

is paid by the Government. Firemen and Sergeants are paid by the City, but all ranks from Assistant Inspector and higher, are Government employees.

The Keibodan operate in most small towns and villages, but also to some degree in large cities where they are maintained as emergency aids to paid fire departments. In some of the larger towns, a few members of the Keibodan are maintained on duty at all times and are paid by the towns. Members of the Keibodan are chosen from the general public on the following basis per 10,000 population:

Where a Government-operated fire station is located - 50 Keibodan.

Where a city-operated fire station is located- 100 Keibodan.

In villages and country- 200 Keibodan.

It is difficult to determine the exact number of Keibodan, but in February 1946, the number was given as 1,531,015 and in July, due to moving and disinterest, the number reduced to 1,371,736.

Metropolitan Tokyo is divided into forty-two Districts, each headed by a "Fire Officer" who has a rank of Inspector in the Police Department. A District may have one or more "Sub-Stations" and/or one or more "Detached Stations" under its control. At present there are 101 "Sub-Stations" and 101 "Detached Stations" in operation. About forty percent of these

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are poorly located on narrow streets and other inaccessible locations. Usually an Assistant Inspector is in charge of a "Sub-Station" and a Sergeant in charge of a "Detached Station."

A Special Fire Brigade of 252 men was assigned for the protection of the Imperial Palace and certain public buildings, but recently this group was disbanded and the men distributed among the regular fire stations. In place of the Special Fire Brigade, the Imperial Palace will be protected by fifteen pumpers in event of a small fire and forty-five for a large fire. Each pumper and its crew have a definite station assigned in accordance with a predetermined plan.

Tokyo was provided with an inadequate fire alarm system which was privately owned, but was almost totally destroyed in the air raids. Each main station and many of the sub-stations and detached stations are provided with towers of sufficient height so a fireman acting as fire watch can see most areas within his District. When fire is discovered, he phones down to his station. The man on duty at the phone is the driver of a truck and he must call Headquarters before his truck can leave. If it is a Sub-Station or Detached Station, the District Headquarters are notified by phone and they in turn, phone Metropolitan Headquarters. In the past,

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the fire departments in one District did not respond to alarms. In another District, unless the Commander of the Second District was ordered by Headquarters to send aid, but recently this method of operation was changed. Now the District departments are expected to cooperate with each other and send assistance whenever fires occur in the nearby vicinities.

When an alarm is received in a District, the station receiving the call responds and also notifies the Main Station and Metropolitan Fire Department Headquarters by phone. The Commander of the particular District orders out the apparatus from his Sub-Stations or Detached Stations if he deems it necessary. These orders, also, are given by phone. If additional assistance is necessary, phone calls are made to Metropolitan Fire Department Headquarters who then call adjoining small main stations. Lack of automatic fire alarm service causes considerable delay in notifying other stations.

Main fire stations in Tokyo house from four to five pieces of apparatus, and each sub-station and detached station has one or two pumpers. The average number of firemen and Sergeants per station is twenty-one actually assigned, although the authorized strength averages thirty.

In setting up the fire department in Tokyo, it was

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planned by the Home Ministry to have 1.5 pumpers per 10,000 population, in Yokohama, Kyoto, Nagoya and Kobe, 1.2 pumpers per 10,000 population, and in all other cities whose fire departments are under government control, one pumper per 10,000 population. Personnel was determined as follows: one Inspector per six pumpers, one Engineer per twelve pumpers, one Assistant Inspector per two pumpers, one Assistant Engineer per six pumpers, two Sergeants per pumper and twelve firemen per pumper.

Most other cities operate the fire departments in manner similar to that described for Tokyo in that the areas are divided into Districts, but the stations are expected to take care of fires only in their own immediate vicinities until ordered into other Districts by their Commanding Officers.

It is probable that these cities will copy the new Tokyo method of answering alarms for nearby fires even though they occur in sections outside of their own district. As a rule the Chief of any District orders out the apparatus only in his District until he finds that additional help is needed, in which event additional apparatus from adjoining districts is requested by phone or messenger.

Throughout Japanese cities, it is planned to assign one Sergeant and six men per shift per pumper, but owing to the difficulties of recruiting firemen, frequently

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only four and in some cases, only two men are available.

Most small towns and villages depend upon the Keibodan for fire protection. Usually the village will be provided with a shed in which a small pumper, or more often, a hand-drawn trailer unit is stored. Nearby is located a watch tower equipped with a gong. In the event of fire, the gong is struck to sound the alarm and members of the volunteer department assemble at the station. If water is not immediately available or no trailer unit is provided, hand-operated pumps taking suction from attached tubs of approximately ten gallons capacity are placed near the fire, and bucket brigades supply the water.

PERSONNEL

Authorization for the personnel operating the fire departments in the thirty-six cities under Government control is shown as Exhibit "F". Figures shown are those prior to the receipt of an order from the Home Ministry that Officer Personnel be cut by fifty percent and certain other reductions be made in the number of Sergeants and Firemen. To order a reduction of fifty percent without consideration being given to the individual cities involved is unreasonable as will be shown in figures in parenthesis in Exhibit "F". The reduced roster, it will be noted, leaves Hokkaido with only one Chief and two Engineers to service the fire departments in four cities which are twenty-five to one hundred and seventy-five miles apart. A similar ridiculous situation results in Fukuoka Prefecture where seven cities now have two Chiefs and four Engineers. Beyond question, revision must be made throughout where there is opportunity to study the needs of the individual cities.

Persons holding ranks of Assistant Engineers or higher are appointed by the Government and are paid by the Government. Sergeants and Firemen of the Kansetsu are paid sixty percent of their salary by the Government and forty percent by the Prefecture. Base pay for Fire Commanders is 1670 yen annually and for Inspectors, Engineers, Assistant Inspectors, and Assistant Engineers, 900 yen annually each. In addition, these officials

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Personnel

receive certain variable sums for "commodity price allowance" "family allowance" "diligent service allowance", and two different "Special allowances." Unmarried men in the training schools receive 154 Yen per month, and after graduation, and assignment to a post in the fire department, the pay is increased to 288.17 yen per month.

During the war it was impossible, because of the low pay and general public disregard, to recruit sufficient men for fire department service, but since February 1946, training schools have been reopened in Tokyo, Yokohama, Kyoto, Hiroshima, and Osaka. Requirements for entrance to these schools vary, but in general, the applicant must be between 20 and 35 years of age, must weigh over 45 kilograms (99 pounds), pass a cursory physical examination which omits checking of such important items as hernia, varicose veins, etc. and must have had at least a grammar school education to pass the written examination covering mathematics, grammar, and composition. The preliminary training course is operated for three months during which time the student receives instruction in the subjects shown in Exhibit "G". Subjects such as "Moral Culture", "Social Common Sense", and "English" should be replaced by studies designed to develop fire fighting technique. Other courses of advanced nature, are shown also in Exhibit "G", in addition to which are certain special courses in Engine Technology, First-Aid, and Supervision.

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Personnel

In the Tokyo Fire Department many of the District Chiefs are men who have advanced "through the ranks", but this has not been found to be true in other fire departments under government control. In some instances, officials have been transferred from the police department to important positions in the fire departments without having had any experience in fire-fighting activities.

After a fireman in the Metropolitan Fire Department has completed one year's service, he is eligible to take a competitive examination for promotion to Sergeant, after two years in that position, he may take examination for promotion to Assistant Engineer, after three years in that category, he becomes eligible to take the examination for promotion to Inspector, and after five years' service as Inspector, may take an examination for promotion to Chief Inspector. The Director of the Fire Department, however, must be chosen from men who have been Chiefs of Police, Chiefs of Economic Divisions, or Chief of one of the Home Ministry branches in the Prefectures.

Members of the Fire Department in the Grade of Sergeant or Fireman are eligible to the following number of days of Annual Leave:

Five Years Service or Less	. . . . .	20 days
Ten " " " "	. . . . .	50 "
Twenty " " " "	. . . . .	80 "
Thirty " " " "	. . . . .	110 "
Forty " " " "	. . . . .	140 "

Annual Leave is not cumulative.

Personnel

When a member of the Fire Department is ill, lost days are deducted from Annual Leave until such Annual Leave is exhausted, after which his base pay, rent allowance, and all other allowances, excepting those for lunch and so-called "working allowances" are paid for two months. After two months, this compensation is reduced fifty percent.

If injuries are incurred in line of duty, salary and all allowances are paid during the period of disability. Eighty percent of all medical expenses are paid by the Police and Firemens' Association. Time lost through "off-duty" injuries, however, is paid for in the same manner as that pertaining to illness and described in the preceding paragraph.

Retirement pay of 1/3 of the base is given after 12 years of service for firemen, or 17 years for an officer, but a fireman cannot be forced to leave his position on account of age, and he may remain on the payroll until he decides to resign. If the person has had more than 12 years of service, (17 for officers), an additional 1/50 of a year's pay is added to the 1/3 of the base pay for each year over 12 (17 for Officers). Two percent of the pay is deducted for retirement fund, and an equal amount is contributed by the government. An additional one percent also matched by the government is deducted for the Police and Firemens' Association which all firemen must join (Optional with Officers).

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Personnel

If death occurs from occupational causes, the widow and/or children are given one year's base pay in a lump sum.

In-service training has been given only during the past few months. Schedules vary in different cities, some giving hourly drills, plus one hour of classroom work each day, while others give only one hourly drill each week. The standard in Tokyo is to give a one-hour drill each day. This consists of evolutions with the various pieces of equipment but little is done with the actual operation of pumpers because the gasoline and oil rations are so low.

Officials in the Jobi-Shobo are Government appointees who are paid by the government. The Sergeants and Firemen, however, are paid by the City. Exhibit "H" lists the number of pumpers and the personnel in cities whose fire departments operate as Jobi-Shobo. Benefits for illness, injury, and death in the Jobi-Shobo departments are similar to those of the Kanetsu in some cities, but many others make no provision for benefits or retirement.

The Keibodan, as stated previously, are volunteers who receive no regular pay or benefits. Each member is given one yen or more for each fire he attends. This is supposed to pay for his meal. Keibodan as a rule meet once each year, but training is not conducted at other times.

ADMINISTRATION

Under the Director of the Police Bureau of the Home Office, the Public Safety Section operates as one of five sections. The Public Safety Section controls one which covers "Guarding", and Section two, which covers the registration of foreign nationals, traffic, and fire prevention and protection. This last group consists of only four men who handle all matters pertaining to all fire departments in Japan.

The Administrative Staff for Metropolitan Tokyo Fire Department includes 344 persons as will be seen in Exhibit "B" (As mentioned previously), the Special Fire Brigade Section is no longer in operation, and therefore the 252 men assigned are not to be included in these figures. Osaka had an Administrative Staff of 138 in addition to 120 assigned to a Special Brigade which has been discontinued.

In Headquarters of Saitama Prefecture, only two men, with ratings as Sergeants, handle all matters pertaining to fire prevention and protection.

Administration of departments operating as Jobi-Shobo is rather simple. The Chief of Police of the City is in charge of the fire department and he reports directly to the Chief of Public Peace, or Chief of Public Safety for the individual prefecture.

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Administration

The Keibodan, of course, operate directly under the local Chief of Police. The Chief of Public Peace, or Public Safety has full authority over all fire departments in his Prefecture, regardless of the fact that all expenses of the fire departments may be paid by the City.

During the present year (1 April 1946 to 31 March 1947), the Government Budget for salaries for officials is exactly half of the amount allotted last year. In this year's budget for fire departments in the thirty-six cities under Government control, the following items are covered:

Personnel expenses.....	28,645,881 yen
Equipment	1,773,303 "
Other expenses	6,477,497 "

Total. . . . 36,896,681 Yen

All Prefectures, cities, towns and villages show the following as budgets for this year's fire department activities:

	<u>Prefectures</u>	<u>Cities, towns, villages</u>
Personnel expenses. . .	223,934	8,157,413
Equipment "	49,727	2,100,530
Other expenses	<u>6,000</u>	<u>1,210,765</u>
Total	279,661	11,468,708

Total budgets from all sources are 48,639,050 Yen.

Budgets are made up by the local fire department officials, given to the local Chief of Police, who may revise them, sent

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Administration

to Prefectural Headquarters for consideration, then to the Home Ministry for further consideration, and finally to the Minister of Finance who also has the authority to revise the estimate. A typical budget in detail is shown as Exhibit "I". These amounts represent the budget for Hyogo Prefecture whose fire departments operate as Kansetsu and whose expenses are borne by the government. All money for budgets is raised by usual taxation of real estate, income, licenses, and similar sources. It will be noted through reference to Exhibit "T" that no provision is made for purchase of new equipment or apparatus. Each city, whether under Government control or city control, purchases its own pumpers, hose, and other equipment. All cities, also, furnish and equip the fire stations excepting in Tokyo where all fire stations are owned by the Government.

Uniforms are supposed to be supplied by the Government for use by the Kansetsu, one summer and one winter uniform being issued each two years. However, no uniforms were issued for four years, due to shortage of cloth, but during the past month a few summer uniforms have been obtained by officials, and others will be issued to the firemen in the near future.

All salaries and wages of the Jobi-Shobo are paid by

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Administration

the City which also supplies the apparatus, equipment, fire stations and uniforms.

The Keibodan receive no regular pay but are given money for meals while fighting fires. Only two prefectures appropriate sums for the pay and equipment of the Keibodan, and the Government pays a small amount for their operation in some Prefectures. Frequently, the apparatus and uniforms are purchased through donations by wealthy individuals.

The chain of command in all cases extends from the Home Ministry through the Director of the Police Bureau of the Home Office to the Chief of the Prefectural Police, and down to the local Chief of Police. Since many of these officials are more interested in police work and have had little experience in fire-fighting activities, they are inclined to pass responsibility for operation along to the official at the head of the actual fire-fighting unit.

RESPONSIBILITIES

While the responsibility of the operation of the fire departments in the thirty-six cities under Government control is vested in the Public Safety Section of the Home Ministry, the efforts of the four employees are confined to the approval of budgets, the collecting of statistics, and liaison between other offices and the fire departments through Prefectural Police Departments. As a rule the Chief of Public Peace, or Chief of Public Safety in a Prefecture knows the top officials of the fire department, but is not familiar with operations or activities, since his duties are mainly those involved in police functions. Responsibilities for the actual operation of the fire department rest in the hands of the City's Administering Officials and the Chiefs of the various fire districts.

Likewise, responsibilities for the activities of the Jobi-Shobo are assumed by the various District Chiefs of the City because the Chief of Police is engaged mainly in police affairs. Prefectural offices have lists of apparatus, personnel, pay, and similar items of the various cities and towns in their prefectures, but assume little responsibility for the actual operation of the fire departments. In Saitama Prefecture for example, all items pertaining to fire departments are handled by two Sergeants.

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Responsibilities

It has been found that Chiefs of Police in villages and towns keep in close touch with activities of the Keibodan, but actual operation of the department is usually vested in a Sergeant.

FACILITIES

Officials of most fire departments investigated appear to feel that modern fire alarm systems are not needed, even in the large cities, and the reason for this attitude is not clear. The only objection offered is the fact that many false alarms resulted from children or drunks tampering with the boxes.

In the early 20's, a Mr. Kiyose, who had made extensive studies of fire alarm systems in England and the United States, formed a company to produce a suitable alarm system for Tokyo. He received no encouragement from fire department officials, so finally obtained financial backing from several of the large fire insurance companies. The necessary alarm box units were purchased and the master recording equipment installed in Metropolitan Police Headquarters. Other recording units were installed in the district fire stations. He obtained permission from the Board of Communications and from the Police Communications Office to use their poles for stringing the fire alarm wires and where such poles were not available, Mr. Kiyose set them himself. Any building owner desiring fire alarm service may subscribe to this service and have a box installed on his property at a maintenance charge of fifty yen per month. The result is a very poor distribution of alarm boxes throughout Tokyo. So far as is known, only Osaka, Otaru and Kyoto have purchased fire alarm systems.

Facilities

As a memorial to the present Emperor ascending the throne, the City of Kyoto purchased a system consisting of sixty boxes located in the downtown section. It was expected that the system would expand, but the number of boxes was so small people did not become familiar with their use and in one of the scrap metal drives during the war, the boxes themselves were removed. However, it was discovered recently that the boxes were not actually put into the scrap metal collection, and so are available for replacement.

Conditions regarding fire alarm systems in the cities of Japan are:

Tokyo,	3000	boxes originally.	About 2/3 destroyed.
Yokohama,	50	" "	Totally destroyed.
Hakodate	75	" "	" "
Nagoya	250	" "	" "
Kobe	250	" "	" "
Moji	130	" "	" "
Yawata	85	" "	" "
Wakamatsu	35	" "	" "
Fukuoka	150	" "	" "
Aomori	80	" "	" "
Kyoto	60	" "	" (Boxes can be replaced)
Ashikaga	75	" "	(System completely repaired)
Otaru	165	" "	(30 in need of repairs)

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Facilities

Japanese Fire Departments are provided with watch towers of sufficient elevation to give a good view of the surrounding area. It is unfortunate, however, that fires usually have burned through buildings before being discovered and therefore have made considerable headway before the arrival of fire apparatus.

The Tokyo Fire Alarm Company owns the equipment in Tokyo. The mechanical construction of the alarm box is similar to those used in the United States and is operated by breaking a glass and pushing a button. This operates a relay which releases a spring-operated motor that, in turn, operates a code wheel. The code wheel operates a pair of contacts which send out an identifying number to the main fire station in that district. The identifying number is repeated three times after which it stops automatically. The motor must be removed when the box is reset. A red light above the box is used to identify its location.

As the demand for fire alarm boxes has been very slight, the company has produced little but is capable of turning out 30 to 40 boxes per month. At present the company is engaged in providing alarm systems for the areas around G.H.Q. billets and it is hoped that this may be the nucleus for an adequate system for the entire city at a later date.

Tokyo's average number of fire alarms per month are

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Facilities

139. Of these 66 are reported from watch towers, 33 by messenger, 31 by telephone, 6 by the police department, and 3 by "other means."

Radio communication is not provided for use of the fire departments.

Watch towers are used almost exclusively by the Kansetsu and Jobi-Shobo. Many of the towers provided with bells at the upper levels, are located in small villages but are not manned. It is understood that persons were assigned to duty in these towers during the war, but not at present. In order to sound an alarm, the person must climb the tower and strike the bell.

Many Japanese do not know how to use the telephone, and also, phones in private residences are few. As a result, persons often run to the fire department rather than trying to telephone.

The water supplies of all cities investigated consist of reservoirs with gravity feed to the gridiron systems. As in the cases of most cities of the United States, water for fire fighting is furnished by the regular domestic supply and no mains for special fire service are provided. In no city inspected did the public water supply give sufficient pressure generally so that hose lines could be used from hydrants directly. A few hydrants in an area of low elevation might have such pressure, but in most other parts of the city pumpers were required.

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Facilities

There are nine sources of water supply for Tokyo, the largest of which supplies about sixty percent of the city's water. This source consists of a series of three reservoirs known as the Yamaguchi, the Upper Muriyama and the Lower Muriyama. Water flows by gravity through a three-meter culvert to the Yamaguchi reservoir (capacity about five billion gallons), to the Upper Muriyama Reservoir (capacity about 850,000,000 gallons), and to the Lower Muriyama Reservoir (capacity about three billion gallons). From here the water flows through a 98" main to the Musashi-Sakai filter plant. After passing through filter beds and chlorinating system, the water flows through two lines (one 78" concrete and one 78" steel with concrete lining) to the Wadahori Reservoir which consists of two 10-1/2 million gallon storages. It is then distributed through Tokyo. Most of the feeder mains are 24", 20", 18" and 16" with the gridiron system running down to 3-1/2". Average daily consumption is about 318,000,000 gallons. During the summer months there are water shortages because of low supply from the river.

The other eight sources of water supply are at different levels which require the use of valves, kept shut to prevent exhausting any single source of supply. In the event more water is needed for fire fighting, the Water Department is notified, and decides whether or not these normally closed

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Facilities

valves shall be opened. It is unfortunate that all of the eight supplies were not installed at elevations to produce the same static pressure in which event divisional valves could be kept open and thus improve the volume of water available.

Static pressure of public water were recorded at all main fire stations in Tokyo during April 1946. The minimum and maximum pressures are shown in Exhibit "J". It will be noted that even the maximum pressures in most Districts are far too low for good fire streams.

At present there are 33,813 hydrants in Tokyo, 1,856 of which are out of service due to air raids. Hydrants are located from 300 to 500 feet apart and most are installed below ground level in manholes. Key wrenches for operation of hydrants are carried on all fire trucks.

In addition to the public water supply, Tokyo has 7714 small cisterns (10,000 to 25,000 gallon capacity each), which were constructed for air raid protection; 2,769 suction lines from rivers and canals, moat water, sea water, ponds, and other sources. Some sections of the city have ample water available but in others, where it is necessary to depend upon the small public mains, there is a scarcity.

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Facilities

The water supplies of Tokyo are typical of those found in other cities, excepting that Tokyo's public system is larger. Many of the distribution mains are too small and many are "dead-ended". By continuing these to form "looped" systems, the flow of water will be greatly increased and will serve as temporary improvement until larger mains are available for reinforcement.

All of the larger cities have connections from rivers, salt water, moats, and other sources in addition to the 10,000-25,000 gallon cisterns constructed for air raid protection.

In Otaru, Hokkaido Prefecture, the 20" main from reservoir to the City is said to be so badly tuberculated that it has the carrying capacity of about a 10 inch main. Kawaguchi, Saitama Prefecture has no public water supply and depends upon water from small cisterns and streams.

The Keibodan have a few emergency cisterns available in some of the larger villages but as a rule they depend upon water from small streams and wells. Public water is available in the Town of Iida, Nagano Prefecture, but is inadequate for large-scale fires. Kakizaki, Niigata Prefecture, depends upon water from a stream but this supply is inadequate during the summer months. Study must be made of each individual city and town to determine the adequacy of water supplies.

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Facilities

Buildings in which fire departments are housed, consist of a great variety of construction. Tokyo, for example, has 244 stations of which 22 are constructed of concrete and the balance of wood, some with stucco covering. All of these are owned by the Government and are in good condition. However, due to being constructed in inaccessible places, many are unsuitable insofar as location is concerned.

Fire stations in other cities, towns, and villages are owned by the community in which they are located. There is no uniformity of construction in any of the locations investigated. Some stations are well built, others are poor; some are merely sheds or lean-tos. They are in various states of repair. Reference to Exhibit "K" will show the variety of buildings used as fire stations. A large number of the buildings are of inferior construction and some poorly located.

Some of the smaller cities and towns have mutual aid agreements whereby assistance is given from neighboring settlements. The agreement in operation among the towns of Saitama Prefecture is very satisfactory.

EQUIPMENT

The pumpers in service throughout Japan represent a long list of manufacturers and vary in models from 1917 to 1945. Those used for protection of the thirty-six cities under government control, have an average age of about ten years, while those operated under city control average about fifteen years in age. While the age of a pumper may not be indicative of its efficiency or operating condition, it must be borne in mind that Japanese maintenance and care is poor compared with United States standards. Furthermore, repair parts were not readily obtainable during the war period, and since the destruction of many plants from air raids, are almost impossible to acquire. Neither the "Toyoda" nor the "Nissan", most commonly used Japanese-made pumpers is so ruggedly constructed as suitable fire trucks should be, and as a result need repairing, after a year or less of service. The bad condition of the roads in general contribute to the rapid deterioration of the pumpers.

The attached "Exhibit "L" lists the make, age, and capacities of the pumpers in Hiroshima City, which is one of the thirty-six under government control, and in Sendai, which is under municipal control. Both of these are typical for their groups. Exhibit "M" is a picture of an American-LaFrance, 750 gallon per minute pumper in service at Kyoto. It's age is not known for certain, but it is said by the Kyoto Fire Department to be a 1927 model.

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Equipment

The solid rubber tires and chain drive place it as even earlier manufacture, probably 1917.

According to figures obtained from the Home Ministry, Japanese Fire Departments, through the Agency of the Government, purchased the following number of pumpers:

1941---	453	1944---	500
1942---	530	1945---	77
1943---	167	1946---	17

These total 1744 and the number remaining after the air raids (number of pumpers lost in air raids throughout Japan are not available), should be in reasonably good condition.

Most cities and towns appear to have a sufficient number of pumpers although some redistribution should be made. For example: The Home Ministry believes that the Metropolitan Fire Department now needs only 431 of the 758 pumpers on hand and that the remaining 327 should be kept in reserve. Kyoto, and Maizura (both cities under government control), on the other hand, show a shortage of fifty-nine pumpers. Similar figures promulgated by the Home Ministry for the thirty-six cities under government control show that

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Equipment

2,027 pumpers are on hand, only 1227 are actually required, and 803 are to be held in reserve.

Following is a complete list of apparatus in Japan:

	<u>Large Pumpers</u>	<u>Small Pumpers</u>	<u>Motor-cycles</u>	<u>Trailers</u>	<u>Fire-boats</u>
Gov't Oper- ated Departments 2027		7	38	939	25
City Oper- ated Departments 596		19	33	203	(Also have 52245) (hand oper.pumps)
Volunteer Departments	<u>2192</u>	<u>291</u>	<u>510</u>	<u>10,652</u>	
Total	4815	317	581	11,794	25

The large pumpers range between 400 and 750 gallons per minute capacity, the small pumpers between 250 and 350 gallons per minute, motorcycle pumpers 50 and 150 gallons per minute, and the trailers between 120 and 250 gallons per minute. Hand pumps are of two sizes- those operated by two persons and the others by four persons.

This array of apparatus, if properly distributed, and in good operating condition, would provide suitable protection. But, as pointed out previously, some cities have more, others less, apparatus than they should have. Likewise,

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Equipment

the pumpers in some cities are in much better condition than others. In order to determine the extent of repair parts needed, the Home Ministry was requested to obtain from each prefecture, a list of such parts. Exhibit "N" shows the total number of parts necessary to put all pumpers into workable condition. Lack of self starters, combined with low quality gasoline and unheated fire stations, last winter resulted in much delay, and in some cases it was impossible to even get the pumpers outside of the stations. Of the 758 pumpers in Tokyo, only 533 are in serviceable condition.

Pumpers carrying motor-driven pumps, usually two reels, each containing twelve lengths (63 feet per length) of unlined linen hose, four playpipes or nozzles, an axe, two pike poles, and ladders 13 to 17 feet long, are quite standard throughout Japan. Ladder trucks are practically unknown, and the Japanese Fire Departments feel they are not needed. Tokyo has four aerial ladder trucks of which two are out of service. Inspection of the two aeri-als was made recently. The first, a German-made Benz, carrying an 85 foot aerial ladder, operated very satisfactorily and the ladder was raised to its full height within 1-1/2 minutes. The second truck, a Japanese copy of the Benz, carries only a 55 foot ladder. Difficulty was experienced with the raising

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Equipment

mechanism and even after being started with the hand-operated windlass, failed to function smoothly. It was raised finally after many minutes of experimenting, but very evidently the mechanism needs overhauling and the crew, training.

Osaka has one aerial which needs repairs, and requires fifteen minutes to raise(it carries a 65 foot aerial ladder), and Kyoto has one 85 foot aerial ladder which requires considerable time to raise.

Aside from these, no other aerial ladders have been found in our survey. In the United States, ladder trucks are considered as being almost as necessary as pumpers in promoting efficient fire fighting, and in many cities today it is specified that the so-called "service ladder trucks" be provided with pumps and hose. When thus equipped, the service ladder truck becomes a "Quad", one of the most efficient pieces of apparatus available. Good fire department practice in a city of 250,000 population would require a total of thirty pumpers (two of these could be hose trucks only) and ten ladder trucks.

Japanese fire departments use 2-1/2" unlined linen hose with all regular pumpers. Because linen hose does not

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Equipment

withstand much chafing and because streets and alleys in many cities are too narrow to permit the passage of motorized apparatus, hose usually is carried on two-wheeled reels which are rolled from the truck down a skid to the ground. Hose is attached to the discharge line of the pump while the hose is being unreeled up to the scene of the fire. Pumpers must be used in most Japanese cities and towns because the water pressure from public mains is too low to supply satisfactory hose streams. Under the normal usage, this type of hose would be expected to give satisfactory service for three or four years, but it has been found in our investigation that two years service is about the maximum before it becomes necessary to patch the hose. Officials of various fire departments visited, could give very little information regarding hose manufacturers but it was finally learned that the Teikoku Seni Kasha, Ltd. was one of the suppliers. Visit was made to the Tokyo Branch Office of that concern and it was learned that all other plants manufacturing 2-1/2" linen hose had been destroyed in the air raids so this company is now the sole source of supply. Arrangements were made for a visit to their yarn mill at Otsu, and the hose weaving mill (Ohmi Textile Company, Ltd.) in Shiga Prefecture.

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Equipment

The Company has about 80,000 acres in Hokkaido planted to flax and from this produces about 130,000,000 pounds of flax straw.

About 12 percent is lost in converting the straw to fibre. The flax fibre is shipped to the Otsu plant where it is processed into yarn of the desired size and shipped to the weaving mill. It was noted that the warp yarn was given only 4-4.5 twists per inch and the woof yarn only 1-1.2 twists per inch. Loosely twisted yarn of this kind when woven into hose cannot be expected to resist abrasion so well as that given a harder twist, and the greater leakage will result because the looser twisted yarn and looser woven hose requires a longer time to expand (or "swell") sufficiently to stop leakage. Hose is purchased on the specification of a minimum bursting pressure of twenty-seven kilograms per square centimeter (about 390 pounds per square inch), but tests are not made to determine whether or not the completed hose meets these specifications. Samples of the Japanese-made hose were sent to the Factory Mutual Laboratories, Boston, Mass., where they were checked against similar samples of 2-1/2" unlined linen hose manufactured to Underwriters specifications by the Charles Neidner's Sons Company, Malden, Mass.

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Equipment

The following results were obtained:

Time	<u>Japanese Hose</u>		<u>Neidner</u>		<u>U. S. Specifications</u>	
	<u>Leakage</u>	<u>Leakage</u>	<u>Hose Leakage</u>	<u>Hose Leakage</u>	<u>Leakage</u>	<u>Leakage</u>
	1st Wetting:	2nd Wetting:	1st Wetting:	2nd Wetting:	1st Wetting:	2nd Wetting:
30 sec.	5 oz.....	5 oz.	1/16 oz.	1.5 oz.	—	—
1 min.	9.5 oz.	9 "	1/4 "	3.25 "	16.2 oz.	—
1st 5 min.	18 oz.	18.5 oz.	1/2 "	5.0 "	—	—
2nd 5 min.	4 oz.	3.75 oz.	3/16 "	0.5 oz.	4.2 "	—

Bursting pressure: The Japanese hose burst at 400 pounds per square inch. The Neidner hose did not burst at 700 pounds per square inch. Minimum bursting pressure, U. S. Specifications, 500 pounds per square inch. It will be noted that leakage from the Japanese-made hose greatly exceeded that of the Neidner product but expanded slowly during the five minute test period and fell within the limits of the U. S. Specification. Expansion was slow, as would be expected from loosely twisted yarn. Bursting pressure was low, although it barely did meet Japanese specifications. Hose of this kind, subjected as it is to great abrasion and hard usage of public fire departments, should be constructed of stronger, harder twisted yarn and the minimum bursting pressure specification should be increased to 500 pounds per square inch. When the matter was brought to the attention of officials in the Tokyo Fire Department Headquarters,

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Equipment

the latter questioned the advisability of specifying better hose because it would require heavier yarn and the hose would be more difficult to handle. Quality should not be sacrificed for such trivial reasons.

Rather than discard hose which develops leaks, Japanese Fire Departments are required to make repairs. This is accomplished by either sewing across the opening ("darning"), or by inserting on both inside and outside, a leather patch through which a copper rivet is fastened. Patching of this kind is carried to an extreme and frequently is continued long beyond the reasonably expected life of the hose. Exhibit "O" and "O-1" picture hose which should have been discarded and which is almost sure to rupture when pumper pressure is applied.

Of the 2-1/2" hose in use by the various public fire departments investigated, about 30% should be replaced as soon as possible, about 30% is patched considerably and will require replacement within the next few months, and the remaining 40% much of which was obtained from Japanese Army and Navy Supplies, is in good condition. The cost of the 2-1/2" linen hose has been 5.95 yen per meter, but in view of increased labor costs, the manufacturer feels this must be increased considerably, probably to 24 yen per meter. This company with its 108 looms in operation (only 63 were running at the time of our visit because sufficient orders were not forthcoming) should be able to supply all fire

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Equipment

departments with the amount of hose required. During 1944 the company turned out 13,596,480 feet of linen hose of which 3,736,830 feet were the size (2-1/2"), used by public fire departments. This company has on hand 225 additional manufacturing capacity appears to be required.

All nozzles examined during this investigation are similar to the "Underwriter" playpipes used in the United States, being made of copper tubing, wound with cord in most instances, and not provided with shut-offs. Most pumpers carry two of the nozzles and sets of tips including 5/8", 3/4" and 7/8". United States Fire Departments use 1-1/8" and 1-1/4" tips on shut-off nozzles ordinarily, but the Japanese pumps (400 g.p.m.) will not supply two good hose streams of those sizes, so smaller tips must be used if more than one hose line is put into service. The use of shut-off nozzles reduces the amount of water damage because the flow of water can be stopped immediately when fire is extinguished, whereas the Japanese fireman must go back to the pumper to shut off the water.

In the United States, fire trucks carry 24-foot extension ladders for use in working on two-story buildings. Japanese fire departments, however, make little use of ladders in fire fighting, and most of those carried on pumpers are 13 to 17 feet in length when extended. Short ladders such as these are of small value in

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Equipment

fire departments. Many of the pumpers examined carry no axe and most others carry only one.

Fog nozzles, both high and low velocity, provide excellent extinguishment for flammable liquid fires as well as protection to the men fighting such fires. The fog nozzle is designed to emit a very fine spray thus enabling the heat to be absorbed more rapidly. It has been found that one gallon of water will absorb about 1350 British Thermal Units (amount of heat required to raise one pound of water one degree Fahrenheit = 1. B.T.U.), if raised from 50° F to 212° F, but that same gallon of water will absorb about 8080 more B.T.U's if converted into steam. Herein lies the successful use of water as an extinguishing agent because that part which is converted into steam has not only absorbed heat to its capacity, but has also contributed to extinguishment through the process of oxygen dilution (one cubic foot of water, if converted into steam, will produce 1700 cubic feet of steam). The Japanese firemen have been deeply impressed with demonstrations of the effectiveness of fog nozzles but as yet none has been provided for their use.

Some of the pumpers carry a copper-shelled extinguisher, designed to contain about one quart of carbontetrachloride under air pressure. No gauges are provided so it is impossible to tell,

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Equipment

except by actual operation, if the air pressure is retained. The manufacturer, Okada Extinguishing Company, Tokyo, stated that corrosion is so great that gauges become inoperative. Evidently leakage occurs at many of the discharge valves because every extinguisher of this kind that has been examined, was found empty. Carbontetrachloride is very difficult to obtain, and it is understood that little, if any, is being manufactured. The Okada Extinguishing Company had only three drums of fifty-five gallons each on hand.

Japanese fire departments made a little use of foam generators, but owing to the difficulties of obtaining aluminum sulphate, sodium bicarbonate, and the foam agent itself, the generators have been discarded. Foam agents (colloids) used in the United States are obtained as by-products in the manufacture of licorice and of dyewood dyes, but of course they have not been available for Japanese purchase. They make some use of a material said to be a lactoprotein obtained from the Soybean Manufacturers Association. When mixed with sodium bicarbonate, aluminum sulphate, and water in the proper proportions, it expands about ten times its original volume, but the foam produced is not of a good quality and does not "stand up" as well as desired.

Some of the Tokyo Fire Boats are provided with mechanical foam solutions and mixing nozzles similar to those in use in the

Equipment

United States. The solution consists of soaponified cocoanut oil which is siphoned into the mixing nozzle by the flow of water in the hose. Air is trapped in the bubbles formed at the mixing nozzle, but again the foam does not "stand up" so well as the mechanical foam used in the United States and produced from soy bean by-products.

The Japanese fire departments use no 1-1/2" hose so are not equipped with "wyes" or siamese for use with 2-1/2" hose. Forcible entry tools, saws, crow bars, flash lights, and other similar equipment is not carried on fire trucks.

Couplings for fire hose are of two designs- a latch type which may be quickly attached but which permits considerable leakage, and a screw type. The latter has five threads per inch and is being used extensively throughout Japan. It is not, however, adopted as a National standard, but probably will be to permit interchange of fire hose from one community to another. A 7-1/2 thread per inch was adopted as a National standard in the United States and is quite universally used.

Attractive comfortable uniforms improve the appearance of any group of men and unquestionably improves their morale. Those worn by members of the Japanese Fire Departments present a sorry sight in many cases, and no new uniforms have been issued since 1942. It is stated that two woolen uniforms and two cotton uniforms were issued each four years. The

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Equipment

regular fire department uniform consists of black coat, trousers, and cap similar to those worn by members of the police department. In many cases however, we have seen firemen wearing black coats, khaki breeches, spiral leggings, the typical khaki Japanese caps, and other nondescript assortments. Footwear, too, is of many kinds and vintages; rubber boots, white "sneakers", patched or holey leather shoes, etc., and the wearing of such apparel must cause considerable embarrassment which would tend to lower the morale of the wearers. It is understood that all members of the fire department have received from one to three pairs of army shoes since October 1945, but some wear them only when off duty-- others have sold them to get money for food. Each fireman paid a nominal price for the shoes issued. Many fire departments in the United States have adopted overalls and denim shirts as fatigue uniforms, thus conserving the regular dress uniform for street wear and extending their use for many months.

FIREBOATS

Waterfront protection in all coastal cities visited is badly neglected. Yokohama had three wooden boats, each about eleven meters long, and all of which are out of service for repairs. Tokyo is better situated with eleven wooden boats, each eleven meters long, carrying a single 500 gallon per minute pump, and provided with an 80 H.P. gasoline motor capable of driving the boat nine knots per hour. Each boat carries twelve lengths of 2-1/2" hose, a section of 4" suction hose about thirty feet long, one foam-mixing nozzle with two 18 litre cans of mechanical foam solution, and is provided with a monitor nozzle. Crew consists of seven firemen. Seven of these boats are located at the Fireboat Main Station and two each at the Harbor Branch and Kita Sub-Stations.

Osaka, with a great waterfront area, has one small fireboat in service and two others under construction. Each is eleven meters long, driven by 80 H.P. gasoline motor, provided with one 500 gpm pump, and has top speed of nine knots. Suction lines are 4" and each boat carries ten lengths of 2-1/2" hose. A crew of ten men per shift for each boat is contemplated.

In Kobe is located the best fireboat found in our investigations. It is a steel-hulled craft designed by the Japanese and used by them as a fire boat until taken over by the U. S. Army Engineers. The pump was not satisfactory so two

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Fireboats

skid units (Dodge motors direct connected to 500 g.p.m. Hale Pumps) were mounted on deck and piped to a monitor nozzle and hose connections or hydrants. It is unfortunate that the Japanese fire boats are capable of pumping only 500 g.p.m. each because that volume of water is vastly too small to cope with most waterfront fires.

A wide variety of extinguishers were manufactured in Japan including the dry-powder type, carbontetrachloride type of many designs, foam, and soda-acid. Those employing carbon-tetrachloride as the extinguishing agent have been in the greater number. Shortages of chemicals for recharging have rendered most of the extinguishers useless, and many of these are deteriorating rapidly. Most of the manufacturing plants were lost through air raids and those few which are still operating, find it almost impossible to obtain metals, hose, and chemicals, for assembling their products for the market. We have not found any extinguishers of the pump tank design, despite the fact that water affords suitable protection for most of Japan's buildings and contents.

Japan has no such organizations as the Underwriters' Laboratories, or the Factory Mutual Laboratories, in which rigid specifications are made for the manufacture of all types of extinguishers, and, as a result, a great variety of types, sizes, and shapes are in use.

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Fireboats

Many are practically worthless and probably give a false sense of security to persons unfamiliar with such devices.

Very few extinguishers are in use, even in most of the factories and stores inspected.

Shortages of gasoline and lubricating oil for use of fire departments are really serious. The Home Ministry makes the request for gasoline allotment, to be used by the fire departments in the thirty-six cities under Government control, to the Ministry of Industry and Commerce, but the city-operated fire departments and the Keibodan must obtain theirs from that allotted for general use of the public. Even the Government-operated fire departments have had difficulty in obtaining gasoline. The total gasoline available for all users is said to be 40,000 litres per month of which fifty percent is allotted to those fire departments under Government control. As stated previously, the municipally-controlled fire departments and the Keibodan obtain their gasoline and lubricating oil from that allotted for the general public, and in most cases investigated very little of either is available.

Even though the fire departments in Hiroshima, Kure, and Hiro are under government control, the shortage of gasoline is deplorable, and this situation is typical of all fire departments investigated. In these three cities, thirty-six fire trucks are in service and they average twenty-five fires per month,

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Fireboats

of which eight occur in areas occupied by Occupational Forces, yet they have received through the Home Ministry only 530 litres (about 133 gallons per month), or about 3.7 gallons per pumper per month. A Pumper will run about six and one half miles per gallon, or will pump water about ten minutes per gallon of gasoline. The average length of run per pumper to a fire and return is about 1.6 miles which requires about one quart of gasoline. Therefore, if a pumper is required to operate at five average fires per month, the gasoline allotment is entirely used up. Two pumpers in Hiroshima ran out of gasoline while enroute to a fire in an area occupied by Allied Troops.

The very low gasoline ration does not permit the use of pumpers for drills or testing, and if even weekly drills are renewed (daily drills and daily operation of pumpers should be made mandatory), another 4-1/2 gallons per month will be needed. Estimates made by the Home Ministry, taking into account all serviceable large and small pumpers as well as the hand-pulled trailer units operated mostly by Keibodan, indicate that the government-operated fire departments require about 50,000 litres per month, the city-operated departments require about 20,000 litres, and the Keibodan about 50,000 litres per month. This represents a total of 120,000 litres or about 31,500 gallons per month for all motorized fire apparatus in Japan. It must be emphasized that only those pumpers

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Fireboats

actually in service shall be allotted gasoline and lubricating oil. Fifteen gallons per month each for large pumpers and ten gallons per month each for small pumpers and trailer units, would not be excessive.

FIRE RECORDS

Fire losses in Japan are fewer in number, comparatively, than they are in the United States. This may be attributed in part, at least, to the following factors:

1. By using holders, most Japanese smoke all of a cigarette. They smoke few pipes and practically no cigars, so few butts or hot ashes are discarded.
2. Few homes are heated by stoves or furnaces and therefore the hazards presented by defective chimneys are reduced greatly. Much of the Japanese cooking is done in the open or in detached sheds.
3. Many homes are lighted by electricity but appliances such as toasters, washing machines, flat irons and heaters are not used extensively.
4. Japanese families use little paint or varnish, or flammable liquid cleaning compounds and therefore the common hazards of spontaneous ignition and those incident to the use of highly flammable liquids, are almost entirely removed.
5. Any person causing fire "negligence in the discharge of one's responsibility or by a grave mistake as, for instance, causing a fire in a factory "is subject to a fine or 3000 yen or imprisonment, for not more than three years (Art. 116 and Addition to Par. 2 of Art. 117 of the Penal Code). A few cases are prosecuted and convictions obtained each year.

Although the number of fires is small, the area destroyed is much larger than the average area per fire in the United States. This is probably due to slowness in the alarm systems, inferior construction of the buildings, and inadequacy of fire-fighting equipment and personnel. Experiments show that the maximum temperature in burning of wooden buildings in Japan

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Fire Records

is reached in only twelve minutes after outbreak. The Fire Section, Public Safety Division, G.H.Q., requested the Home Ministry to obtain each month from all Prefectures, the fire loss data showing the location, cause, amount of loss, deaths, and injuries. Combined statistics for these two months of May and June show that 2016 fires occurred causing forty-three deaths, injuries to 343 persons and a property loss of 212,119,277 yen. This represents an average loss of approximately 105,000 yen per fire as compared with approximately \$725. loss per fire in the United States.

The report form submitted to the Home Ministry was designed for the purpose of pointing out through use of these statistics, the locations in which fires occur too frequently, or in which losses appear to be consistently excessive. Through such study, proper corrective action can be recommended. For example: investigation of a large fire in Muramatsu (Niigata Prefecture) disclosed that the single pumper and two of the three trailer units were out of service when the fire originated. About 1400 buildings were lost.

Under our proposed method of operation, a visit by representatives of our Fire Section would be made to the local or Prefectural Authorities and attempt made to not only improve the protective equipment, but also to introduce a fire prevention program.

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Fire Records

Only by this means can we hope to improve conditions. Loss of tax revenue, both on property and income, had not been considered by the Home Ministry, Public Safety Division. It was pointed out to them that this loss is enormous, and the following facts cited:

Property loss - May, June and July	Approx.	490,000,000 yen
Annual Loss on this basis . . . . .		.1,960,000,000 "
Property tax (average rate 5%)		98,000,000 "

At the rate of loss for May, June and July, Japan's Annual Fire Losses would amount to 1,960,000,000 yen, and if the buildings were not replaced, the loss from real estate taxation on the destroyed property alone would be 98,000,000 yen. It must be remembered that building materials are difficult to obtain at present, and Tokyo has been able to replace only 17% of its buildings due to this shortage.

In addition to loss of this revenue from property taxation, there are also losses of income tax through unemployment, losses of manufacturing tax through non-production of destroyed properties, and additional costs of caring for the injured and homeless during the emergency.

If fire records are to improve, Japan must increase budgets at least sufficiently to finance a reasonable prevention program, and the figures given indicate that such expenditure is economically sound. Insurance companies report

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Fire Records

that their losses are running about double the amount of losses prior to the war. Annual fire losses in Japan, as given by the Home Ministry are as follows:

<u>Year</u>	<u>Number of Fires</u>	<u>Buildings destroyed</u>	<u>Persons killed</u>	<u>Injured</u>	<u>Yen Losses</u>
1939	17,147	18,786	613	2991	91,452,783
1940	16,915	26,697	680	2278	210,137,619
1941	14,883	16,244	401	1814	128,490,744
1942	16,684	18,477	477	1938	161,025,475
*1943	15,678	17,115	739	1892	209,517,481

* Note: 1943 figures do not include air raid losses which are given as 2,339,100 buildings destroyed. 279,994 persons killed, and 361,175 injured.

Individual fire losses for May, June and July 1946 as submitted by each Prefecture to the Home Ministry, are on file in this office.

EFFICIENCY

Under the present method of operation, the efficiency of Japanese Fire Departments is certain to be rated low when compared with departments in the United States. Japanese construction is vastly inferior to that found in the average city in the United States. Most homes, stores and shops have wood frames and pine sidings with roofs covered with pine shingles 1/16" x 4" x 10", bark or straw. Even the tiled roofs usually are underlaid with bark or shingles, and housing is very badly congested in most cities and towns. Mere alley-ways only a few feet in width, separate rows upon rows of wooden homes and shops. When fires occur in such areas, the possibilities are that more than half of them will be discovered by firemen in watch towers, perhaps a half mile distant. By the time the alarm is given, the fire has gained considerable headway, possibly having burned through a roof, and has increased still more before the fire department arrives. Reference to the several photographs in Exhibit "P" will indicate some of the difficulties to be expected from the type of construction shown. Under this system of delayed alarms and inferior, congested construction, losses covering large areas must be expected.

A good workman must have good tools, but surely the re-patched hose, lack of ladders and other equipment, low capacity pumps, and inadequate water supplies cannot be rated "good".

Summing up, we would say the efficiency of the average

Efficiency

Japanese fire department is poor when compared with departments in the United States, but if some of the deficiencies could be corrected or improved, provide automatic alarm systems which the public was trained to use, wider separation of buildings, better quality of hose provided, etc., and a better training school curriculum adopted, the Japanese fireman with the support of the public, could greatly improve his present activities.

FIRE PREVENTION LAWS

Laws covering fire prevention and fire protection are vague, but Article 2 of the Administrative Execution Law for Fire Prevention gives the "Administrative Official" (The Governor of the Prefecture or his representative), the right to "Enter a home against the occupant's will after sundown or before sunrise" to investigate any suspected irregularities. This includes gambling houses and houses of prostitution, but excludes hotels, restaurants, and other places kept open to the public.

Article 4 of the same law states "The Administrative Official will utilize land or articles when ordered by the Emperor or when it is determined necessary for safety measures and health in time of natural calamity, and also will take necessary action or will limit the usage of land and articles."

Article 13 of "Laws pertaining to Construction in the City", appears to give ample authority for introducing fire prevention measures. It is quoted as follows: "The competent Minister may indicate a fire zone when he deems it necessary from the standpoint of precaution against fire. He may make regulations in that zone which are necessary in regard to anti-fire equipment and fire proof construction of buildings. In the fire zone, a fire wall for parts of a building may be constructed up to the boundaries of the property."

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Fire Prevention Laws

Detailed regulations for erection of chimneys are given in the "Home Ministry's Regulations pertaining to the Execution of Construction Law in the City." Article 35 states "The part of the chimney for heaters, ovens and bath tubs which extends through the roof shall be over two feet. Chimneys constructed of stone or brick should not exceed three feet unless it is reinforced." Article 36 states "In event there is an eave directly above the chimney, the chimney shall extend more than two feet above the eave. This regulation also applies in event the chimney is less than three feet in horizontal distance from the upper eave." Article 37 is quoted as follows: "The part of the metal chimney which extends from the rear of a hut or under the floor will be covered with fire resistant material other than metal. In Article 38, it is stated: "Metal chimneys should be separated by at least five inches from wood, or other inflammable material. This rule does not apply in the event that three inches in thickness of fire resistant material other than metal, is used."

So far we have been able to determine that these regulations regarding chimneys are not being enforced, even though sparks and hot coals cause about 47 percent of Japan's fires.

In the Criminal Law, under "Punishment for Incendiarism and Fire caused by carelessness", the following Articles govern:

Fire Prevention Laws

Article 108 pertains to incendiary damage to buildings, trains, street cars, ships, and mines, specifying a sentence of "five years or longer, or the death penalty; Article 109 governs total loss through incendiarism to any house or building, and inflicts a sentence of "more than two years." Article 109 further is explained in the next paragraph in this manner: "In regard to the above Article, if the property was owned by the person himself, he will be given six months or longer, and if no damage was done, he will be dismissed. In other words, no penalty is attached unless the incendiarism is successful.

Article 110 refers to Article 108 and states "if the fire destroys a public building, the offender will be given a sentence of one to ten years, but if personal property only is destroyed, he will be given a maximum sentence of one year or 100 yen fine.

Article 111 states "When a fire was caused from his own property to other buildings, the offender will be given a sentence of three months to ten years." Article 112 is very vague and appears to contradict Article 108. It states "When Articles 108 or 109 was attempted, the offender shall be punished."

Article 113 states "Anyone who has planned the acts covered in Articles 108 and 109 will be given two years or less, and according to the situation he may be freed."

Fire Prevention Laws

Article 114 states "At the time of fire, anyone who is caught having anything secretly which is easily ignitable, or anyone who deliberately uses means to interfere with bringing the fire under control, will be given a maximum sentence of ten years."

Article 115 states "In regard to Articles 109 and 110, if loaned or seized goods are destroyed, that will be regarded as destroying another person's property."

Article 116 states "In regard to Article 108, if the fire was caused by carelessness, the offender will be fined three hundred yen or less."

Article 117 states "The same action will be taken when carelessness was the cause under Articles 108 and 109, result from the use of gun powder, steam, or other explosives, they will be regarded the same as incendiarism. If resulting from carelessness, it will be regarded the same as incendiarism."

Under the Police Punishment Law (Home Ministry), anyone guilty of the careless handling of coal or other materials, subject to spontaneous combustion will be fined twenty yen.

The "Control of Fire Arms and Gunpowder" regulation of the Home Ministry specifies lightning rods, explosion vents, exits, types of flows, heating, exhaust systems, etc. in detail for gunpowder factories and ammunition dumps.

Fire Prevention Laws

The Imperial Rescript on "Port Regulations", Article 11 refers to alarms and fires on board ship, and prohibits sheeting of fire arms or rockets without permission of the harbor chief.

Under the "By-Laws pertaining to the execution of the Fire Arms and Gunpowder Law (Home Ministry), precautions similar to those previously mentioned, are ordered.

The "Forest Laws and Enforcement Regulations" require permits to be obtained from the local police or forest official, and specifies penalties for fires otherwise started.

The "Law regarding responsibility of accident fire" was modified, so that it "shall not be applied to accidental fires. However, this will apply in cases when defendant in the accident case was negligent."

The various laws and regulations mentioned above should be replaced with definite, concise regulations, probably best promulgated by the fire department, and put into effect as local ordinances. It would appear that Articles 2 and 4, as presently worded, gives the Governor of the Prefecture ample power for putting into effect any fire prevention regulations and the Public Safety Division, Ministry of Home Affairs, operate on this premise.

The duties of a modern public fire department are three-

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Fire Prevention Laws

feld: 1. Preventing the outbreak of fire. 2. Preventing serious spread of fire, and 3. Providing for prompt detecting and extinguishing of fire. That such methods are successful are proven by experience of public fire departments in the United States where, over a long period of time, the trend of losses in relation to the amount of combustible property has been decreased. Peak losses in the United States were reached in 1926 when they totalled about \$550,000,000, and the yearly loss figure has been reduced to about \$375,000,000. If such program has succeeded in the United States, we fail to see why it should not, also in Japan, if effort is expended, especially along the line of fire prevention.

Statistics of fires which have occurred in Japan during May, June and July, and which were furnished by the Home Ministry upon request from this office, indicate that more than half were caused by careless handling of hot coals or sparks, and from careless smoking. Surely all of these could have been prevented if a little more care had been exercised.

Fifteen of the Japanese Fire and/or Marine Insurance Companies are members of the "Japanese Damage Insurance Association", commonly known as the "No-Life Insurance Association."

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Fire Prevention Laws

Foreign Insurance Companies may become honorary members. Its aim is to develop the insurance enterprise through standardization of rates and contracts, uniformity in the investigation of losses, and acting as a group in dealing with the government.

"The Insurance Business Law", Law #41, was adopted 29 March 1938 and has been amended at various times, the last being dated 13 February 1945. Under the law, the insurance company must obtain a license from the competent minister, and operate within the limitations of prescribed. It pertains to both mutual and limited (stock) insurance organizations and covers the organizational and dissolution activities in great detail, giving the competent minister quite broad powers. This law contains 170 articles in addition to the several amendments.

Now since we have explained to them our desire to emphasize fire prevention, they are willing to cooperate fully with the public fire departments. We have suggested that the insurance association sponsor a weekly radio program of perhaps 15 minutes duration in which brief mention may be made of various fires that have occurred and preventative measures, mainly in the home, which should be observed. This is now under consideration by the Association. Also, we have suggested that the insurance companies cooperate with fire

departments in a program for a "Fire Prevention Week" similar to that sponsored by the National Fire Protective Association in the United States, and the Association have agreed to do so.

Present loss ratio to premium paid is about eight-five (85) percent which means that losses plus acquisition costs of new insurance, preparation of policies, office expenses, etc. probably exceeds premium income, and the insurance companies are actually losing money.

Our Fire Section, interested in the reduction of fire losses throughout Japan, outlined a proposed program of fire prevention and urged its adoption by the Metropolitan Fire Department. Commissioner Fujita accepted the proposal enthusiastically and now is engaged in the process of setting up such a group in his organization. This Fire Section is aiding in the training of these inspectors.

At a recent meeting of five hundred members of the Tokyo Fire Department, the writer was requested to speak and made mention of the functions and activities of the National Fire Protection Association in the United States. Chief Hokota of the Suginami District Fire Station, and Chief Kurimata of the Keishikawa District immediately took steps to organize Fire Prevention and Protection Associations in their own vicinities.

Fire Prevention Laws

The writer attended both organizational meetings, one on 5 August, and the other on the following day. Much enthusiasm was demonstrated at both meetings and it is hoped that these will become the forerunners of similar organizations throughout Japan. If the interest of such groups can be aroused for the prevention of fires, certainly fire losses can be expected to decrease in both frequency and volume.

We have proposed to Public Safety Division of the Home Ministry that they instruct all fire departments to utilize their present personnel for the inspection of chimneys, rubbish, and smoking conditions in their own communities. Such inspections should result in the correction of some delinquencies and at the same time familiarize the firemen with the neighborhoods in which they may have occasion to fight fires.

Deficiencies of Japanese Fire Department

The following deficiencies were made evident in our investigations:

1. Fire Departments operate under Police Department supervision.
2. The Japanese Public in general has little regard for firemen and gives them practically no support.
3. The Japanese Public in general appears to be resigned to the belief that fires are inevitable and therefore, a prevention program may receive little support.
4. In the Administrative Groups, duties frequently overlap and are not clearly defined.
5. Officials in responsible positions are unfamiliar with fire department activities.
6. In many areas the actual assigned personnel is far below the number authorized.
7. Physical examinations for entrance to training schools are cursory and some of the subjects taught have little value in actual fire-fighting.
8. Training does not encourage a fireman to think for himself, but only to obey commands of his superiors.
9. General housekeeping conditions within the fire stations, themselves, are unsatisfactory.
10. Firemen are not given daily drills.
11. Due to lack of a suitable civil service system, promotions are not made through the media of competitive examinations, and therefore firemen are not encouraged to improve their own knowledge and technique.

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Deficiencies of Japanese
Fire Department

12. Some pumpers should be discarded and many others repaired.
13. No specially designed chassis for rugged fire department work is available from Japanese Manufacturers.
14. No long-range program is in operation for replacement of apparatus.
15. Pumpers are not distributed efficiently among these cities under government control.
16. Few aerial trucks are in suitable condition, and there are no ladder trucks.
17. The 2-1/2" unlined linen hose used by all public fire departments in Japan is of inferior construction and cannot be expected to stand up under rough usage.
18. Defective hose is kept in service too long by continued patching.
19. Fire departments have no long-range program for replacement of hose.
20. No shut-off nozzles are available.
21. Extension ladders in the vast majority of stations are too short.
22. Pumpers do not carry enough axes.
23. Fog nozzles are not available.
24. Carbontetrachloride type extinguishers carried on pumpers are not filled or not available.
25. At present the fire departments have no channels or other means of controlling fires in flammable liquids.

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Deficiencies of Japanese
Fire Department

26. Equipment such as small hose, wyes, saws, crowbars, flashlights, etc. is not carried on the pumpers.
27. Fire hose coupling threads are not standardized.
28. Most automatic fire alarm systems are not in operation, nor are the fire departments in sympathy with their use.
29. Fire departments in large cities have no method for radio communication between stations and official cars.
30. Fire department personnel are not permitted to operate valves of water system and must depend upon the willingness of water department employees to do so.
31. Water pressure is too low and mains too small in most cities.
32. Too many leaks still exist in many water systems.
33. Manholes are not marked distinctly to indicate location of underground hydrants.
34. Many hydrants need repairs or replacement.
35. Pumping capacities of fire beats are too low.
36. Many of the fire beats are laid up for repairs.
37. Gasoline and lubricating oil ration is too low to permit training and testing procedures and often too low for adequate fire fighting.
38. A fireman's pay depends upon too many variables- it should be a definite monthly salary and should not consider the number of dependents.

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Deficiencies in Japanese
Fire Department

39. Budgets allotted for fire departments are extremely small and cover very little beyond salaries and office overhead.
40. Laws pertaining to fire prevention and protection are indefinite and not broad enough.
41. Firemen are not well-informed regarding the operation of automatic sprinkler systems which are installed in buildings located in their fire districts.
42. Average homes and shops are mostly of wood and very much congested.
43. A fire prevention program, including public education, is needed badly.

-4-

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