

National Fire Costs—A Wasteful Past but a Better Future

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ABSTRACT

Fires are costing many countries around 1% of Gross Domestic Product, but compared with other aspects of national waste such as Road Safety, Crime Prevention and Industrial Safety, Fire Prevention ranks low in political priorities.

Countries have a responsibility to develop a fire strategy aimed at reducing fire costs. For measuring the success of the strategy, national fire cost statistics are needed for comparison with other countries. These statistics need to cover both fire losses and fire protection costs.

In 1983 the World Fire Statistics Centre was formed under the auspices of the Geneva Association and with headquarters in Geneva. Its object is to encourage better world fire statistics and to encourage politicians to rank fire protection higher in the list of political priorities.

Major Centre activities have included cooperation with the United Nations in a fire statistical scheme under which 14 countries have submitted annual fire cost statistics and with the Commission of the European Communities (EEC) in the International Fire Symposium held in Luxembourg in 1984. Details of national fire cost statistics are included in this paper, together with some suggestions for future progress, including a plea for a World Fire Research Council.

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NATIONAL FIRE COSTS - A WASTEFUL PAST BUT A BETTER FUTURE

Political interest in fire prevention

Although fires are costing many countries around 1% of Gross Domestic Product, fire prevention generally ranks low in national political priorities. This fact was dramatically illustrated in a study published by the Geneva Association in 1979 - European Fire Costs - The Wasteful statistical gap. The study contained tentative estimates for 6 key items of fire costs for 12 European countries covering the years 1970-1975. If all 12 countries had produced annual statistics for each of the 6 items, a regular European collection of 72 valuable fire statistics would have been available for practical fire use. In fact only around 30 of these 72 statistics appeared to be published. Not surprisingly the study went on to comment "This suggests that little political will exists in Europe to reduce fire waste".

Why is this lack of statistics so wasteful? The simple answer is that in order to monitor the success of national fire strategy, Governments need to survey the annual trends in their own national fire costs and then to measure them against trends in countries abroad - without statistics, measurements are impossible and decision-making remains speculative.

Yet other types of national waste are tackled impressively, both at national and international level. Road Safety, Industrial Safety and Crime Prevention all receive top-level political attention. Where political will exists to reduce waste, spectacular results can be achieved as any survey of the achievements of the World Health Organisation dramatically illustrates.

Progress on fire statistics

There are encouraging signs of increased political interest in fire safety, both at international and at national level. In 1981 the United Nations started a fire statistical scheme and in 1984 the Commission of the European Communities (EEC) held a most successful International Fire Symposium. With the prime object of encouraging better world fire statistics the World Fire Statistics Centre was formed in 1983 under the auspices of the Geneva Association and with headquarters in Geneva.

United Nations fire statistical scheme

In 1981, The United Nations Economic and Social Council, through its Working Party on Building, agreed to support a proposal for better fire statistics. The proposal came from the meeting held by the International Council for Building Research Studies and Documentation (CIB) in Athens in 1980 at which a spirited discussion had taken place on the need for better fire statistics. As a result of the CIB initiative, the United Nations agreed that the fire statistical problem needed tackling at international level and commissioned a pilot study under which 4 countries provided data for the years 1978/9 covering 6 items of fire costs - direct fire losses, Indirect fire losses, Human losses, plus the costs of fire brigades, of fire insurance and of protecting buildings against fire.

The study involved stimulating challenges to ensure that the statistics should be as accurate as possible and that the data should be produced on a uniform basis. As there is no uniform European system for collecting fire statistics, a method had to be evolved to bring together a widely varying set of national data. The method adopted was to draft a questionnaire asking countries to submit published data for each of the 6 items of fire costs. A list of possible

adjustments for each item was then included in the questionnaire and fire experts in each country were asked to estimate additions or deductions to the published figures, in order to bring the final figures onto a standardised European basis. In some cases these adjustments were far-reaching, for example the direct loss calculation allowed for 8 possible additions and for 3 possible deductions.

The following year, the UN studied the report on the pilot study and felt that this method of standardising national data was practical. 13 countries then agreed to join an extended scheme under which they would provide data for the years 1979/80. A year later, all 13 countries agreed to update their figures and the Canadian Fire Commissioner added Canada to the scheme. The data is analysed annually by the World Fire Statistics Centre in a report for presentation to the United Nations. In this report, which covers around 12 pages, estimates are given of the national fire costs covering the 6 items, which are then compared with the Gross Domestic Product (GDP) or the population of the country concerned. Some indication of these estimates is given below.

1. Direct fire losses

Direct fire losses are, of course, a major item of national fire costs and frequently cover around 30% of total fire costs. The figures for the countries submitting figures are:-

TABLE 1. - COST OF DIRECT FIRE LOSSES

<u>Country</u>	<u>1979</u>	<u>1980</u>	<u>Percentage of Gross Domestic Product</u>
Hungary	Ft 600 m	FT 750 m	0.10
Japan	Yen 240,000 m	Yen 276,000 m	0.12
Spain	Ptas 21,900 m	Ptas 26,700 m	0.18
Austria	AS 2,550 m	AS 1,500 m	0.21
Netherlands	Dfl. 650 m	Dfl. 725 m	0.21
United Kingdom	£375 m	£500 m	0.21
Finland	Fmk 350 m	Fmk 525 m	0.25
United States	US \$6,300 m	US \$6,600 m	0.26
Sweden	SKr 1,300 m	SKr 1,325 m	0.30
France	F7,750 m	F8,750 m	0.32
Denmark	DKr 1,100 m	DKr 1,500 m	0.36
Norway	NKr 925 m	NKr 1,025 m	0.37

The volume of direct losses can, of course, vary considerably from year to year, so too much cannot be read into two years results. But it is interesting to see that both the Eastern European countries (Hungary and Austria) enjoyed good results. Japan has long been respected for its low fire losses, helped by their scientific approach to fire problems. At the lower end, the Scandanavian countries clearly suffer from climatic conditions.

2. Indirect fire losses

Indirect fire losses were defined as "the losses falling on the national economy as the result of consequential fire losses". A few years ago, it was frequently suggested that these indirect losses were as high, or higher than direct losses, but it is now becoming clear that indirect losses are less than 10% of total fire costs.

Precise calculations are very difficult to make and it might be misleading to publish a Table of the tentative estimates. Where a country enjoys a thriving

business interruption insurance market, the insured losses provide a valuable guide to the total national indirect losses. In other cases, the industrial fire losses often provide the best indication of the total indirect losses. In Holland the fire brigades produce statistics. For all countries, it was assumed that only 50% of the actual indirect losses affect the national economy (the balance being taken up by gains to trade competitors etc).

3. Human losses

Fire deaths and fire injuries are to most people the most tragic aspects of the fire problem. So it is not surprising that figures for fire deaths are more reliable than most fire statistics. Not only do fire brigades keep records in most countries for fire deaths to which they respond, but the World Health Organisation publish Government figures for deaths from fires and flames. The following Table is based on the higher of these 2 sets of figures and frequently includes an addition for unreported fire deaths.

Table 2. - POPULATION COMPARISONS FOR FIRE DEATHS (1979/1980)

<u>Country</u>	<u>Deaths per 100,000 persons</u>
Switzerland	0.64
Netherlands	0.64
Austria	1.00
Spain	1.25
Denmark	1.33
Sweden	1.80
Japan	1.80
France	1.90
Norway	2.27
United Kingdom	2.39
Finland	2.56
Hungary	2.64
United States	3.63

It is interesting to compare this Table with Table 1 (Direct losses) and to notice that Netherlands and Austria continue to show up well. Spain too shows low losses, perhaps helped by the warm climate. The high death toll in the USA has of course, been recognised for many years and energetic steps are being taken to reduce the numbers.

Many countries also publish figures of fire injuries, but as the definition of "fire injury" varies so widely, I have not included any statistics. It may, however, be a reasonable supposition to expect the national pattern of fire injuries to be similar to that for fire deaths.

4. Fire-fighting organisations

So far, the Tables have related to fire losses. The remaining Tables deal with the cost of protection. Until recently, international Fire Tables tended to concentrate on losses rather than protection, but figures for both classes are needed to assess national fire problems.

It is rather surprising that although the cost of fire fighting organisations is running at the rate of around 15% of total national fire costs, many countries publish no annual figures for fire brigade costs. The major part of the cost is, naturally, related to the public fire brigades, but additions need to be made for the cost of such organisations as industrial and volunteer fire brigades.

TABLE 3. COSTS OF FIRE-FIGHTING ORGANISATIONS

Average percentage of Gross Domestic Produce (1979/1980)

Country

Denmark	0.09
Netherlands	0.16
Finland	0.20
Norway	0.21
United Kingdom	0.24
United States	0.27
Japan	0.31
Sweden	0.33

Possibly a factor in the low cost of Danish fire brigades is the strength of the Falck privately owned system. The high Japanese figure may come as a surprise to some fire experts - it may well be part of the price that Japan is paying in order to achieve its low fire losses.

Sadly no figures were forthcoming for the cost of the Austrian fire brigades since their situation is a most interesting one. With a population of 7½ million, there are around 2000 firemen in the public brigades and a staggering 250,000 in the volunteer brigades. The strength of the volunteer brigades may be the key to Austria's fine fire record, since not only are the fire brigade costs low, but the expert training of the volunteer firemen and their families must contribute towards the cause of the low Austrian fire losses.

5. Fire insurance

The cost of administering fire insurance is somewhat similar to that of running the fire brigades and is running at the rate of around 15% of total national fire costs. Surprisingly, it is rare for countries to publish the annual cost of administering fire insurance, since the fire figures tend to be merged with other classes of insurance business. However, with the help of insurance experts, most countries were able to answer this part of the questionnaire.

TABLE 4. - COSTS OF FIRE INSURANCE ADMINISTRATION

Average percentage of Gross Domestic Product (1979/1980)

Country

Hungary	0.01
Finland	0.07
Spain	0.08
Sweden	0.08
Denmark	0.13
Austria	0.14
Norway	0.14
United Kingdom	0.15
Japan	0.15
France	0.16
United States	0.22

The low Hungarian figure is due to the State monopoly. A remarkably low expense ratio accounts for the low Finnish figure.

If any further study into fire insurance were contemplated, then it would best be carried out by some such body as the Fire Group of the Comité Européen des Assurances who have carried out valuable studies into fire insurance problems.

6. Building protection

The cost of fire protection to buildings ranks with direct losses as the most costly section of national fire costs - around 30%.

No annual statistics for this item are published and an accurate calculation is not easy. An important pioneering work in this area was published in 1967 by Alan Silcock of the UK Fire Research Station - Protecting buildings against fire - (Architects Journal Information Library 13.12.1967). In this paper, Silcock estimated that the average fire protection cost as a percentage of total building costs varied from 1% (Housing) to 7% (Industry). By applying these percentage costs to the government figures for new construction, he arrived at a figure of around 2% of the total building costs in 1965. Today, the more stringent nature of UK Building Regulations means that some figures are probably slightly higher, although annual patterns depend on the relationship between domestic and industrial volumes of building.

Several countries put forward estimates for the cost of fire protection to buildings:-

TABLE 5. - FIRE PROTECTION TO BUILDINGS

Average percentage of Gross Domestic Products (1979/1980)

Country

France	0.16 (1978/1979)
Denmark	0.18 (1978/1979)
United Kingdom	0.18
Netherlands	0.19
Japan	0.32
United States	0.32
Sweden	0.38
Switzerland	0.44
Hungary	0.45
Norway	0.65

Too much should not be read into these figures since a great deal of further research is needed before any reliable international Table can be produced. This expensive aspect of national fire costs is perhaps the one with most potential for rewarding research and it is encouraging to know that an increasing amount of interest is being shown in it - one recent example being the Japanese study by Mr H Nokamura Analysis of the Fire Protection Index Appendix to minutes of World Fire Statistics Centre Seminar March 23/4 1983. This study involved computerised studies of the fire protection costs of 1300 buildings.

Value of United Nations statistics

The United Nations Committee are under no illusions about the difficulties in evaluating and comparing fire statistical data with other countries. Such international comparisons are fraught with danger, even in such well developed areas as company financial statistics. Governments have been passing laws on company accounting for over a century, but even today investment analysts find extreme difficulties in making international comparisons of multi-national companies using their annual published accounts. But nevertheless, the United

Nations statistics provide the best indications available of the relative success that each country enjoys in its fire strategy.

There are encouraging signs for the future with new countries considering joining the scheme including W Germany and New Zealand. Another indication of increased Government interest in fire costs was the major initiative of the Commission of the European Communities (EEC) in holding an International Fire Symposium "to consider the measures that can be taken to cut fire costs and to reduce fire risks". The Symposium ended with a spirited discussion on possible EEC future initiatives including a suggestion that the EEC goal should be to bring about a substantial reduction in the cost of fire by the end of the century. In listing some suggestions for fruitful international action, I have drawn heavily on this EEC discussion.

Suggestions for a better fire future

Earlier I have mentioned that the object of the World Fire Statistics Centre is to encourage the production of better world fire statistics and to encourage politicians to rank fire protection higher in the list of political priorities. But these two aims are merely steps towards the ultimate goal which is "To reduce international fire costs". If these costs are to be reduced, then there is scope for action in both the statistical and political field. Given steady progress in these two areas, specific areas for cost-reduction can be singled out - Arson and the high cost of the fire protection parts of Building Regulations being two possible targets.

Taking these problems of statistics, political involvement and targets for savings in turn, I will attempt to suggest a few possible ways of moving forward. In doing so, I should like to emphasise that these proposals are not put forward as a model method for cutting fire costs; many participants in the Symposium are infinitely more knowledgeable on fire matters than I am and better qualified to suggest the ideal way to move forward. But if this paper succeeds in provoking discussion on how better to cut international fire costs, then its purpose will have been achieved.

1. Scope for better fire statistics

I hope that I have convinced readers of this paper, that without adequate fire statistics, monitoring of national fire strategy is impossible and therefore decision-making becomes unduly speculative.

The obvious two areas for better statistics are:- 1. The national fire statistics for the 6 key-items of national fire costs, and 2. National statistics covering causes and locations of fire. The top priority for the national fire cost statistics is, I think, to improve their quality rather than their quantity. A few months spent on an international study of the costs of fire protection to buildings could be particularly rewarding. So far as statistics for causes and locations of fires are concerned, the scope for improvement is immense. Many important countries produce no annual statistics at all for this crucial problem and of those countries which do publish figures, frequently the value of the figures is drastically reduced by the lack of figures for monetary losses in the Tables. One important exception to this situation is the Annual Report of the Canadian Fire Commissioner - Fire Losses in Canada which packs a mass of essential information into less than 50 pages and is well worthy of study by any country planning to produce their own national figures. An unfortunate constraint on any international comparison of national statistics for "causes and locations" is the widely varying sets of classifications used in different countries. However, there are in Europe, a limited number of statistics produced on a uniform basis - the analysis of large fires carried out by the Comité

European des Assurances - and closer cooperation between fire experts and the CEA could produce worthwhile results.

2. Scope for greater political involvement in fire cost-cutting

As I have mentioned earlier, the progress recently in this field has been most encouraging, so some say that it is greedy to ask for more. Nevertheless, a little more involvement would be invaluable and could yield savings infinitely greater than costs. The obvious logical step forward is the formation of a United Nations Fire Research Council which would coordinate national efforts and take international initiatives. The UN is holding this year its 7th International Congress on Crime Prevention - a conference which takes place at five-yearly intervals. The organisation of a similar Congress on Fire Prevention (with the main aim of cutting fire costs) could be an early priority for the new Fire Council. Another valuable role could be the provision of small sums of money to bodies such as the Conference of Fire Protection Associations for their international work. Such organisations lack funds to employ staff able to spare much time on international affairs, which can only be given at the expense of handling domestic national day-to-day problems. So a small grant could enable one or two people to be employed with specific international responsibilities, who could help in such activities as the organisation of the proposed international congress, or international studies into current fire problems.

3. Scope for identifying specific areas for cutting fire costs

Individual lists of the most fruitful area for international cooperation will, clearly, vary greatly - the following suggestions are not intended to comprise a definitive list - rather are they put forward in order to indicate the scope for worthwhile international cooperation, which I believe exists.

a) Direct and Indirect fire losses

Many fire experts regard arson as the major area warranting urgent action. The announcement of an international will to reduce arson losses, coupled with the provision of a small budget to help the Conference of Fire Protection Association in their international anti-arson work would be a practical step forward - formation of an international anti-arson Task Force could speed up progress. It goes without saying that better statistics covering arson would be needed to monitor progress.

Another early priority might be the growing problem of warehouse fires. An attempt to encourage safer building and furnishing material could be cost-effective. A study could review recent international improvements, review the cost-benefit equation and put forward proposals for better pooling of international knowledge in this rapidly-developing field. Another possible study might cover the scope for better fire detection, including the progress being made on greater reliability, the scope for cutting costs and an attempt to discover new ideas for anti-arson detectors.

b) Fire Brigade costs

Considering that this item represents around 15% of total national fire costs, surprisingly little international cooperation exists. In fact several leading countries show so little interest in the problem that they do not even produce national figures.

The scope for international study, therefore, appears to be almost unlimited. But such study cannot be carried out in isolation from a study of total national fire costs. Some countries might well be spending too little (not too much) on

their fire brigades - the example of Japan shows how an expensive, but high-quality, fire brigade network can contribute towards a low national fire loss.

c) Cost of fire protection to buildings

This item ranks with Direct fire losses as the largest item of national fire costs (around 30%). There is a feeling in several countries that Building Regulations now involve too high implementation costs. An international Government-inspired study might produce startling ideas for savings.

Other possible cost-effective areas for international cooperation include acceleration of harmonisation progress and the introduction of National Certification systems such as the recently formed British Approval of Fire Equipments (BAFE).

d) Publicity

One area where greater expenditure might well be justified is the field of publicity for national fire prevention efforts. Success and failure in this area differs widely from country to country. An international review identifying outstanding successful publicity campaigns could make very stimulating reading for fire experts disheartened by the paucity of press and television interest in their own country. A particularly interesting international study could be conducted into the best method of bringing up children to become powerful fire prevention allies. A sideline of such a study might include the effect of volunteer fire brigades on youth training - one cannot help suspecting that the low Austrian fire losses are influenced by the astonishing success of the volunteer fire brigades, who number 1 out of every 20 Austrians amongst their membership of around 250,000. Another Central European country with a large volunteer fire brigade movement is Switzerland with over 200,000 volunteer firemen.

Conclusion

If I have been guilty of pessimism in sketching a wasteful past history of international efforts to cut fire costs, I hope that I have restored the balance by proper recognition of current progress and by an optimistic view of the future. If such optimism is to be justified, it seems to me that a powerful international Fire Research Council needs to be formed receiving strong support from several leading national Governments. The Council's Governing body of fire experts could then identify priorities, allot budgets, monitor progress using statistics and finally cut fire costs.

