A CIVIC GUIDE TO ECONOMY IN MUNICIPAL GOVERNMENT

NUMBER THREE

Fire Department

They shall pay especial attention to fire and upon the first sign of smoke, extraordinary light or otherwise warn the people by knocking at their houses. And if they see any likelihood of fire, they shall give warning by rattling and calling, and run to the church, of which they are to have a key, and ring the bell.

Quotation from old court records describing duties of night watchman in Beverwyck (now Albany) in 1659.

Foreword

CITIZENS in a community pay for two types of fire protection. To guard against possible fire loss, they collectively support a fire department and other municipal fire defenses. To receive compensation when fire losses occur, they individually pay premiums to private insurance companies. The costs of these two services are not unrelated. Adequate municipal fire defenses result in low base insurance rates for the community; and conversely, inadequate fire defenses mean higher base rates. The problem, therefore, in providing municipal fire protection is to determine the desirable level of government expenditures. Municipal fire defenses must be adequately supported to enable the city to enjoy low rates, but the support must not be so liberal that it encourages waste and inefficiency.

An appraisal of your municipal fire defenses will indicate whether expenditures are wisely made and whether increased expenditures have actually resulted in improved protection. What is your city's fire insurance rating as established by the National Board of Fire Underwriters? How many "deficiency points" must be removed for your city to obtain a better classification? Is the number of fire houses determined on the basis of modern conditions of motor-driven apparatus? Does your city have a comprehensive fire prevention code and is it rigidly enforced?

This manual has been prepared to serve as a guide for appraising your municipal fire defenses in order to determine where economies can be effected without impairing the city's fire insurance rating.

Contents

A CIVIC GUIDE TO A GOOD MUNICIPAL FIRE DEPARTMENT

TWO possibilities for direct savings exist through giving attention to municipal fire defenses. One consists of reductions in fire insurance rates and the other of lowered costs of operating the fire department. Which of these is the more important will depend upon conditions in the individual cities, but in some cases both types of economies can be made. A third type of economy, less tangible in its effect upon the community as a whole but probably the most important of all, is the reduction of fire losses.

Fire defense factors include not only the fire department proper and the fire alarm system, but also the water supply, structural conditions, the control of special hazards, the adequacy and enforcement of building laws, the cooperation of the police department, and climatic conditions. Standards for their measurement have been set up by the National Board of Fire Underwriters in its *Standard Schedule for Grading Cities and Towns of the United States.* A good grading of defenses on the basis of this schedule results in low base fire insurance rates, whereas a poor grading means high rates. The schedule, although sometimes criticized as too exacting, has been a strong influence in improving the efficiency of municipal fire departments.

It would obviously be false economy as well as poor policy to reduce fire department costs at the expense of lowering the classification of the department under the grading schedule. There are, however, several ways in which these costs can be reduced without having such an effect. Wasteful conditions have developed because of inefficient personnel practices, unsound pension plans, and the distribution of fire-fighting strength on the basis of fire houses which were originally planned to meet the problems of horse-drawn equipment.

In general, the fire departments of American cities are reasonably well-equipped and efficient and are greatly superior to those found in European municipalities. Under normal conditions, however, fire losses are more severe in our cities than in those of Europe, where conflagrations are very rare. The use of frame buildings in this country is, of course, an important factor contributing to this condition. Carelessness is responsible for most of our fires and arson is a factor of far greater importance than is generally supposed. The fact that much more emphasis is given to fire prevention in foreign cities than in ours is also a very important consideration. Consequently, American cities which have undertaken good programs of fire prevention have reduced their fire losses by considerable amounts.

Improved fire protection, therefore, depends upon better methods of fire prevention more than upon increasing fire-fighting forces. Although important advancement has been made in fire prevention work, it remains a weak point in the fire defense measures of most cities.

FIRE DEFENSES AND INSURANCE RATES

The fire insurance premium rate of a city is affected by both state and local considerations. A base rate applying to all cities within a state is computed on the basis of the fire loss experience of the state as a whole. This rate is then modified for individual cities according to the grading given their fire defenses under the grading schedule of the National Board of Fire Underwriters. Cities of 25,000 population or more are graded by the National Board and smaller cities by state rating agencies.

Fire losses are not considered in the grading schedule. If the fire loss experience of a city is exceptionally high or low, however, state insurance authorities may revise the city's rate upward or downward accordingly, although the precise basis for making such revisions is obscure. Under ordinary conditions the fire loss experience of a city does not affect its insurance rates except as it influences the experience of the entire state.

These generalizations apply to all states but Texas, where the state fire insurance department computes key rates for cities according to a method which provides direct credit to cities individually for lowered fire losses. It is frequently pointed out that the Texas plan differs further from the grading schedule by providing a more direct relationship between the cost of fire defenses and the cost of insurance. The amount of reduction in the total insurance premiums paid by citizens, which can be expected from a proposed improvement in a city's fire defenses, can be roughly calculated before the improvement is started.*

The Fire Underwriters' Grading Schedule

The grading schedule of the National Board of Fire Underwriters was devised in 1916 after several years of study and technical investigation. It was revised in 1922 and modified slightly again in 1930 and in 1942. The schedule provides for a possible 5,000 deficiency points for seven major factors of fire defenses. These seven factors of fire defenses and the maximum number of deficiency points for each are as follows:

Fire Defense Factors	Deficiency Points	Per Cent of Total
Water Supply	1,700	34
Fire Department	1,500	30
Structural Conditions	700	14
Fire Alarm	550	11
Fire Prevention	300	6
Building Laws	200	4
Police	50	1
TOTAL	5,000	100

Consideration is also given to two other factors—climatic conditions and the divergence between the factors of water supply and fire departments.

The classification of a city is determined by the total number of deficiency points assigned to conditions which are below standards prescribed in the grading schedule. As the number of deficiency points is reduced from the maximum (5,000) in amounts of 500, the grading of a city improves from Class 10 to Class 1 and the base insurance rates are lowered correspondingly. The ten classes with the range of deficiency points for each are as follows:

Class	Deficiency Points
1	0 to 500
2	501 to 1,000
3	1,001 to 1,500
4	1,501 to 2,000
5	2,001 to 2,500
6	2,501 to 3,000
7	3,001 to 3,500
8	3,501 to 4,000
9	4,001 to 4,500
10	4,501 and over

*Orin F. Nolting, *How Municipal Fire Defenses Affect Insurance Rates* (Chicago: International City Managers' Association, 1939), p. 31.

According to the National Board of Fire Underwriters, from 50 to 75% of the fire losses of any city can be traced to only 1 or 2% of the total number of fires. The grading schedule has therefore been designed primarily to measure defenses against large loss fires, or conflagrations which occur mainly in industrial and mercantile areas. The standards of the schedule for fire-fighting strength for areas of high value and periods of high hazard are so stringent that very few cities can afford to attain them.

No municipality has been able to reach a Class 1 grading for its fire defenses as a whole. Only a few cities have Class 2 gradings. Although quite a number of municipalities have Class 2 gradings for either their water supply or fire department, deficiencies in other factors of fire defense are of such weight as to increase the over-all number of deficiency points so that a poorer grading results. Nearly three-fourths of our cities of more than 30,000 population are graded Class 3 or Class 4. Any city of such size with a better grading than these classes indicate can be considered to have exceptionally good fire defenses. Smaller cities may expect a higher number of deficiency points, but in general all municipalities with more than 10,000 population should not have a poorer grading than Class 6. Little or no relationship, however, exists between the grading of fire defenses and the fire loss experience of a city.

These facts indicate that the grading schedule encourages fire departments which are more expensive than most cities can see their way clear to supporting, and that a city cannot reasonably expect to obtain the lowest base insurance rates possible even with a Class 1 fire department. The National Board, however, can point to considerable economies affected in fire insurance rates since the adoption of the schedule in 1916. Average rates were lowered from $1.07 in 1914 to $0.67 in 1939.

Although the grading schedule is considered to be a very good instrument for measuring the physical fire defenses of a city, some students of the problem believe it to be inadequate in other important respects. It is sometimes argued that the grading schedule provides no credit for a low record of fire losses, only limited credit for fire prevention work, and does not consider either the actual performance of the employees in fighting fires or the moral hazards of carelessness and arson. It has been pointed out that the schedule has not been subjected to thorough revision since 1916 and it is suggested that such a revision now be made to provide for these additional factors.*

Insurance Rate Reductions**

Frequently, the greatest savings to citizens can be secured by improving the classification of fire defenses so that reductions in base insurance rates can be obtained. Usually, several improvements in fire defenses can be made at little or no cost, and if a city has not already made a thorough survey of the situation, it is quite possible that there is a good opportunity for rate reductions. This is particularly true, of course, if the classification of the defenses borders closely upon a better grading. Savings in insurance premiums will apply only to mercantile and industrial areas as a general rule, for base rates for residential districts are seldom lowered after a city attains a rating of Class 6 or better.

Normally, the greatest opportunities for improvement are present in the factors of structural conditions, fire alarm systems, and control of hazards, for these have been the most neglected by cities. Improving structural conditions depends largely upon a long-term program, while fire alarm systems as recommended under the grading sched-

*See Harold A. Stone, *Fire Insurance Classification of Cities and Fire Losses* (Chicago: Public Administration Service, 1934).

**For detailed information on this subject, see Orin F. Nolting, *How Municipal Fire Defenses Affect Insurance Rates* (Chicago: International City Managers' Association, 1939).

ule are quite expensive. However, laws governing electric wiring, and the use of inflammable and explosive materials, can be made to conform to nationally accepted standards and can be strictly enforced at little additional cost. A strengthening of such laws frequently reduces the number of deficiency points assigned under the factor of fire prevention.

Most cities have already given considerable attention to the factors of water supply and the fire department, but substantial improvements usually require expenditures which few of them can easily afford. In the case of the fire department, however, it may be possible to effect many improvements at little or no cost by raising the standards of personnel selection and management, building inspection, and departmental records.

In any event, the general possibilities for lower rates may be ascertained by discovering all improvements which can be made at low cost in the seven factors of fire defenses and relating these to the number of deficiency points which must be eliminated to obtain a better grading. The National Board of Fire Underwriters usually publishes the results of its survey in a short manual which indicates, in its opinion, the major and minor deficiencies in the city's fire defenses. The Board will not predict precisely what affect anticipated improvements will have upon the grading, but establishes a new grading entirely on the basis of a new survey of fire defenses. An effort should always be made to secure from the Board some indication of the effect that proposed improvements will have upon the city's classification, particularly those improvements that entail additional expenditures.

Improvements may have been made in a city's fire defenses since the last survey of the National Board of Fire Underwriters and so may not have received credit in the city's grading. If it appears, after a careful analysis, that such improvements are of sufficient weight to change the classification of the city and thereby reduce insurance rates, the National Board of Fire Underwriters should be requested to make a new survey of the city's fire defenses. It is recommended that the chief executive appoint a board composed of the fire chief, the city engineer, and the head of the water department to make the initial study of the situation and carry on negotiations with the National Board of Fire Underwriters. If the city has a technically trained fire prevention engineer, this official should also be a member of the local board.

In general, the problems of administration and personnel management of the fire department are similar to those of the police department as both are quasi-military organizations. The grading schedule recognizes the value of competent department employees by providing limited credit for good personnel practices. There is, however, only a limited relationship between good personnel practices and departmental economy. The grading schedule requires a greater number of men, without determining their ability on the basis of their actual performance at work, than most cities can afford.

ADMINISTRATION

The Fire Chief

The fire chief should have well-developed qualities of leadership as well as administrative ability. He should, of course, have a thorough knowledge of fire-fighting methods, techniques and equipment. It is particularly important that he, as well as his subordinate officers, make the quick, correct decisions which are needed for the emergencies of fire-fighting work. Although the selection of the chief should be on a strictly merit basis, his responsibility to the chief executive should be confirmed by giving the executive the power of appointment and removal. The chief should be familiar with the implications of the grading schedule as they relate to local conditions if full advantage is to be taken of the opportunities for lower insurance rates.

Personnel Management

Personnel Selection

The maximum age of recruitment should be 29 years, with the age range of from 21 to 25 years generally preferred. In some cities it is fixed at even a lower figure. In case of positions requiring technical training, these age limits can be waived.

Recruits should be high school graduates or the equivalent. The minimum physical standards are the same as for the police department, but firemen need also to have genuine athletic ability and agility. Competitive mental and psychological examinations should stress quick thinking, mechanical aptitude and adaptability for fire-fighting work. Character investigations should be carefully made in the same manner as for police recruits. The morale of the force should be maintained at a high level.

Probationary Period

The probation period should extend for not less than a year and acceptance as a member of the force should not be a perfunctory matter. After the probation period is over, removal from the force becomes very difficult and special efforts should be made to eliminate those who for reasons of temperament or ability are unsuited to the work. The quality of a recruit's work and his progress in training should be carefully studied and reported on by his superior officers. Permanent appointment to the force should take the form of a positive, formal recommendation by the chief.

Training Program

The training program should be continuous and provide for keeping the men in top physical condition as well as informed about up-to-date fire-fighting methods and techniques. In cities of any appreciable size, there should be a drill tower for practice in ladder and hose extension work. Fire schools may be maintained individually by departments in large cities and by state municipal leagues for small municipalities.

Educational work should include an intensive study by officers and men of the conditions of hazard and possible fires in the high value and hazard areas. For this purpose, the department should have detailed drawings and plans of large industrial buildings and layouts of mercantile and industrial areas. Problems simulating actual fire conditions should be worked out regularly so that the men are prepared for any foreseeable emergencies.

Vacations and Sick Leaves

If vacations and sick leaves are not carefully controlled, more men than necessary are required to maintain the effective strength of the force and personnel expenses rise. Annual vacations of two weeks are customary, but all vacations should be scheduled within a period of a few months so that the force will not be depleted severely during any one time. Sick leave periods of two or three weeks a year with pay should

be permitted but care should be taken that the privilege is not abused. The period should be definitely established and not left to the discretion of the chief. Long illnesses can be provided for by a cumulative plan which considers the unused sick leave periods of prior years. Each case of sick leave should be investigated carefully.

Promotion

Firemen should be graded according to at least three and preferably five ranks with salary differentiations for each. A higher rank should be based partly on length of service and also upon the quality of service rendered and the progress made in training. Service rating plans are important in determining the qualifications of men either for higher rank or for positions as officers. Officer positions should be open to firemen or officers in the next lower rank. Major weight should be given to the success of the applicant in a competitive examination designed for the post in question.

Retirement

It should be possible to retire firemen who have become too old for active service at the age of 55 and retirement should be compulsory at 65. In the case of officers, these ages can be advanced to 60 and 70, respectively. Retirement benefits should be based upon not less than 25 to 30 years in service in order to provide sufficient time for accumulating adequate funds for maximum benefits (from one-third to one-half pay) under a pension plan.

Records

Without adequate records the fire-fighting forces cannot be distributed on the basis of actual need. Records are also essential for determining the relative need for various items of equipment. They are particularly necessary for fire prevention work. The general adequacy of record systems can be obtained by an examination of the annual report. This should include detailed information on the classification of alarms; fire losses; causes of fires; inspections of buildings; investigations of fires; and on personnel, equipment and operations.* A main weakness of many record systems is inaccurate fire loss data.

The record system should reflect considerable attention given to discovering the causes of fires. If there are not a certain number of arrests for noncompliance with fire laws it indicates that enforcement is weak. Assuming that the strength of fire-fighting companies for all districts is above the absolute minimum required in residential districts during the day, the records should show the greatest strength in industrial and mercantile areas at night.

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*DeWayne E. Nolting, *A Model Records and Reporting System for Fire Departments* (Chicago: Public Administration Service, 1938).

FIRE PREVENTION PROGRAMS

Further improvements in the curtailing of fire losses depend largely upon fire prevention programs. Every city has some of the elements of such a program, but only a small minority has established them on a comprehensive, coordinated basis. Several of these have made substantial reductions in their fire losses at relatively low cost, for a fire prevention program costs comparatively little. The expense of an adequate fire prevention program is mainly that of employing fire prevention engineers who have the necessary technical training to make thorough, competent surveys of buildings for fire hazards. One such employee is needed in small cities and several in large municipalities.

At the present time, the economies of an adequate program depend mainly upon the lowering of fire losses themselves and the affect of such reductions on the basic state premium rate. The grading schedule of the Board of Fire Underwriters provides a certain amount of credit for good building laws and control over hazards which are important elements of a fire prevention program. It does not, however, provide direct credit for a comprehensive program which is supervised by a competent fire prevention engineer. As has been explained, some students of the problem believe this should be done and that more weight should be given to fire prevention work.

A good fire prevention program is characterized by: (1) a comprehensive fire prevention code which is rigidly enforced; (2) competent technical surveys and inspections of commercial and public buildings; and (3) an effective public relations program.

Fire Prevention Codes

All cities have fire prevention ordinances of various kinds but usually these are miscellaneous in character and are not complete in coverage. A fire prevention code consists of bringing these ordinances together into a single document, relating them, and adding such other ordinances as may be necessary to form a comprehensive set of enforceable regulations. The code should be subject to alteration from time to time as needed. Rigid enforcement is very important.

The fire prevention code is chiefly concerned with combustible, inflammatory, and explosive materials. It governs the manufacture, handling, storage, use and transportation through the city of such materials as well as the machinery or equipment employed. It provides also for licensing tradesmen whose work involves hazards. such as electricians, plumbers, and moving picture operators; and for issuing permits to individuals and business firms where fire hazards warrant special attention. It covers the private fire protection facilities which are deemed necessary in various types of businesses and types of buildings. Although most of the provisions relate to the occupancy and use of buildings, any hazardous outdoor conditions are also considered, such as lumber yards, growths of grass and weeds, and collections of combustible refuse or rubbish.

Technical Inspections

An adequate fire prevention program requires that all commercial and public buildings be competently examined for fire hazards by the technical inspector, or fire prevention engineer. In the case of large industrial buildings, this official draws detailed plans which show the layout, type of construction, hazardous conditions, locations of fire hydrants, etc. Rougher layouts are drawn of smaller structures and maps of congested areas of high hazard and value. On the basis of these surveys, recommendations are made to secure full compliance with the fire prevention code and to minimize fire risks. The layouts and maps are also of

great value to the fire-fighting force as a means of studying hazardous conditions and working out plans of operation in anticipation of possible fires.

If fire prevention inspections are carried out by employees who have had no training or experience other than that in the building trades, they cannot be considered true surveys and are of very limited value. Such inspectors are also usually political appointees and likely to be lax in their attitude toward strict compliance.

Usually the work of technical inspection is set up under the fire department as a fire prevention bureau. In some cities, however, the work of the fire prevention inspector is consolidated with that of the building, electrical, and plumbing inspectors into a separate department or division. This plan has the advantage of coordinating the activities of all city inspectors whose work is associated with fire prevention. Another duty of fire prevention engineers is to visit fires and to aid in determining their specific causes. This duty is very important as a means of preventing fires due to carelessness and arson.

Routine Inspections

Routine inspections by members of the fire-fighting force are quite common in municipalities. These are made to discover and remedy ordinary types of hazards and to secure compliance with fire ordinances. They have the additional advantage of acquainting firemen with the interiors of buildings.

This method has not proved very effective in enforcing fire laws. The inspecting firemen leave notices of any conditions which require correction, following up with reinspections and the issuance of complaints if correction has not then been made. If compliance is not secured after a complaint has been issued, legal steps become necessary if the code is to be enforced. The fire department, for political and other reasons, usually does not resort to legal action, a fact which has served to weaken enforcement considerably. Uncorrected complaints should be made the responsibility of the technical inspector because this official enjoys police power and recognizes the need for strict and universal compliance with the fire prevention code.

Public Relations

A good fire prevention program requires that business firms make certain expenditures in the interests of fire protection and that the occupants of private dwellings permit their homes to be subjected to routine inspection. If people are not informed about fire prevention matters, many of the regulations and policies incidental to the program appear to them to be arbitrary and unreasonable. An essential of a good program is therefore to inform and educate the general public on preventive measures and to enlist their active support.

Civic groups have been important instruments for the dissemination of information and for securing popular backing of the program. Many cities have fire prevention committees for these purposes. Press releases and work with school children are also important.

Fire Prevention Week is generally observed as a means of dramatizing and focusing public attention on matters of fire prevention. Observation should not be casual but should constitute an intensive, short-term drive to inspect homes and places of business for fire hazards, distribute literature describing ordinary hazards and how they can be corrected, and clean up collections of combustible refuse. Of course, if a city has already adopted an adequate fire prevention program, Fire Prevention Week assumes considerably more significance than if there is no continuous, year-round program.

POSSIBLE ECONOMIES

In reducing the cost of fire departments, care must be taken that the insurance grading of the department is not lowered and that protective facilities are not weakened. The pension rights of employees must be taken into consideration if reductions in personnel strength are proposed. Important opportunities for economies within these limitations usually exist, although all of them cannot be realized immediately.

Personnel Reductions

There may be more employees than are needed either in line or staff operations. Line operations embrace actual fire-fighting operations, while staff activities consist of office and other non-fire-fighting work. Personnel reductions may be made by retiring employees on pension as soon as they reach pension age and by not recruiting new employees until the force has reached the minimum desired.

Reductions in Line Personnel

On the basis of the grading schedule of the National Board of Fire Underwriters, few fire departments are overmanned in terms of strength per fire-fighting company. The personnel requirements of the schedule vary for different sections of a city and during different times of the day. Usually those for the low value areas during periods of low hazard are realized, but the higher minimums for high value areas and high hazard periods are seldom fully attained.

For example, the minimum strengths of engine companies which are required by the grading schedule range from four men in residential areas during the daytime to eight men in mercantile and industrial districts at night, with six men required either for residential sections at night or high value areas during the day. A strength of less than four men is not found under any of these conditions, for this is the absolute minimum needed to operate the equipment. But usually the higher minimums for areas and periods of high value and hazard are not realized. Engine companies account for most of the fire-fighting force, but the same generalizations apply to ladder and hose companies.

A particularly wasteful condition exists if personnel strength exceeds the standards of the grading schedule. Although this will not often be the case, investigation of this point should be the first step in determining whether a department is overstaffed. The personnel standards of the grading schedule should not be exceeded under any circumstances.

Salaries should also be examined to make certain that they conform to the general salary and wage levels of the community. The importance of planned vacations and control of sick leaves in keeping the effective strength of the force at the highest possible point without requiring an excess number of employees has been pointed out.

A more frequent cause of overstaffing in line operations is an excessive number of small fire stations covering the same areas as those designed for horse-drawn apparatus. On the basis of the greater fire coverage possible with motorized equipment, this condition produces an overlapping which sometimes results in a greater number of companies and pieces of equipment than are prescribed under the Underwriters' schedule. By redistributing companies, it may be possible to eliminate certain fire houses, companies, and equipment without affecting either the grading schedule classification or fire-fighting efficiency.

Fire houses built before 1920 were usually located for coverage by horse-drawn equipment, with an operating radius under the grading schedule of one-half mile in mercantile and industrial areas, one mile in closely-built residential areas, and one and one-half miles in scattered residential dis-

tricts. For motorized equipment, the grading schedule has extended these coverages to three-fourths mile, one and one-half miles, and three miles, respectively. By determining the age, location, and coverage of fire houses, civic groups can discover whether there is a likelihood of overstaffing. If such is the case, substantial savings may be possible in personnel, equipment and overhead costs through the enlargement of coverage of fire stations and companies.

Redistributing of companies often requires the building of new fire houses even though fewer of them are needed. The number of new houses required varies with conditions in different cities and the degree to which a redistribution plan is undertaken. Construction costs should be carefully related to possible economies, of course, before the program is definitely decided upon. The program should consider both the improvements which are practicable at once and a long-term plan of gradual redistributing on a comprehensive basis. A spot map showing areas of high and low value with their predominant construction characteristics and the location of present fire houses will indicate general possibilities.

Reductions in Staff Personnel

The greatest waste of manpower is usually found in staff operations or other activities which are not of a fire-fighting character. A condition of overstaffing may arise when firemen who are too old or otherwise incompetent for fire-fighting activities are transferred to less active types of work for which they are not qualified. This is not only an extravagant practice, but also operates against the efficiency of the department. As a general practice, therefore, all uniformed members of the force should be retired on pension as soon as they become unfit for active fire-fighting duty, whether because of advanced age or of other disability.

Staff operations include the maintenance of records and other clerical work, technical surveys and inspections, the departmental garage, and the fire alarm system. Usually a storeroom is maintained in connection with the garage, principally for replacement parts for the fire-fighting equipment. Staff work is all of a specialized nature and should be performed by employees who are trained for and suited to it and whose salaries are based upon the type of work performed.

Other activities, of a more or less extraneous nature, include a variety of special details. Former fire fighters may serve as chauffeurs for officers of the department. They may be stationed in theaters or other private or public buildings for the ostensible purpose of guarding against fire. Details of this kind are of little or no value and should be discontinued where found.

Pension Systems

The same considerations apply to firemen's pension systems as to those of policemen. If the system is not on a true actuarial basis or is not financially sound without ultimate dependence upon unlimited contributions by the city, it is unreasonably expensive to the city and may become bankrupt. If there is any doubt as to whether the system is really on an actuarial basis, an actuary should be called in to decide the question.

Fire Boards

Fire boards are to be discouraged more because they operate against efficiency than because they represent an unnecessary cost. A board is not competent in an administrative capacity no matter how competent its members as individuals may be. A fire board which attempts to perform an executive function only confuses lines of authority that should extend directly from the mayor or other chief executive to the fire chief. In

the absence of either a civil service agency or a disciplinary board composed of departmental members, a fire board sometimes passes upon matters of employee discipline which have been referred to its attention by the fire chief.

Three Platoon Systems

Three platoon systems represent a potential rather than an actual cause of waste. Very few cities have adopted them. But as the plan increases personal service costs by about 50% without improving the insurance classification of the department, any agitation for it should be promptly and effectively discouraged.

In former years, most fire departments operated on a single platoon system with men on duty 24 hours a day. Now, however, most departments have the double platoon system which provides for two shifts. In the three platoon system there are three shifts of 8 hours each. Advocates of the plan argue that firemen, like other workers, should have an 8-hour day.

This argument would be reasonable enough if firemen actually worked eight hours a day, either in fighting fires or in training. But very little of their time is taken up in the former activity and the time required for training is also limited. Firemen have ample time and opportunity for recreation and sleep while on duty, a condition which is certainly not found in most occupations. The three platoon system should be resisted as an unwarranted extravagance.

CONCLUSION

An appraisal of the fire department and other municipal fire defenses along the lines pointed out in this manual will indicate to citizen groups where economies can be effected. Because of the relationship between a city's fire defenses and its base insurance rate, any proposed economy should be considered in the light of its affect upon the fire insurance classification of the city. An unwise cut in fire department expenditures will not result in real economy if fire defenses are so weakened that the city is placed in a poorer class, thereby increasing the amount of insurance premiums that citizens must pay. On the other hand, slight additional expenditures for improvements recommended by the National Board of Fire Underwriters, particularly in a city which is bordering on a better class, may reduce the number of deficiency points to such an extent that insurance premiums will be reduced. Little excuse can be offered, however, for not taking immediate advantage of opportunities for improving fire defenses which do not involve additional expenditures.

APPRAISING YOUR LOCAL FIRE DEPARTMENT

The following questions relate mainly to the fire department itself but also consider important aspects of the fire defense grading. In each case an affirmative answer indicates a favorable condition.

1. Assuming that the city has a population of 30,000 or more, has it an insurance grading of Class 4 or better for its fire defenses as a whole? If its population is between 10,000 and 30,000, is the grading Class 6 or better?

2. Has the National Board of Fire Underwriters made a report upon the city's fire defenses within the last five years?

3. Have the fire defenses of the city been competently analyzed with a view toward eliminating such deficiency points as can be removed at little or no cost in order to reduce insurance rates?

4. If major improvements in the water system, fire department, or other factors of fire defense have been effected since the last complete Underwriters' survey, has a subsequent inspection been requested and made?

5. Is the fire chief familiar with the grading schedule requirements in relation to the conditions of fire defense in the city?

6. Is the fire chief appointed by and directly responsible to the mayor, and is appointment based upon merit?

7. Is the maximum age of recruitment of firemen 29 years except for positions requiring technical training?

8. Is the selection of recruits made on the basis of open, competitive examination as determined by mental and psychological fitness for the special duties of fire fighting, and are physical standards adequate?

9. Is there a well-organized and continuous training program which emphasizes both the physical and technical aspects of fire fighting?

10. Are promotions to officer positions based mainly upon competitive examinations which are open to all employees in the next lower rank?

11. Are firemen retired at the age of 55 and officers at 60 if unfit for active duty, and are the compulsory retirement ages 65 and 70 years, respectively?

12. Are vacations spread throughout the year, and are sick leaves definitely provided for and carefully controlled?

13. Assuming that more than the absolute minimum of 4 men are attached to engine companies, is the company strength greater in high value areas and at night than in residential areas and during the day?

14. Is the strength of fire-fighting companies not in excess of the requirements of the grading schedule?

15. Does the annual report of the fire department include detailed information on the classification of alarms; fire losses; causes of fires; inspections of buildings; investigations of fires; and on personnel, equipment and operations?

16. Do the records of the department indicate that special efforts are made to determine the causes of fires and do they show a certain number of arrests for violations of fire ordinances?

17. Is the number of fire houses determined on the basis of modern conditions of motor-driven apparatus?

18. Are routine staff operations conducted entirely by nonuniformed employees, and are there no firemen attached to special details?

19. Is the firemen's pension fund on a true actuarial basis or financially sound with limited city support?

20. Is there a comprehensive fire prevention code and is it rigidly enforced?

21. Is there a competent fire prevention engineer who makes detailed surveys and inspections of structures in industrial and mercantile areas for fire hazards?

22. Are the layouts and plans drawn in these surveys used by the fire department to plan operations in anticipation of fires occurring in high value areas?

23. Is public support of the fire prevention program secured through an adequate plan of public relations?

BIBLIOGRAPHY

The following is a partial list of books and pamphlets containing information of both a general and technical nature on municipal fire defenses:

Institute for Training in Municipal Administration, *Municipal Fire Administration.* Chicago: International City Managers' Association, 1942. 666 pp. $7.50. A thorough discussion of the methods and procedures which the fire chief should know to achieve the maximum efficiency in the operation of his department. Citizens should recommend its use to the fire chief.

National Board of Fire Underwriters, *Standard Schedule for Grading Cities and Towns of The United States With Reference to Their Fire Defenses and Physical Conditions.* New York, 1942. 78 pp. The Grading Schedule is the detailed procedure by which the number of deficiency points for cities is established. For a defense of the Grading Schedule, see "Schedule Grading of Cities," an address by George W. Booth, Chief Engineer, National Board of Fire Underwriters, before the Annual Meeting of the New England Association of Fire Chiefs, June 26, 1940. This address has been printed in pamphlet form by the National Board of Fire Underwriters, 85 John Street, New York, N. Y.

National Board of Fire Underwriters, *Suggested Fire Prevention Ordinance.* New York, 1941. 95 pp. An ordinance establishing a Bureau of Fire Prevention and prescribing regulations for fire prevention and protection in connection with hazardous materials and processes. Copies may be obtained from the National Board of Fire Underwriters.

Nolting, DeWayne E., *A Model Records and Reporting System for Fire Departments.* Chicago: Public Administration Service, 1938. 77 pp. $2.00. A manual designed for use by municipal fire departments in modernizing their records and reporting procedures.

Nolting, Orin F., *How Municipal Fire Defenses Affect Insurance Rates.* Chicago: The International City Managers' Association, 1939. 101 pp. $1.50. A description of how fire insurance rates are established, the procedure in determining a city's classification, and methods of reducing insurance rates.

Public Administration Service, *The Selection of Fire Fighters.* Chicago, 1940. 28 pp. $.75. A description of good personnel procedures which if followed will result in improving the quality of fire department personnel, thereby increasing its effectiveness.

Stone, Harold A., *Fire Insurance Classification of Cities and Fire Losses.* Chicago: Public Administration Service, 1934. 25 pp. $.50. A criticism of the grading schedule of the National Board of Fire Underwriters with the conclusion that a city's classification does not give a fair picture of the city's ability to cope with fire as shown in the actual record of fire losses and number of fires.