



International Association for the
Study of Insurance Economics

Études et Dossiers

Extract from

Études et Dossiers No. 346

**The M.O.R.E. 22 – Seminar of
The Geneva Association**

Munich, 18 - 19 September 2008

&

**The 6th Annual Round Table of
Chief Risk Officers, 2008**

Ballerup, 21 - 22 April 2008

October 2008

**Working Paper Series of
The Geneva Association**

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Layout & Distribution: Valéria Kozakova

Estimating the Total Cost of Risk from Fire

Gary C. Stevens

Overview

- What does the cost of risk iceberg for fire look like ?
- What factors are included in the iceberg ?
- What additional factors should be considered ?
- How do different countries compare ?
- Who bears the cost of fire risks ?
- Some target risk reductions areas
- Need for improved data collection in Europe.

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Studies in Economic Costs of Fire

1. USA: The Total Cost of Fire in the United States (to 2005); John R. Hall, Jr., NFPA, February 2008
2. UK: The Economic Cost of Fire: Estimates for 2004; Office of the Deputy Prime Minister, April 2006 – next report due April 2009.
3. Denmark: Danish Emergency Management Agency (2001) The socio-economic costs of fire in Denmark
4. Canada: Schaenman, Stern, Bush (1994) *Total Cost of Fire in Canada. An Initial Estimate*, The National Research Council of Canada Fire Research Laboratory
5. WFSC: Annual estimates of the direct, indirect and other costs of fire in a number of countries – *sourced from voluntary contributions*.

There is no internationally agreed methodology, so national costs can be partially but not critically compared.

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Economic Cost of Fire

UK Methodology * utilises good fire statistics and economic surveys

- a) **Costs in anticipation** – these are predominantly protection and prevention measures undertaken to prevent or mitigate the damage caused by fire.
- b) **Costs as a consequence** – these are incurred as a result of fire. These costs are due to exposure of property, individuals or the environment to fire and its products, and the cost is borne by a range of victims. These include individuals, private firms and society.
- c) **Costs in response** – These are the costs of extinguishing and clearing up after fire. Society bears the majority of these costs.

* Method built on Donald Roy's approach in 1997 using 1993 data – Home Office 1997.

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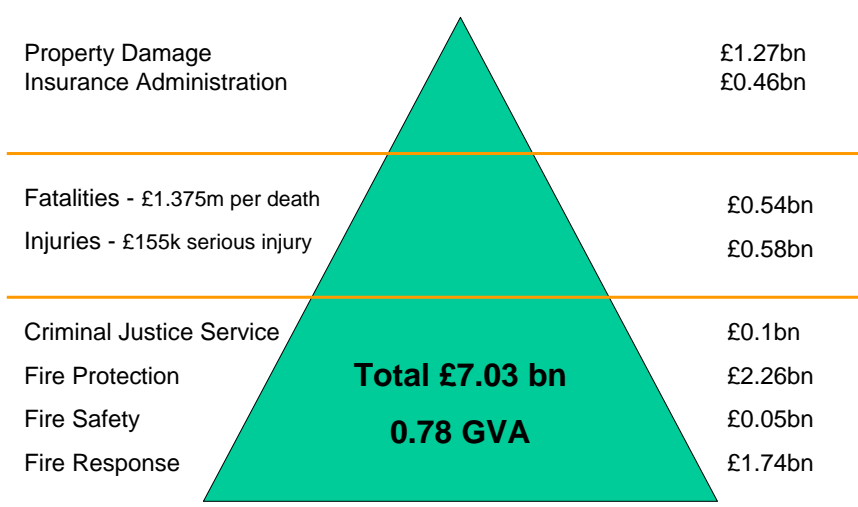
Economic Cost of Fire – UK Factors

Estimated	Not Estimated
Costs in Anticipation Costs in Fire protection in buildings (capital costs) Fire safety equipment Fire safety activity by the FRS Insurance administration	Fire protection in consumer items Fire safety research Non-FRS fire safety education and training Fire protection in buildings (maintenance costs)
Costs as a Consequence Property losses Lost output Emotional & physical suffering (related to injuries and death) Healthcare costs Loss of business	Environmental costs Heritage and cultural costs Costs to the community Emotional suffering and health care costs related to fire-fighter injuries incurred during training. Emotional suffering related to property damage Clean-up costs Disruption to households Wider economic distortions Disruption costs to public services Loss of output due to false alarms
Costs in Response FRS response costs	Private fire brigades Traffic accidents occurring during FRS response

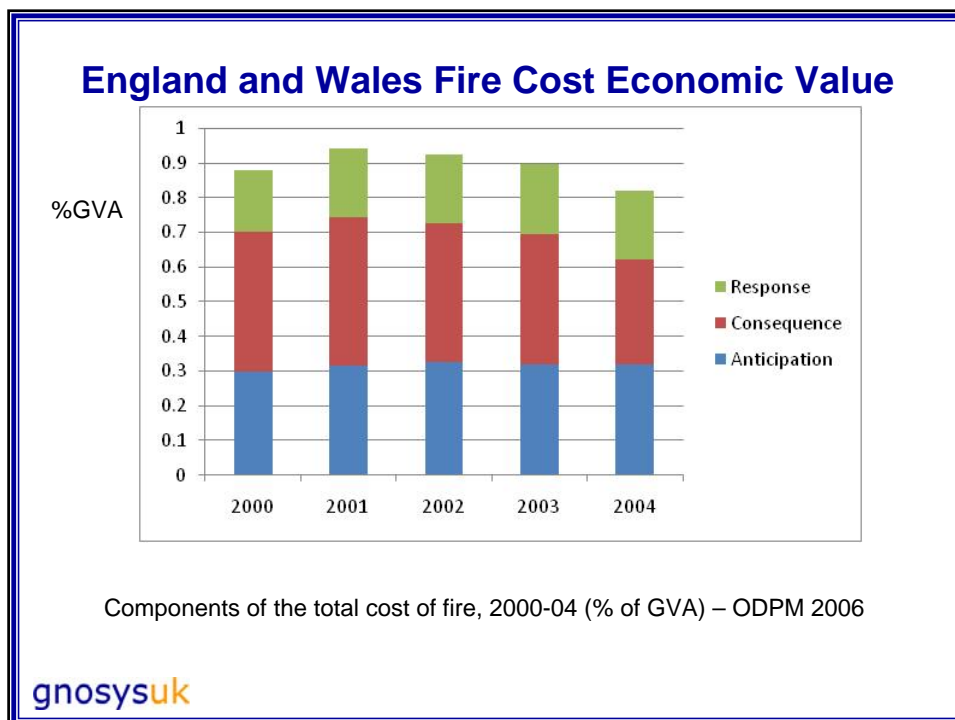
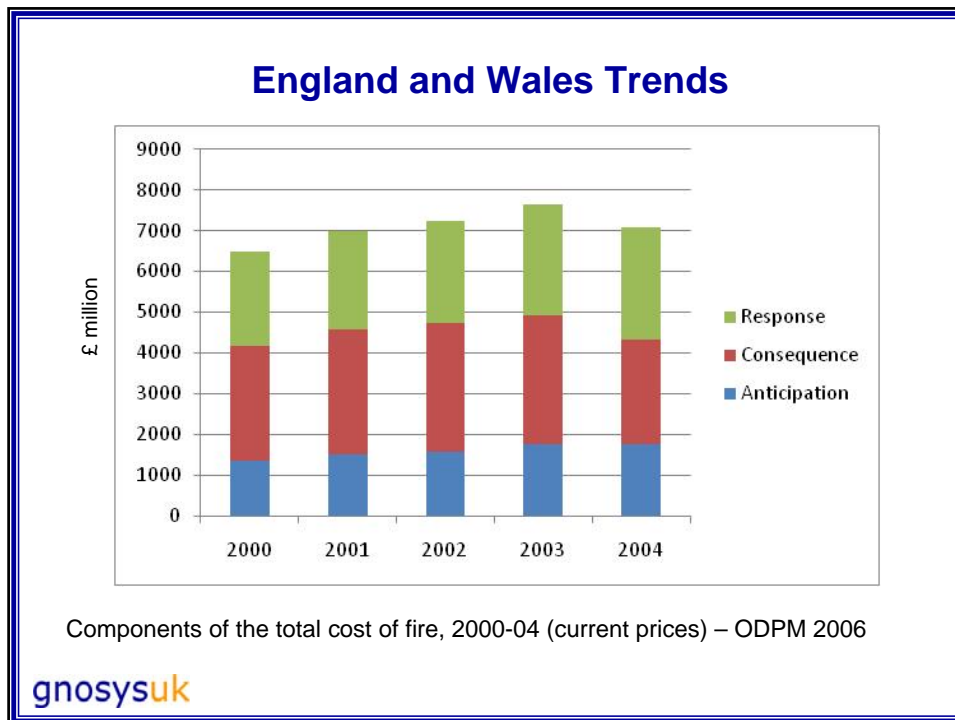
Costs estimated and not estimated in the economic cost of risk of fire – ODPM 2006

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Cost of Risk In Fire England and Wales (2004)



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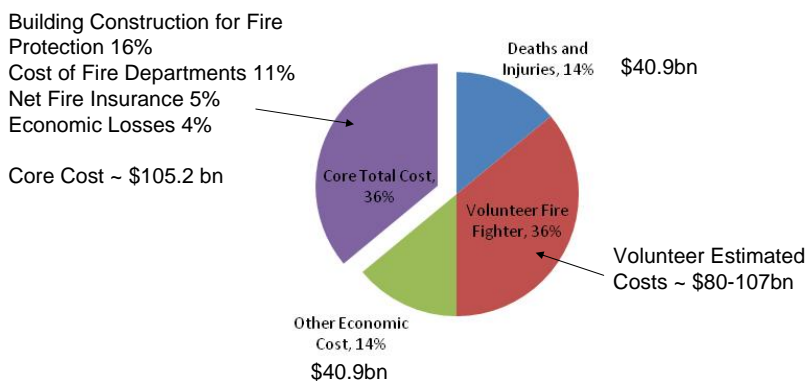


Total Cost of Fire in the USA (2005)

- In 2005, the total cost of fire was an estimated \$267-294 billion, or 2 to 2.5 percent of U.S. GDP.
- If volunteer estimated costs are removed the total cost is ~ \$187billion, or ~ 1.5% GDP.
- The total cost of fire includes the losses that fire causes, such as lives lost, medical treatments, property damage, business interruption, etc.
- It also includes the cost of provisions to prevent or mitigate the cost of fire, such as fire departments, insurance, and fire protection equipment and construction.

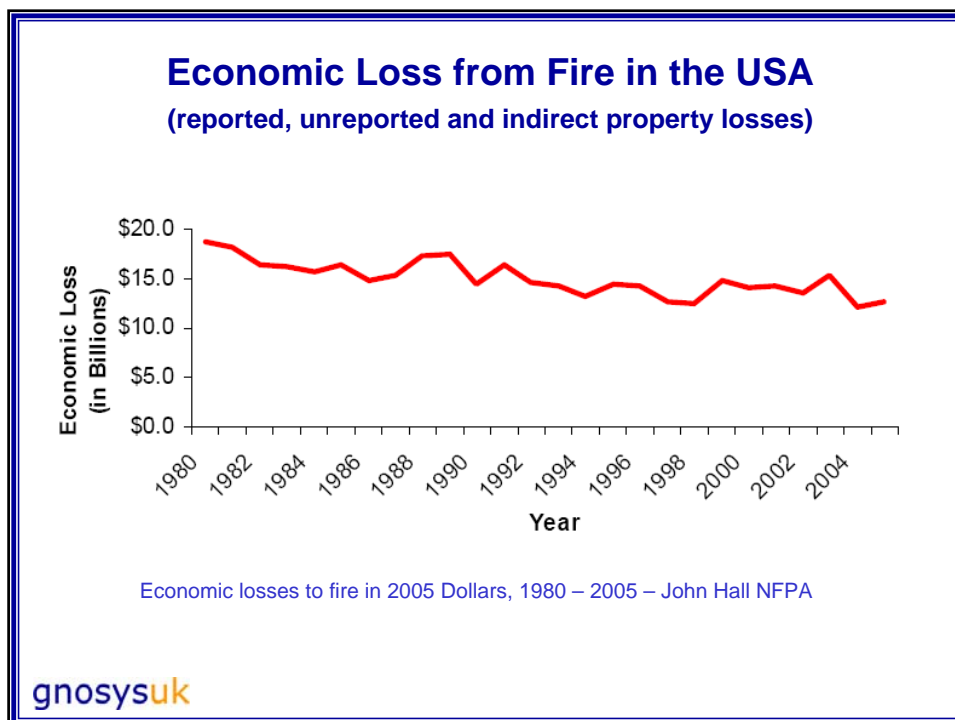
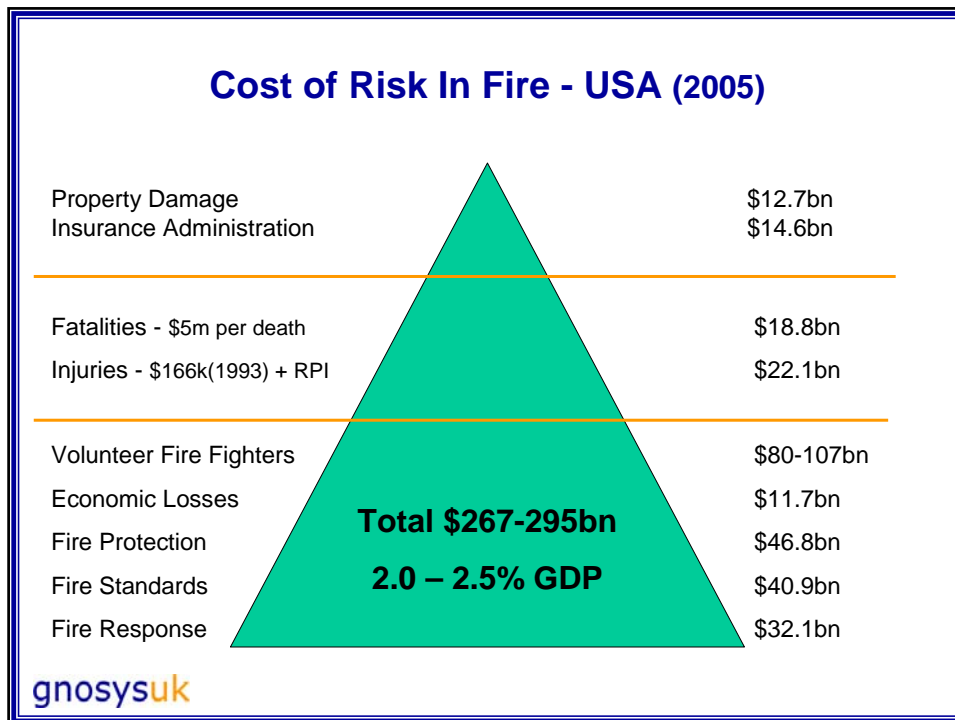
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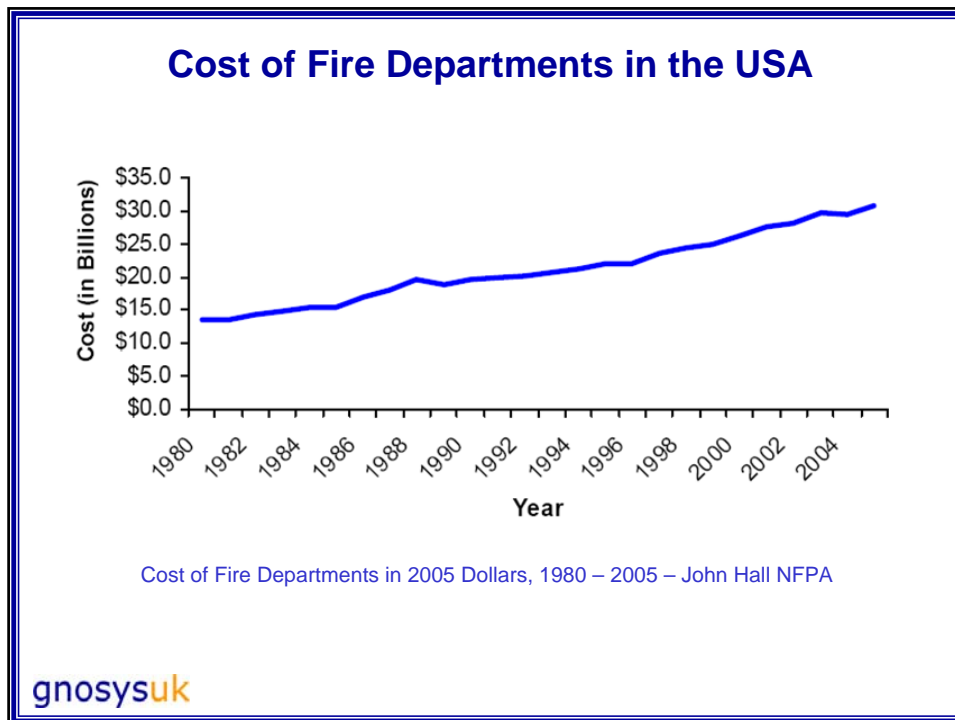
Total Cost of Fire in 2005 in the USA



In 2005, property losses to fire (direct, indirect, reported and unreported) totalled an estimated \$12.7 billion – John Hall NFPA

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Additional Economic Impact Factors

Research Area	Potential impact on cost of fire	Potential for achieving improvements to cost of fire
Fire protection in consumer products, public places and transport	Large	Medium
Environmental Liabilities Directive – conferred damage	Medium	Unclear
Costs to the environment from fire and fire-fighting	Medium	Medium
Improved estimates of the costs incurred by the Criminal Justice System	Medium	Medium
Improved estimates of the statistical value of fire deaths	Medium	Medium
Property damage from fires in public buildings	Medium	Medium
Disruption to public services	Medium	Medium
Disruption to households	Medium	Medium
Costs of maintenance and repair in accordance with building regulations	Medium	Small
Expenditure by central government not already captured	Small	High
Improved estimates of insurance coverage in public sector buildings	Small	High
Comparison of the value of property damage in deliberate and accidental fires	Small	Medium
Cost of vehicle fires	Small	Medium
Fire research expenditure by non-government bodies	Small	Medium
Output lost due to false alarms*	Small	Medium
Different average property damage and lost business estimates for different locations*	Small	Medium
Marginal response cost estimates	Small	Small
Heritage and cultural costs	Small	Small
Clean-up costs	Small	Small
Non-FRS fire safety education and training	Small	Small

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* No impact on the total cost of fire but would improve evaluation

International Comparisons

WFSC Estimated Cost of Direct Fire Losses

Country	% GDP
Poland	0.07
Singapore	0.07
Slovenia	0.07
Czech Republic	0.10
Japan	0.10
United States	0.10
New Zealand	0.11
Hungary	0.12
Spain	0.12
United Kingdom	0.13
Finland	0.15
Australia	0.16
Germany	0.16
Canada	0.17
Sweden	0.17
Italy	0.18
Netherlands	0.18
France	0.19
Denmark	0.20
Switzerland	0.23
Belgium	0.24
Norway	0.25
Austria	0.26

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Adjusted direct losses 2002-04

International Comparisons

WFSC Estimated Cost of Indirect Fire Losses

Country	% GDP
Norway	0.002
Czech Republic	0.005
Sweden	0.005
New Zealand	0.007
USA	0.007
Finland	0.008
UK	0.009
Germany	0.012
France	0.013
Italy	0.014
Austria	0.016
Japan	0.016
Slovenia	0.021
Canada	0.022
Netherlands	0.027
Denmark	0.029
Hungary	0.029
Switzerland	0.095

Average percentage of GDP (2002–04)

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International Comparisons

WFSC Cost of Fire Fighting Organisations

Country	% GDP
Singapore	0.04
Slovenia	0.05
Denmark	0.08
Austria	0.11
Norway	0.11
Belgium	0.14
Netherlands	0.15
New Zealand	0.15
Sweden	0.15
Poland	0.18
UK	0.21
Finland	0.22
USA	0.25
Japan	0.34
Canada	0.35

Average percentage of GDP (2002–04)

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International Comparisons

WFSC Fire Protection to Buildings

Country	% GDP
Japan	0.15
France	0.16
Slovenia	0.16
Sweden	0.16
Australia	0.17
Czech Republic	0.18
New Zealand	0.18
UK	0.21
Singapore	0.27
Belgium	0.29
Canada	0.29
Switzerland	0.29
Netherlands	0.30
Italy	0.34
USA	0.35
Norway	0.36
Hungary	0.42
Denmark	0.52

Average percentage of GDP (2001–03)

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Who Bears the Cost of Fire Risks ?

- Insurance industry – UK BCS claims it is relatively small e.g. ~ 10% of total household losses in the UK – only 15% of UK dwelling fatalities appear in loss adjusted claims – property up to 15% of total costs.
- Societal costs largely meet by government (*taxpayers*)*
- Public sector government property – self insured
- Many large industries and utilities – self insured via captive insurance companies (*may use re-insurance*)
- Commerce and small to medium industries – insurance – but may be part of multi-risk policies – *fire component unclear*
- Domestic – in UK ~30% households not insured – probably carry largest risks ~ 3-4 times higher in financially challenged (*vulnerable*) households.

* 50% of the total cost of fire in England and Wales could pay for 7,700 hospital beds or it could build 112 new secondary schools each year.

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Some Target Risk Reductions Areas

- Increase level of fire protection in new buildings
- Improve effectiveness of fire and smoke detection particularly in residential environments
- Improve understanding of vulnerability and develop targeted policies
- Improve fire awareness in, and fire protection for, vulnerable groups
- Sustain and improve passive fire protection in consumer products

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Need for improved data collection in Europe.

To guide policy development and to further reduce risk from fire while protecting people, property and the environment

- Fire statistics and the societal cost of fire - *economic, social, business, environmental*
- Better understand links between socio-economic-demographic factors and fire risk
- Assess how passive and active countermeasures for fire risk reduction can be maximised for vulnerable communities
- The European Commission should establish a mechanism for the collection and publication of reliable fire statistical information by Member States on a common basis.

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