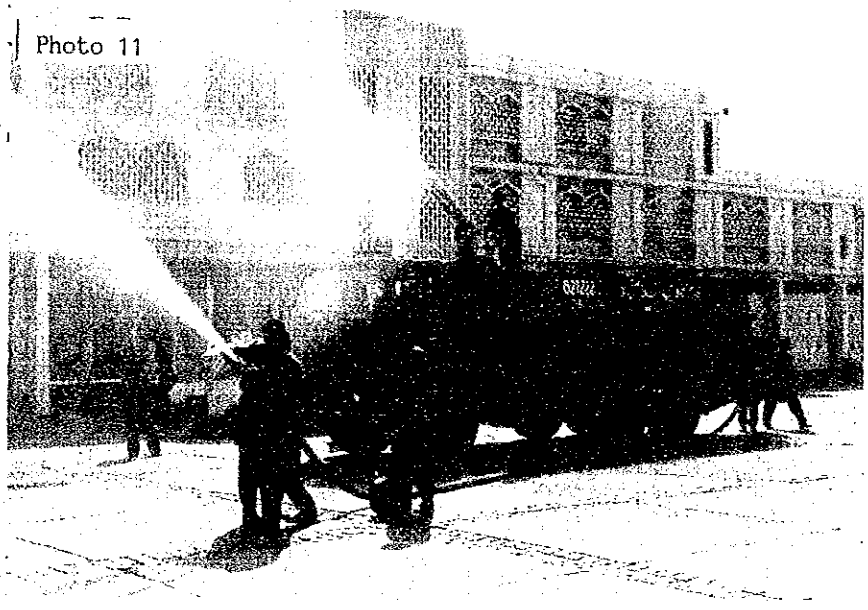
A Discussion Held by the CDA Executives and the Japanese Study Team



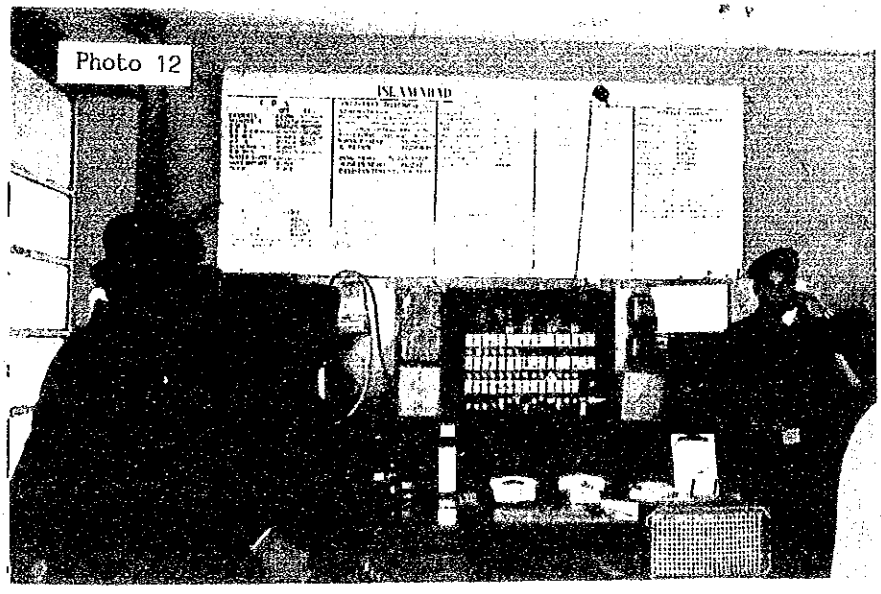
The Headquarters of the CDA Fire Service



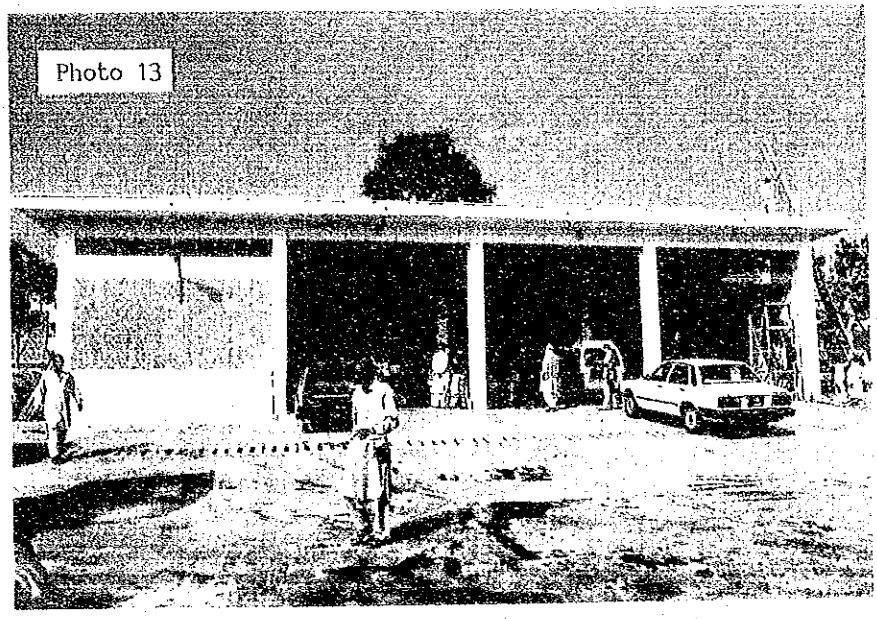
Fire-fighting Training



Control Room (Radio Communication set, Telephone set)

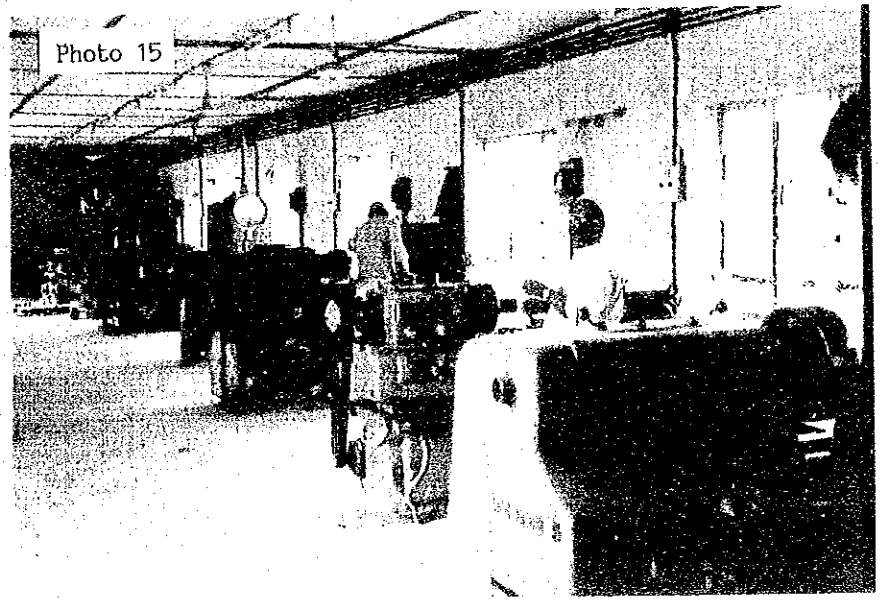


Separate Garage Building in the Backyard of the CDA Fire Service



Fire Station at Diplomatic Enclave

CDA Maintenance Shop (Machinery Pool Organization, CDA)



SUMMARY

Summary

The people of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") have been endeavoring to modernize their country since their independence in 1947. Among other projects, the construction of the planned city of Islamabad, the country's capital, has been making steady progress. In recent years especially, the city has seen a rapid increase in population as well as a sharply increased number of buildings, including medium- and high-rise buildings. Fire outbreaks doubled accordingly during the past two decades, showing the urgent necessity of strengtheing the municipal fire equipment to meet this situation as well as to deal with other disasters characteristic of large cities.

In Pakistan, the Capital Development Authority (hereinafter referred to as "CDA") and the four provinces (Punjab, Sind, Baluchistan and the Northwest Frontier Province) take charge of the fire service in their respective administrative regions. Additional fire equipment is most urgently needed in the Specified Area of Islamabad, which continues to develop as a planned city.

The Islamabad Fire Service (hereinafter referred to as "CDA Fire Service" is directly controlled by the CDA of Pakistan. While, the Rawalpindi Fire Service, a neighboring city, and the fire station at the Islamabad Airport are independently controlled by the Rawalpindi City Government and the Civil Aviation Bureau, respectively. However, Rawalpindi and the Islamabad Airport, which are constituent members of the Specified Area of Islamabad, are given advice and recommendations by the CDA, and there are close relationships between them.

Under the present circumstances, where industrial technologies are still in their developing stages, it is impossible for Pakistan to manufacture its own special high-performance fire engines for dealing with disasters characteristic of large modern cities. consequently it is necessary to introduce high-performance fire engines of foreign make, so that all fire vehicles now in use are of foreign make.

In addition, it is very difficult for Pakistan, which is now in financial difficulty, to introduce fire-fighting trucks or to renew superannuated fire engines in order to meet the development of the metropolitan area with its own limited funds.

Such being the case, the Government of Pakistan formulated the Project for Providing Fire-fighting Trucks and Equipment for Islamabad (hereinafter referred to as the "Project") to protect the people and property in the event of urban disasters, including fires, and requested grant aid assistance from the Government of Japan as to provision of the fire equipment necessary for the

Project.

In response to this request, the Government of Japan decided to conduct a basic design study, and the Japan International Cooperation Agency dispatched a basic design study team to Pakistan from 11 to 25 November 1991. The team confirmed the background and details of the request and conducted a survey on the system for implementing the Project, through discussions with the CDA persons concerned. The team also carries out a survey on actual conditions of the fire facilities in Islamabad, Rawalpindi, and the Islamabad Airport, as well as related matters. The survey results are summarized below.

(1) The fire services of Islamabad, Rawalpindi and the Islamabad Airport are independently organized. However, these organizations voluntarily respond to provide outside assistance in cases of spreading fires, in order to reduce damage, though there are no written outside response agreements. In such outside assistance, the CDA Fire Service in Isalmabad plays the leading role.

(2) Among the three organizations mentioned in (1) above, the CDA Fire Service is the best equipped. The Fire Service has only one fire defense headquarters at present, but one headquarters and five fire sub stations are planned for the future. At one of the sites planned for these stations, the fire sub station building has already been completed.

(3) The CDA Fire Service now engages 275 firemen and 21 fire engines in everyday fire defense activities. This equipment is far from being satisfactory, however. Of the 21 vehicles, for example, only 11 are always ready for use (two of them are ambulances). Moreover, most of them are so superannuated that they will not be operable several years from now. Among the nine fire engines located at the three fire stations of the Rawalpindi Fire Service, only three are operable. Such being the case, it is recognized that strengthening of fire equipment is indispensable in the metropolitan area.

Based on the above-mentioned situation, the Project for Providing Firefighting Trucks and Equipment for Islamabad has been formulated. The outline of the Project is as follows.

(1) Executing agency: CDA

(2) Planned activities: Planned major activities are fire extinguishing activities and rescue activities, which will contribute in the following ways.

· Fire extinguishing activities for high-rise buildings through the introduction

of aerial ladder trucks.

- Strengthened checking of the spread of fire in urban districts with an increased number of water tank trucks.
- Rescue service through the introduction of rescue trucks (rescue equipment).
- Strengthened outside assistance to neighboring regions.

(3) Details of equipment: The planned pieces of equipment are necessary and important to reinforce fire services not only in Islamabad but also in Rawalpindi and the Islamabad Airport.

Priorities given in selecting equipment: The equipment must be highly utilized, able to be used in special disasters, and widely applicable and easy to operate.

(4) Places of equipment: Pieces of equipment provided in accordance with the Project will be placed in the headquarters building of the CDA Fire Service and the new fire sub station to be established (whose building has already been completed at the diplomatic enclave).

Details of planned fire equipment are shown in the following table.

List of pieces of fire equipment to be provided

Fire equipment	Quantity
Fire engines	
46m Aerial Ladder Truck	1
Fire Truck with 12,000ℓ Water Tank	9
Fire Truck with 4,000ℓ Water Tank	2
Rescue Truck	1
Command Car	1
Utility Truck (Pickup Truck)	1
Equipment	
Rescue Equipment (a radio set included)	1 set
Supplies (spare parts)	1 set
Total	15 pieces and 2 sets

The term of the work required for the Project's implementation is estimated at three months for detailed design and 11 months for procurement and transportation of equipment.

The following effects can be expected from the Project's implementation under grant aid cooperation of the Government of Japan.

(1) It improves fire service organizations which play the leading role in reducing damage from fires and other disasters in the metropolitan district of Pakistan, and thereby maintains peace and order and contributes to the promotion of public welfare.

(2) The introduction of aerial ladder trucks will make possible rescue service in high-rise buildings, and thereby contributes to the protection of people and property in the event of disasters including fires.

(3) Strengthened fire equipment in the CDA Fire Service in turn strengthens the system to provide outside assistance, and there by contributes to the reduction of damage from fires and other disasters in the entire metropolitan district.

The evaluation of the Project's implementation, maintenance and management is as follows.

(1) Location of planned fire equipment: Fire engines and equipment to be provided are to be located at the CDA Fire Service Headquarters and the new fire sub station at the diplomatic enclave. There is no problem regarding space because the garages there have sufficient space.

(2) Number of firemen: The CDA Fire Service now operates the existing fire engines with 275 firemen. An increase is being planned for firemen as a part of the national plan for strenghening fire service force. It is planned that 35 firemen including three officers, will be newly employed. There is no problem regarding the number of firemen.

(3) Maintenance and management of vehicles: The CDA has a large vehicle maintenance shop and conducts repairs and maintenance of fire engines. This shop has sufficient capability to handle the general maintenance and management of vehicles to be provided under the Project. There are no financial or technical problems.

The Project's implementation will have the above-mentioned effects and will ensure the safety of the citizens of the metropolitan district of Pakistan. The Project is expected to contribute to modernization of the fire service in Pakistan. Based on these considerations, the Project's implementation under grant aid cooperation is regarded as appropriate.

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR PROVIDING FIRE-FIGHTING TRUCKS AND EQUIPMENT FOR ISLAMABAD IN THE ISLAMIC REPUBLIC OF PAKISTAN

Contents

CHAPTER 1 INTRODUCTION

Chapter 1 Introduction

The Government of Pakistan formulated the Project for Providing Fire-fighting Trucks and Equipment for Islamabad, in order to better deal with disasters, including fires, which are ever increasing with the progress of the construction of the country's capital, Islamabad, a planned city. Through the Project's implementation, the Government also intends to strengthen the fire service forces of Rawalpindi and the Islamabad Airport, both of which are constituent members of the Specified Area of Islamabad. Therefore, the Government has requested the grant aid cooperation of Japan regarding the provision of the necessary equipment.

In response to this request, the Government of Japan decided to conduct a basic design study, and the Japan International Cooperation Agency dispatched the Basic Design Study Team headed by Koichi Miyoshi, Director of the Second Basic Design Study Division, Grant Aid Cooperation Project Study Department, to Pakistan between 11 and 25 November 1991.

The Basic Design Study Team had a series of discussions with the CDA officials concerned, made a survey on the condition of fire service facilities in Islamabad, Rawalpindi, the Islamabad Airport, and collected data and information, to confirm the range of cooperation, details of requested equipment, expenses borne by the Government of Pakistan, etc. Returning to Japan, the Team selected the most suitable equipment, estimated the expenses for the Project's implementation and formulated an implementation plan, based on the survey results.

This report describes the selection of fire equipment which is deemed most appropriate, the basic design, the implementation plan, the maintenance plan, evaluation of the Project, recommendations, etc., for the Project's implementation. The members of the Team, study schedule, the list of interviewed persons and Minutes of Discussions are included as appendices.

CHAPTER 2 BACKGROUND OF THE PROJECT

Chapter 2 Background of the Project

2.1 Outline of the Fire Defense System of Pakistan

2.1.1 Present Situation of the National Fire Defense System

Pakistan has been endeavoring to construct a modern nation since its independence. As part of this effort, the Government of Pakistan intends to improve the national fire defense system to protect people's lives and property from disasters including fires.

On a national administrative basis, the Cabinet Secretariat controls fire defense. However, the Ministry is just managing the fire service in Islamabad through the CDA. There are no established laws there such as a fire organization act or a fire service act, which stipulate national fire organization. Consequently the Government of Pakistan is to strengthen the national fire defense system, including fire service force standards, by establishing a law, based on the knowledge of the actual numbers of firemen and fire engines throughout the nation.

Fire services in regions other than the capital are independently provided by municipalities, under the control of provincial governments. Such services, however, are not based on established laws such as the Fire Service Act but are provided as customary practices. Few surveys therefore have been conducted regarding the number of fires, burnt floor areas, the number of lost lives, injured persons, the amount of damage and causes of fire outbreaks. There are no reliable statistics, either.

In Pakistan, educational institutions such as a fire defense college and fire academy have not been established. This has resulted in the insufficient fostering of firemen with a high level of expertise and techniques to deal with ever diversifying disasters. The fire service has yet to be modernized in Pakistan.

Under these circumstances, the Government of Pakistan is to review the national fire defense system and accelerate improvements for establishing a modern fire defense system.

2.1.2 Present Situation of Fire Service Administration

Fire services now provided have an insufficient legal basis. They are provided just as a matter of custom, and the range of the fire service administration is not specified, as a result. For instance, it is often the case that instructions to equip large buildings with fire fighting facilities are given not by fire service institutions but by provincial governments or city departments or bureaus. Consequently, on fire defense expertise is not fully utilized: fire-fighting water sources are few and the provision of necessary facilities for fire prevention equipment, including fire extinguishers, standpipes, sprinkler systems, fire alarm systems and escape facilities, are poor.

2.2 Present Situation of National and Local Public Bodies' Fire Defense Systems

Outlines of fire defense systems in Islamabad, Rawalpindi and the Islamabad Airport, which constitute the Specified Area of Islamabad, are described below.

2.2.1 Fire Defense System of the CDA Fire Service

(1) Position of the Fire Service

Islamabad, a planned city, is the capital of Pakistan. Its construction is still in progress now. The city has an area of 906.5㎢ (urban area: about 220 ㎢) with a population of 400,000. With the progress of construction of the city, its form is rapidly changing, with its population increasing year after year, and disaster situations and rescue activities have become more diversified accordingly. It is urgent to modernize and strengthen the fire service force to meet this situation.

The CDA Fire Service is under the direct control of the CDA which is part of the national administrative system. Its position is shown in Fig. 2-1 " Organization of Pakistani Government" and Fig. 2-2 "Present Organization of CDA"

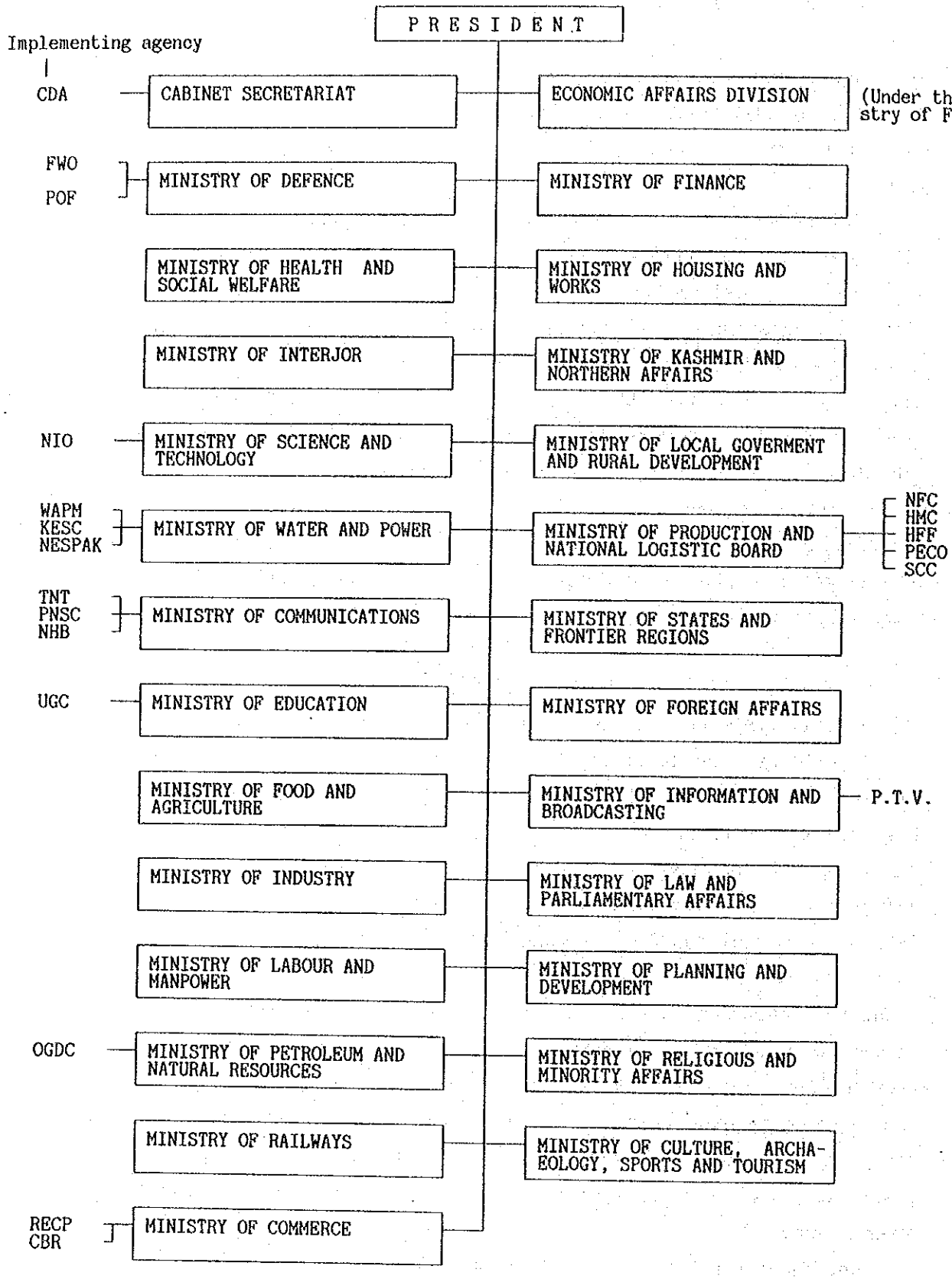
(2) Present Status of Personnel and Equipment of the Fire Service

The CDA Fire Service provides everyday fire services with 275 firemen and 21 fire engines. One of the latter is regularly parked at the official residence of the President and another at the official residence of the Prime Minister, and the others are parked in the Fire Service building. However, most of the 21 fire engines were manufactured many years ago, as shown in Table 2-1, and some were manufactured as long as 28 years ago, far exceeding their useful life. The fire engines made in Czechoslovakia, which currently constitute the main strength of the fire service, have been provided on a barter basis, and it is impossible to procure spare parts for them. Parts are detached from those fire engines which cannot be repaired any longer, and are used to repair other fire engines which are out of order. Under these circumstances, only 11 fire engines are now operable, and there is the possibility that fire engines now in operation may become unrepairable in several years.

One characteristic of the CDA Fire Service is that several firemen are regularly stationed at the President House and the Parliament House, etc. They are in charge of initial fire defense by engaging themselves in fire-fighting using standpipes and fire extinguishers in case a fire breaks out.

Fig.2-1

ORGANIZATION OF PAKISTANI GOVERNMENT



Source:Rafique Akhtar,Pakistan Year Book 1984-85 .

Fig. 2-2 Organization of The Capital Development Authority (CDA)

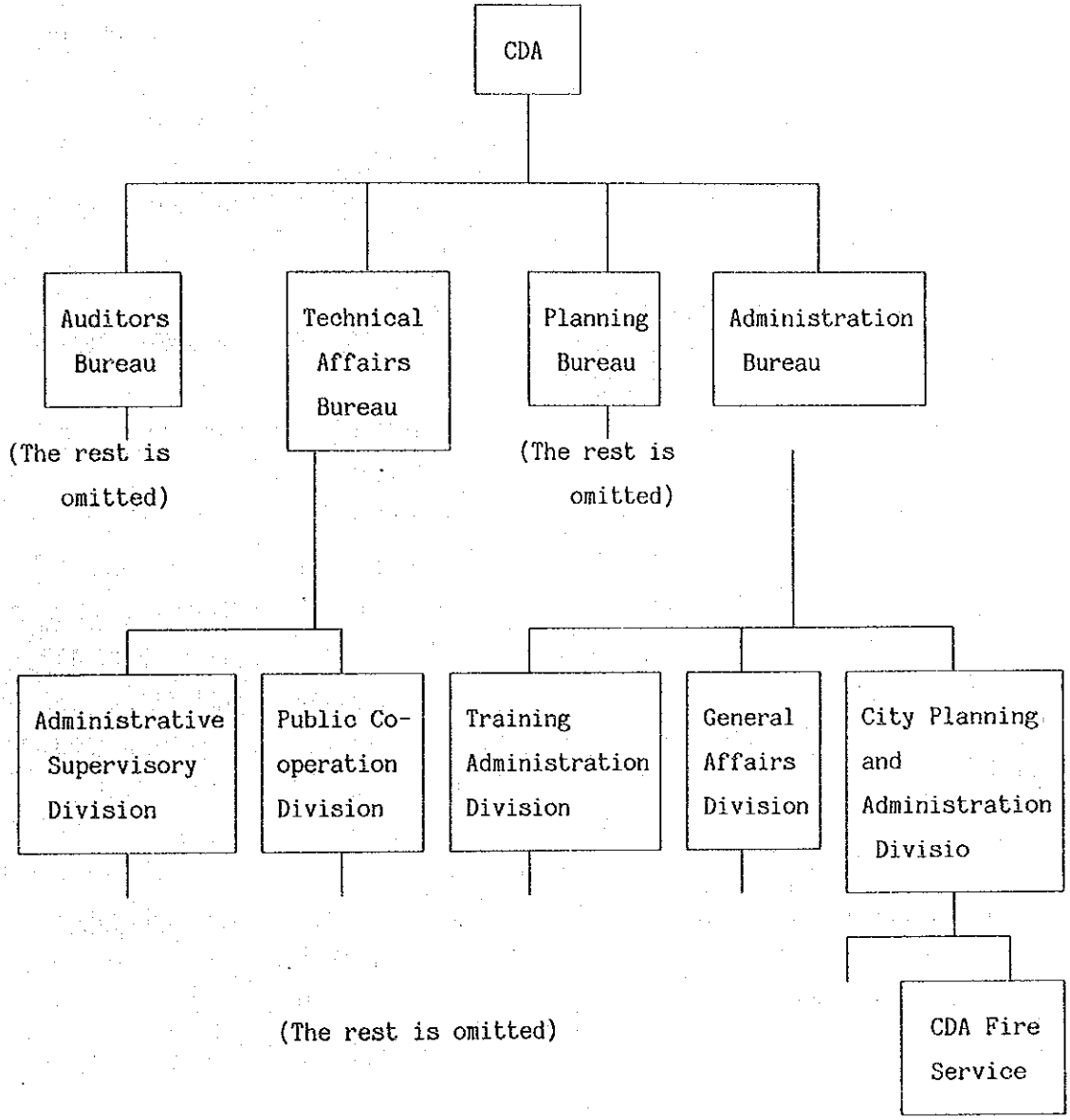


Table 2-1

VEHICLES POSITION OF CDA FIRE SERVICE

1991.11.16

No.	TYPE OF VEHICLS	MODEL	MAKER	REGISTRATION No.	REMARKS
1	SNORKEL TRUCK 27 M	1966	L.A.FRANCE	RIK-3477	UNSERVICEABLE
2	FIRE TENDER	1963	LEYLAND	RIK-3478	UNSERVICEABLE
3		1973	BEDFORD	IDA-3724	〃
4		1982	〃	IDA-3958	〃
5		1985	〃	IDB-2081	〃
6		〃	TATRA	IDB-4394	〃
7		〃	〃	IDB-4395	SERVICEABLE
8		〃	〃	IDB-4396	TROUBLE (ASSIGN AT PRIME MINISTER HOUSE)
9		〃	〃	IDB-4397	SERVICEABLE (ASSIGN AT PRESIDENT HOUSE)
10		〃	〃	IDB-4398	SERVICEABLE
11		〃	〃	IDB-4399	TROUBLE
12	WATER TENDER	1985	BEDFORD	IDB-2471	UNSERVICEABLE
13		〃	TATRA	IDB-9241	SERVICEABLE
14		〃	〃	IDB-9242	〃
15		〃	〃	IDB-9243	UNSERVICEABLE
16		〃	〃	IDB-8459	SERVICEABLE
17		〃	〃	IDB-8467	〃
18	MINI FIRE TENDER	1988	LAND ROVER	IDC-4208	SERVICEABLE
19		〃	〃	IDC-4209	〃
20	AMBULANCE	1985	TOYOTA	IDB-3531	SERVICEABLE
21		〃	〃	IDB-3532	〃

Table 2-2

EXISTING SET UP OF CDA FIRE SERVICE

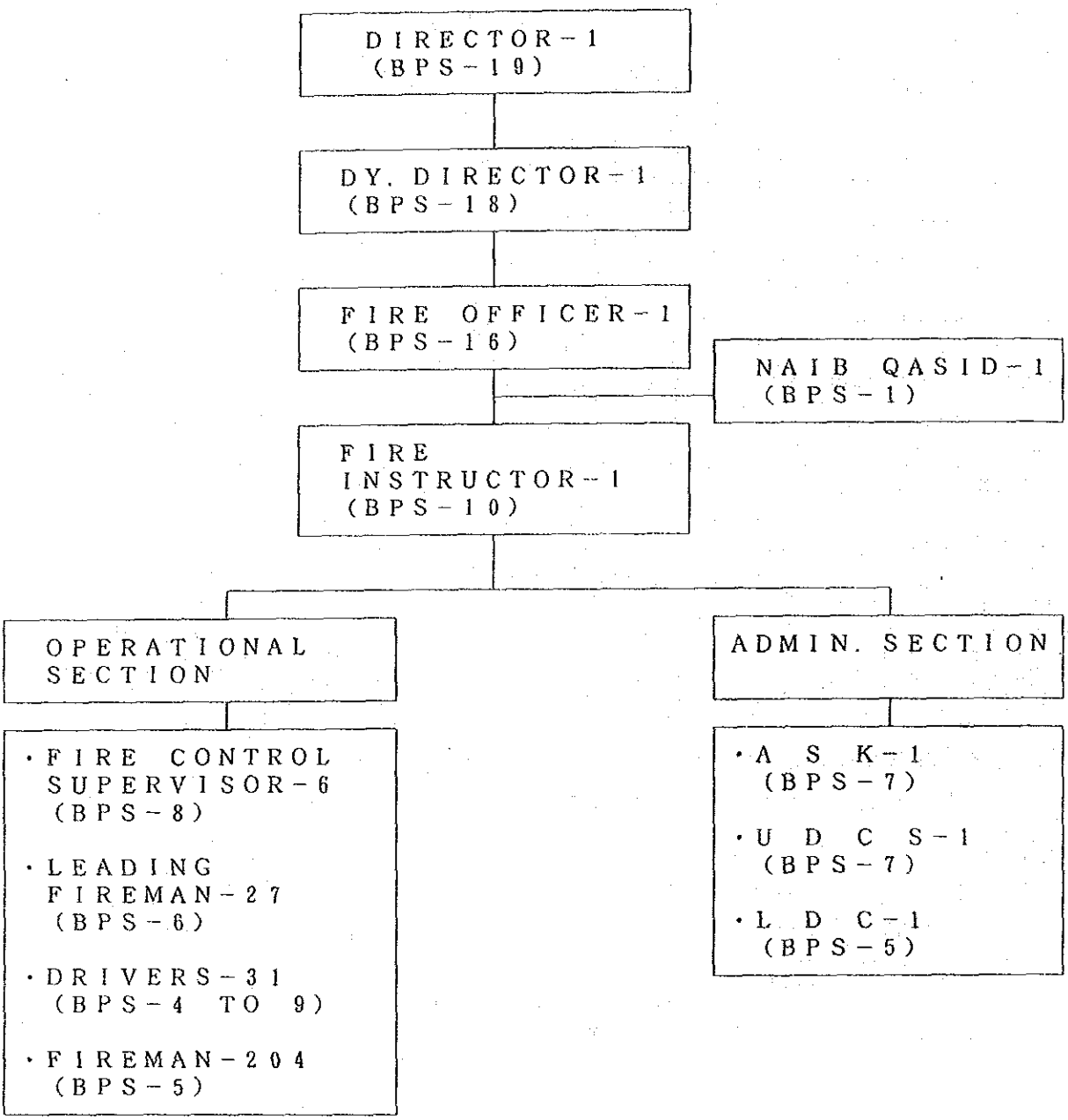
	STAFF DEPLOYED	EXISTING VEHICLES AND ARRANGEMENTS
FIRE HEADQUARTERS	・FIRE OFFICER 1 ・FIRE INSTRUCTOR 1 ・FIRE CONTROL SUPERVISOR 3 ・LEADING FIREMAN 11 ・DRIVERS 25 ・FIREMANS 84 ・A. S. K 1 ・U. D. C 1 ・L. D. C 1 ・NAIB QASID 1	・FIRE TENDER 8 ・WATER TENDER 6 ・MINI FIRE TENDER 2 ・AMBULANCE 2 ※ Most of the vehicles are undependable.
PRESIDENT HOUSE	・FIRE CONTROL SUPERVISOR 3 ・LEADING FIREMAN 3 ・DRIVERS 3 ・FIREMANS 36	・FIRE VEHICLE 1 ・FIRE HYDRANTS 5 ・AID FIRE FIGHTING EQUIPMENT (FIRE EXTINGUISHERS. HOUSE PIPE etc.)
PRIME MINISTER HOUSE	・LEADING FIREMAN 3 ・DRIVERS 3 ・FIREMANS 12	・FIRE VEHICLE 1
PARLIAMENT HOUSE	・LEADING FIREMAN 3 ・FIREMANS 12	・FIRE HYDRANTS 3 ・PROVIDED FIRST AID FIRE FIGHTING EQUIPMENTS.
CABINET DIVISION	・LEADING FIREMAN 3 ・FIREMANS 12	・FIRE HYDRANTS 3 ・PROVIDED FIRST AID FIRE FIGHTING EQUIPMENTS.
PAKISTAN SECT: PHASE-I	・LEADING FIREMAN 1 ・FIREMANS 12	・FIRE HYDRANTS 6 ・PROVIDED FIRST AID FIRE FIGHTING EQUIPMENTS. ・PROVIDED DRY RIZERS. ・SMOKE CHECK DOORS ・UNDER GROUND WATER TANK (Capacity 150m³)
PAKISTAN SECT: PHASE-II	・LEADING FIREMAN 1 ・FIREMANS 12	・FIRE HYDRANTS 6 ・PROVIDED FIRST AID FIRE FIGHTING EQUIPMENTS. ・PROVIDED DRY RIZERS. ・SMOKE CHECK DOORS
FOREIGN AFFAIRS	・LEADING FIREMAN 1 ・FIREMANS 12	・FIRE HYDRANTS 4 ・PROVIDED FIRST AID FIGHTING EQIPMENTS.
INTELLIGENCE BUREAU	・LEADING FIREMAN 1 ・FIREMANS 12	・FIRE HYDRANTS 4 ・PROVIDED FIRST AID FIGHTING EQIPMENTS.

Note

All the above 8 important buildings are being given coverage from the fire headquaters no sub station have been built except the one in dipiomatic enclave so far to cover these buildings and other various parts of the city independently and locally.

Fig. 2-3

EXISTING ORGANIZATION CHART OF DIRECTORATE OF MUNICIPAL ADMINISTRATION



(3) Strengthening of the Organization of the Fire Service

It is very inefficient for the fire headquarters to cover the entire area of the extensive metropolitan area. To reduce damage from fires, etc., it is indispensable to establish fire sub stations at appropirate intervals and thereby to shorten the response time of fire companies so that they can quickly start their fire-fighting activities. For this purpose, the CDA has a plan to establish five fire sub stations, for which sites have already been selected.(see Fig.2-4) In one of these sites, a fire station building has already been constructed at the diplomat enclave, with a garage which can house three large-size fire engines (or six small-size fire engines) and one medium-size fire engine. This fire sub station can be opened any time if it is equipped with firemen and fire engines.

(4) Dispatch of Fire Companies

Table 2-3 shows annual responses of the CDA Fire Service from 1981 to 1990. In recent years, the Fire Service responded to about 250 ~300 fires annually.

However, the CDA estimates that the actual number of fire outbreaks is to be twice the number of responses, because it is said that many fires are not reported. Non-reporting to the Fire Service is attributable to the low spread rate of telephones, which is about 5%, except in the central part of the metropolitan area. Another reason is that houses are made of earth, blocks or concrete in Pakistan, with a considerable distance between them, which results in little possibility of fires spreading. It may often be the case that a fire burns itself out after burning only one house. On receiving a fire report, a fire company rush to the scene on a fire engine accompanied by an ambulance. The commander at the fire scene requests assistance if necessary.

As this ambulance is used to carry injured persons from the fire scene to hospitals, a new system to have accidents other than fires handled by separate organizations is under examination.

(5) Situation of Medium- and High-rise Buildings and Fire Service

In Islamabad, there were 257 medium- and high-rise buildings as of December 1990. It is reported that 170 of them are more than five-storied buildings and 6 of them are more than 31 meters high and require fire-extinguishing operations with aerial ladder trucks. A 27-m snorkel truck, a product of La France of the United States, was at work until May 1991. However, it is so superannuated that it cannot stand repairs any more. Currently there are no fire engines which can cope with fire fighting for high-rise buildings.

Fig. 2-4 Location of the CDA Fire Service Headquarters and Five Fire Sub Stations

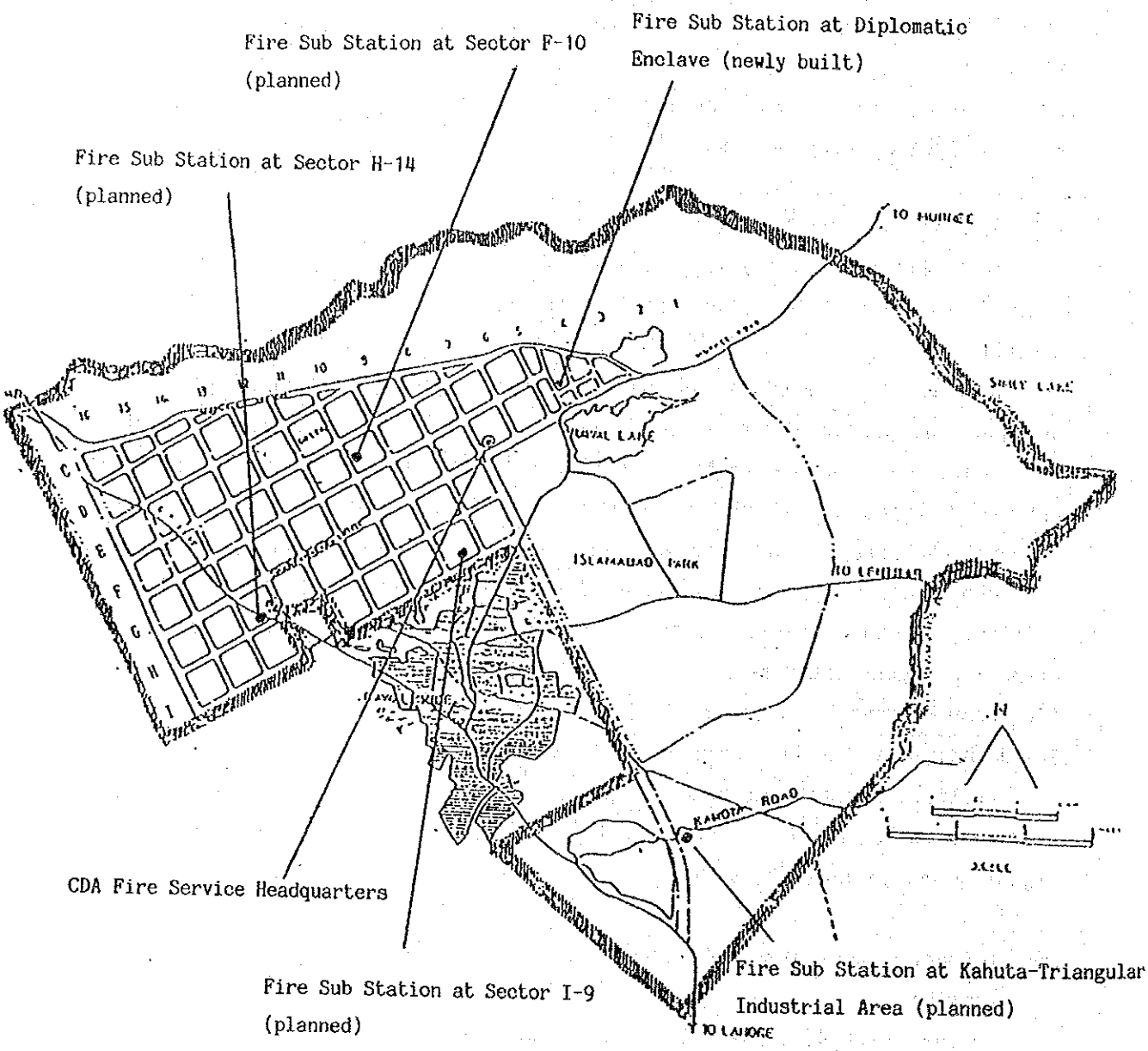


Table 2-3

YEARLY PROGRESS REPORT OF FIRE INCIDENTS FROM 1981 TO 1990

YEARS	INCIDENTS
1 9 8 1	1 8 6
1 9 8 2	1 0 3
1 9 8 3	1 2 6
1 9 8 4	1 9 0
1 9 8 5	1 5 6
1 9 8 6	1 8 0
1 9 8 7	1 8 7
1 9 8 8	2 6 0
1 9 8 9	3 0 6
1 9 9 0	2 8 8
TOTAL	1, 9 8 2

(6) Maintenance of Fire Engines

There is a garage and repair shop (about 50㎡) in the backyard of the Fire Service. Simple repairs are made there, while heavy repairs are made in the large vehicle repair shop belonging to the CDA. This repair shop has 52 experts including the shop manager. They are highly capable mechanics, who can make most repairs if they are provided with spare parts.

(7) Education and Training of Firemen

There are no educational or training institutions for firemen such as a fire academy. One instructor in charge of firemen training is assigned in the Fire Service. This instructor gives elementary training in the backyard. There are no established fire-fighting tactics, either, for rational and effective fire-fighting operations. In order to deal with ever more diverse disasters in an appropriate manner, it is necessary to give highly specialized education and training as well as to establish modern fire-fighting tactics.

(8) Fire Prevention Administration and Participation of the Fire Organization

Regarding those buildings whose scales exceed the specified scale, the CDA has established standards to make the owners provide their buildings with fire prevention equipment --① sprinkler systems, ② standpipes, ③ fire department standpipes, ④ fire alarm systems, ⑤ escape facilities, and ⑥ fire-using facilities. However, these are controlled by technical departments other than the Fire Service, and they are not sufficiently utilized. The Fire Service does not provide an active campaign for fire prevention, either.

(9) Fire-Fighting Water Sources

In Islamabad, water pipes have been laid to supply household water. However, there are no hydrants attached to these pipes, nor regulations requiring public fire cisterns. Moreover, the nation has very few natural water sources such as rivers, lakes and marshes. Only water in the reservoirs of large buildings provide fire-fighting water sources. Under these circumstances, where hydrants, fire cisterns, rivers, lakes and marshes cannot play an important role in fire fighting, the fire service must depend on water tank trucks.

(10) Volunteer Fire Corps and Private Fire Brigades

There are no volunteer fire organizations (volunteer fire corps) in Islamabad. Only the public fire organization deals with disasters including fires. There are no private fire brigades for buildings whose scales exceed the

specified scale (i.e., fire prevention property). Independent fire protection systems have not yet been established.

(11) Mutual Assistance

The fire organizations in Islamabad, Rawalpindi, the Islamabad Airport voluntarily respond in cases of spreading fires. The number of annual outside responses from Islamabad to Rawalpindi reaches 10 to 15, and from Rawalpindi to Islamabad 1 or 2. The fire organization of the Islamabad Airport receives outside assistance but it cannot respond to outside requests for assistance because it just has the mandatory minimum equipment stipulated by the International Civil Aviation Treaty (ICAO:1940).

2.2.2 Fire Defense System of the Rawalpindi Fire Service

(1) Fire Fighting Environment in Rawalpindi

As shown in Fig. 2.5, Rawalpindi is a large city adjacent to Islamabad, having an area of 120km² with a population of about 1,000,000. Unlike the planned city, roads other than trunk roads are narrow, houses stand roof to roof, and there are few fire-fighting water sources. The fire-fighting environment of Rawalpindi is very poor, and the threat of fires spreading is considerable in many regions.

(2) Organization, Personnel and Equipment of the Fire Service

The Rawalpindi Fire Service is controlled by the Rawalpindi City Government and organized in three fire stations. It has 125 firemen and 9 fire engines, which are all superannuated. For six of them no repairs are possible any longer, and the engine has been removed from a water tank truck, which is now used as a water reservoir. Fire-fighting services are provided with only three serviceable fire engines.

(3) Dispatch of Fire Companies

The Rawalpindi Fire Service responded to 85 spreading fires in 1990. The Fire Service estimates that the number of fire outbreaks was at about 500, of which few were reported (the spread rate of telephone is about 5%.) Even if reports are recived, the insufficient fire defense system sometimes does not allow responses. As a result, fire-fighting services are aimed at spreading fires only. In cases of a serious fire or simultaneous fires, which are beyond the capacity of the Fire Service, outside assistance is requested. The fire service in Rawalpindi depends on that in Islamabad. The renewal of the six unrepairable fire engines is not planned for the time being. All that the Rawalpindi Fire Service can do is to maintain the status quo. Regarding the dispatch of fire companies, one fire engine is sent as a report is received, and an assistance company is dispatched in response to the commander's request. If there is the possibility of the fire spreading, neighboring fire organizations are asked for assistance.

(4) Conditions of Buildings in Rawalpindi

There are many old buildings made of earth, blocks or concrete. There are no high-rise buildings exceeding 31 meters, but there are a number of 4- or 5-storied medium-rise buildings. However, the Rawalpindi Fire Service says that the actual number of them is unknown. The Fire Service does not have special fire engines such as aerial ladder trucks which can deal with fires in these buildings.

(5) Maintenance of the Fire Engines

There is a repair shop with a floor area of about 50 ㎡. There, simple maintenance is possible, such as changing engine oil and lamps, as well as battery charging. Heavy maintenance is entrusted to private maintenance shops.

(6) Education and Training of Firemen

Senior commanders give elementary education and training, while firemen learn how to conduct fire fighting operations based on experience. If a special fire occurs, they must fight it without sufficient knowledge and techniques.

(7) Fire Prevention Administration and Participation of the Fire Organization

The Provincial Government and the City Government intend to establish mandatory standards of fire prevention facilities for buildings whose scales exceed the specified scale, by studying the CDA's regulations, etc.

(8) Fire-Fighting Water Sources

Water pipes have been laid in the urban area of Rawalpindi, but there are no hydrants. There are no public fire cisterns, either. Natural water sources such as rivers and lakes are so few that they cannot be used as fire-fighting water sources. Therefore in Rawalpindi, too, fire-fighting operations must depend on water tank trucks, just as in Islamabad.

(9) Volunteer Fire Companies (Volunteer Fire Corps and Private Fire Brigades)

There are no volunteer fire organizations in Rawalpindi. There are no voluntary fire prevention systems such as private fire brigades organized for buildings whose scales exceed the specified scale. Fire service is provided only by the public fire organization.

2.2.3 Fire Defense System of the Islamabad Airport Fire Station

(1) Organization, Personnel and Equipment of the Fire Station

The Islamabad Airport Fire Station is controlled by the Civil Aviation Bureau. It has been established for disaster relief within the airport in cases of airplane crash fires, etc., in accordance with the International Civil Aviation Organization Treaty (1940). The Islamabad Airport Fire Station now has 60 firemen and seven fire engines including three chemical trucks. Since the airport isshared with the Pakistani Air Force, about half of the fire defense system is supported by the Air Force.

(2) Maintenance of the Fire Engines

The fire engines are in better condition than those of the Islamabad and Rawalpindi Fire Services. However, fire engines of the Islamabad Airport Fire Station are all so old that some of them are almost unrepairable.

(3) Fire-Fighting Water Sources

Fire equipment and fire-fighting water sources of the airport satisfy the standards required for an international airport.

(4) Education and Training of Firemen

Education is given regarding fire extinguishing and rescue from airplane crash fires. However, limitations in the use of burning agents and extinguishing agents do not allow sufficient practice in fire control with simulated crach fires.

(5) Airplane Crash Fires and Mutual Assistance in Fire Fighting

The Islamabad Airport has experienced no big fires or accidents. The Airport Fire Station therefore has not conducted disaster relief operations including fire extinguishing and rescue. However, the current fire service force does not allow the dispatch of fire companies to assist Islamabad or Rawalpindi in cases of spreading fires. The Airport Fire Station does receive assistance from the Fire Services of these cities, but it cannot assist them in fire-fighting operations.

2.3 Present Condition of Fire Service Force in the CDA Area and Comparison with Foreign Cities

2.3.1 Number of Fire Engines and their Operational Condition within the CDA Areas

Most fire engines possessed by the fire organizations of Islamabad, Rawalpindi and the Islamabad Airport, which constitute the Specified Area of Islamabad, are superannuated, exceeding their service life. The fire engines made in Czechoslovakia were given on a barter basis, and their spare parts cannot be obtained any longer. Consequently most of the fire engines now at work will become unrepairable in three to five years.

Among the 37 fire engines in the fire stations in the CDA area, only 21 are operable. This results in insufficient responding to the as many as 800 fires occurring within the region each year.

The 21 in-service fire engines at present will decrease to less than 13 within three years. Such a situation would result in an almost nonexistent fire service force which could hardly deal with the number of fires increasing year after year.(see Table 2-4)

Table 2-4

NUMBERS OF EXISTING FIRE ENGINES

AND POSSIBLE IN SERVICE ONES 3 YEARS AFTER IN CDA AREAS

TYPE OF VEHICLES	EXISTING	IN-SERVICE	POSSIBLE IN-SERVICE 3 YEARS AFTER
SNORKEL TRUCK 27M	1	0	0
CHEMICAL TRUCK	3	3	2
FIRE TRUCK WITH 5,000ℓ WATER TANK	29	14	7
MINI FIRE TRUCK WITH 500ℓ WATER TANK	2	2	2
AMBULANCE	2	2	2
T O T A L	37	21	13

2.3.2 Comparison of Fire Service Force between the CDA Areas and Foreign Cities

Table 2-5 shows comparisons of the fire service force of the CDA areas with Kawasaki, Singapore and Bangkok. These cities, though different in weather and climate, are large cities with a population of more than 1,000,000, where there is little difference in urban fire outbreaks. Regional characteristics of these cities are described below.

1) Kawasaki, located in the Keihin industrial zone of Japan, has a number of large-scale factories as well as 6,800 medium- and high-rise buildings of more than four stories. These buildings include commercial facilities, educational facilities and condominiums. There is a high possibility of fire outbreaks. The old residential districts and shopping districts are densely built up with wooden houses. Once a fire breaks out, it will easily spread. As a means to reduce damage from fires, 39 fire stations have been established in various locations to shorten response time.

When compared with the fire service force of the CDA areas, more than three times the number of fire engines and firemen are stationed in their area of responsibility, which is about one third the size of the CDA areas. The Fire service force is strengthened to a considerable degree as fire equipment incorporating the latest technologies are abundantly introduced, in order to satisfy the Standards on the Fire Service Strength stipulated by the Fire Defense Agency, the Ministry of Home Affairs.

2) Singapore, with its continuing rapid development, has a number of high-rise buildings in its urban area. Economic activities are vigorous, and industrialization is making steady progress. To meet this situation, planned strengthening of the fire service force is being promoted. The Singapore Fire Department, controlling the Singapore mainland and 54 islands, conducts fire fighting and rescue operations.

When compared with the fire service force of the CDA areas, the Singapore Fire Department has more than twice the number of fire engines (except ambulances) for its population and jurisdiction, which are about twice those of the CDA areas. There is no great difference in the ratio of fire engines to population and area. However, half the fire engines are not operable in the CDA areas, while the Singapore Fire Service has more special fire engines such as aerial ladder trucks, chemical trucks and foam trucks, as well as fire equipment in which the latest technologies are introduced. Consequently the overall fire service force in Singapore is much stronger.

The Singapore Fire Service has been actively promoting fire prevention

administration, and most of the more than 5,000 annual fire outbreaks are extinguished while still small .

3) The fire service force of the Metropolitan Bangkok region has been steadily strengthened. Currently there are 11 fire stations with 1,200 firemen. According to the report presented by the Director of the Metropolitan Bangkok Region Police and Fire Defense Agency at the IFCAA general assembly, the numbers of fire stations and firemen must be further increased to 80 and 3,600, respectively, in order to provide fire-fighting services satisfactorily, which has been recommended by the National Police of the Kingdom of Thailand. Many of the existing fire engines are superannuated, and their renewal is also necessary. The Director points out that more special fire engines are also necessary.

When compared with the CDA areas, however, the Bangkok Fire Department has 235 fire engines excluding 30 ambulances and 12 fireboats for a population and an area about four times those of the CDA areas. This figure of 235 is about six times 37, the number of fire engines possessed by the CDA areas. The fire service force of the Bangkok Fire Department is much stronger.

When compared with these fire service forces, the fire service force of the CDA areas is very weak both in the numbers of fire stations and firemen as well as fire equipment. Moreover, there are many fire engines which may become unrepairable. The weakest part should be reinforced first, and then improvements should be made one by one based on a comprehensive improvement plan for the future.

Table 2-5 COMPARSON OF FIRE FIGHTING FORCE BETWEEN CDA AREAS AND FOREIGN CITIES (KAWASAKI CITY,SINGAPORE AND BANGKOK)

CLASSIFICATION		CDA AREAS	KAWASAKI CITY	SINGAPORE	METROPORITAN BANGKOK
CHARACTERISTICS OF AREAS	POPULATION	1.40 MILLION	1.15 MILLION	2.60 MILLION	5.50 MILLION
	AREA	340 ㎢	137 ㎢	617.8 ㎢	1,568 ㎢
	FIRE PERSONNEL	460	1,354	1,000	1,200
	HEADQUARTER & FIRE STATION	HEADQUARTER 1 FIRE STATION 4	HEADQUARTER 1 FIRE STATION39	HEADQUARTER 1 FIRE STATION11	HEADQUARTER 1 FIRE STATION34
FIRE ENGINES etc.	PUMPER	IN SERVICE 16/ ASSIGNMENT 31	76	33	223
	AERIAL LADDER TRUCK	———	9	30	4
	SNORKEL TRUCK	IN SERVICE 0/ ASSIGNMENT 1	1		5
	CHEMICAL TRUCK	3 (AIRPORT)	6		1
	RESCUE TRUCK	———	8		3
	FLOODLIGHT WAGON	———	1		4
	WRECKER	———	1		7
	AMBULANCE	IN SERVICE 2/ ASSIGNMENT 2	24	23	30
	FIREBOAT	———	3	———	12
	UTILITY TRUCK (PICK UP TRUCK)	———	8	13	4 (FOR BREATHING APPARATUS)
	COMMAND CAR etc	———	2		———
T O T A L		IN SERVICE 21/ ASSIGNMENT 37	139 (INCLUDING FIREBOAT)	99	293 (INCLUDING FIREBOAT)

Note: In areas outside the CDA areas, although fire hydrants are installed along roads few fire engines with tank are assigned.

2.3.3 Estimation of the Necessary Minimum Number of Fire Engines in a Total Plan for the CDA Areas

The fire service force necessary for the CDA areas in the future has been estimated, based on the comparisons in 2.3.2 and the results of the present basic design study this time (field survey). Necessary equipment includes:

Aerial Ladder truck: 2
Snorkel truck: 1
Chemical truck : 5
Fire truck with 12,000 ℓ water tank: 30
Fire truck with 4,000 ℓ water tank: 15
Fire truck with 500 ℓ water tank: 2
Rescue truck: 2
Ambulance: 2
Command car: 2
Utility truck(pickup truck): 2
Special purpose vehicle (floodlight wagon etc.): 2
Total: 65 vehicles (see Table 2-6, Row A).

In this estimation, the following conditions have been especially taken into consideration.

(1) Most buildings are made of earth, blocks or bricks in the CDA areas. Unlike in cases of wooden houses, there is little possibility of fires spreading to neighboring buildings.

(2) The smaller number of high-rise buildings than in Kawasaki, Singapore and Bangkok does not require many aerial ladder trucks.

(3) A large number of water tank trucks are necessary because there are no hydrants in the streets.

Table 2-6

NUMBER OF VEHICLES RECOMMENDED FOR FUTURE PLANS AND POSSIBLE IN-SERVICE IN FUTURE

CLASSIFICATION	ON RECOMMENDED FOR FINAL PLAN (A)	ON IN THIS PROJECT (B)	POSSIBLE IN-SERVICE AFTER THIS PROJECT (C)	POSSIBLE IN-SERVICE 3 YEARS AFTER THIS PROJECT (D)
46m AERIAL LADDER TRUCK	2	1	1	1
27m SNORKEL TRUCK	1	———	———	———
CHEMICAL TRUCK	5	———	3	2
FIRE TRUCK WITH 12,000ℓ WATER TANK	30	9	9	9
FIRE TRUCK WITH 5,000ℓ WATER TANK	———	———	14	7
FIRE TRUCK WITH 4,000ℓ WATER TANK	15	2	2	2
MINI FIRE TRUCK WITH 500ℓ WATER TANK	2	———	2	2
RESCUE TRUCK	2	1	1	1
AMBULANCE (EXCLUSIVE OF THE AMBULANCE SERVICE)	2	———	2	2
COMMAND CAR	2	1	1	1
UTILITY TRUK (PICK UP TRUCK)	2	1	1	1
SPECIAL PURPOSE VEHICLES (FLOODLIGHT WAGON etc)	2	———	———	———
T O T A L	65	15	36	28
RESCUE EQUIPMENT	2 SET	1 SET	1 SET	1 SET
SPARE PARTS	1 SET	1 SET	1 SET	1 SET
T O T A L	3 SET	2 SET	2 SET	2 SET

2.4 Background and Details of the Request

The CDA first requested supplies as shown in column A of Table 2-7, whith th view of improving its fire fighting force, the strengthening of which is the purpose o f the Project. However, successive occurrence of tank truck trouble and damage in engines and pumps due to aging lowered the CDA Fire Service's fire fighting force considerably, making it very difficult for the Fire Service to provide an adequate fire fignting service. To meet the situation, the CDA requested that the number of fire trucks with water tanks be increased as shown in Column B of Table 2-7.

The Team studied the appropriateness of the types and numbers of requested fire equipment, based on the details of the request, and concluded, after a series of discussions with the CDA persons concerned, that units of fire equipment would be supplied under the Project in accordance with the number shown in Column C of Table 2-7. The number are to be entered in the Minutes of Discussions.

Out of consideration for the present fire fighting force and the plan to construct fire sub stations as well as the present and planned numbers of firemen, the CDA has formulated a project to strengthen its fire service force and requested grant aid assistance of Japan, regarding the following 15 vehicles and 2 sets of equipment

1) Introduction of an aerial ladder truck to fight fires in high-rise buildings
2) Introduction of 11 water tank trucks which are urgently necessry
3) Introduction of a rescue truck, a command car and a utility truck(pickup truck) as well as provision of a set of rescue equipment and a set of spare parts

The number of operable fire-fighting trucks is expected to become 36 including existing 21 operable ones, after the Project's completion. The number of operable vehicles is expected to be 28 three years later, by excluding unrepairable ones (see Table 2-6, Rows B to D).

The CDA needs to strengthen its fire service force by obtaining the desirable number of fire-fighting trucks specified in its overall plan for the future, after construction of additional fire sub stations and incerase of firemen.

Table 2-7 The Detailes of the Requested Fire Equipment

Classifications		A:Number in the 1st request	B:Number in the 2nd request	C:Final Request
Fire Engines	46m Aerial ladder truck	1	1	1
	27m Snorkel truck	1	1	–
	Fire truck with 12,000 ℓ water tank	6	9	9
	Fire truck with 4,000ℓ water tank	–	2	2
	Rescue truck	2	2	1
	Command car	2	2	1
	Utility truck (Pick up truck)	2	2	1
Other Equipment	Rescue equipment (including radio equipment: set)	2	2	1
	Spare Parts(set)	1	1	1

CHAPTER 3 DETAILS OF THE PROJECT

Chapter 3 Details of the Project

3.1 Objectives of the Project

The country of Pakistan has been endeavoring to construct the country's capital, Islamabad, in accordance with a city plan. The CDA, which is in charge of development of the Specified Area of Islamabad, administers the Islamabad Fire Service under its direct control. The Fire Service was established about 26 years ago when the CDA was established, and since then it has been incorporated in the national administrative organization.

The planned construction of Islamabad has been carried out smoothly to date, and the city has continued its remarkable development. As a result, its population has grown substantially, and the number of tall buildings including high-rises has been increased. Unfortunately, as the whole city is congested with vehicles which are used for both public and private transport, the consumption of fuels including gasoline has rapidly increased, resulting in higher possibilities of types of disasters characteristic of urban districts. The number of fires has increased 1.5 times and two times when compared with ten years and twenty years ago, respectively. Such an increase in fires has naturally led to greater damage of assets as well as increases injuries and loss of life. This trend has been found throughout Islamabad and the metropolitan area. On the other hand, the organization, staff members, and equipment of the fire fighting agencies have been left unimproved irrespective of the modernization of the cities. Fire engines, which form a principal part of fire fighting equipment, have become so obsolete that they seem extremely poor when compared with the present modern looks of the city. Since there are neither aerial ladder trucks nor other high-performance special-purpose fire engines, the CDA has formulated the Project for Providing Firefignting Trucks and Equipment for Islamabad.

The objective of this Project is to contribute to reinforcement of the fire service force of the metropolitan area by improving fire fighting trucks and the necessary equipment.

3.2 Review of the Request

3.2.1 Necessity and Appropriateness of the Project

Principal parts of the CDA's plan are summarized in the following four points:

(1) To reinforce fire service force of the metropolitan area.

(2) To reinforce fire service force to cope with fires in high buildings

(3) To reinforce rescue service capabilities to cope with disasters which require special operations.

(4) To improve fire-fighting equipment to smooth activities

The CDA intends to strengthen fire service force of the CDA Fire Service, through the Project's implementation. The Fire Service is involved in the CDA initiative for fire fighting force strengthening in the future. It already has a garage to house vehicles to be provided under the Project and plans an increase of firemen. In addition, the CDA has a repair shop where maintenance and repairs of large vehicles as well as fire fighting trucks to be provided can be made. Such as being the case, the Project's implementation is regarded as appropriate also from a technical point of view. The broad trunk road which connects Islamabad, Rawalpindi and the Islamabad Airport, providing easy access to each other, makes it easy to respond to requests for assistance in cases of fire spead. Supply of fire fighting equipment to Islamabad therefore strengthens overall fire fighting force of the Specified Area of Islamabad.

It can be concluded that the Project's implementation will protect lives and property of the citizens in the metropolitan area (about 1.4 million people) from disasters including fires. It can be also concluded that the Project will contribute to the promotion of construction of modern cities in the countrty. Taking these facts into consideration, the Project can be regarded as appropriate as grant aid assistance of Japan.

3.2.2 Execution and Operation Plan

The Project is to be executed and operated by the CDA Fire Service, which is under the direct control of the CDA. The Fire Service plans to construct five fire sub stations, one of which has been already completed (Fire sub station at the deplomatic enclave). Fire fighting trucks to be provided under the Project are to be located at the Headquarters and this fire sub station, which has a garage to house them. The CDA Fire Service currently has 275 firemen, who operate 21 fire fighting trucks. To strengthen fire service force, it plans to employ additional 35 firemen. The Fire Service thus has a sufficient number of firemen to operate vehicles to be provided under the

Project.

The CDA possesses a vehicle maintenance shop as part of its undertakings. Maintenance and repairs of construction vehicles for the development of the metropolitan area are carried out in this shop. Therefore sufficient maintenace can be expected for the fire-fighting trucks to be provided. There is no problem in maintence and repairing of them.

The CDA Fire Service actually spent Rs.31.35 million over the past five years (about ¥167 million), about Rs.6.27 million (¥33.49 million) a year on the average, for maintenance and management of its fire fighting equipment. Since annual maintenance expenses for fire fighting equipment to be provided under the Project are estimated at about Rs.4.06 million, there is no budgetary problem. It can be concluded that the Project's execution and management system is appropriate.

3.2.3 Details of Requested Fire Equipment

The CDA has requested the provision of pieces of fire equipment necessary for fire service force strengthening, which is the objectives of the Project.

Appropriateness of the requested pieces of fire equipment is studied below.;

1) 46m Aerial ladder truck

Generally speaking, fire trucks that cope with fires in high-rise buildings include an aerial ladder truck and a snorkel truck. These trucks are designed to provide an external site from which a fireman can enter the interior of a burning building at an elevated point so as to rescue those people who have failed to escape and also to fight the fire. While the aerial ladder truck is provided with a ladder which is extended linearly, the snorkel truck has a folding arm whose top end is equipped with a working basket. The aerial ladder truck can extend the ladder longer, but it has the drawback that the ladder operation is restricted by overhead cables, etc. On the other hand, the snorkel truck has the merit of being able to avoid overhead cables, but its extension length is shorter. When selecting truck types, therefore, these merits and drawbacks have been taken into consideration in addition to road conditions and obstacles to ladder operation.

In the course of discussions with them, the CDA requested that an aerial ladder truck and a snorkel truck be added to the Project for Providing Fire fighting Trucks and Equipment. They insisted that the aerial ladder truck might be used to cope with fires at higher stories, while the snorkel truck could be easily and effectively applied to buildings of medium height. However, Islamabad, which is a city constructed according to the city plan, has a network of wide roads and highways, and power cables and telephone cables have all been installed underground, not using utility poles. Since there are hardly any obstacles to operation of the ladder, the aerial ladder truck can fully cope with fires at buildings of great and medium heights. Moreover, the opinion arose during the discussions that priority should be given to arranging for more water tank trucks rather than the provision of both a 46-meter aerial ladder truck and a 27-meter snorkel truck. As a result of considering this matter, it was agreed that only a 46-meter aerial ladder truck should be included in the Project for the time being.

2) Fire truck with water tank

Fires are extinguished mainly by using water. Since water can be secured with relative ease and has an extremely high capability to extinguish fire, it is often used as the principal substance in fire fighting activities. However, not a single hydrant has been installed in the water supply networks in Islamabad and Rawalpindi, and no water reservoirs are provided, either. This means that fire fighting activities must depend solely on water stored in water tank trucks, if no streams, lakes, or swamps are available near the scene of fire nor are there reservoirs are installed in buildings. Hence, it is necessary to increase the number of water tank trucks.

Islamabad has blocks of buildings surrounded by wide roads which do not hinder the smooth passage of large-sized vehicles. To enhance fire service force, a water tank truck should preferably contain as much water as possible as long as its tank does not hinder the functions and passage of the truck. On the other hand, Rawalpindi has many narrow roads and includes extensive areas where large-sized vehicles cannot pass smoothly. When considering dispatching fire trucks from Islamabad to Rawalpindi in the case of a spreading fire, medium-sized tank trucks with high maneuverability and high driving speed should be included in the Project.

Regarding the number of medium-size tank trucks, the CDA mentioned the situation in which a succession of unexpected troubles had lowered its fire fighting force considerably, and requested that the number of 12,000-liter water tank trucks and 4,000-liter water tank trucks be increased to 9 and 2 respectively, by all means. In the backyard of the CDA Fire Service, a fire

truck damaged in a traffic accident and six inoperable pump trucks due to aging are left, which suggests the difficult situation now facing the CDA. In fact, the number of operable pump trucks in the Fire Service is much smaller than that in Kawasaki, Singapore and Bankok.

Considering these facts and the number of the garage available for fire engines, the plan of providing 9 fire trucks with 12,000 water tank and 2 fire trucks with 4,000 water tank is considered to be appropriate.

3) Rescue truck

As the construction of Islamabad progresses, the number of city-type disasters, namely, cases requiring first aids and rescue has increased enormously due to rapid increases in population, buildings, and vehicles. Though first-aid service is currently carried out by a party other than the fire fighting agency, rescue service is provided by the agency. The CDA Fire Service has been burdened with the increase in rescue cases which require special rescue equipment.

To help deal with such cases more effectively, the CDA has requested the supply of two rescue utility trucks and two sets of rescue equipment. However, the provision of one rescue truck and one set of rescue equipment is considered to be appropriate, in view of the situation of past accidents and rescue activities.

4) Command car and Utility truck

Fire fighting activities will achieve the greatest effects only when all the fire companies dispatched to the scene of a fire engage in an organic operation under a scene commander's direction. By using a command car provided with a radio unit, the scene commander should grasp the activities of each fire company at the early stages of the disaster and should give accurate orders based on the information collected. The command car is a vital unit in this sense.

Fires and other disasters involve a great variety of factors. It is naturally impossible to equip a fire truck with all the materials applicable to every type of disaster. Generally, necessary materials should be carried in accordance with a request from the scene. In order to assure smooth fire fighting operations, an utility truck(pickup truck) is an indispensable which plays an important role.

The CDA has requested the supply of two command cars and two utility trucks. However, it is considered to be appropriate for the time being to provide one command car and one utility truck, in view of the present command system and types and numbers of pieces of equipment now possessed by the CDA.

3.2.4 Basic Policy of Cooperation

It is judged appropriate to implement this Project in the form of grant aid by the Japanese Government partly because the foregoing review has confirmed its effects, ability to be successful, and the implementing capacity of the Pakistani side and partly because the effects of this Project agree with the objectives of Japan's grant aid assistance.

Hence, the following sections consider outlines of the Project and offer basic designs on the premise that Japan's grant aid assistance is applied to it. As stated, however, in the section reviewing the requested fire equipment, the contents of the Project include those portions whose partial modification has been agreed upon with the Pakistani side in the course of the discussions.

3.3 Outline of the Project

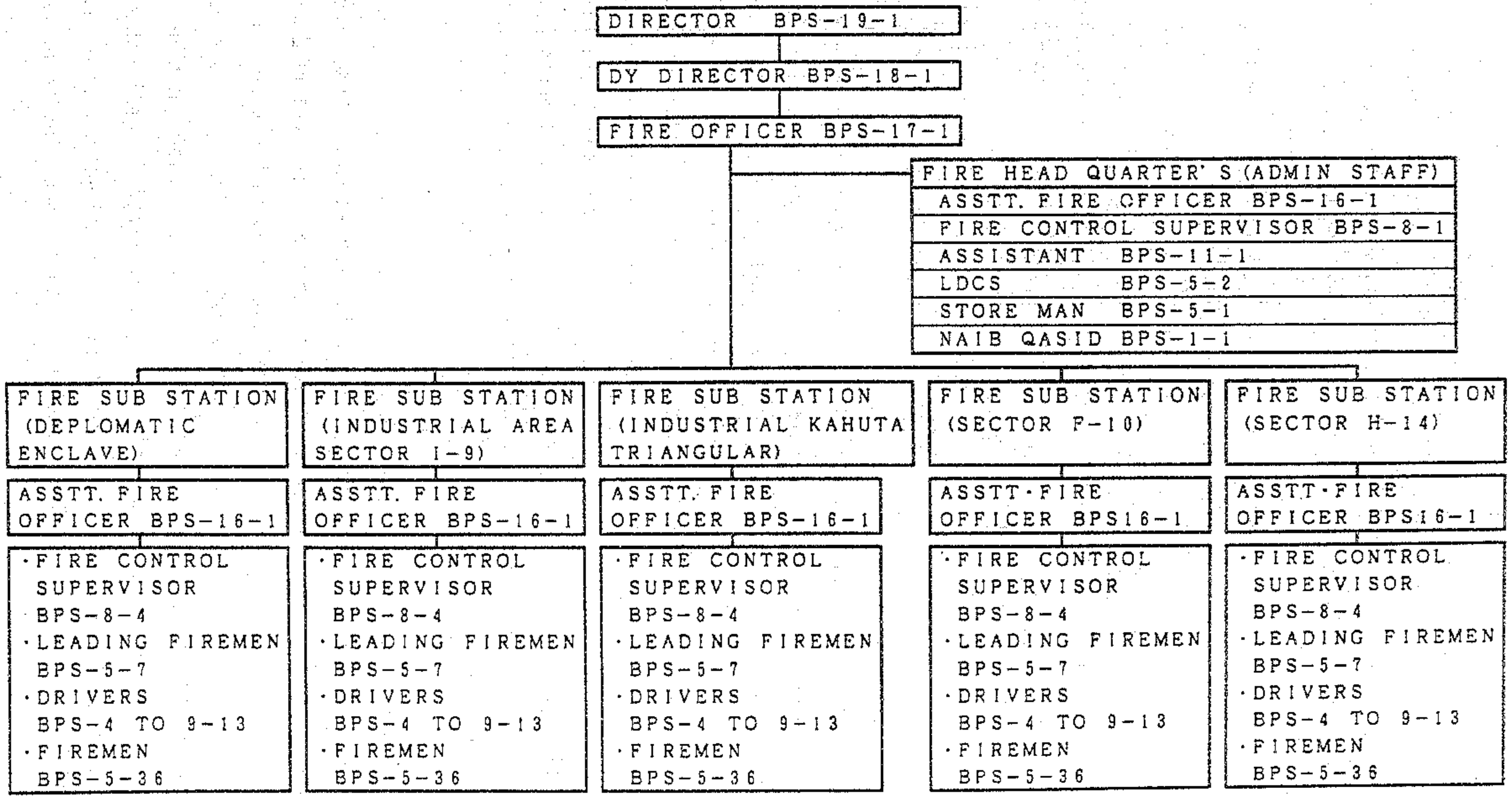
3.3.1 Executing Agency and Management System

The executing agency of this Project is the CDA. The CDA is an administrative agency which controls the Islamabad Fire Service (CDA Fire Service) and gives instructions and recommendations to Rawalpindi and the Islamabad Airport, both included in the Spacified Area of Islamabad. The fire fighting trucks and equipment to be supplied under this Project are to be installed in the CDA Fire Service.

The fire fighting system of the CDA Fire Service is composed of 275 members, not including the Manager of the Urban Administration Dept., and is in charge of activities to prevent occurrences of and protect citizens from disasters. The organization chart of the Department is shown in Table 2-3.

The number of operators needed when the Project is implemented is considered to be about 310 including the present ones. The CDA is planning to take provisional measures to add 35 members, including three senior ones, for the time being and to increase the total number to 315 as shown in Fig. 3-2, when a system with one Headquarters and five fire sub stations is realized in the future.

Fig. 3-2 FUTURE PLANNING OF FIRE SERVICE STAFF DTE. OF MUNNICIPAL ADMIN.



3.3.2 Implementation Plan

Table 3-1 shows the locations of fifteen vehicles to be supplied under the Project.

Table 3-1 Locations and Numbers of Fire Engines to be supplied

Classification	CDA Fire Service Headquarters	Fire Sub Station at Diplomatic Enclave
46-m Areal Ladder Truck	1	--
Fire Truck with 12.000 ℓ Water Tank	6	3
Fire Truck with 4.000 ℓ Water Tank	2	--
Rescue Truck	1	--
command car	1	--
Utility truck (Pickup truck)	1	--

Garages for the Existing Fire Engines

Among operable fire engines, one is always located at the offical residence of the President and another at the of ficial residence of the Prime Minister. There are now six large vehicles and four small vehicles in the main building of the CDA Fire Service Headquarters. The garage of the building is divided into 11 spacious spans. Since each of these divisions has a frontage of 5 meters and a depth of 13.7 meters, it can house a large vehicle and a small vehicle, or two medium-size vehicles. Another building has a garage which can house three large vehicles. There is sufficient space to house all vehicles to be provided under the Project.

Fireman Training

Pakistan does not have educational or training institutions for firemen such as Fire Defence Academy. Fire defence agencies must train firemen themselves. In the CDA Fire Service, a full-time instructor gives training to firemen from provinces, in response to requests from provincial fire defence agencies.

3.3.3 Locations and Conditions of the Project Sites

(1) CDA Fire Service

The building of the CDA Fire Service Headquarters is currently located in the eastern part of the urban area or almost at the center of the whole metropolitan area. Since it is near important facilities of the national government, it is said that the location has been selected by considering future urban development plans.

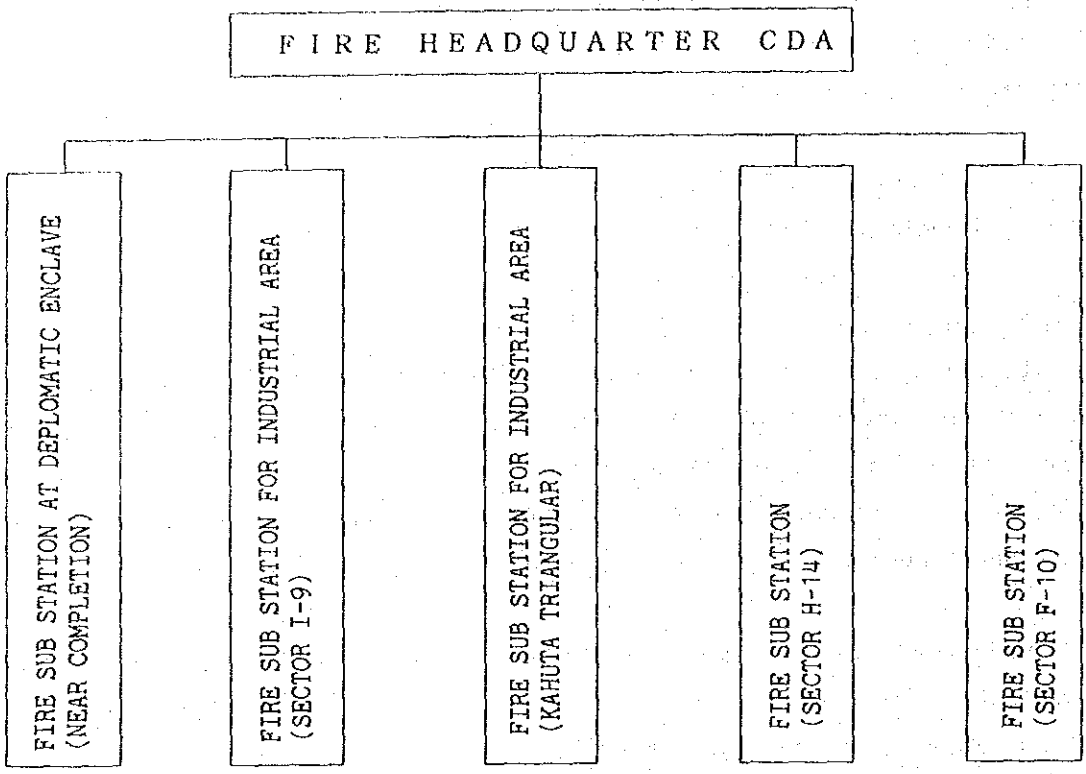
The present building is constructed on flat ground and faces a main street, convenient for starting out in any direction. It is located in an environment most suitable for a fire fighting building.

(2) Fire sub stations to be newly constructed

Construction of five fire sub stations is planned to appropriately disperse fire service force and to shorten the time requested for a fire company to reach the scene of a fire. The construction sites are shown in Figs. 3-3 and 2-4. Among the five sites, the fire station building at the diplomatic enclave has been completed and is ready for service.

The fire sub station's building is constructed on wide flat ground and faces a main street and is located in an environment most suitable for a fire-fighting building.

Fig.3-3 F U T U R E P L A N N I N G



3.3.4 Maintenance and Management Plan

(1) Maintenance and management system

When the Project is implemented, fire fighting trucks and equipment are to be located in the Headquarters and the newly constructed fire sub station of the CDA Fire Service at the diplomatic enclave. The CDA is planning to improve educational and training programs for operators of such equipment and to bear the expenses needed for maintaining and managing them.

(2) Maintenance shop of large-sized vehicles

As discrived above, the CDA operates a maintenance shop for large-sized vehicles as its subordinate agency. A total of 52 experts including the shop head engage in maintaining a variety of vehicles. It is possible, therefore, to quickly repair any mechanical troubles of those vehicles which are to be supplied under the Project when it is implemented.

(3) Past records of maintenance expenses

It is reported that the CDA has borne Rs 31,355,000 (about ¥167 million yen, ¥33.49 million a year on the average) as maintenance expenses for fire fighting trucks during the past five years. It is thought that they have invested more money than actually needed, since obsolete vehicles whose supply of parts has already been suspended or reduced are still being put into service.

When fire fighting trucks and equipment are improved in the future as a result of the grant aid assistance, the CDA will be able to bear the expenses of about 4.06 million yen, which are estimeted to be necessary for the maintenance of these vehicles. It is also expected that such expenses will be drastically reduced and that a balance of conventional maintenance expenses may be allocated to purchas of new vehicles.

3.4 Technical Cooperation

(1) Request for dispatching fire defense experts

In addition to the Project request, the CDA earnestly requests that Japanese fire defense experts be dispatched to Islamabad to educate and train firemen through job training.

The CDA has also expressed an earnest request that fire personnel of the

CDA be accepted in an appropriate fire defense institution in Japan to give them advance professional education and training so as to foster expert technicians who have mastered professional technologies including fire fighting strategy.

This Project is not executed in the flamework on the technical cooperation program, but the nesessary guidance to operatate the vehicles and equipment will be fully given by the contractors of the equipment. However, it is considered to be desiable that the technical guidence including a general one on the fire-fighting administration be carried out as part of technical cooperation.

CHAPTER 4 BASIC DESIGN

Chapter 4 Basic Design

4.1 Equipment Design Policy

When designing the fire fighting trucks and equipment which have been planned in Section 3.2.3 "Details of Requested Equipment," they have been reviewed under the following design criteria.

(1) Meeting objectives to reinforce the fire service force in the CDA areas

The equipment and materials should be designed to realize the improvement of the fire service force in the CDA areas, to protect citizens' lives and property from fire and other disasters, and to lessen the damage caused by such disasters.

(2) Suitability for reinforcing the regional fire service force

This Project contributes to i)extinguishing of fires in high buildings, ii)operation of special rescue services, iii)extinguishing of fires occurring in places with less water availability, and iv) effective operation of fire-fighting activities. Hence, fire fighting trucks and equipment should be selected to meet these objectives and contribute to city inhabitants' safety through prevention of fires and other disasters.

(3) Scale and applicability of the fire fighting trucks and equipment

As the central fire-fighting agency in the Specified Area of Islamabad, the CDA Fire Service engages in activities for preventing disasters in the capital territory as well as helping prevent them in Rawalpindi and the Islamabad Airport. Hence, fire fighting trucks and equipment should be chosen so that their scales (quantity) are suitable for such regional characteristics and their functions are applicable to general purposes. The scale of the equipment should be determined in accordance with the space of the existing garages of fire-fighting agencies.

(4) Fire fighting trucks and equipment with easy operation and maintenance

Fire fighting trucks and equipment which can be easily operated, maintained, and locally backed up should be selected. Their specification should be such as to minimize operation and maintenance expenses, and their spare parts should be sufficiently supplied.

(5) Arrangement of the fire fighting trucks and equipment

The fire fighting trucks and equipment to be supplied under the Project should be distributed between the Fire Service Headquarters and the newly constructed fire sub station at the diplomatic enclave in accordance with the dimensions and weight of the vehicles, the sizes of the garages, and integrated utilization of the fire fighting trucks and equipment.

4.2 Design Conditions

4.2.1 Natural Conditions

Atmospheric temperature and relative humidity

The metropolitan area of Pakistan belongs to the subtropical zone. The annual climate is divided into the dry and rainy seasons. In the dry season, the highest temperature recorded sometimes reaches 40° C while the annual average temperature is 27° C. In the rainy season, showers continue for many days, and the relative humidity rises near 80%.

Considering the above-mentioned natural conditions, the design conditions are set as follows:

Design atmospheric temperature: 0 to 45° C
Design relative humidity: Maximum 80%

4.2.2 Buildings and Utilities

(1) Buildings

1) The CDA Fire Service Headquarters buildings

The buildings are composed of a reinforced-concrete three-storied main building with a building area of 1,286 m², a floor area of 3,900 m², and a ground area of 12,040 m² and a reinforced-concrete, single-storied separate with a building area of 222 m². The first floor of the main building has a garage and an office, while the second and third floors have room for firemen to sleep during their overnight duty and dormitories for their families. The separate is used as a repair shop and garage in addition to its use as a warehouse.

The garage can contain 13 large-sized vehicles (or 26 medium and small-sized ones), and 12 newly introduced vehicles are planned to be located. However, an aerial ladder truck is 3.9 meters high, while the front door of the carage is only 3.6 meters in hight. Therefore, the 0.6 meters high lattice windows placed at the upper part of the garage door should be removed. The CDA will modify the door at their own expense.

2) Newly constructed fire sub station building at the diplomatic enclave

This building is a reinforced-concrete, three-storied one with a building area of 490 m^2 and a floor area of 1,470 m^2 on a ground area of 1,500 m^2. Its first floor has a garage and an office while its second and third floors have rooms for firemen to sleep during their overnight duty and dormitories for their families.

The garage contains three large-sized vehicles (or six medium- or small-sized ones) and one medium-sized vehicle. Among the fire truck with 12,000 little water tank planned to be provided, 3 vehicles will be located in this station.

(2) Power supply

Power fails for a short time once every few days. Hence, a power unit to cope with interruptions is included in the radio communication unit for the base station. A constant-voltage unit is also added to cope with large voltage fluctuations.

4.2.3 Applicable Regulations and Standards

Type of vehicles	right hand drive, single cabin
Type of Hose	connection; BS instantaneous coupling
Radio communication unit for the base station	voltage 220 V, with power supply unit (power failure free) frequency 134-174 MHZ, 6ch.

4.3 Basic Design

4.3.1 Equipment Provision Plan

The details of the fire equipment planned to be provided are shown in the next pages.

1. 46M AERIAL LADDER TRUCK

1. Truck Chassis

1) Engine	:	Not less than 300ps (Diesel)
2) Drive	:	6 X 4
3) Steering	:	RHD (Power assisted)
4) Cabin	:	All steel, Forward control type single cabin.
		Seating capacity : 3 persons

2. Aerial Ladder

1) Type	:	All steel, 6 - section type
2) Maximum height	:	46M
3) Elevation angle	:	-10 ~75 degrees
4) Rotation angle	:	360 degrees
5) Obliquity adjust	:	7 degrees automatically adjusted
6) Lifter	:	2 persons (or 180 kg)
		Interphone device
7) Basket	:	2 persons, Detachable
		Interphone device
8) Turret	:	Ladder Top and Basket ea.1
9) Safety device	:	Neccessory ladder stop system
10) Auxiliary pump	:	Motor type

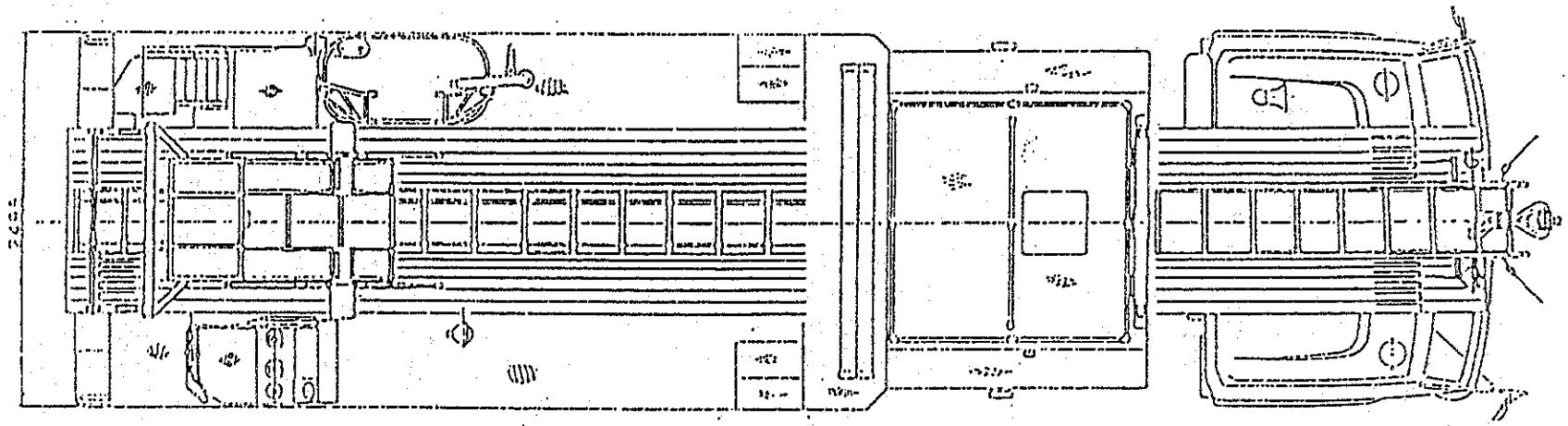
3. Pump

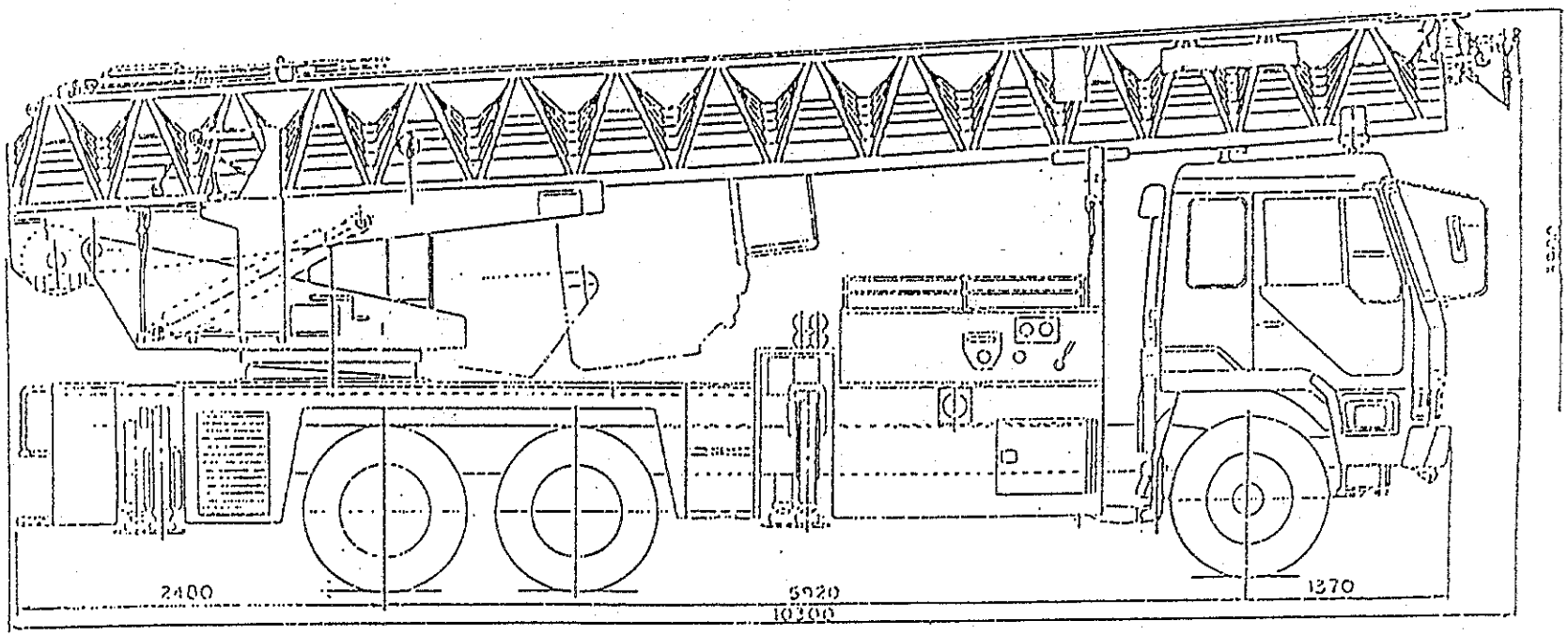
1) Water pump	:	2 stage centrifugal pump
Performance	:	Not less than 2,800L/min.
2) Priming pump	:	650mm Hg within 30 sec.
3) Suction inlet	:	BS thread, 100mm.
		One on both side
4) Delivery outlet	:	BS instantaneous coupling 65mm.
		One on both side

4. Accessory

a) Red rotation lamp ---------- 2
b) Electric siren with speaker ---------- 1
c) Search light ---------- 3
d) Suction hose (100 mm X 2 m) ---------- 4
e) Suction strainer ---------- 1 set
f) Delivery hose (65 mm X 20 m) ---------- 10
g) Water branch pipe (65 mm) ---------- 2
h) Variable nozzle ---------- 1
i) Nozzle tip, 23 mm, 26 mm ---------- ea. 1
j) Mobile radio communication (134-174 MHZ)- 1
k) Spare Tyre ---------- 1
l) Wheel Stopper ---------- 4
m) Fire helmet ---------- 6
n) Fire coat ---------- 6
o) Fire boot ---------- 6
p) Fire glove ---------- 6
q) Dividing breeching (65 mm X 65 mm - two)- 1
r) Hose for ladder (65 mm X 50 m)---------- 1
s) Adaptor (100 mm X 65 mm) ---------- 1
t) Safety belt ---------- 1
u) Other standard Accessory ---------- 1 set

1. 46M AERIAL LADDER TRUCK





2. FIRE TRUCK WITH 12,000 LITERS WATER TANK

1. Truck Chassis

1) Engine	:	Not less than 300ps (Diesel)
2) Drive	:	6 X 4
3) Steering	:	RHD (Power assisted)
4) Cabin	:	All steel, Forward control type single cabin.
		Seating capacity : 3 persons

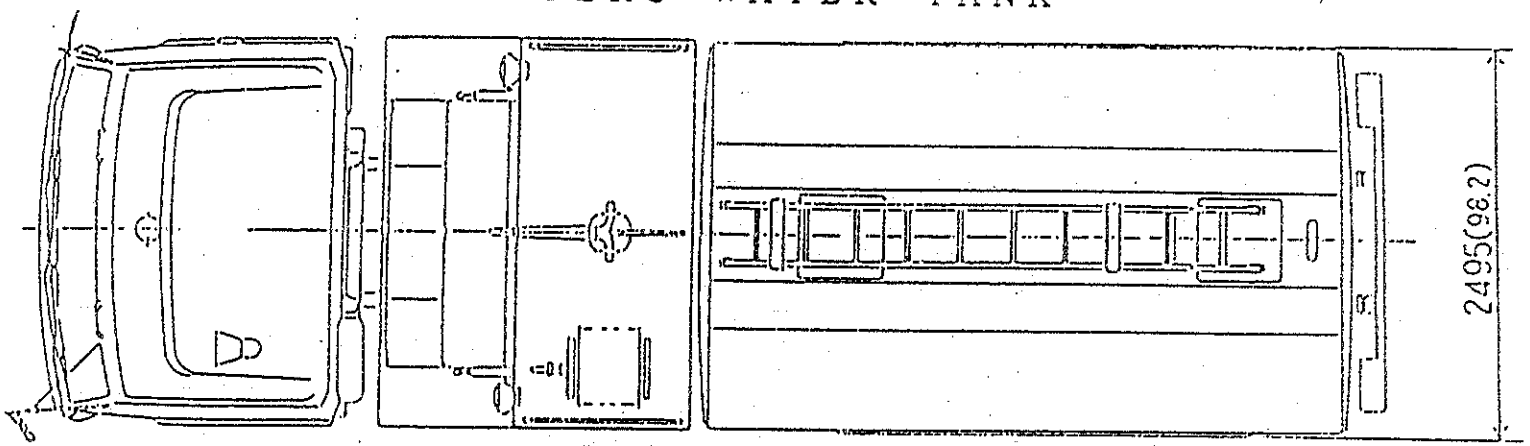
2. Pump and Water Tank

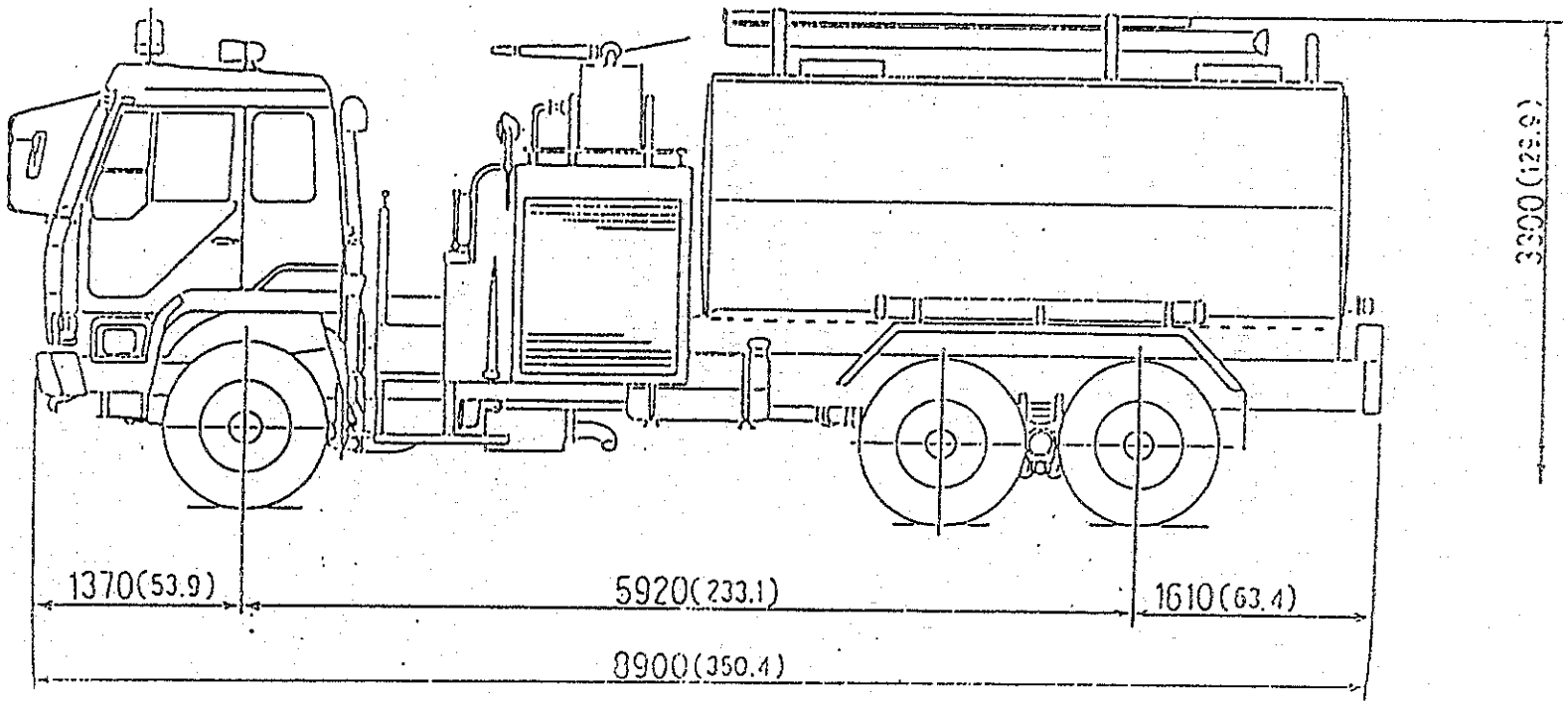
1) Water pump	:	2 stage centrifugal type
Performance	:	Not less than 2,800L/min.
2) Priming pump	:	650mm Hg within 30 sec.
3) Suction inlet	:	BS thread type 100mm
		One on both side
4) Delivery outlet	:	BS instantaneous coupling 65mm
		Two on both side
5) Water Tank	:	All steel Round shaped type
Volume	:	12,000L
Water filler	:	BS instantaneous coupling 65mm
		Two on rear side
6) Turret	:	One on the pump compartment
7) Hose reel	:	One on the pump compartment
		25mm X 30m
8) Open bench seat	:	On the rear of cabin
		Seating capacity : 4 persons

3. Accessory

a) Red rotation lamp ---------- 1
b) Electric siren with speaker ---------- 1
c) Search light ---------- 2
d) Suction hose (100 mm X 2 m) ---------- 4
e) Suction strainer ---------- 1 set
f) Delivery hose (65 mm X 20 m) ---------- 10
g) Water branch pipe (65 mm) ---------- 2
h) Variable nozzle ---------- 1
i) Nozzle tip, 23 mm, 26 mm ---------- ea. 1
j) Mobile radio communication (134-174 MHZ) -- 1
k) Aluminium one-section ladder, 3.1 m -------- 1
l) Aluminium three-section ladder, 9 m -------- 1
m) Spare Tyre ---------- 1
n) Wheel Stopper ---------- 2
o) Fire helmet ---------- 6
p) Fire coat ---------- 6
q) Fire boot ---------- 6
r) Fire glove ---------- 6
s) Dividing breeching (65 mm X 65 mm - two) - 1
t) Adaptor (100 mm X 65 mm) ---------- 1
u) Foam making branch pipe with pick up tube -- 1
v) Other standard Accessory ---------- 1 set

2. FIRE TRUCK
WITH 12,000 LITERS WATER TANK





3. FIRE TRUCK WITH 4,000 LITERS WATER TANK

1. Truck Chassis

1) Engine	:	Not less than 160ps (Diesel)
2) Drive	:	4 X 2 WD
3) Steering	:	RHD (Power assisted)
4) Cabin	:	All steel, Forward control type single cabin.
		Seating capacity : 3 persons

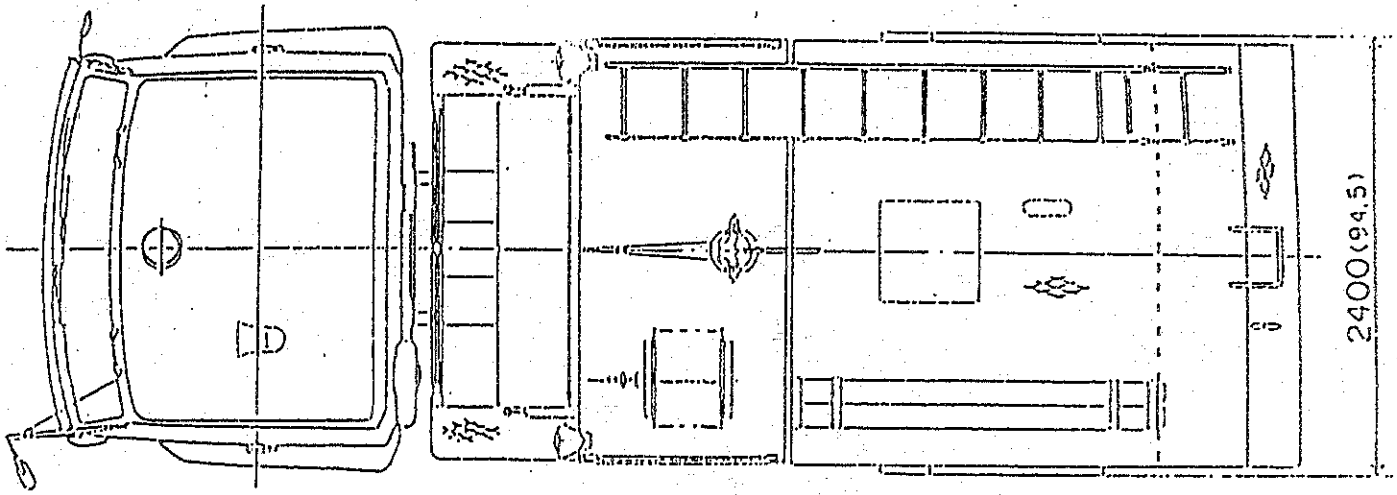
2. Pump and Water Tank

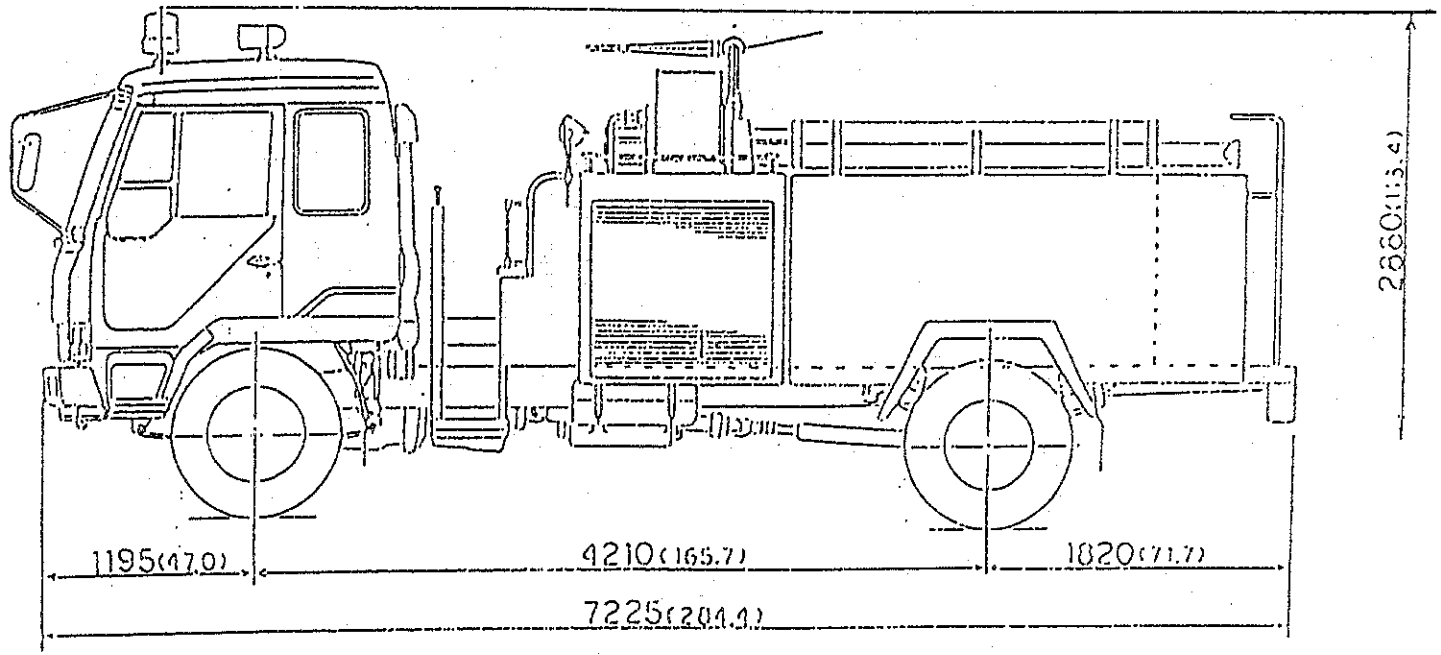
1) Water pump	:	2 stage centrifugal type
Performance	:	Not less than 2,800L/min.
2) Priming pump	:	650mm Hg within 30 sec.
3) Suction inlet	:	BS thread type 100mm
		One on both side
4) Delivery outlet	:	BS instantaneous coupling 65mm
		Two on both side
5) Water Tank	:	All steel Square type
Volume	:	4,000L
Water filler	:	BS instantaneous coupling 65mm
		One on the side of truck
6) Turret	:	One on the pump compartment
7) Hose reel	:	One on the pump compartment
		25mm X 30m
8) Open bench seat	:	On the rear of cabin
		Seating capacity : 4 persons

3. Accessory

a) Red rotation lamp ---------- 1
b) Electric siren with speaker ---------- 1
c) Search light ---------- 2
d) Suction hose (100 mm X 2 m) ---------- 4
e) Suction strainer ---------- 1 set
f) Delivery hose (65 mm X 20 m) ---------- 10
g) Water branch pipe (65 mm) ---------- 2
h) Variable nozzle ---------- 1
i) Nozzle tip, 23 mm, 26 mm ---------- ea. 1
j) Mobil radio communication (134-174 MHZ) -- 1
k) Aluminium one-section ladder, 3.1 m -------- 1
l) Aluminium three-section ladder, 9.0 m ------ 1
m) Spare Tyre ---------- 1
n) Wheel Stopper ---------- 2
o) Fire helmet ---------- 6
p) Fire coat ---------- 6
q) Fire boot ---------- 6
r) Fire glove ---------- 6
s) Dividing breeching (65 mm X 65 mm - two) - 1
t) Adaptor (100 mm X 65 m) ---------- 1
u) Other standard Accessory ---------- 1 set

3. FIRE TRUCK
WITH 4,000 LITERS WATER TANK





4. RESCUE TRUCK

1. Truck Chassis

1) Engine	:	Not less than 160ps (Diesel)
2) Drive	:	4 X 4 WD
3) Steering	:	RHD (Power assisted)
4) Cabin	:	All steel, Forward control type single cabin.
		Seating capacity : 3 persons

2. Superstructure

1) Winch	:	Attached in front of cabin
		Capacity : Not less than 5000 kg
2) Equipment locker	:	Aluminium roller shutter
		Three on both side
3) Crane	:	Attached in rear of truck
		Lifting capacity not less than 2 ton
4) Open bench seat	:	On the rear of cabin
		Seating capacity : 4 persons

3. Accessory

1) Red rotation lamp	1
2) Electric siren with speaker	1
3) Wheel stopper	2
4) Spare tyre	1

4. Rescue Equipment

1) Aluminium ladder 3.1 m	1
2) Aluminium ladder 8.8 m	1
3) Rescue mat 3.5 m	1
4) Rescue belt	1
5) Rescue rope 200 m	2
6) Snap hook	20
7) Pully	5
8) Portable winch 1.6 ton	1

9) Wire rope (14 mm X 10 m) ---------- 2

10) Hydraulic rescue equipment

Spreader (Max. spreading force 6.1 ton) - 1

Cutter (Max. pulling force 9.8 ton) ---- 1

Ram cylinder ---------- 1

Engine, pump, hose reel ---------- ea. 1

11) Engine cutter ---------- 1

12) Portable gas cutter ---------- 1

13) Chain saw ---------- 1

14) Wire cutter (16 mm) ---------- 1

15) Multi purpose axe ---------- 2

16) Hammer (10LBS type) ---------- 1

17) Insulated glove (Not less than 20,000V) -- 6

18) Leather glove ---------- 6

19) Safety belt ---------- 6

20) Portable generator, Search light --------- 1 set

Cord reel, Tripod

21) Portable loud speaker ---------- 1

22) Tools (pick, wooden maul, shovel (square, sword), crow bar, fire hook, saw, sickle, hatchet, axe) -- ea. 1

23) Dust proof mask ---------- 6

24) Life line 30m ---------- 1

25) Rope dog ---------- 1

26) Air lifting bag (24ton, 40ton) ---------- 1 set

27) Portable smoke ejector ---------- 1

28) Engine driven generator 5 KVA ---------- 1

29) Telescopic pole 4.5 m ---------- 1

30) Flood light (500 W X 6 pcs) ---------- 1

31) Mobile radio communication (134-174 MHZ) 1

32) Stretcher ---------- 1

33) Rescue rubber boat ---------- 1

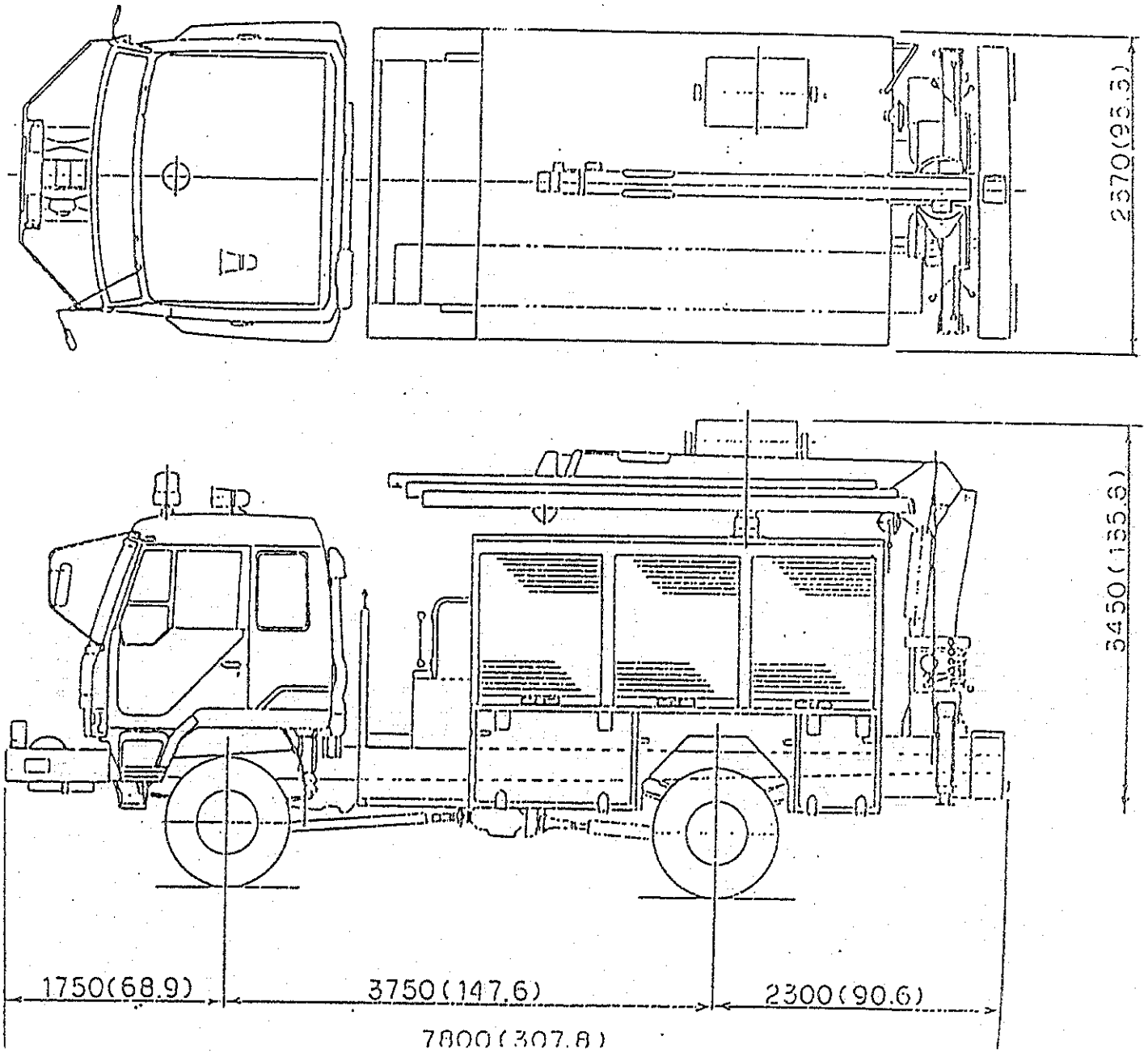
34) Fire helmet ---------- 6

35) Fire coat ---------- 6

36) Fire boot ---------- 6

37) Fire glove ---------- 6

4. RESCUE TRUCK



5. COMMAND CAR

1. Engine : Diesel, Not less than 70ps

2. Drive : All wheel drive (4 X 4)

3. Steering : Right hand drive

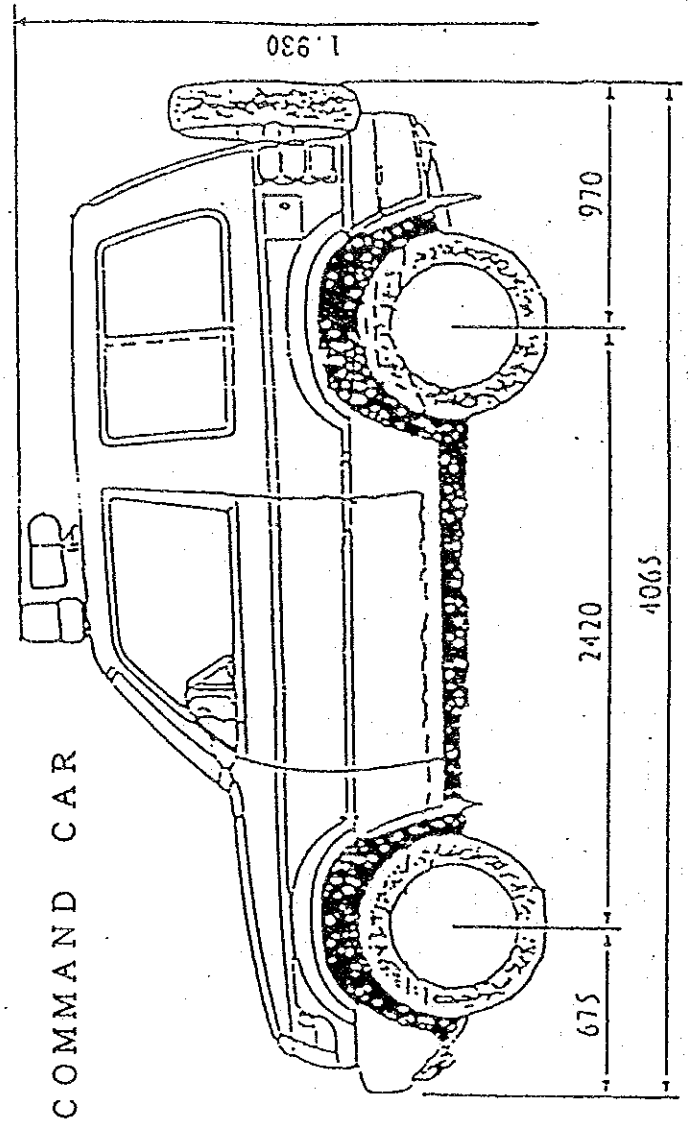
4. Transmission : Manual type

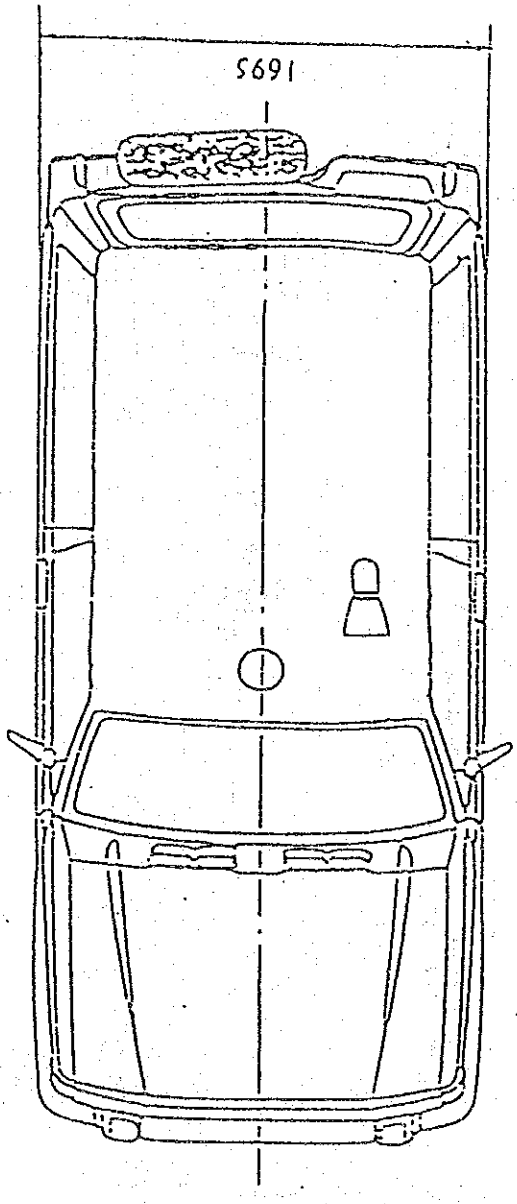
5. Seating capacity : 5 persons

6. Accessory

a) Red rotation lamp ----------	1 pc
b) Electric siren with speaker ----------	1 pc
c) Mobil radio communication ----------	1 set
d) Spare tire and wheel ----------	1 set
e) Other standard Accessory ----------	1 set

5. COMMAND CAR





6. UTILITY TRUCK (PICKUP TRUCK)

1. Engine : Diesel, Not less than 70ps
2. Drive : All wheel drive (4 X 4)
3. Steering : Right hand drive
4. Transmission : Manual type
5. Seating capacity : 3 persons
6. Accessory
   a) Red rotation lamp ---------- 1 pc
   b) Electric siren with speaker ---------- 1 pc
   c) Mobil radio communication ---------- 1 set
   d) Spare tire and wheel ---------- 1 set
   e) Other standard Accessory ---------- 1 set

6. UTILITY TRUCK (PICKUP TRUCK)