European Fire Costs — The Wasteful Statistical Gap *

by Tom Wilmot **

One important finding of the research project published in English in the "Etudes et Dossiers" No. 27 of the Geneva Association is that fire is costing many countries around 1 % of their Gross Domestic Product. The project goes on to suggest some lines of action which could cut millions of pounds of fire waste.

In sponsoring a study into fire costs, the Geneva Association was continuing a deep rooted insurance tradition to play a prominent part in fire protection. In the United Kingdom, for example, it was the fire insurance companies who took the lead in the 18th century by the formation of their own fire brigades. Across the Atlantic, it was the determination of a few insurance men in 1896 that led to the creation of the USA National Fire Protection Association, a model which was rapidly copied all over the world.

The Geneva study has attempted to break new ground in the fire protection field — for one thing, most fire research projects tend to concentrate on national, rather than international problems, whereas the Association studies fire costs in 12 European countries. Previous studies of national fire costs have tended to concentrate on fire losses, whereas the Geneva study also produced figures for the national costs of fire protection — thus opening the way to cost-effectiveness studies.

This summary report starts by a brief comment dealing with the objects and results of the research, then it comments on the 7 items of fire costs and finally summarizes the suggestions for further action to cut European fire costs.

1. Object of research and results

1.1. Object of research

The object of the study was not primarily an academic one — on the contrary the emphasis was on the practical problem of reducing European fire waste. In the course of the three years work spent on the study, an increasing strong impression was gained that the national campaigns against fire waste in Europe were handicapped by the shortage of fundamental statistical data covering the essential items of fire losses and of the cost of fire protection. Yet without accurate statistics, decision making becomes a matter of chance.

* Research sponsored by the Geneva Association from 1975 to 1978.

** Research Fellow, The University of Sussex, Centre for Contemporary European Studies.

Consequently the main effort of the research was devoted to visiting each of the 12 countries on several occasions in order to discover the range of existing national fire cost statistics, to discuss their scope and limitations with local fire experts, and to enlist the cooperation of local fire experts in making candid criticisms of preliminary estimates for the gaps in each country's fire cost statistics.

As a result of the enormous help that was received in each of the 12 countries, it has been possible to make tentative estimates for each of the 12 countries, covering the 7 main items of fire costs for the years 1970/75. The calculation of these estimates has taken up the majority of the time of the research and forms the greater part of the report. Some possible lines of action for countries who wish to reduce their fire waste, are also suggested.

Although the report is primarily prepared for all those who hold national responsibilities for reducing fire waste, it is hoped that some parts of it may prove thought-provoking to others involved in the fire problem.

1.2. The seven items of fire costs

Fire costs can be divided into two categories — Fire losses and Fire protection. For many years, data involving fire, fire deaths, injuries and losses has been collected from many countries around the world and published by the USA National Fire Protection Association and the UK Fire Protection Association. The study has drawn heavily from this valuable pioneering work and tried to extend and refine the existing range of statistical data.

The NFPA and FPA statistics covered 2 of the 7 items of fire costs analysed in the study — Direct fire losses and human losses (killed and injured). To these 2 items has been added one other item of fire loss (Indirect fire losses) and also 4 items of fire protection — the cost of the fire brigades, fire insurance, protecting buildings against fire and finally the cost of fire protection and propaganda. The advantage of analysing the national costs of fire protection (as well as the fire losses) is that it facilitates the start of cost-effectiveness studies.

Other ways in which the study tried to extend the range of the NFPA/FPA statistics include the addition of one or two countries to the numbers covered for fire losses and human losses.

How significant are each of the 7 items of fire costs ? For the 12 European countries studied, fire costs are running at the rate of roughly 1 % of Gross National (or Domestic) Product. These costs are divided approximately as follows :

Direct losses	30 %
Building protection	30 %
Fire brigades	15 %
Fire insurance	15 %
Indirect losses	5 %
Human losses	5 %
Total	100 %

The cost of fire research and propaganda is negligible. There is also an eighth fire cost (which it has not been able to attempt to estimate) — the cost of fire protection to the contents of buildings.

In attempting to refine the NFPA/FPA statistics, the study concentrated on placing them on an international standardised basis. The earlier statistics were based on returns made by the different countries (generally through the national fire protection association) and thus were calculated in several different ways.

They invariably, in the study's opinion, underestimated the total losses. It will be seen from the detailed calculations covering national cost figures, that additions have been made for such items as fire losses to Government property (often uninsured) and for fire casualties which have not been reported to the fire brigades.

1.3. Research methods

The research study, which was on a part-time basis, took 3 years. The first year was spent in preparing a tentative analysis of the fire costs in 6 countries (United Kingdom, Belgium, France, Germany, Holland and Switzerland) for the years 1970/73. During the second year the 4 Scandinavian countries were added. Finally Italy and Luxembourg were added in the last year. All the figures were updated so that they cover the years 1970/75.

The study started by work at Sussex University which concentrated in collecting the published fire literature dealing with international fire costs. Next a draft UK section was prepared with the help of many of the leading UK fire experts. Simultaneously, correspondence began with leading European fire experts, which was aimed at identifying further relevant European fire literature. A series of European visits followed during which discussions with fire experts enabled preparation of drafts of the individual national sections of the fire statistics. Halfway through the research, the Geneva Association provided an invaluable forum for discussion on the tentative assessments by the holding of a Seminar in Geneva in November 1976 for some leading European fire experts to comment on the 61 page report prepared on the first year's work covering 6 countries for the years 1970/73. As the work progressed the volume of European visits increased and a greater number of experts provided information and criticism.

1.4. Results

The first conclusion drawn from the national figures is that few national statistics for fire costs are being produced annually. If all twelve countries produced annual figures for each of the seven items, a European collection of eightyfour valuable fire statistics would be available for worthwhile practical fire use. At present, only around 30 of these 84 statistics appear to be published. It is suggested that most of these published national fire statistics are incomplete.

This suggests that little political will exists in Europe to reduce fire waste. Considering the size of the European fire problem perhaps the time is approaching when it will attract political interest in the way that road safety and industrial safety have attracted Government attention, leading to highly effective national safety campaigns. In this event, a high priority might be the organisation of an effective national statistical bureau covering the 7 items of fire costs.

2. Direct fire losses

2.1. Method

Figures for fire losses in 9 of the 12 countries covered in the study have been published by the USA National Fire Protection Association for several years, based on statistics submitted by national fire bodies to the NFPA. Useful though these figures have been, they are incomplete in every case. Almost invariably, Government losses are excluded and usually all uninsured losses are omitted.

As an example of the Geneva study's method of calculating direct losses the Table 1 is typical :

Table 1 : Direct fire losses — France

Published figures

Statistics of Fire insurance claims are published for industrial risks by the Assemblée Plénière des Sociétés d'Assurances contre l'Incendie and for domestic risks by the Government (La direction des Assurances) ^{a)}.

Insurance claims (FFcsm)

<i>Year</i>	<i>Industrial</i>	<i>Domestic & Agricultural</i>	<i>Total</i>
1970	657	924	1581
1971	891	1180	2071
1972	1063	1115	2178
1973	1027	1425	2452
1974	1313E	1760E	3073E
1975	1375E	2163E	3538E

Method of calculation

The figures are based on insurance claims paid by fire insurance companies operating in France. The figures represent all claims notified during the year, together with a figure for the final claim settlement. This involves adjustments to preliminary figures for previous years (to take account of the difference between the preliminary claims estimates and the final claims settlements figures).

Adjustment to published figures

Additions need to be made to allow for :

- (a) Losses not insured such as Government property, eg. Post Office, Railways, Power — Add 3 %.
- (b) Losses underinsured or subject to excesses — Excesses are rare, but the average clause is not strictly enforced. — Add 7½ %.

^{a)} *Annuaire des Sociétés d'Assurances.*

(c) Fires on ships or in cars. — Add 4½ %.

A deduction has to be made for indirect losses paid :

1970	1971	1972	1973	1974	1975
FFcs 62m	FFcs 171m	FFcs 109m	FFcsE 80m	FFcs 112m	FFcsm 92m

Large fires

Figures for the large fires are published by the Assemblée Plénière des Sociétés d'Assurances contre l'Incendie which disclose that the direct cost of the 10 largest fires was :

1970	1971	1972	1973	1974	1975
FFcs 125m	FFcs 161m	FFcs 283m	FFcs 161m	FFcs 246m	FFcs 141m

Adjusted figures

On the above assumptions the French direct fire losses emerge as follows :

1970	1971	1972	1973	1974	1975
FFcs 1750m	FFcs 2200m	FFcs 2400m	FFcs 2750m	FFcs 3400m	FFcs 4000m

2.2. European direct losses / GDP

An attempt to estimate the direct losses in each of the twelve countries on a uniform basis results in Table 2.

Table 2 : European direct fire losses / GDP-1970/75

<i>Country</i>	<i>Average direct fire loss</i>		<i>Percentage of GDP</i>
UK	£	170m	0.24
Belgium	Bfcs	7750m	0.45
Denmark	Krs	600m	0.39
Finland	Mks	125m	0.19
France	Ffcs	2750m	0.26
Germany (West)	Mks	1650m	0.19
Holland	Fls	325m	0.20
Italy	Lira	120000m	0.15
Luxembourg	Bfcs	350m	0.53
Norway	Krs	375m	0.34
Sweden	Krs	450m	0.21
Switzerland	Swfcs	300m	0.25

In the recent USA National Fire Prevention & Control Administration report on international differences in reported fire loss, an extremely valuable comparison is provided of fire loss indices for 1972/74 covering twelve countries included an Index for "Building fire losses as % of the GNP". In view of the international value of such an Index, Table 3 has been constructed based on figures in Table 2.

Table 3 : Index of European direct fire losses as % of the GDP

<i>Country</i>	<i>Direct fire loss as % of GDP — 1970/75</i>	<i>Index</i>
Italy	0.15	54 %
Finland	0.19	67 %
Germany (West)	0.19	67 %
Holland	0.20	70 %
Sweden	0.21	75 %
UK	0.24	86 %
Switzerland	0.25	89 %
France	0.26	91 %
Norway	0.34	120 %
Denmark	0.39	139 %
Belgium	0.45	159 %
Luxembourg	0.53	189 %
Mean	0.28	100 %

Although every effort has been made to produce as accurate an Index as possible, the statistics should nevertheless, in the study's opinion, be treated with grave suspicion. The published European statistics for direct fire losses are prepared on different bases and hence can be interpreted in a variety of different ways.

The figures for Italy and Belgium are particularly suspicious. It may be true that Italy enjoys a superior fire record to its neighbours but until some detailed research is carried out into the Italian method of collecting fire loss statistics, it seems safer to defer judgement. So far as Belgium is concerned, the losses look suspiciously high but on the other hand they are only put forward after some expert local research. The Luxembourg figures are somewhat freakish due to a single large fire in 1972 which distorted the figures for this small country.

Regular annual reliable statistics for direct fire losses are a fundamental part of any national campaign to reduce fire costs and it is a reflection of the surprising lack of public interest that accurate statistics for annual direct fire losses are not being produced in several of the 12 countries.

3. Indirect fire losses

3.1. Method

No country publishes annual estimates of their national indirect losses, so much new ground had to be broken. Some countries (Germany and United Kingdom for example) have a thriving consequential loss market. In these cases, the insurance figures provide a valuable guide to the total national indirect losses. Where no substantial consequential loss market exists, the industrial fire losses often provide the best indication of the total indirect losses. In Holland the fire brigade statistics were used.

Indirect losses were defined as "the losses falling on the national economy as the result of consequential fire losses". In calculating these losses, it was estimated that only 50 % of the actual indirect losses affect the national economy (the balance being taken up by gains to trade competitors, etc.).

3.2. European indirect fire losses

The national indirect fire losses falling on the economy appear to be running at the rate of around a quarter of their direct fire losses. This figure is considerably lower than many unofficial estimates which have sometimes suggested that indirect losses are as high, or higher than direct losses, but the study could find no evidence to suggest such a high figure in any of the twelve countries (see Table 4).

Table 4: European indirect fire losses 1970/75

<i>Country</i>	<i>Proportion of indirect fire loss to direct loss (1970/75)</i>
UK	0.32
Belgium	0.25
Denmark	0.23
Finland	0.24
France	0.28
Germany (West)	0.20
Holland	0.20
Italy	0.10
Luxembourg	0.25
Norway	0.23
Sweden	0.15
Switzerland	0.25

The problem of preventing indirect fire losses cannot be scientifically tackled until the national statistics for indirect losses are prepared and published. Not only do Governments have a responsibility to produce statistics as part of their national fire prevention responsibilities, but other agencies could benefit from a well prepared propaganda campaign warning the public of the damage caused by indirect losses. Fire insurers, in particular, could see a vast increase in business for Consequential Loss insurance if annual statistics for indirect losses were widely publicised. Not surprisingly one of the main recommendations of the recent UK Government study into Consequential Losses from fire was that estimates of "total economic loss from industrial fires be prepared each year and given full publicity".

4. Human losses

4.1. Method

Studies of fire death statistics are aided by the existence in most countries of 2 sets of figures :

- (1) Fire brigade figures recording deaths connected with fires to which they respond and
- (2) Government figures in health statistics recording deaths from fire and flames (published in World Health Organization statistics).

Figures for fire deaths in 10 of the 12 countries have been published by the USA National Fire Prevention Association for several years, based on statistics submitted by national fire bodies. Frequently these statistics were based on fire brigade figures only and consequently were underestimated. A Dutch study into unreported deaths suggests that the fire brigade statistics only include around 50 % of the total Dutch fire deaths.

The Geneva study recorded the two sets of figures for each country (where available) and started calculations on the higher of the two statistics. An addition was also made for unreported fire deaths — normally in the region of 25 %.

For the purposes of the study, it was necessary to attempt to put a value on human life. A valuable paper published by Dr. S. J. Melinek, of the United Kingdom Fire Research Station, infers that £50,000 is a reasonable figure to take as the economic value of a life saved by fire precautions and that £1,000 may be taken for a fire injury (1972 figures). These figures were used for each country (with annual adjustments for inflation).

The UK section (see Table 5) shows a typical calculation :

Table 5 : Human losses — killed and injured — United Kingdom

Published statistics — Deaths

Government statistics are published annually based on :

- (a) reports by local authority fire brigades, covering deaths occurring only if the fire was attended by the fire brigade (UK fire and loss statistics) ;
- (b) death certificates where the cause of death is given as fire (World Health Organisation Statistics Annual).

<i>Year</i>	<i>Deaths (fire brigades)</i>	<i>Deaths (WHO)</i>
1970	839	1031
1971	822	879
1972	1078	935
1973	1041	1048
1974	1046	970
1975	920	NA

In 1975, due to a small gap in the fire brigade reports, the Government statistics contain some estimates.

Adjustment to published figures

The fire brigade figures are highly regarded in the UK and based on them — Adjustment need to be made for :

(a) Northern Ireland

Deduct the following NI deaths (Registrar General's Report) :

<i>1970</i>	<i>1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>
21	52	65	47	40	40E

(b) Deaths unknown to fire brigades

The fire brigade figures omit deaths from fire where no Government fire brigade is called, eg people dying at home in many cases, people dying in many car crashed, deaths in Armed Service fires and some people dying in hospital after fires.

The major omission is probably old folk dying at home and this supposition is supported by a comparison of the death figures ^{a)} of people aged over 70 as reported by

(a) Fire brigades

(b) Registrar General

1969 — Fire Brigades : 270 deaths Registrar General : 383 deaths

Allowance for fire deaths not reported by fire brigades — Add 25 %.

Published statistics — Injuries

Government statistics are produced by the fire brigades on a similar basis for fire injuries, ie injuries requiring medical treatment as opposed to merely first aid.

<i>Year</i>	<i>1970</i>	<i>1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>
Injuries	5200	5017	6330	6709	6198	5800
(Fire Brigade report)						

Adjustment need to be made to allow for :

(a) Northern Ireland

^{a)} *Loss of life expectancy due to fire*, by S. J. Melinek, Fire Research Station.

Deduct the following figures for N Irish injuries (Registrar General's Report) :

1970	1971	1972	1973	1974	1975
103	193	185	221	198	200E

(b) Injuries unknown to the fire brigades.

The same factors apply as for deaths, but inevitably a higher proportion of fire injuries escape the notice of the fire brigades. In suggesting that the numbers of fire injuries reported by the fire brigades should only be doubled, not only are fire injuries requiring merely first aid omitted, but the figure of £ 1,000 per injury is being born in mind. Add 100 %.

Adjusted figures

On this basis the following figures emerge :

Year	1970	1971	1972	1973	1974	1975
Deaths	1025	950	1250	1250	1250	1100
Injuries	10,000	9,500	12,500	13,000	12,000	11,000

Economic value of human losses

Year	1970	1971	1972	1973	1974	1975
Total	£ 50b	£ 55m	£ 75m	£ 85m	£ 95m	£ 95m

(1972 deaths at £ 50,000 and 1972 injures at £ 1,000 each.)

4.2. European fire deaths

An attempt to estimate the fire deaths in each of the twelve countries on a uniform basis results in Tables 6 and 7.

Table 6 : European fire deaths / population

Country	Average fire deaths (1970/75)	Fire deaths / 100,000 persons
UK	1150	2.08
Belgium	200	1.96
Denmark	100	2.03
Finland	100	2.35
France	1000	1.90
Germany (West)	700	1.15
Holland	175	1.27
Italy	425	0.78
Luxembourg	3	0.90
Norway	70	1.81
Sweden	175	2.04
Switzerland	40	0.61

An Index, based on the above Table, of fire deaths per 100,000 persons shows the following :

Table 7 : Fire deaths per 100,000 persons 1970/75

<i>Country</i>	<i>Fire deaths per 100,000 (1970/75)</i>	<i>Index</i>
Switzerland	0.61	(39 %)
Italy	0.78	(50 %)
Luxembourg	0.90	(57 %)
Germany (West)	1.15	(73 %)
Holland	1.27	(81 %)
Norway	1.81	(115 %)
France	1.90	(121 %)
Belgium	1.96	(125 %)
Denmark	2.03	(129 %)
Sweden	2.04	(130 %)
UK	2.08	(132 %)
Finland	2.35	(150 %)
Mean	1.57	(100 %)

Probably statistics for fire deaths are the least imprecise of all the European fire statistics. Looking at the individual countries, the study shows scepticism of the figures for Italy for the same reasons as the doubts over the Italian fire losses. Reservations are also expressed over the excellent Swiss figures, despite Swiss experts confidence in their accuracy.

Although statistics for fire injuries have been included in the national figures, they need to be treated with grave reservations. This is particularly due to the variations in the national definitions of what constitutes a fire injury. However, in considering the national economic losses from fire deaths and injuries, it is the total of deaths that is far and away the more significant of the two.

Some more detailed comparative study of European fire deaths could be rewarding. A first stage might be to compare the national statistics for deaths reported to the fire brigades with those reported by doctors.

5. Fire brigades

5.1. Method

Statistics for the cost of public fire brigades were published in 8 of the 12 countries, but were prepared on different bases. No statistics appeared to be published for the cost of the private fire brigades. One problem was that of estimating the non-fire activities of the public fire brigades and another arose from the variation in accounting techniques covering such items as depreciation of buildings, land and equipment.

5.2. Fire brigades cost / GDP

An attempt to estimate the 1975 national fire brigade costs on a uniform basis results in the Table 8 :

Table 8 : Fire brigades cost / GDP Index 1975

<i>Country</i>	<i>Fire brigades cost as % of GDP</i>	<i>Index</i>
Italy	0.06	44 %
Germany (West)	0.07	49 %
France	0.08	60 %
Luxembourg	0.09	62 %
Switzerland	0.11	78 %
Denmark	0.13	93 %
Belgium	0.13	95 %
Holland	0.15	107 %
Norway	0.16	112 %
Finland	0.17	122 %
Sweden	0.24	177 %
UK	0.28	204 %
Mean	0.138	100 %

Although the Index cannot be regarded a precise comparison of national fire brigade costs, the general impression that it gives may not be far removed from the truth. Amongst the low cost countries, it is logical to see Germany with its economical system of volunteer fire brigades. Similarly Switzerland's costs might be expected to be below average. Denmark may well be running their fire brigades more cheaply than other Scandinavian countries due to the strength of the Falck privately owned

system. In considering the high cost countries, climatic conditions would influence the three Scandinavian countries. The high United Kingdom costs may be largely due to rigid accounting methods.

One reliable national figure for both the fire brigade costs and the direct losses can be established ; a strong case can be made for a comparative study of European fire brigades. Fire brigades operate on very different lines in different countries and their vital part in fire protection can be affected by numerous factors — location, time to reach the fire, strength, hours of work, equipment, etc.

6. Fire insurance

6.1. Method

Although one might have expected no difficulty in making estimates for the costs of administering fire insurance in each of the 12 countries, surprisingly only one country appeared to publish annual figures. The fundamental problem was that whereas in the last century fire insurance ranked as a separate class of business, today the fire figures tend to be merged with other figures covering property insurance. However, the European Insurance Committee (Comité Européen des Assurances) has a strong Fire Insurance Group and their members were extremely helpful in providing figures and expert advice based on non-published information.

6.2. Fire Insurance Administration costs (GDP)

An attempt to estimate the 1975 national costs of administering fire insurance results in the Table 9 :

Table 9 : Fire insurance administration costs / GDP — 1975

<i>Country</i>	<i>Fire insurance administration cost as % of GDP</i>
Italy	0.08
Finland	0.10
Sweden	0.11
Germany (West)	0.12
Switzerland	0.15
France	0.17
Luxembourg	0.17
UK	0.17
Denmark	0.18
Norway	0.20
Belgium	0.23
Holland	0.26

Thanks to the ready cooperation of European insurers, perhaps the Table gives a fair indication of the varying national costs of administering fire insurance in the 12 countries. Italy's costs are low because of the low popularity of fire insurance cover amongst Italians. The good Finnish figures are caused through a remarkably low expense ratio. The Dutch figures, however, look suspiciously high.

The cost of administering fire insurance is high, but it must not be overlooked that, without fire insurance, many fire losses would be infinitely greater. Not only does the work of fire insurance surveyors play a major role in encouraging policy holders to reduce fire losses, but the fire insurance discounts for effective fire protection (especially for sprinklers) provide a valuable incentive. But perhaps the most important fire insurance role has been to reduce indirect fire losses — were it not for the receipt of fire insurance claims, innumerable firms (many of them large) would have been bankrupted as a result of fires in their buildings.

If any further study into fire insurance costs were contemplated, it would best be carried out under the auspices of the Fire Group of the Comité Européen des Assurances. The 18 countries represented on this Group have carried out valuable studies into industrial risks and into sprinklers.

7. Fire protection — Buildings

7.1. Methods

No annual statistics for the cost of fire protection to buildings are published, although 3 of the 12 countries have carried out studies into national fire protection costs. In a UK pioneering study published in 1967, which has never received the worldwide attention which it warranted, Alan Silcock (Fire Research Station) estimated that the cost of fire protection in UK buildings in 1965 was around 2½ % of the total UK buildings costs. Since then more stringent fire building regulations have probably resulted in increasing the fire protection proportion of building costs in many countries.

This Silcock paper is described in Table 10 :

Table 10 : Fire protection — buildings — United Kingdom

Published statistics

No official statistics for the cost of fire protection in buildings are published, but figures are published ^{a)} for the total annual cost of new building construction.

Year	1970	1971	1972	1973	1974	1975
Total constructional output	£ 5517m	£ 6116m	£ 6951m	£ 8877m	£ 10,045m	£ 11,421m

Other Government statistics are published breaking down building construction costs into different sectors (Industry, Housing, etc.) and separate figures exist for repair and maintenance.

^{a)} *Annual Abstract of Statistics* — Table 8.62, Constructional work : Value of output in Great Britain.

Adjustment to published statistics

In his 1967 paper ^{a)} on protecting buildings against fire, Silcock estimated that the average fire protection cost as a percentage of 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 £ 63m for the cost of fire protection in buildings in 1965. This was around 2½ % of the total building construction costs.

In attempting to update the Silcock calculations, it is necessary to review the UK building fire protection trends since 1965. In two ways, fire protection in buildings has been encouraged : Government Building Regulations have led to stricter fire precautions and fire insurance discounts have helped to expand the volume of sprinkler installations.

Taking these trends into account, increases in Silcock's percentages have been adopted for Offices and shops (3 % rather than 2 %), and for Entertainment (7 % rather than 5 % for 1972/5, reflecting Hotel Regulations). Health is increased from 3 % to 4 % (likely Regulations). Silcock's calculations were based on new orders (rather than output) and omitted repair and maintenance. A figure of 1 % for fire protection costs has been taken for repair and maintenance expenditure.

Silcock also omitted public expenditure on Roads, Harbours, Water, Sewage, Gas, Electricity and coal and railways. A case can be made for adding an item for fire expenditure on some of these items, particularly gas, electricity and coal, so an addition of 1 % of construction costs has been made for these items.

By applying the above adjustments to Silcock's calculations and by reference to current UK Building statistics ^{b)} the following figures emerge for the cost of fire protection to buildings :

1970	1971	1972	1973	1974	1975
£ 110m	£ 115m	£ 140m	£ 200m	£ 185m	£ 175m

7.2. European costs

The Geneva study suggest that the cost of fire protection to buildings is generally the largest item of national fire costs, frequently being higher even than direct fire losses. The average cost of fire building protection in the twelve countries appears to be running at the rate of rather over 0.30 % of GDP.

However in view of the paucity of national research into this very intricate aspect of fire protection, it would be unrealistic to regard the Geneva estimates as anything more than an attempt to stimulate national interest in this important item. It would have required a separate project to analyse in detail the national statistics for building construction in the twelve countries and to make separate calculations for the fire protection building costs of different building sectors (industry, shops, housing, etc.).

^{a)} *Protecting buildings against fire*, by Alan Silcock (Architects Journal Information Library, 13 December 1967).

^{b)} *Annual Abstract of Statistics* — Table 103, Constructional work : Value and volume of output, and 104 : New orders.

7.3. Comments

Although there has been increased national interest in analysing the fire protection item in building costs, it is surprising that the topic has been neglected for so long. It is often the largest item in national fire costs and it is an item which is arousing considerable public interest, particularly from members of the public involved in heavy additional building costs in order to comply with national building regulations.

National research into the cost-effectiveness of fire protection in buildings could pay handsome dividends. There could also be worthwhile European studies, for example into the fire protection building costs in Hotels, an area where the cost of complying with public demands for fire safety needs to be compared with the cost of other national projects which are also needed in the public interest.

8. Fire research and publicity

8.1. Method

Fire research and publicity is far and away the smallest of the 7 items of fire costs, but it was included as a separate item for its importance, which is out of all proportion to its economic cost.

Apart from Germany, no country appeared to have attempted to calculate the cost of the total national fire research efforts. However, figures are available for the annual costs of most Fire Protection Associations.

8.2. Costs of fire research and publicity

The cost seems to average around 1 % of direct fire losses (or say 0.003 % of GDP). Some countries (Finland and Switzerland) spend considerably more whereas others, Luxembourg for example, spend very much less.

Since fire prevention organisations play a role in fire prevention out of all proportion to their cost, the Geneva study attempted to list many of the leading bodies operating in this field, in the hope that the information may save time for other people carrying out research into international fire problems.

8.3. Comments

The European fire insurance companies can be proud of their record in stimulating the formation of fire prevention institutions and in many countries, the insurance efforts have exceeded those of the Government.

The dedicated and diligent staff of the fire prevention organisations have played such a vital role in European fire affairs, that it is surprising that in some countries (Italy for example) no Fire Protection Association exists.

Owing to the early initiatives of private organisations in forming national FPAs, the role of European national governments in fire research is remarkably limited in several countries. This is in marked contrast with the USA where the growth of the consumer movement in recent years has led to the allocation of large sums of Government money in a determined effort to bring about "a 50 % reduction in the nation's fire losses in the next generation".

9. Proposals for further action

The Geneva study was confined to 12 European countries, the object being to suggest ways of reducing European fire waste. But it soon became apparent that many of the lessons learnt from the study were equally applicable to non-European countries and that the scope for action aimed at reducing world fire waste was immense.

The first astonishing conclusion was that although fire is costing most countries around 1 % of GDP, no country appears to be producing annual fire cost statistics. Without these fundamental fire figures, all national fire studies are inevitably limited and much important fire decision-making becomes speculative.

A moment's thought demonstrates the importance of these crucial fire statistics not only to developed countries but also to developing countries. In a masterly paper at the 1979 International Fire Conference, Dr. Badami of the Indian Fire Research Centre pointed out the developing countries growing awareness of fire losses and of the need to reduce them through preventive measures. As a practical man, he explained the difficulties of developing countries in tackling a mounting fire problem with poor national financial resources — the solution, he incontrovertibly explained, lies in cost/effectiveness. Yet this is the weak area in the fire research of the advanced developed countries, caused by the concentration on national fire loss statistics at the expense of figures for the cost of fire protection. The truth is that both loss and protection statistics are equally needed and until countries attempt to produce estimates for each of these two groups, a vast amount of money is going to be wasted.

If world fire costs are to be controlled, then national governments will need to start two essential bodies :

1. An effective national statistical bureau covering the 7 items of fire costs ;
2. A national Fire Prevention organisation, responsible to a single minister, coordinating the efforts of existing fire prevention agencies and acting as a catalyst for future action.