

G o v e r n m e n t C o n s u m e r S a f e t y R e s e a r c h

Electric Blanket Fires & Related Injuries

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Department of Trade and Industry

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1. SUMMARY OF RESEARCH FINDINGS

1. There were 816 electric blanket fires attended by the Fire Brigade in 1996 compared with over 2000 in 1985. In addition, there are (based on Crime Survey Statistics) in the region of 5000 electric blanket fires which are dealt with in the home and to which the Fire Brigade is not called.
2. The number of fatalities has fallen by 40% to 19 in 1996 compared with 32 in 1985. The number of non-fatal injuries has fallen by 80% to 91 in 1995 from 438 in 1985. The majority of non-fatal injuries (76%) are minor in nature, usually involving smoke inhalation, and do not involve admittance to hospital. Severe injuries (24%) require an average of 4 days in hospital, and 22% are transferred to other hospitals.
3. The number of electric blanket fires and associated fatal/non-fatal injuries fell rapidly until about 1989/90 and declined slowly thereafter.
4. The age group at greatest risk is the older person, aged 65 and over, with 6 times the national average of fatal injuries per million population and over twice the national average of non-fatal injuries.
5. Sales of electric blankets have fallen from over 1 million in the early 1980s to nearer 800,000 from 1990 onwards, mainly because many people have invested in central heating and double glazing.
6. There are in the region of 10 million blankets in use in the UK. About 30% of blankets in use are greater than 10 years old (about 1.5 million aged 11-15 years, 0.75 million aged 16-20 years, and about 0.5 million aged over 20 years).
7. At least 99% of electric blanket fires are believed to involve blankets that are more than 10 years old.
8. The main causes of electric blanket fires due to overheating of the blanket are as follows, in approximate order of importance –
 - Many old blankets are often worn, with mechanical damage and deterioration of the heating elements and wiring.
 - The flexible nature of electric blankets used in the UK means that they are liable to rucking, especially as many consumers do not use the ties correctly, which in turn can subject the electrical wiring within the blankets to high levels of mechanical stress over a number of years.
 - Misuse by the consumer such as leaving the blanket switched on while folded up.
 - Falling asleep on a pre-1990 standard blanket that is still switched on. Older blankets do not have adequate overheat protection, heat builds up where the blanket is rucked or with the weight of the person lying on top, and after time it can ignite.
9. Many of the electric blankets sold between 1985 and 1992 had PVC/PVC overheat protection systems. The PVC material ages/deteriorates over time, and some manufacturers believe that in some instances this may subsequently be a contributory factor to electric blanket fires.

2. RESEARCH OBJECTIVES, METHOD AND SAMPLE

The Standards and Technical Regulations Directorate of the Department of Trade and Industry commissioned an independent study to provide a clear understanding of why there continue to be a high number of fires caused by electric blankets.

2.1 Background, objectives, research method and sample

2.1.1 Background to the research

Trading Standards Departments throughout the country have raised concerns about the number of problems connected with electric blankets. Home Office fire statistics indicate that there are between 800 and 1000 fires each year caused by electric blankets, which resulted in 19 fatalities and 262 non-fatal accidents in 1996.

2.1.2 Main objectives of the research

The main aim of the study was to determine why accidents caused by electric blanket fires are occurring, and to identify the precise nature of the problem, as well as an indication of how the number of accidents can be reduced.

2.1.3 Research method

A key element of the research is the careful analysis of the statistical data from the Home Office Fire Statistics, the Home Accidents Surveillance System (HASS), Leisure Accidents Surveillance System (LASS) and the Home Accidents Deaths Database (HADD), together with discussions with fire brigades, electric blanket manufacturers and other specialists.

In-depth face-to-face interviews were carried out for a focused analysis of electric blanket fires, fatal and non-fatal injuries and property damage with the larger fire brigades. Telephone interviews were an essential method of gathering and checking information with fire brigades and other sources such as blanket testing organisations.

Contact with trading standards offices provided extensive information on the testing programme of electric blankets among consumers and analysis of electric blanket faults.

An Internet search on electric blanket fires was also undertaken. This yielded much information on the safe use of electric blankets, provided by a number of fire brigades and other organisations, and identified electric blanket research studies in Italy and the USA.

A national poll provided information on the use of electric blankets in the home. Consumer groups then focused on the habits and attitudes of consumers regarding their electric blankets and blanket safety to assess the likely response to various safety messages, and thence to the development of the recommendations of this report.

10. The key developments in electric blanket design have been the introduction of more sophisticated overheat protection devices, lower operating temperatures both in pre-heat and all night mode, blankets which can be slept on all night, fitted blankets and also machine washable blankets.
11. Blankets sold since 1993 are considered to give a higher level of safety, with reliable PVC/PE overheat protection systems; and examination of 182 fire brigade FDR1 reports (mainly 1997-1998) have not identified any fires caused by electric blankets manufactured after 1993.
12. Less than 5% of consumers return electric blankets to manufacturers for testing (as advised in the operating and safety instructions) because of the "fit and forget" attitude of consumers and the high cost involved compared to the original cost of the blanket.
13. Most consumers (interviewed in focus groups) do not consider the safety of their electric blanket, providing it is still functioning.
14. A safety drive to remove old electric blankets from the market is likely to be particularly effective in tackling the current problem of thousands of 'old' blankets still in use. Such a drive will usefully complement local initiatives to encourage consumers to have blankets tested. The key elements for any publicity initiative in the short term on electric blankets are :
 - Focus on older people (aged 60 years or more), the key age group at risk.
 - The key message is "If your blanket is over 10 years old, it is strongly recommended that you replace it immediately with a new blanket." This message should be supported by strong support information, eg there are over 2 electric blanket fires a day, nearly all of which involved old electric blankets and could have been avoided if they had been new.
 - A secondary message is to educate the consumer on the safe storage and use of electric blankets to avoid mechanical damage to the elements.
 - The continuing programme of blanket testing offered to consumers by many Trading Standards Departments, Fire Brigades and the voluntary sector, provides a useful complementary reassurance/safety check programme for those blankets that are less than 10 years old and which may be showing signs of wear and/or misuse. The programme can also be used to help promote the "replace your 10-year old blanket" message.

2.1.4 Sample achieved

Table 2.1-1

	Face-to-face interviews	In-depth telephone interviews/contacts	Total contacts/interviews
Fire brigades	9	16	25
UK manufacturers/retailers	4	2	6
Trading Standards	5	10	15
Overseas manufacturers	2	4	6
Other overseas organisations	5	21	26
Others	0	11	11
Total	25	64	89

Note: Others includes specialists in the UK such as ERA Technology who were particularly helpful in providing technical support.

Consumers (8 groups)	67
Consumers (national poll)	1,000

Eight consumer focus groups were carried out in November 1998 in the North, West Midlands, London and the South West. Four groups were made up of people aged 60 years and more who used an electric blanket. Two groups were made up of adults who cared for a person aged 65 years and older who uses an electric blanket. Two groups consisted of adults aged 30-55 years who had children and used an electric blanket. Half were male, half were female. Consumers in the carer and adult groups were half ABC1, half C2DE.

2.1.5 Definitions

Electric blanket fire - This is a fire which begins in an electric blanket. It excludes heat pads used for localised heat treatment, for example for sports injuries.

Fatal and non-fatal injuries - Injuries include burns and internal injuries caused by smoke inhalation which occur during an electric blanket fire, where there are smouldering or overheating blankets, and where there are heat burns due to contact with a hot blanket, but exclude injuries caused by tripping over the blanket or its cable and when no fire is involved.

Minor injuries - Injuries which are sufficient to require a visit to the Accident and Emergency Department of a hospital but do not require admission as an in-patient are described as minor in this report.

Severe injuries - Injuries which require admission to hospital, transfer to a specialist hospital or unit are classified as severe injuries.

Age groups - The age group under 5 years is used to mean from birth up to, but not including, the 5th birthday. 5-10 years includes children from their fifth birthday up to, but

not including, the 11th birthday. 11-17 years includes all older children who have not yet reached their 18th birthday. The age group 18-64 years includes all adults up to their 65th birthday. 65 years and over is used to indicate adults aged 65 years and older.

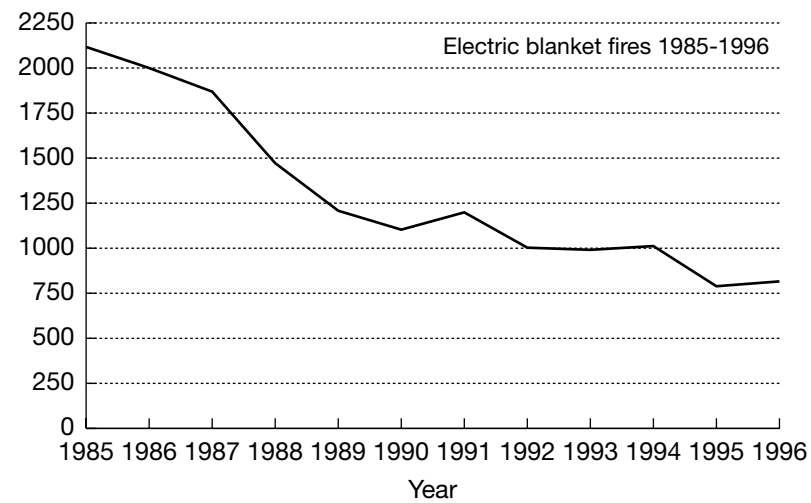
Note – at the time of carrying out the fieldwork, electric blankets were covered by British Standard EN60967. It is however acknowledged that this standard will be withdrawn in 2001 and will be replaced by BS EN60335/2/17, which was published in April 1999.

3. THE SCALE AND NATURE OF ELECTRIC BLANKET FIRES

Electric blanket fires attended by Fire Brigades have fallen by over 60% from just over 2000 in 1985 to 816 in 1996. Fatal and non-fatal injuries have also fallen significantly.

3.1 The number of electric blanket fires per annum

Table 3.1-1



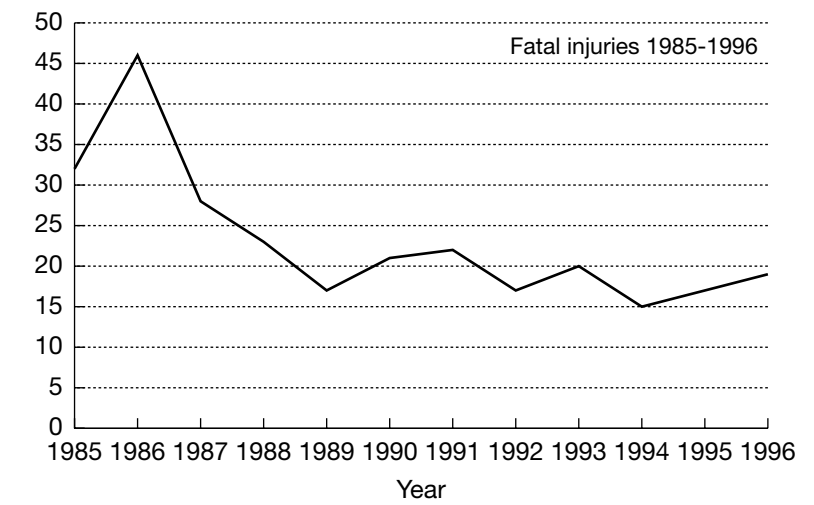
Source: Home Office Fire Statistics

Electric blanket fires attended by the Fire Brigade have fallen significantly by over 60% from 2118 in 1985 to 816 in 1996. This is believed to be due mainly to the provision of overheat protection and later improvements in these devices.

The 1996 British Crime Survey estimates that 12-19% of domestic fires, ie about 15%, are attended by the Fire Brigade, and this figure is confirmed by Fire Brigades. Therefore the total number of electric blanket fires could be in the region of 5000, albeit the majority are minor and dealt with in the home without the need for the Fire Brigade to attend.

3.2 The number of fatal injuries in electric blanket fires

Table 3.2-1

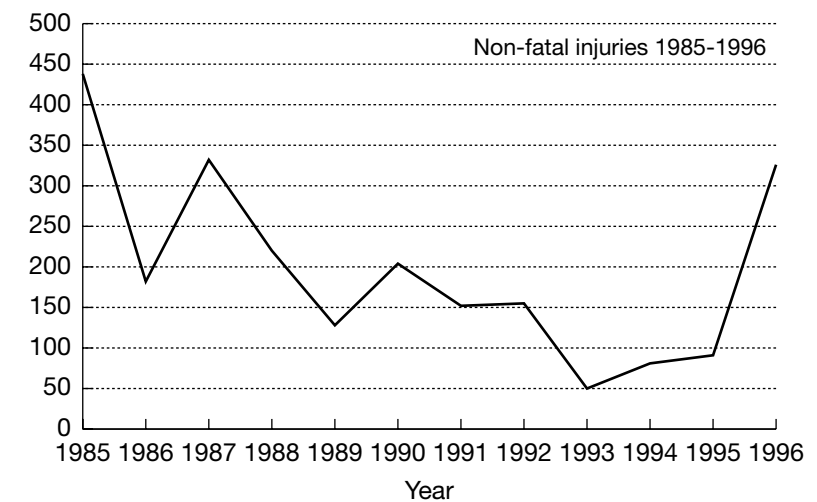


Source: Home Office Fire Statistics

The number of fatal injuries has fallen by about 40% from 32 in 1985 to 19 in 1996. The Home Office Fire Statistics are used for fatal injury figures in this table.

3.3 The number of non-fatal injuries in electric blanket fires

Table 3.3-1



Source: HASS/LASS Data

Non-fatal injuries have fallen by nearly 80% from 438 in 1985 to 91 in 1995. There is an unexplained rise in non-fatal injuries in 1996.

3.4 Past and future trends in electric blanket fires

Fire Brigades and electric blanket manufacturers consistently believed that the number of electric blanket fires per annum has continued to fall over the past 10 years, in part due to the increased presence of central heating and double glazing in domestic dwellings, and to sales of electric blankets with overheat protection gradually replacing older blankets without such devices. The fall in electric blanket fires is expected to continue, albeit slowly, due to the long time consumers keep blankets without replacing them.

3.5 Severity of fires and average damage cost

Table 3.5-1

	Percentage	Average cost	Fires attended by Fire Brigade	Total cost
Minor	70%	£25	560	£14,000
Moderate	26%	£1000	208	£208,000
Severe/extensive	4%	£25,000	32	£800,000
Total attended fires	100%	£1,268	800	£1.014m

Table 3.5-2

	Average cost	Total fires	Total cost
Unattended fires	£25	5,000	£125,000
Attended fires	£1,268	800	£1.014m
Total attended and unattended fires		5,800	£1.139m

Source: Fire Brigade Interviews, Loss Prevention Council, British Crime Surveys

Minor Part of the heating elements within the blanket overheats (due to blankets being worn out, left on too long, left on while folded or slept on). As the heat builds up, the blanket begins to smoulder and smoke is given off. Tests have shown that, typically after about 2 hours, the blanket will ignite. There will be scorch marks on the blanket and smoke in the room. Often the consumer finds the blanket and tries to put out the fire. Damage is usually limited to small areas of the blanket and there may be some smoke damage. (Note: some blankets tested by Trading Standards Offices were found to have scorch marks from previous incidents, although the consumer was still using the blanket.)

The cost of the damage ranges from nothing to £50 as the blanket is usually the only item damaged, although there may be some smoke damage. An average cost of £25 is used in the above calculation as the majority of minor fires require only the replacement of the electric blanket and some will not be replaced.

Moderate Extensive smoke damage, fire damage to the room where the fire took place including the bed, bedding, mattress and surrounding carpet and other furnishings. If the

blanket is carried into another room, usually the bathroom, to try to extinguish the fire, other rooms may be affected by smoke damage and require redecoration.

The cost of damage ranges from £400-£3000, depending on how quickly the electric blanket fire is discovered and extinguished, and the extent to which smoke damage has spread to other parts of the dwelling. An average cost of £1000 is used, based on information provided by the Loss Prevention Council and the views of Fire Brigade respondents.

Severe There is extensive fire and smoke damage in the dwelling, and, in the most serious fires, the damage may affect neighbouring dwellings. These fires are more likely to happen at night, to older people, particularly if the blanket is left on for many hours, eg all night, or they think they have put out the fire, go to sleep and the blanket is still smouldering.

The cost of damage ranges from £4000 - £85,000 depending on how quickly the blanket fire is discovered and extinguished and the extent to which the fire and smoke has spread to other parts of the dwelling. An average cost of £25,000 is used, based on information provided by the Loss Prevention Council and the views of Fire Brigade respondents.

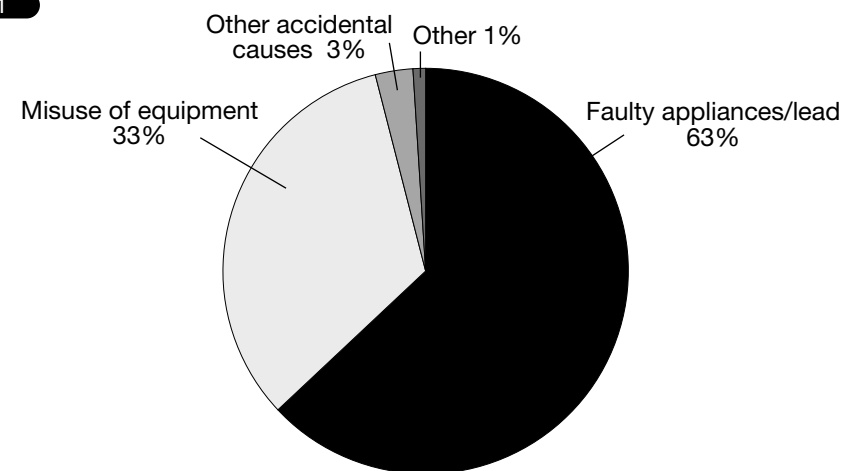
Unattended minor fires In addition to fires attended by the Fire Brigade, there are an estimated 5000 incidents where the Fire Brigade is not called, and these are likely to be minor in nature, requiring the possible replacement of the electric blanket. An average of £10 is used for the cost of each of these fires.

4. THE MAIN CAUSES OF ELECTRIC BLANKET FIRES

The main cause of electric blanket fires is overheating due to a defect in the blanket brought about by the old age of the blanket and often misuse.

4.1 Summary of the main causes of electric blanket fires

Table 4.1-1



Source: Home Office Fire Statistics

About two-thirds of electric blanket fires are caused by faults in the electric blanket, due to the deterioration of the heating elements and the fabric of the blanket over time and the lack of adequate overheat protection to prevent a fire occurring due to overheating. As the blanket is used, it rucks and moves on the bed, the fabric becomes worn, and the elements move about or bend in the blanket, causing hot spots to occur. When the blanket is left on, these hot spots, in an older blanket, start to smoulder and after about 2 hours a fire may occur. Examination of FDR1 reports and discussions with fire brigades revealed that faulty blanket fires also often included some misuse of the blanket, such as not being tied down. Hot spots in a blanket made in the past 5 years will cause the overheat mechanism to operate, cutting off the electricity supply.

Manufacturers and electric blanket testing organisations believe that electric blanket fires involve blankets which were made before 1991. This view is confirmed by examination of product details from 1994 HASS data and recent FDR1 reports. These indicate that, where information is available, at least 97%, and up to 99%, of fires involve blankets aged mainly 10 to 35 years old. (See appendices for details.)

About a third of fires are caused by misuse of the blanket. For example, it is folded on the bed or put crumpled or folded to one side, and left switched on. This causes overheating and again after time, if not switched off, a fire will occur. (In a newer blanket the overheat protection will operate, avoiding a fire).

Comparison of FDR1 reports, HASS and HADD records suggests that electric blanket fires have similar causes whether there is no injury, non-fatal injuries or a fatality. The severity of the fire and injury is dependent on the time taken to discover or become aware of the incident, whether an attempt was made to tackle the fire and the age of the person involved.

4.2 Product faults - faulty appliances/leads

Most accidents categorised as faulty appliances/leads are recorded in HASS records with little detail other than "overheated", "caught fire" or smouldered". However examination of HADD and 182 FDR1 reports provided more detailed information.

55 mentions of a cause of the defect were given as shown below:

Table 4.2-1

Product fault	Mentions
Insulation/heating elements	20
Wiring	11
Lack of maintenance/worn out	8
Arcing	4
Short circuit	3
No overheat protection	2
Old blanket (10+years)	2
Incorrect fuse	1
Frayed flex	1
Control box	1
Faulty lead	1
Overloaded socket	1
Total mentions	55

Source: HADD and FDR1 reports.

Some fires categorised as due to a product defect have other factors which also contribute to the cause of the fire, such as the blanket was known to have been stored in a crumpled state between use, or was regularly left on for long periods of time for no apparent reason.

4.3 Misuse of electric blankets - main causes

Most accidents categorised as misuse of equipment are recorded with some detail in HASS, HADD and FDR1 reports. 84 mentions of a specific misuse were given as shown below:

Table 4.3-1

Type of misuse	Mentions
On while folded/crumpled	27
Left on for a long time	26
Sleeping with blanket on	23
Surrounded by many covers	3
Wet bed	3
Jammed controller under bed	1
Ties not in place	1
Total mentions	84

Source: HASS, HADD and FDR1 reports.

4.3.1 Causes - views of fire brigades interviewed and manufacturers

Fire brigades, manufacturers and blanket testing organisations consistently agreed that the main cause of electric blanket fires is the old age of the blanket. Consumers in the UK are seen to hold on to their blankets, without replacing them, typically for at least 10 years and a few for 20-30 years.

The age of the blanket contributes in several ways to the risk of fire as outlined below in accidents attributed to both product defect and misuse:

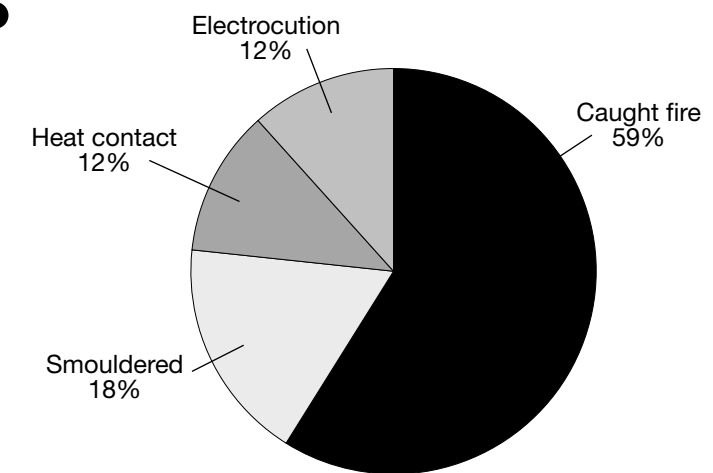
- Breakdown of the insulation around the heating elements, causing hot spots, due to wear and tear and movement in use. (Note: this is because of the flexible, ruckable material liable to expose the blanket to mechanical wear, for example when the ties are not correctly tied or when stored.)
- Deterioration of the fabric of the blanket allowing the elements to be exposed or to move within the blanket, due to wear and tear and movement in use.
- Lack of overheat protection.
- Unsuitable for sleeping on, when switched on.
- Failures in joints in blankets (where joints were within the blanket).
- Greater operating temperature and higher wattage.

According to electric blanket manufacturers and testing organisations, these problems are not expected in newer blankets produced and sold in the 1990s which have overheat protection. Only one incident of 182 FRD1 reports inspected was attributed to a 1990s

blanket. This was thought to have been bought in 1992, although manufacturers said that if it was purchased from a small independent retailer rather than a major outlet, it was not necessarily manufactured recently and it could have been in stock for some time. Also testers said that, when testing blankets, they found that where the tester knew the model age, the age of blankets was often 1-5 years older than the age given by the consumer. This underestimate was due in part to the time the electric blanket was in stock before it was sold, and also to consumers' underestimating how long they had had it.

4.3.2 Type of electric blanket accident in non-fatal HASS records

Table 4.3-2



Source: 1996 HASS/LASS

In 53 (47%) of the total 113 HASS cases 1985-1996, there are some data about the cause of the fire. In just over half these cases (27) the electric blanket had been left on and the injured person was asleep on it. In a further 21% (11 cases) the injured person was somewhere else in the house (and the blanket had probably been left on). In 6% (3 cases) the electric blanket had been folded and put elsewhere without being switched off.

Note: the definitions of the above categorisation are given in the appendix 10.7.2.

4.4 Main causes of electric blanket fires - typical scenarios

4.4.1 Product fault - typical scenarios

Breakdown of insulation - "18/10/85. There was a breakdown in the insulation on the electric blanket, exposing the heated elements which ignited the covering. The elderly lady, aged 81, tried to put out the fire, but died due to smoke inhalation. The electric blanket was not secured with ties, and she was known to leave the blanket on all night."

"29/8/97. An electric blanket was involved in a small fire, although it was mostly unaffected by fire and smoke. There was no thermostat associated with the heating elements. It was

not creased or folded. Examination of the blanket revealed that the element casing appeared yellowed in places and the foam appeared to have disintegrated. The blanket was more worn where the fire damage had occurred as if that side were more heavily used. It appeared to be fairly old and well worn. The heating element exhibited signs of ageing and insulation appeared damaged by heat in some places."

Faulty wiring - "12/11/97. An elderly lady, aged 86, entered her bedroom and discovered the fire as the smoke alarm went off. Faulty wiring had caused the overblanket to overheat. The Fire Brigade was called at 10.30pm and she was taken to hospital for a precautionary check-up."

"25/12/97. The electric blanket, left unattended, overheated due to a defect in the wiring. There was moderate damage. The elderly man, aged 74, was taken to hospital suffering from smoke inhalation."

4.4.2 Misuse of equipment - typical scenarios

Folded/crumpled and switched on - "10/5/97. The electric blanket had been turned on whilst being folded on the floor causing it to overheat. The Fire Brigade was called at 7pm, but the fire was out on arrival and there was little damage."

"5/3/97. Two children were in their mother's bed with the overblanket switched on. They were told to leave the bed, and the electric blanket slipped to the floor, where it lay crumpled. Later the mother smelled burning and called the fire brigade. There was minor damage to the blanket."

Left on for a long time - "1997. The elderly man was told by his brother not to switch his blanket on until the evening, but he was believed to be switching his blanket on earlier or even leaving it on all day. It had a lot of bedding blankets on top of it, and overheated. He was found slumped in the bathroom, although there was no indication that he had tried to tackle the fire, and died later in hospital."

Sleeping with it on - "25/3/88. The elderly man, aged 68, who died was sleeping on a switched on electric blanket, which overheated and ignited. The control switch was found for the electric blanket switched to maximum heat, and the cable was burnt through. It had a 13amp instead of a 3amp fuse. The control company had gone into liquidation in 1980 so it was at least 8 years old at the time of the fire. There was no evidence that it had been regularly serviced."

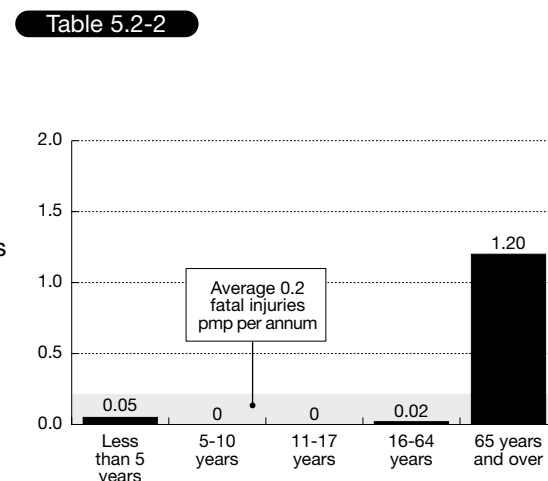
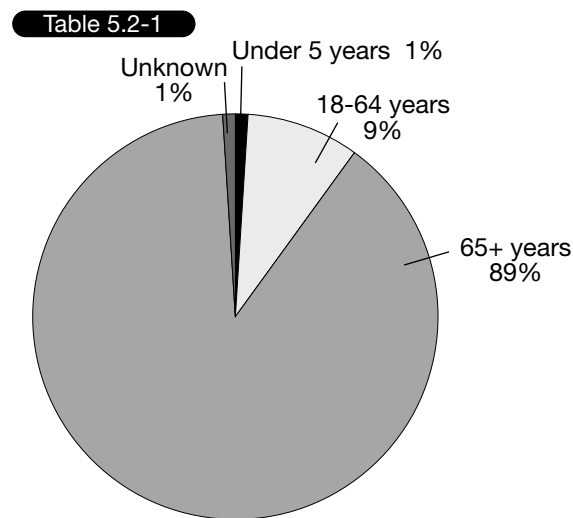
5. KEY CONSUMER GROUPS AT RISK

Older people aged 65 years or more are at greatest risk, with 6 times the national average of 0.2 pmp fatal injuries and over twice the national average of 3.4 pmp non-fatal injuries.

5.1 Summary of the key consumer groups at risk

89% of fatalities occur to the older person, aged 65 years and older, averaging 1.2 fatalities per million population per annum compared to the average of 0.2 fatalities per million of the total population. Older people are also the consumers at greatest risk of non-fatal injury with 7.7 non-fatal injuries per million population compared to the average of 3.4 non-fatal injuries per million of the total population.

5.2 Fatal accidents by age

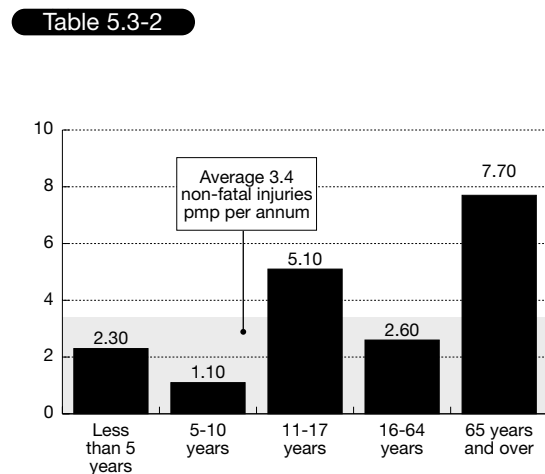
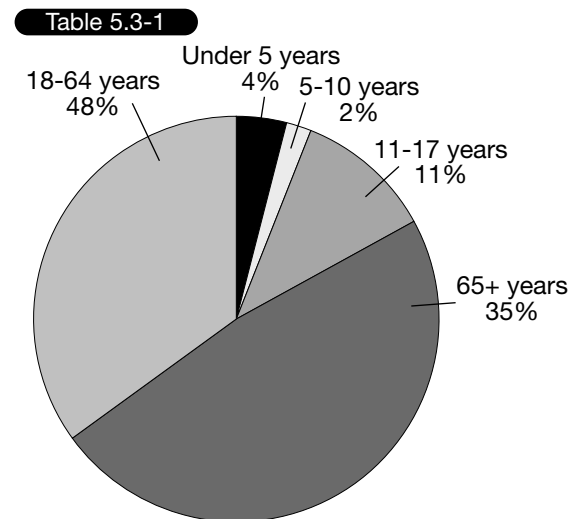


Source: HADD 1985-1995

Between 1985 and 1995 there were an average of 12 deaths per annum caused by electric blanket fires, 0.2 per million population, on the HADD database. 89% of fatalities occur to the older person, aged 65 years plus, averaging 1.2 fatalities per annum in this age group.

Note: The HADD database was unable to provide adequate data on fatal electric blanket accidents by sex.

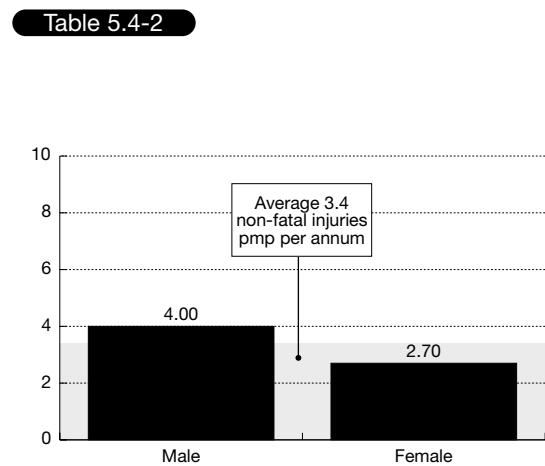
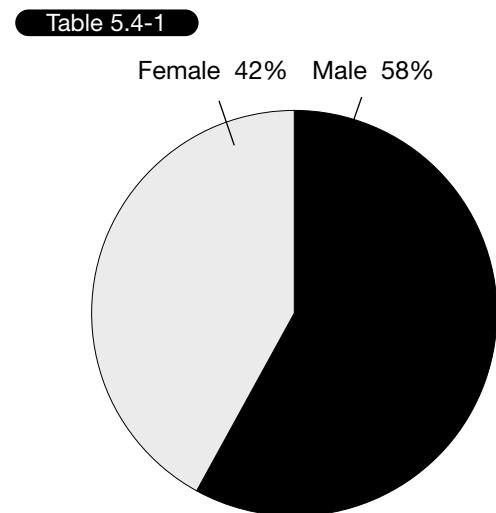
5.3 Pie chart of non-fatal accidents by age



Source: HASS/LASS 1985-1996

Note: The number of electric blanket cases per annum on the HASS/LASS database is small, and therefore these tables show an indication of the number of injuries by age and are not statistically reliable.

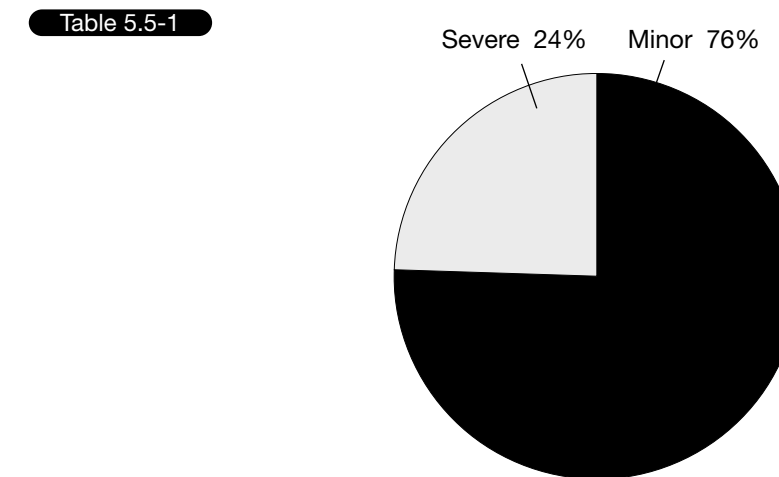
5.4 Pie chart of non-fatal accidents by sex



Source: HASS/LASS 1985-1996

5.5 Severity of non-fatal injuries

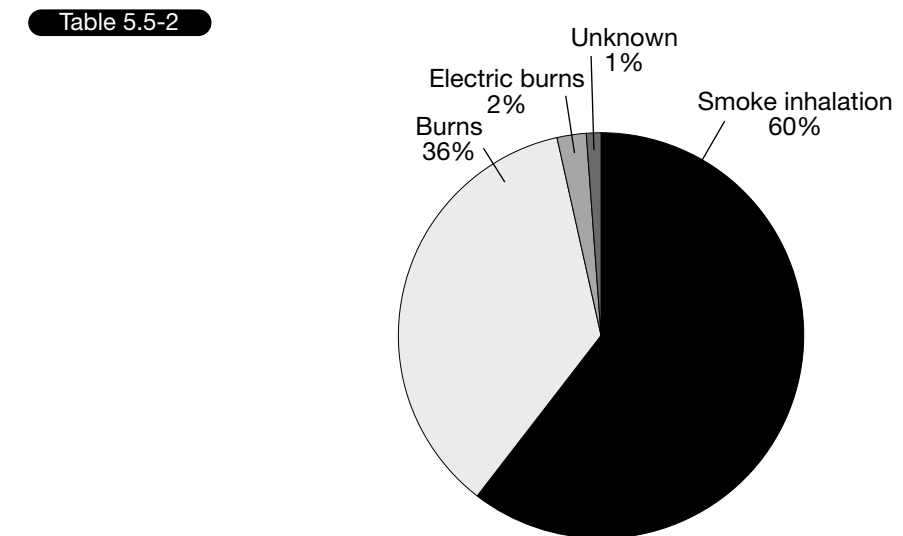
5.5.1 Pie chart of non-fatal accidents by minor or severe injury



Source: HASS/LASS 1985-1996

The majority of injuries are minor in nature. There are insufficient cases to determine whether there has been any change in the ratio of minor to severe injuries from 1985 to 1996.

5.5.2 The nature of minor injuries

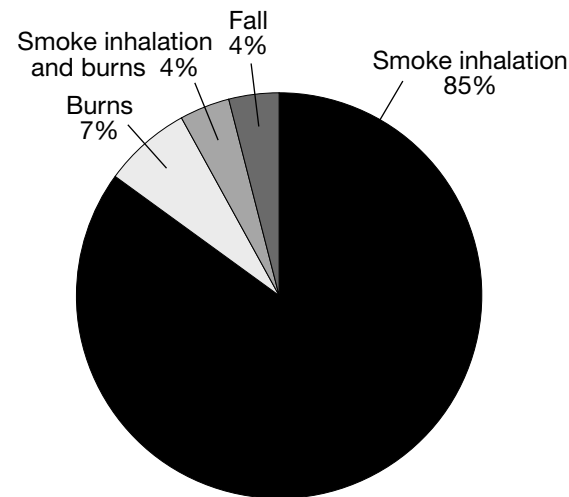


Source: HASS/LASS 1985-1996

60% of minor injuries are due to smoke inhalation. The electric blanket has either caught fire or smouldered, and the person has been overcome by the smoke fumes. 36% of minor injuries are burns and do not require treatment as an in-patient. 10% of injuries are caused by the injured person trying to pick up the burning blanket.

5.5.3 The nature and scale of severe injuries

Table 5.5-3

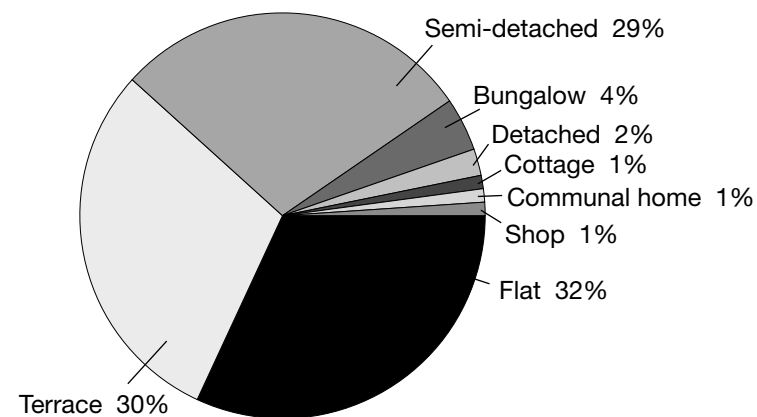


Source: HASS/LASS 1985-1996

85% of severe injuries are due to smoke inhalation compared with 60% of minor injuries. The number of IP days varies from 1-30, with an average of 4 days. 22% of in-patients were transferred to other hospitals.

5.6 Types of dwellings involved in electric blanket fires

Table 5.6-1



Source: Inspection of FDR1s, HASS & HADD data

Examination of 182 electric blanket fire FDR1 reports, HASS and HADD data (where known) together with discussions with fire brigades indicates that electric blanket fires occur across most property types, whatever the age of the person involved. Only one fire occurred in a communal home, and involved an older person, aged 65 years or more.

6. THE MARKET FOR ELECTRIC BLANKETS

Sales of electric blankets have fallen by a third from 1.2 million in 1985 to around 800,000 from about 1994 onwards to 1997. There are about 10 million electric blankets in use.

6.1 The size and nature of the UK electric blanket market

Average sales of electric blankets in the UK have fallen from well over a 1 million in the early 1980s (eg 1.2 million sales in 1985) to nearer 800,000 from 1994 onwards, with sales rising and falling in any particular year depending on the severity of the winter weather.

Table 6.1-1

	1985	1989	1994	1997
Electric blanket sales (millions)	1.204	0.635	0.804	0.800

Source: executive interviews with manufacturers

The fall in electric blanket sales is attributed to the recent warmer winters, to the increase in central heating and double glazing in domestic dwellings and also to the increased price of electric blankets because of the cost of adding overheat protection from 1985. About 93% are underblankets, 7% overblankets. About 50% of blankets sold are at the cheap end of the market, ie under £20, 50% are more expensive usually from £30-£65. Manufacturers estimated that about 20% of the population has electric blankets, and this figure is close to the 23% shown in the national poll.

Blankets made prior to the standard (BS/EN 60967/1990 – Specification for safety of electrically heated blankets, pads and similar flexible heating appliances for household use) are unsuitable for sleeping on all night. Manufacturers agreed that, due to poor stock rotation and sales through small retailers, blankets not meeting the 1990 standard may have been available in the shops up to 1993. Blankets meeting BS/EN 60967 have a minimum of two operating modes - a high temperature pre-heat mode and a lower temperature all night mode (around 33°C-37°C). In the event of a blanket made since 1992 overheating, the blanket heating mechanism will switch off and have to be returned to the manufacturer for re-setting.

6.2 Average lifetimes and numbers in use

Average lifetimes The life of an electric blanket varies according to how well it is looked after. Provided a blanket is properly maintained, manufacturers agreed that it will have a life expectancy of at least 10 years, and many far in excess of that. All electric blankets sold in the UK are approved by the British Standard BS/EN 60967 which requires the blanket to be subject to a 10 year life test as part of the approval process. Underblankets are expected to have twice the life expectancy of overblankets, which are more prone to rucking

as they move around and the material is not as rugged.

The national poll gives an estimate of 8 million electric blankets in use, with an average of 1.5 electric blankets per household. This is thought to be an underestimate. A more accurate method using calculation of past sales and the proportions still in use, based on discussions with manufacturers and trading standards officers, estimates a figure nearer 10 million as shown below.

Table 6.2-1

Age of blankets	Sales of electric blankets	% in use	Numbers in use
0-5 years	4 million	95%	3.8 million
6-10 years	4.25 million	75%	3.2 million
11-15 years	5 million	30%	1.5 million
16-20 years	5 million	15%	0.75 million
Over 20 years			0.50 million
		Total	9.75 million

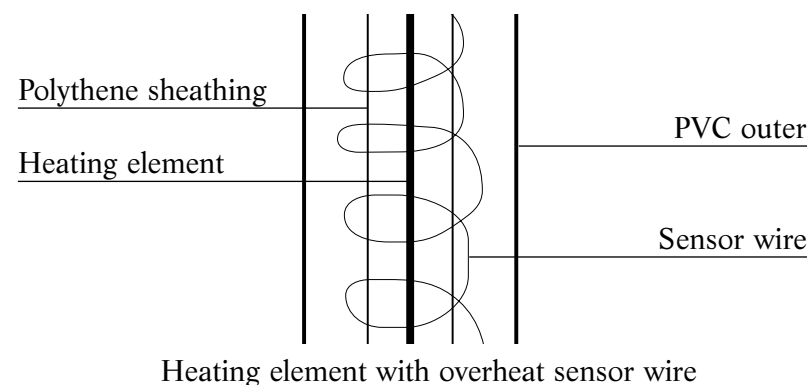
This indicates that there are just under 10 million blankets in use in the UK, of which about 25-30% (2.4-2.75 million) will be over 10 years old.

6.3 The main manufacturers/suppliers of electric blankets

The majority of the market is dominated by three key UK companies – CozeeCumfort/Burco Dean Appliances, Dreamland/Breville and Winterwarm. Others (about 3-5 smaller suppliers) include the Italian manufacturer, Imetec, and the US manufacturer, Sunbeam.

6.4 Electric blanket design changes, future accident trends

The main changes in blanket design have been improvements in overheat protection and element fixing in the blanket itself.



Manufacturers have introduced electric blankets with more sophisticated overheat protection. Conventional blankets, in the event of a fault, shut down and switch off. In the current technology, overheat protection is controlled by means of a sensor wire in the heating mechanism of the blanket. This means that the blanket shuts off before a fault develops. The melt temperature of the polythene sheathing around the heating element is lower than that of the PVC outer sheathing, and if overheating occurs, it will melt causing contact with the sensor wire. This cuts off the electricity, and the blanket has to be returned to the manufacturer for resetting. The PVC outer sleeve has a higher melt temperature to protect the blanket from fire. The elements are totally encapsulated and bonded with glue so that it is difficult for the element to migrate.

Modern blanket design also avoids the need for element joints within the blanket, which could cause hot spots in the past, where these joints deteriorated. The joint between the cable and the elements is now encapsulated in the control switch.

Operating temperature Modern blankets operate at about 5°C lower than older blankets with temperature settings enabling the consumer to sleep safely with the blanket switched on all night.

Blanket fabric The new standard allowed manufacturers to use modern man-made fibres for electric blankets such as acrylic fabrics.

Washable and fitted blankets Machine washable blankets are now more readily available in the UK and are designed to allow the cable and control box to be removed before washing. Fully fitted electric blankets designed to be easier to fit and to be ruck resistant have also been promoted in the 1990s, although these account for only a small percentage of the market due to the higher cost compared to a standard blanket.

Future accident trends Manufacturers felt that modern day blankets are unlikely to suffer from fire as in the past, although they cannot eliminate all accidents as any product is open to misuse by the consumer, particularly if they tamper with the control unit. They believe that nearly all accidents occur with old blankets, which do not meet the current standards, run at higher temperatures and have no overheat protection. They anticipate that electric blanket fire incidents will reduce further as old blankets are removed from UK households. Manufacturers said that sleeping with a current electric blanket full on all night, ie at pre-heat temperature, should not cause a fire due to the lower temperature operating bands and also overheat protection devices. It would be very hot to sleep on, although not as hot as a pre-1985 blanket. Folding the blanket and leaving it switched on would activate the overheat protection device. Although manufacturers have seen singed modern blankets because they have been bunched up, the blanket has switched off before a fire has occurred. (With the new sensory wire system, the blanket would be likely to switch off before there was any evidence of a fault, ie singeing).

It is estimated that about 3 million electric blankets were sold with PVC/PVC sensory wires. PVC ages with time, and some manufacturers interviewed believe that this aging process may contribute to some electric blanket fires. Many blankets with PVC/PVC sensory wire systems are likely to still be in use. It is believed that the PVC/PE system introduced in most recently manufactured electric blankets, does not suffer with the same aging problems. Although PE ages over time, it ages much more slowly than PVC. Furthermore, if the PE does age, it can sometimes result in 'premature operation' of the sensory system – which is a 'fail safe' mode of failure. It is likely that in the future the level of fires caused by electric blankets will remain static or fall very slowly as old blankets are substituted with new, safer, PVC/PE overheat protected blankets.

6.5 Service inspection and testing

Manufacturers consistently agreed that the majority of consumers do not anticipate an electric blanket going wrong, unlike other electrical appliances such as a kettle or toaster. Less than 5% are returned for testing on a regular basis, partly due to the "fit it and forget it" attitude of consumers and due to the high cost involved for the consumer in testing (£12-£30 including postage and packing) in relation to the cost of the blanket. If an electric blanket sent for testing is in a poor condition, manufacturers offer a discount replacement to the consumer. Current blankets do not require testing in the early years, provided the consumer inspects it for signs of wear and tear.

"We get extremes - people who want their blanket testing every 5 minutes, the others only come back to us when the blanket fails." - blanket manufacturer.

Operating instructions/testing

All manufacturers provide operating instructions and details of testing and inspection procedures with their blankets. These contain details for wiring the plug, fitting the blanket, how to use it, important points to remember, storage instructions and safety inspection and repair guidelines as well as details of the guarantee.

Since 1990 all manufacturers have printed the date of manufacture (either actual or coded dates) on the sewn-in blanket label for ease of identification, should a problem arise and to confirm warranty period. One manufacturer used to put the instructions in a pocket in the bag containing the blanket. However they found that the consumer did not see it, so they now place the instructions in the middle of the blanket so that it is visible on opening out the blanket. Another manufacturer has recently introduced changes to its sewn-in label to include details of how to tie the blanket to the bed as well as other safety advice such as not to use folded or rucked. The company found that many blankets returned to them still had the ties in their original packaged condition. It believes that less than 10% of consumers actually read the instructions prior to fitting the electric blanket, and a major High Street retailer has also identified this as a problem.

Some manufacturers now operate a helpline as the cost of returning a blanket for testing puts off many consumers from returning the blanket. They ask if the blanket is 6 years old, and if so, advise the consumer to replace it at a concessionary price, rather than bear the cost of the service/repair, if a repair is possible.

6.6 BEAB mark on electric blankets and BEAB approvals

Electric blankets manufactured since 1991 are labelled with a mark in the shape of a rectangle containing the letters "BEAB" to indicate that the blanket complies with British Standard EN 60967. The previous indication of BEAB approval was in the shape of a circle with a mark resembling a Kitemark to indicate that it conforms to the relevant British Standards. Blankets, which do not have the rectangular mark, were therefore made at least 8 years ago, and their age suggests that they are nearing the end of their life expectancy, requiring replacement or dispatch to the manufacturer for inspection.

This does not indicate that all blankets made prior to receiving the current BEAB mark are unsafe, as some earlier blankets are particularly well made and known to be fully protected.

7. CONSUMER HABITS

Most consumer respondents in the focus groups believe that as long as an electric blanket continues to work, it is safe and does not need to be independently inspected and tested.

7.1 Usage and habits of consumers with electric blankets

7.1.1 Users of electric blankets and reasons for use

Manufacturers believed that the main user of electric blankets is aged 56+ years as an electric blanket is a cheap form of heating and one which they are more likely to be familiar with than younger people. The other main user group is adults aged 35-55 years. Often it is a distress product bought when the weather suddenly drops in temperature. Families of ethnic origin are seen by manufacturers to be less familiar with electric blankets and unlikely to purchase them.

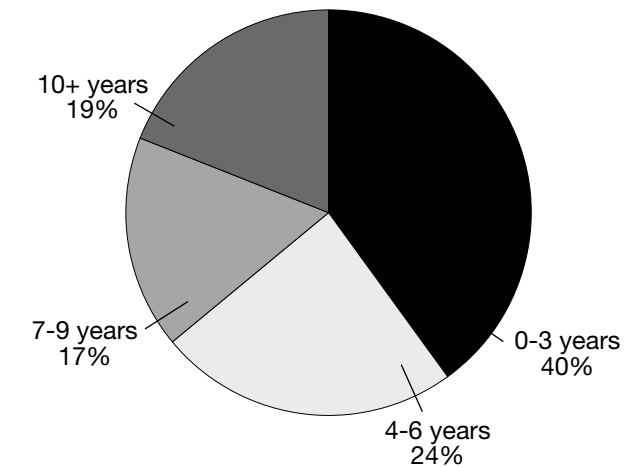
Consumer groups were recruited to reflect the views of people aged 60 years and older and adults aged 30-55 who also had children, who all had electric blankets which were used regularly. Also recruited were people who cared for older people, who used electric blankets regularly, although the carer did not necessarily have an electric blanket themselves. (Only 1 of the 15 carers for older people recruited had an electric blanket.) The focus groups showed that 53% are bought by the user themselves, 28% by a relative or friend and 19% are received as a gift.

Consumers use electric blankets to keep warm. About 14% of all consumer respondents had health problems which were helped by the use of an electric blanket. All consumer respondents preferred not to have central heating on during the night to keep warm, and 3% did not have central heating. Use of electric blankets had often begun before they had central heating, and they had found them a convenient way of keeping warm.

7.1.2 The number of electric blankets consumers have and their age

The average number of blankets among consumer respondents was 1.7, slightly higher than the figure of 1.5 in the national poll. Where only one bedroom was used regularly in the house, the additional electric blankets were often kept laid out on spare beds.

Table 7.1-1 Electric blankets shown by age as a percentage

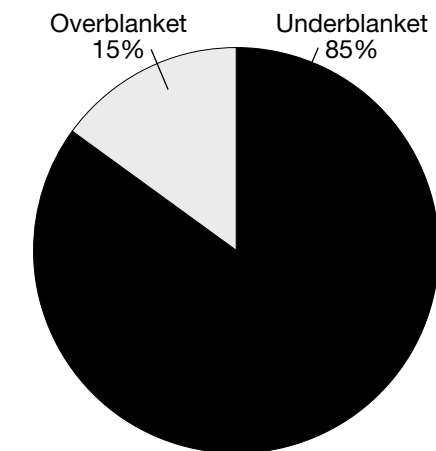


Source: 109 electric blankets/consumer groups

The age of electric blankets was similar among adults and older people. The percentage of very old blankets estimated by carers of older people was nearly double that recorded by older people themselves (31% compared with 18%). Although numbers are small, it bears out manufacturers' views that consumers underestimate the age of their electric blanket. The oldest blanket of consumers in the groups was 28 years old.

7.1.3 Type of blanket used and safety features

Table 7.1-2



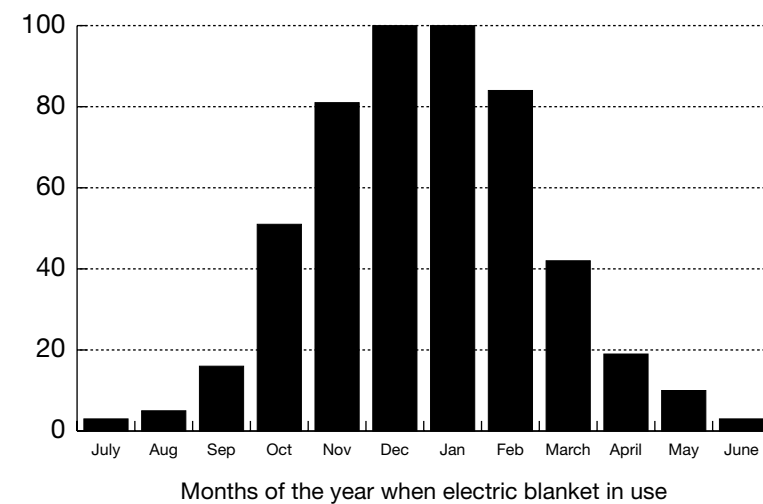
Source: 109 electric blankets/consumer groups

Underblankets are usually tied to the bed between the mattress and the bottom sheet. Some adults aged 30-55 years also placed a fleece mattress cover or protector on top of the electric blanket beneath the bottom sheet for extra comfort. Overblankets are usually placed between a top sheet and a duvet.

Apart from temperature controls, consumer respondents had little knowledge of the safety features of their electric blanket. When prompted, 13% said that their blanket had overheat protection, although based on the age given for their blankets, at least double that number would be expected to have overheat protection. Many did not understand what overheat protection meant.

7.1.4 Times of the year when the electric blanket is used

Table 7.1-3



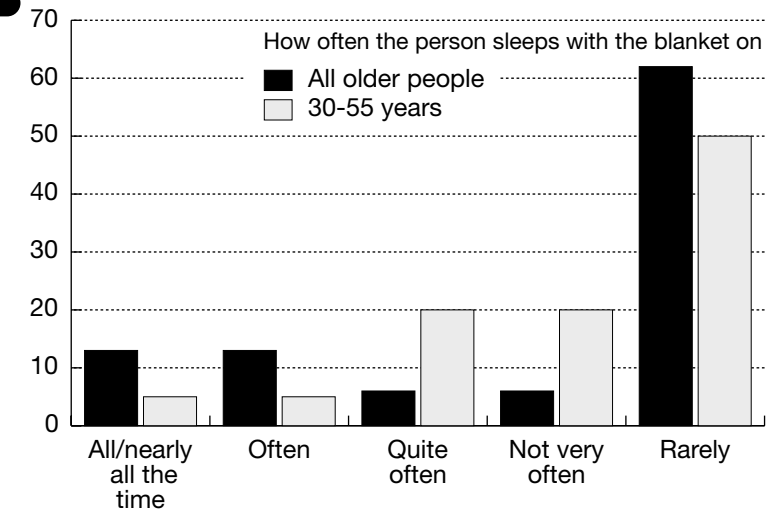
Source: 67 consumer group respondents

The time of year when electric blankets are used was similar among adults aged 30-55 years and older people.

Those using the blanket in the summer months often had a health condition, which was improved by the use of the blanket.

7.1.5 Frequency of sleeping with the electric blanket switched on

Table 7.1-4



Source: 67 consumer group respondents

Most consumers, both adults aged 30-55 and people aged 60 years and over do not sleep with the electric blanket on. Many believe strongly that the blanket should be switched off before getting into bed, although all admit that they have forgotten to switch it off at some time in the past and woken up because of the heat.

7.1.6 Where the blanket is kept in the summer months

Table 7.1-5

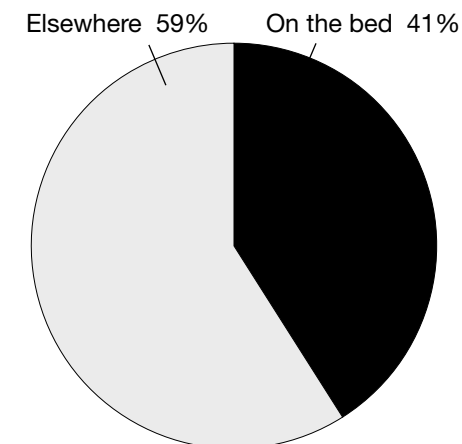


Table 7.1-6

Elsewhere	%
In a cupboard	34
In a blanket box	17
Airing cupboard	14
Wardrobe	14
In a drawer	9
In a box	6
Under the bed	3
In a suitcase	3
Total	100%

Source: 67 consumer group respondents

Note: ERA Technology stated that, in terms of safety, it was best to leave an electric blanket on a bed all year round, rather than fold it, provided it was checked for signs of wear and tear.

7.1.7 The electric blanket as part of the bedding or electrical appliance

Table 7.1-7

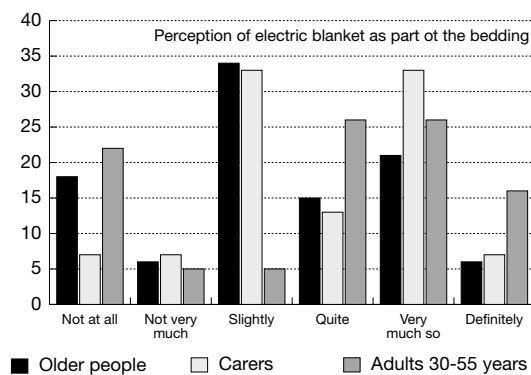
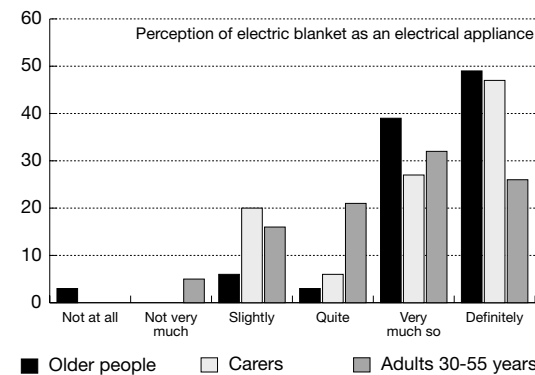


Table 7.1-8

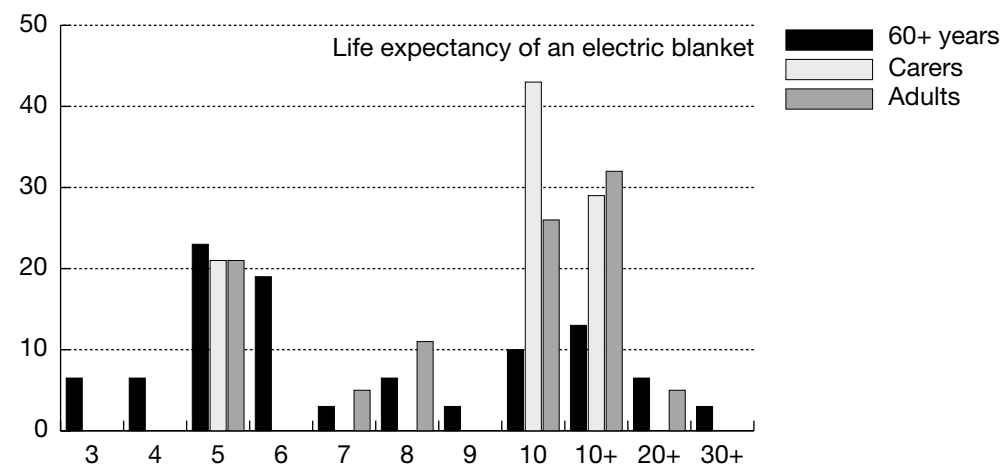


Source: 67 respondents/consumer groups

Most consumers perceive an electric blanket as an electrical appliance, particularly older people themselves. More adults aged 30-55 perceive it more as part of the bedding (68%) compared with older people (42%) and the views of older people as perceived by their carers (53%).

7.1.8 Life expectancy of an electric blanket

Table 7.1-9



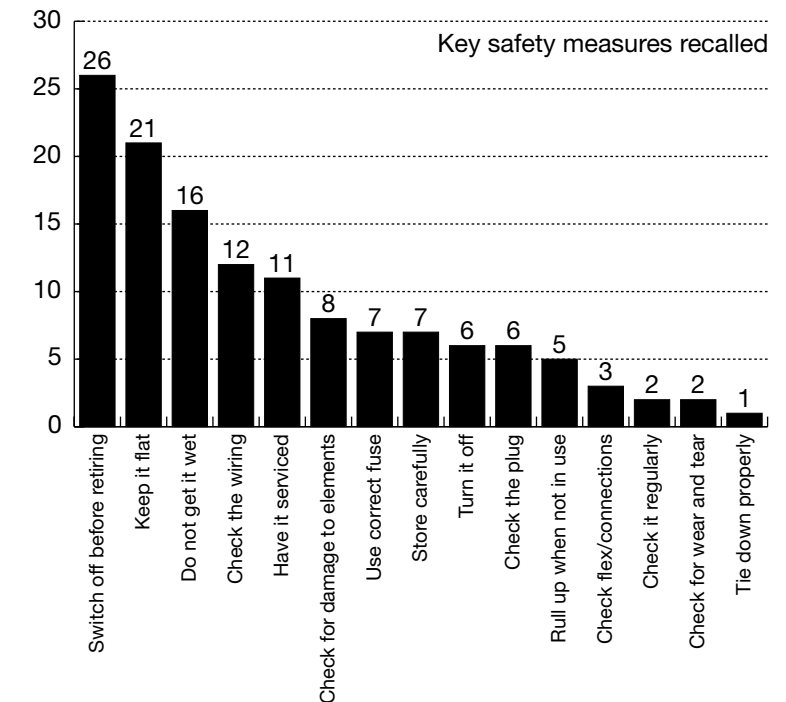
Source: 67 respondents/consumer groups

62% of adults aged 30-55 and 72% of carers, thought that their blanket, or the blanket of older people they looked after, would last 10 years or more, compared with 33% of older people themselves. Many (60+%) consumer respondents said that they used an electric blanket until it stopped working and saw no need to replace an electric blanket earlier.

7.2 Awareness and attitudes to safety issues

7.2.1 Key aspects remembered for the safe use of an electric blanket

Table 7.2-1

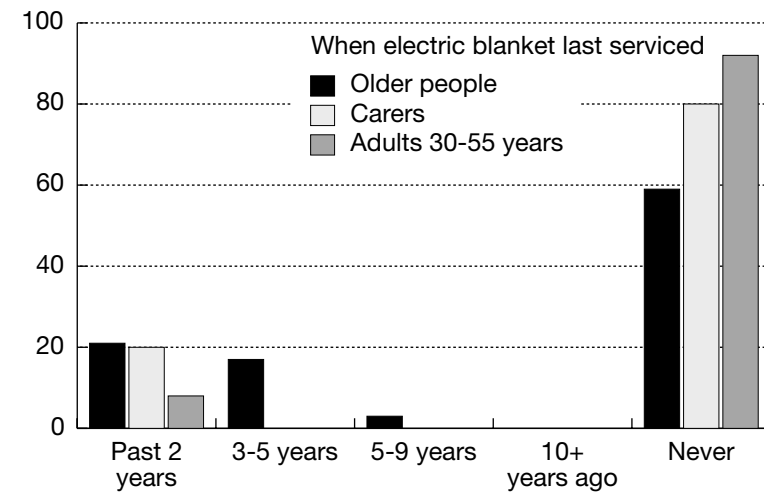


Source: 67 respondents/consumer groups

An average of two aspects for the safe use of an electric blanket were written down by each consumer respondent. Just over 16% mentioned having the blanket serviced. Discussion identified that adults aged 30-55 in particular did not think about the safety aspects of their electric blanket because they do not expect any problems to occur. Older people tend to be more aware of the need to keep the blanket flat, although, when prompted, only 3% of all respondents were aware that the electric blanket should not be weighted down by other objects, eg coat and other bedding piled on the bed. Men were more likely to mention checking the plug and the use of the correct fuse than women.

7.2.2 Habits and attitudes to electric blanket inspection/testing

Table 7.2-2



Source: 67 respondents/consumer groups

74% of the blankets owned by all consumer respondents had never been serviced, although 60% of blankets were 4 or more years old (see 7.1.-1). 9% said that it was because their blanket was too new. Most of those who never have their blanket serviced (66%) said that they could not be bothered or did not get round to it. "It always seems OK so I don't bother."

Of the 26% which had been serviced in the past, respondents said that it was to ensure their own safety, and two respondents regularly used the free facility offered by the local trading standards and local fire brigade (Avon and Warwickshire). 96% of consumers had no concept of the cost of getting an electric blanket serviced, and one respondent paid £8 taking the blanket in to a local electrical shop.

7.2.3 The use of instructions for electric blankets

76% of older people said that they still had the instructions for their electric blankets, and 47% of carers thought that the older people they looked after probably still had the instructions. However 100% of adults aged 30-55 did not have the instructions (50%) or were not sure if they still had them (50%). Discussion revealed that the adults did not see the need to keep the instructions. Should it stop working, they regarded it as cheaper to replace than repair, as with other relatively low cost domestic electrical appliances.

Most consumer respondents said that they had looked at the instructions when they first bought the electric blanket, although very few had read the instructions since then.

7.2.4 Attitudes of consumers to manufacturers' instruction leaflets

A variety of instruction leaflets from electric blanket suppliers and a major retailer were circulated among consumer respondents, and they were asked to write down what they liked about them, what worked well, what they disliked, and what didn't work so well. The following tables show the responses by number of mentions.

Table 7.2-3

What they like	Mentions
Clear diagrams	16
Easy to understand	14
Easy to read	12
Pictures, eg (✓) and (X)	8
Comprehensive	3
Large print	3
Washing instructions	3
Free helpline	2
Don't do DIY repair	2
Pre-heating takes longer now	2
Safeguard overheat	1
Service record	1
Big sheet size	1
Show importance of safety	1
Total comments	69

Source: 67 respondents/consumer groups

Table 7.2-4

What they dislike	Mentions
Print too small	30
Safety not prominent enough	11
Too much information to read	10
Difficult to read	3
No cost given for testing	3
Confusing diagrams	3
Washing instructions	3
Not moulded plug	2
Coloured paper	2
Total comments	67

Discussion showed that most consumer respondents felt that the print on almost all the brochures was too small for people to comfortably read, particularly with the amount of information that was covered. Consumers would give up reading it or glance quickly through it rather than read the information thoroughly. The use of diagrams was well liked, and respondents felt that the safety advice was often left to the end of the brochure and was not sufficiently strongly brought to the consumer's attention.

7.2.5 Consumer attitudes to basic traditional UK blanket

A single soft pliable blanket with basic controls from a British supplier and a basic single blanket in the continental style (stiffer and without ties) common in mainland Europe were passed among consumer respondents. They were asked to write down what they liked and what they disliked about the two types of blanket.

Table 7.2-5

What they liked UK blanket	Mentions
Soft	16
Good controls	10
Lightweight	6
Compact	5
Ties to bed/won't slip	5
Warm	4
Comfortable	4
Well made	2
Clear instructions label	2
Good connection	2
Others	6
Total comments	62
Percentage of all comments	40%

Source: 67 respondents/consumer groups.

Other aspects of the UK blanket consumers liked (with one mention) were *clean, does the job, controls on wheel, no control block on blanket, all in one colour, bright, thick cable*. Other aspects they disliked (with one mention) were *not attractive, can't wash it, looks like it could smoulder, can't detach connection, large control*.

During discussion many consumers said that they found the control on the UK blanket very stiff and difficult to use, particularly those with arthritis. It was also very difficult to read the numbering on the control switch. Consumers liked the fact that there was a sewn-in label on the blanket with basic safety information. Most felt that the blanket would stay on the bed without rucking, although nylon cords were seen to be likely to slip during use.

Table 7.2-6

What they disliked UK blanket	Mentions
Switch stiff to use	29
Nylon cord slips	13
Can feel wire	11
Not very thick	8
Small	8
No instructions on control	6
Poor quality	6
Difficult to read control	2
Light	2
Not moulded plug	2
Old-fashioned	2
Others	5
Total comments	94
Percentage of all comments	60%

7.2.6 Attitudes to a continental style electric blanket

Table 7.2-7

What they liked continental	Mentions
Control easy to use	22
Well padded/can't feel wires	14
Attractive/modern	13
Detachable control	11
Texture/firm	8
Sturdy plug	5
No cords for tying	4
Sturdy	4
Firm edge	3
Good size	2
Stays flat	2
Other	3
Total comments	91
Percentage of all comments	40%

Source: 67 respondents/consumer groups

Other aspects of the continental style blankets consumers liked with one mention were *easily folds, washable and conforms to BS*.

Many consumer respondents preferred the continental style blanket as it seemed sturdier and less likely to ruck than the UK blanket. However they were concerned that the material might be rather rough for sleeping on and, as with the UK blanket, found the controls difficult to read.

Table 7.2-8

What they disliked continental	Mentions
Uncomfortable/rough material	13
Difficult to read control	11
No ties	11
Difficult to undo connector	5
Connection	3
Switch not positive enough	3
Lumpy connection box	3
Cheap control	2
Looks like ordinary bedding	2
Not moulded plug	2
Washable	1
Total comments	56
Percentage of all comments	38%

7.3 Attitudes to electric blanket test failures and fatalities

7.3.1 Attitudes to electric blankets failing Trading Standards tests

Consumer respondents were asked to estimate the percentage of 10,000 blankets which failed the safety tests provided by Trading Standards. The average estimates by consumer type were very close and varied between 31% for older people, 38% for carers of older people, and 40% for adults, compared with the actual failure rate of 63%. Most consumer respondents were surprised by the high failure rate and they thought the need for checking blankets and having them inspected regularly should be advertised more strongly to consumers. They stressed that they thought that there was a certain complacency among consumers that if the blanket continued to work, they did not consider that it could be unsafe.

Consumer respondents suggested getting rid of failing blankets in greater numbers by national free checks for the elderly prior to the start of winter, although they thought that some people would still continue to use a blanket which had failed, if it continued to work.

7.3.2 Consumer awareness and attitude to fatalities

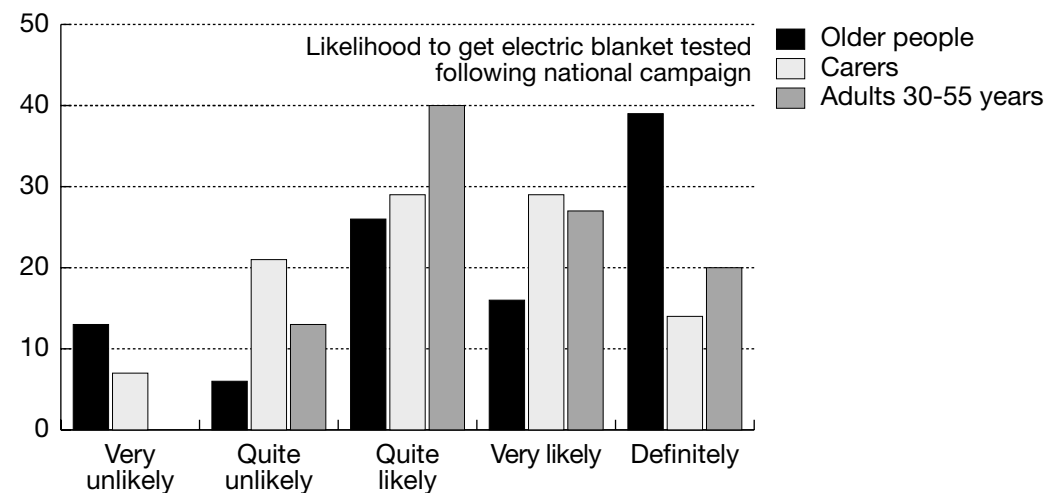
During discussion, consumers were unaware of how many deaths were caused each year by electric blanket fires as they had heard nothing about such deaths in the media. Some mentioned, unprompted, safety campaigns targeting fatalities caused by carbon monoxide poisoning and injuries caused by the misuse of fireworks.

Suggestions to reduce the number of fatalities included inserting a microchip into the electric blanket, which would stop the blanket working after 7-8 years, and national campaigns similar to those for carbon monoxide poisoning and firework safety.

7.4 Consumer attitudes to electric blanket safety campaigns

7.4.1 Attitudes to a safety campaign promoting blanket servicing

Table 7.4-1



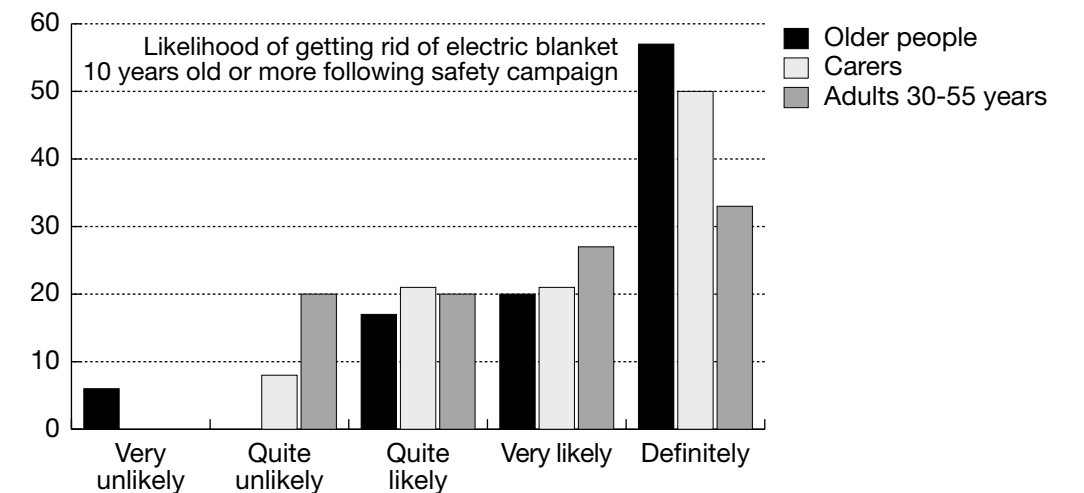
Source: 67 respondents/consumer groups

Consumer respondents were asked to write down, if there were a national campaign telling people to get their electric blanket tested, how likely they would be to do so.

55% of older people, 43% of carers and 47% of adults were very likely to or would definitely get their electric blanket tested.

7.4.2 Attitudes to a safety campaign for replacing old electric blankets

Table 7.4-2



Source: 67 respondents/consumer groups

Consumer respondents were asked to write down, if there were a national campaign to get rid of electric blankets if they were 10 years old or more, how likely they would be to do so. 77% of older people, 71% of carers and 60% of adults aged 30-55 years old were very likely to or would definitely get rid of the old blanket if they had one.

7.4.3 Attitudes to the organisation promoting the campaign

Consumer respondents were asked to write down for each of the following organisations - Trading Standards, Age Concern and the Department of Trade and Industry - whether they were more likely, about the same, or less likely to take action if that organisation was mounting the campaign. Trading Standards was seen to have the greatest influence if it mounted the safety campaign for consumers. Discussions showed that consumers regarded Trading Standards as an independent organisation with interests in safety, no commercial interests, and unbiased towards any consumer group in particular, and was held in high regard.

Table 7.4-3

Trading Standards	More likely	About the same	Less likely
Older people	47%	53%	0%
Carers	79%	21%	0%
Adults 30-55 years	57%	43%	0%
Average percentage	61%	39%	0%

Source: 67 respondents/consumer groups

Table 7.4-4

Age Concern	More likely	About the same	Less likely
Older people	41%	53%	6%
Carers	57%	29%	14%
Adults 30-55 years	27%	53%	20%
Average percentage	42%	45%	13%

Source: 67 respondents/consumer groups

Table 7.4-5

Department of Trade	More likely	About the same	Less likely
Older people	34%	50%	16%
Carers	14%	64%	22%
Adults 30-55 years	7%	86%	7%
Average percentage	18%	71%	15%

Source: 67 respondents/consumer groups

7.4.4 Consumer views on how best to improve electric blanket safety

Message Consumer respondents felt that the cost and trouble of returning an electric blanket for testing was too great for many users, and that a campaign promoting the replacement of older electric blankets would be likely to be more successful. However several adults aged 30-55 questioned the need for electric blankets currently sold to be tested regularly, given that they had satisfactory overheat protection devices, and felt that it was up to manufacturers and suppliers to promote the need for testing, if required.

Consumer respondents consistently agreed that, although older electric blankets need to be replaced, consumers, particularly older people, will be reluctant to do so without strong evidence such as statistics on fires, fatalities and injuries, that there is a potential danger.

Incentives Several consumer respondents suggested the use of incentives such as money-off vouchers, as many consumers would continue to use an old electric blanket if it was working satisfactorily. These would, however, not have to favour any manufacturer or retailer, as they would then be seen as a marketing incentive to encourage sales of electric blankets rather than a bona fide measure to encourage consumers to replace their old blankets.

Media Television was considered the main method for getting the message across, particularly to older and housebound consumers, who were seen to spend a lot of time watching television and to be the main users of electric blankets. Posters in doctors' surgeries were also frequently mentioned.

Target audience Educating adults, as well as older people themselves, was seen as a necessary measure to improve electric blanket safety among their parents or elderly relatives, and also to improve their own, relatively poor, knowledge of electric blanket safety requirements. Health visitors and social services were considered good influencers in homes where older people lived alone.

8. TRADING STANDARDS BLANKET TESTING

Trading Standards testing of electric blankets showed a failure rate of 63%, of which 41% were too dangerous to use.

8.1 Trading Standards electric blankets surveys

A database of the results of inspection and examination surveys carried out by 35 Trading Standards Offices (including 2 London consortia) across the country. Consumers were invited by means of posters, radio, television and press coverage to have their electric blanket inspected and tested to ensure it was safe to use.

8.1.1 Pass/failure results of Trading Standards surveys

Table 8.1-1

Electric blankets tested	Number	Percentage
Passed as satisfactory	3843	37%
Failed	6454	63%
Total blankets tested	10474	100%

Source: Trading Standards Offices

Too dangerous to use Of those blankets which were failed, an average of 41% were failed as too dangerous to use. The main reasons given in order of frequency were breakdown in insulation, worn/threadbare, elements exposed, bare wires, lack of overheat protection (not always used as a point of failure), ties missing.

Not recommended for use About 50% were failed usually due to problems in the cable lead and plug connection. Wrong fuses were replaced, plugs were rewired, and botched cable repairs were mended as part of the inspection/test survey. Others (about 7-9%) failed because the control box needed attention, the blanket needed re-stitching, and the consumer was advised to return it to the manufacturer for repair/service.

8.1.2 Typical condition, age of blankets tested, oldest tested

Where asked, most of the electric blankets (90+%) tested were in regular use. Some were obviously unsafe as the insulation had broken, elements were exposed or bare wires were showing. Some had the ties taken off or still in their original condition, tied up and never used.

Most electric blankets tested were believed to be at least 10 years old. According to Gems (blanket testing company) the typical age of the blankets tested is 20 years. The oldest blanket tested in the Trading Standards Offices surveys database was bought in 1947, and others from the 1950s and 1960s were also mentioned. Where there has been several years of testing in the same geographical area, Trading Standards Offices have noticed a drop in the average age of the blankets tested. For example in Croydon it has dropped from 19.6 years to 14.5 years.

However, it should be noted that the average age of blankets tested is considered higher than the average age of blankets in the UK (ie 10 years) because few people are likely to take new blankets to be tested.

9. RECOMMENDATIONS

Safety drives to encourage consumers to replace electric blankets over 10 years old are likely to be particularly important in the short term.

9.1 Ideas for reducing accidents involving electric blankets

9.1.1 National safety drive

The consumer research indicated that a drive to replace blankets aged 10 years or more is likely to be particularly effective in reducing the number of fires, fatal and non-fatal injuries by reducing the number of old blankets still in regular use. The aim is to motivate consumers to take action by highlighting the dangers of old blankets and the need to replace them with a new blanket.

Message

Most electric blankets, which are 10 or more years old, present a danger from fire risk due to the deterioration of the blanket and should be replaced immediately. This main message would be supported by electric blanket fire and injury statistics. For example, there are over 2 electric blanket fires a day, nearly all of which involved old blankets and could have been avoided if they had been new.

Target audience

The campaign would target older people (aged 60 years or more) as this is the key group at risk. A secondary target group would be those who care for older people including family and professional carers/visitors.

Safe disposal of old blankets

Ideally, any financial incentive to replace old blankets should be linked to consumers handing in the old blanket to the retailer for safe disposal. This avoids the danger of the old blanket being used at a later stage by the consumer or a relative or it being put back in circulation.

Timing

Any such safety drive should preferably take place in early autumn, ie mid September, to have the greatest impact, as this is the time when consumers tend to think about putting their electric blanket back on the bed or using it again, if left on the bed all year round.

9.1.2 Blanket testing

The valuable work carried out by many Trading Standards Departments, Fire Brigades and the voluntary sector, complements the initiative outlined in 9.1.1. It provides a useful complementary reassurance/safety check programme for those blankets that are less than 10 years old and which may be showing signs of wear and/or misuse. The programme can also be used to help promote the "replace your 10 year old blanket" message.

9.1.3 Product development options

Electric blankets currently sold in the UK are not deemed to present a problem in terms of overheating because of the use of overheat protection. However, if at any time in the future problems do occur, the following may be considered for further research.

- Continental style 'ruck-resistant' blankets may be easier for older people to use as they do not require tying to the bed, are less pliable than a UK style blanket, and are therefore less liable to ruck, which can cause hot spots and damage in the insulation. They were also perceived more favourably by consumers than traditional style blankets.
- A flexguard cable reduces the likelihood of damage by excessive mechanical wear and tear on the cable where it enters the blanket.
- Electric blankets with the PTC system, as used in the USA, are likely to be naturally replaced after about 10 years as the polymer ages in such a way over time as to become cooler during use compared with when first used, and the consumer becomes dissatisfied with its performance.

9.1.4 Other safety concerns - 1) electric blanket controls

Improved controls would be useful for consumers, as almost all consumer respondents found it difficult to use and to read the controls on an electric blanket. These difficulties were greatest among older people or the medically infirm, and readability was seen to be more difficult at night in poor lighting conditions. Improvements in the control might reduce the risk of accidents caused by contact burns, particularly among those with sensitive skin, who forget to switch off the blanket and fall asleep with it on. However, the number of people injured with contact burns is small, ie an average of 15 per annum in 1992-1996, and the effects of this option on reducing accidents is likely to be very low. The main suggestions are:-

- Larger lights indicating whether the blanket is on and larger setting numbers
- Improvements in the switch itself making it easier to turn to ensure that the blanket is used correctly by being turned off or to a lower setting during the night.
- Pre-set timers, already available on some blankets, which will automatically switch a blanket off after 30, 60 or 90 minutes, assist by switching the blanket off when the consumer is sleeping.

9.1.5 Other safety concerns - 2) operating and safety instructions

Consumer groups confirm manufacturers' views that only a small percentage of consumers have their electric blankets tested on a regular basis and few read the instructions thoroughly. There is a common regard among consumers that if the blanket is still working, it does not present a danger to the consumer. Giving the consumer adequate safety information in a format that they will take heed of was seen by consumers as the

responsibility of the manufacturer/supplier. The following recommendations would assist in improving the presentation of safety information to the consumer and the likelihood of it being read, although the effect on accidents is likely to be minimal, ie less than 1%, because in practice very few people read the safety instructions.

- Labels on the electric blanket itself which are readily visible when the bed sheets are changed and highlight the need for the blanket to be kept flat on the bed and checked for wear and tear regularly.
- Larger size instructions and safety advice leaflets (ie A4) with the use of larger print so that it is easy for the consumer to read the information. Note: the Royal National Institute for the Blind (RNIB) suggests 14 point text for target audiences with poorer eyesight, e.g. older people.
- Use of pictures and diagrams such as ✓ DOs and ✗ DO NOTs help the consumer to quickly taken on board safety messages without having to read too much text.
- Use of colour and larger type helps to highlight safety information as opposed to operating instructions.
- The availability of a free helpline allows the consumer to check if they should replace their electric blanket, particularly as few consumers return the blanket for testing to the manufacturer and the cost of testing/postage is relatively high in comparison to the cost of a new blanket.

10. APPENDICES

10.1 Details of organisations participating in the research

Note face-to-face interviews are marked with an asterisk ()*

Manufacturers/retailers	Respondent	Country
Argos	Nathalie King	UK
Boots plc	Richard Gill	UK
*Burco/CozeeCumfort	Charles Borrill	UK
*Burco/CozeeCumfort	Barry Ward	UK
*Dreamland/Breville	Ray Croll	UK
*Imetec	Chris Cheshire	UK
*Imetec	Lesley Clarke	UK
*Winterwarm	Steven Bates	UK
Fire Services		
Avon	ADO Ken Bennett	UK
Buckinghamshire	Jeffrey Goddard	UK
Cleveland	Barry Huggins	UK
Devon	Bill Grantham	UK
East Sussex	Dave Sutton	UK
*Gter London	Derek Thorpe	UK
Gter London	Jim Cosgrave	UK
Gter Manchester Stats Office	Tricia Farrow	UK
Gter Manchester	DO Jones	UK
*Gter Manchester	Sub Officer Vaughan	UK
Kent	Richard Moore	UK
*Lancashire	John Taylor	UK
Leicestershire	SO Bendall	UK
Leicestershire	SO Mark Speight	UK
*Merseyside	John Patten	UK
*Merseyside Stats Service	Doreen Gallimore	UK
North Yorkshire	ADO R Ashman	UK
*Oxfordshire	Steve Vermeulen	UK
*South Yorkshire	Bernard Akers	UK
Strathclyde	Ian Scade	UK
Warwickshire	Noel Harris	UK
Warwickshire	John Myers	UK
West Midlands	Dave Toplass	UK
*West Midlands	Bill Gough	UK
*West Midlands	John Herdman	UK

*West Midlands	Dave Brammeier	UK
*West Yorkshire	Bob Cunningham	UK
*West Yorkshire	Jenny Bagshaw	UK

Trading Standards Offices

Bexley	Alan Ritchie	UK
Birmingham	Graham Farrington	UK
Brent	Giles Speed	UK
Brent & Harrow	Neil McLaughlin	UK
*Croydon	Alan Philips	UK
Hampshire	Kevan Morley	UK
*Kingston	E.R. Forsyth	UK
*Kingston	Leon Livermore	UK
Lancashire	Paul Heward	UK
*Lancashire	Gillian Glover	UK
*Leicestershire County	Karen Nolan	UK
Liverpool	Robin Croft	UK
*Oxfordshire	Linda Akers	UK
Redcar & Cleveland	Howard Turton	UK
Walsall	Mr Deakin	UK
Warrington	Neil Shillan	UK

Overseas

HTN-Elektrogeräte	Gerhardt Greifeneder	Austria
CRIOC (EHLASS)	Mrs Carine Renard	Belgium
C.S.C. (as CSU in UK)	Mr de Monck	Belgium
Ministry of Economic Affairs	Mr van der Cruyssen	Belgium
Ministry of Energy (Elec)	Mr Heschbeuler	Belgium
Department of Health	Mrs Lene Schiebel	Denmark
University Hospital (Burns)	Vivi Torbin	Denmark
University Hospital (Burns)	Dr S Sheller	Denmark
C.S.C. (as CSU in UK)	Mrs R Loosle-Surans	France
C.S.C. (Elec)	Mr Majneau	France
L.N.E. (National laboratory)	Daniel Courtnele	France
Bauerhin Elektrowärme	E.Seidel	Germany
Beurer	Mrs Grieger	Germany
C.P.I.	P-F Benucci	Italy
Centro Tessile Cottoniero	Cristina Cassani	Italy
Technica Tessile	Alessandro Cerretini	Italy

*Technica Tessile	Alessandro Cerretini	Italy
*Technica Tessile	Massimo Cerretini	Italy
*Imetec	Arturo Morgandi	Italy
*Imetec	Graham Cole	Italy
Imetec	Elinor Borsio	Italy
C.S.U.	Dirk van Ahen	Netherlands
C.S.U.	René Ulgerah	Netherlands
C.S.U.	Thea Mooiy	Netherlands
General Inspektorate (Elec)	Jan van Leyndt	Netherlands
Institute of Public Health	Marie Tosler	Norway
Product & Electrical Safety	Viv Solverod	Norway
C.P.S.C.	Jim Hoble	USA
C.P.S.C.	Aaron Banerjee	USA
*C.P.S.C.	Aaron Banerjee	USA
*Independent Attorney	David Baker	USA
*Product Safety Letter	S Tilley	USA
*Sunbeam	Rik Prins	USA
*Underwriters Laboratories	Gordon Gillerman	USA

Other

AMDEA	John Humphries	UK
Assoc Directors Social Services	Jeremy Ambache	UK
BEAB	Mike Vint	UK
ERA (blanket testing)	Clive Trunkfield	UK
GEMs (blanket testing)	Steve Jones	UK
Gfk Marketing Services	Steve Lowe	UK
HSE	David Wynn	UK
Home Office Fire Statistics	Patrick Collier	UK
Home Office Fire Statistics	John Gamble	UK
ITSA	Sandy Driscoll	UK
Loss Prevention Council/FPA	Alison Vyse	UK
ONS	David Dix	UK

25 trading standards offices provided results of electric blanket testing -

Bedford	Merton
Bexley	North West London Co-ordinating Group
Devon	Oxfordshire
Dorset	Redcar & Cleveland
Dundee	Plymouth
Enfield	Powys
Gloucester	South Tyneside
Hampshire	Suffolk
Humberside	Wandsworth
Isle of Wight	Warrington
South London Co-ordinating Group	Warwickshire
Lancashire	West Sussex
Leicestershire	

10.2 Details of Internet search

A search was made of the Internet using a number of search engines such as Yahoo, Infoseek and Alta Vista on electric blankets and the following articles provided information of interest to the research.

9/9/98	Are electric blankets safe?	Pittsburgh News	USA
19/6/98	Sunbeam recall of electric blankets	Sunbeam Corporation	USA
5/5/98	Reply to electric blankets	Fire Findings Exchange	USA
17/4/98	Electric blanket fire details	Fire Findings Exchange	USA
14/4/98	Electric blanket fire details	Fire Findings Exchange	USA
10/3/98	Home fires scorch insurers for £250m	BBC News Online	UK
11/2/98	Warning of electric blanket hazards	Hartford Consumer Protection	USA
1998	Bedroom hazards	Florida Fire College	USA
19/9/97	Can you sleep safe at night?	W.Sussex Co Council	UK
17/5/97	Don't get hot wired	Inman News	USA
26/3/97	Cleaning up your house after a flood	Minnesota University	USA
27/2/97	Protecting the Community	Suffolk County Council	UK
1997	Gently launder electric blankets	Whirlpool Corporation	N/a
1997	Safety at home and out of doors	Benton Elec Association	USA
1997	Preventable tragedies	Homesafety, Hereford	UK
1997	Sicurezza dal fuoco delle coperte elettriche	L.A.P.I.	Italy
14/9/96	Advice for the Elderly	Gter M'chester Fire Serv	UK
15/7/96	Think safe - children & fire safety	Homesafe	Australia

1996	Automatic electric blankets	E.E.A. Factsheet	USA
1996	Making electric blankets safer	The Trading Standard	UK
21/10/93	EC bans warm electric blankets	E. Anglian Daily Times	UK
10/1/92	Electric blankets - care & laundering	Michigan State University	USA
N/a	Electric blanket care & safety	Southpower	N.Zealand
N/a	Fire Safety Messages	National Safety Council	Ireland
N/a	Safety in the bedroom	Newcastle City Council	UK
N/a	Safe use of electricity	FNQEB	Australia
N/a	On the safety circuit	Dallas Fire Department	USA

In addition there were several articles regarding the exposure to magnetic fields from electric blankets which are available if required, but are not of direct interest to this study.

10.3 Reports and other literature consulted during the research

Heating folded electric blankets	Stanger/London Fire Brigade 1997
Fires in the Home in 1995	British Crime Survey 1996
Fires in the Home in 1992	British Crime Survey 1993
Fatal fires in the West Midlands 1996	West Midlands Fire Service
Fatal fires in the West Midlands 1993-4	West Midlands Fire Service
Fatal fires in the West Midlands 1992	West Midlands Fire Service
Fatal fires in the West Midlands 1991	West Midlands Fire Service
Is your electric blanket safe?	Which? report 1996
Electric blanket accidents 1977-1983	CSU/AMDEA/BEAB
Checks highlight blanket peril	Trading Standards Review Oct 1998
Electric blankets undercover action	Electrical and Radio Today 27/8/98
New blankets no fire threat	Electrical and Radio Today 12/11/98

10.4 Internet pages of interest

10.4.1 Electric Blankets-Care and Laundering

Michigan State University Extension
Home Maintenance and Repair - 01500195
10/01/92

Care

- Read the manufacturer's instructions before using the blanket.
- Do not use an electric blanket for an infant, handicapped person or one who is insensitive to heat.
- Keep small children and pets away from the blanket. It is an electrical appliance that can be damaged.
- Turn off the blanket when it is not in use.
- Do not tuck-in, bunch-up, or fold over the wired area of the blanket.
- Do not lie on top of an electric blanket with the control on because there is a possibility of getting burned or damaging the electrical wiring.
- Do not use pins, they may damage the wiring.
- Do not dry-clean electric blankets; follow manufacturer's care instructions.
- To prevent damage to wiring, never store anything heavy on top of blanket, and never put moth repellents in with it.

Laundering

Laundering an electric blanket is as easy as laundering a regular blanket. Follow the specific manufacturer's care instructions for best results.

Machine wash for a limited period of time; generally one to five minutes is suggested. Dissolve detergent in the suggested water temperature before placing the blanket in the washer; do not use bleach. Evenly distribute the blanket in the washing machine. Use a regular cold water rinse and spin cycle. If a conventional washing machine is used, do not use wringer to extract the water.

OR

Hand wash by soaking the blanket for 15 minutes in detergent and lukewarm water. Squeeze the suds through the blanket. Rinse in cold water at least twice. Do not vigorously twist or wring the blanket.

Machine dry by preheating the dryer at medium temperature. Add the blanket and allow it to tumble dry for ten minutes. Most manufacturers suggest the damp blanket finish drying

by draping the blanket over two parallel lines. Use both hands to straighten and pull into shape.

Electric mattress pads and footwarmer pads probably can be washed in similar manner, BUT follow directions on care tag that came with the articles.

This file was generated from data base 02 on 03/09/98. Data base 02 was last revised on 10/01/92. For more information about this data base or its contents please contact cook@msue.msu.edu .

10.4.2 Fire Findings Exchange April 17th 1998

Re: Electric blankets

[Follow Ups] [Post Followup] [Fire Findings Online Message Board]

Posted to Al Graps on April 17, 1998 at 08:04:19:

In reply to: Re: Electric blankets posted by A1 Graps on April 17, 1998 at 07:50:59:

:I investigated an electric blanket fire several years ago.

The cause was that the blanket was left "on" in an unmade bed, bunched and folded over under a comforter. The blanket had been washed numerous times and the heater wires had had an opportunity to coil in the loose basting thus concentrating the heat. The blanket was a relatively "hot" : 360 Watts. Most blankets range 75-150 Watts. In addition to the dual heat controls the blanket also contained a sensor module that indicates a break in any of the heater wires. The fire started at or near the sensor module, which was in the bunched up area of blanket. The sensor module function or contribution to the fire could not be accurately determined.

The blanket had been purchased from a discount store with the only mfg information: for service send to Blanket Service Station, Waynesboro, Mississippi."

qtm.net/fireiind/mboard/messages/785.html 09/09/98

10.4.3 Fire Findings Exchange May 5th 1998

Re: Electric blankets

[Follow Ups] [Post Followup] [Fire Findings Online Message Board]

Posted by Jack Bandy on May 05, 1998 at 17:33:58:

In reply to : Electric blankets posted by Dave Hallman on April 14, 1998 at 10:54:08:

My home burned down on 2-09-97 due to an electric blanket. It was a new Sunbeam that was 3 months old and was never washed. My 12 year old son was in the bed at the time the fire started and was burned. The blanket was bought from a discount store and returned originally because it wouldn't heat up. When it was returned there were another couple returning their blanket for the same reason. Our blanket was replaced and 3 months later our home was destroyed because of that blanket which was a Sunbeam queen dual control model. If anyone has information that can help my family as far as similar cases please contact me [.jbandy@cncnet.com](mailto:jbandy@cncnet.com)

:I have several electric blankets that have caused fires. Consumer Products Safety Commission to recalls on any electric blankets.

:Does any one have information on fires caused by an electric blanket, especially Sunbeam?

:I think that there have been several lawsuits on this matter.

Posted 1

Link URL www.qtm.net/firefind/mboard/messages/831.html 09/09/98

10.4.4 Sunbeam recall factsheet for electric blanket 1998

- Sunbeam is voluntarily recalling all production of an electric blanket with a new type of safety circuit. In these 53,000 electric blankets, identified as Model 602, the heat-sensing safety circuit could malfunction, potentially resulting in a fire.
- Sunbeam has discontinued production of Model 602 electric blankets.
- No other Sunbeam electric blanket products are affected by the recall. All other Sunbeam electric blanket products utilize a different type of safety circuit, which Sunbeam has used for many years, and they are not affected by the recall.
- The recalled blankets were sold only during the Winter of 1997-98, and were sold primarily in three stores: Bradlee's in the Northeast, and Kohl's and Hills, primarily in the Midwest. In addition, blankets marked as second quality were sold under the name "Arlington" to various discount retailers.
- Sunbeam has received three consumer complaints, which may have resulted from a malfunction of the safety circuit. In one case, there was a minor personal injury.
- Model 602 blankets can be identified by green lettering on the label, which is at the foot of the blanket. The model number is in the lower left corner of the label. Model 602 blankets were sold in twin, full, queen and king sizes in a variety of colors.
- Specific Model Numbers Are As Follows: Twin Size 88460-602 Full Size 88472-602 Full (Dual Control) 88473-602 Queen Size 88484-602 King Size 88400-602
- All Sunbeam electric blankets are designed to shut off automatically if a problem develops with the wiring. The blankets being recalled had a new heat-sensing safety circuit, which was designed to also detect external safety hazards, such as smoking in bed.
- Sunbeam is offering consumers their choice of a replacement blanket with the traditional safety circuit or a full refund. To participate in the recall, call your Sunbeam customer service representative toll-free at (800) 440-4668.

Sunbeam Home Page Press Release Fact Sheet Frequently Asked Questions Shipping Information. <http://www.zacks.com/IW/html/annual/soc/fact.htm> 09/09/98

10.5 Results of the National Poll

A national poll was undertaken between September 23-27th 1998 by RSGB/Taylor Nelson AGB among a representative sample of 1000 adults, male and female aged 16 or more. 23% of adults interviewed used electric blankets in their household, with an average of 1.5 electric blankets. There are about 23.4 million households in the UK, and the national poll suggests therefore that there are about 8 million electric blankets in use in UK households.

Usage of electric blankets was spread across the socio-economic classes and ages. However 34% of the elderly interviewed had one or more electric blankets compared with only 20% of the rest of the population in the sample. The highest usage of electric blankets was in Greater London, South East and South West.

Table 10.5-1

Average age of the electric blanket	Percentage
0-5 years	67%
6-9 years	18%
10 or more years	15%
Total in use	100%

Source: RSGB national poll.

The above table indicates that the average age of blankets (based on consumer perceptions) is about 6-7 years.

81% of consumers interviewed using electric blankets said that they never left them on all night. 11% rarely did, and 7% left them on often or very often. 85% of consumers interviewed using electric blankets said that they had never had their electric blanket tested. 13% had had them tested, and 2% did not know.

10.6 Home Office statistics for electric blanket fires 1985-1996

Table 10.6.1 Table of electric blanket fires 1985-1996

Fires	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Faulty appliances/leads	1257	1300	1209	951	763	649	767	662	637	634	520	576
Misuse of equipment	787	631	597	473	417	425	389	300	317	344	203	185
Faulty fuel supply	8	13	15	1	2	0	0	1	1	1	5	2
Careless handling fire/hot substance	0	2	2	0	2	0	0	1	0	0	0	0
Placing too close to heat	4	6	3	1	1	0	1	1	2	0	0	0
Other accidental causes	54	43	39	43	22	27	42	36	31	32	44	44
Dk/unspec	7	5	4	3	1	2	0	2	3	1	7	9
Subtotal	2117	2002	1869	1472	1208	1103	1199	1003	991	1012	789	816
Excluded - playing with fire	1	2	1	1	0	1	0	0	0	0	1	0
Total	2118	2002	1870	1473	1208	1104	1199	1003	991	1012	780	816

Table 10.6.2 Table of fatal injuries 1985-1996

Fatals	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Faulty fuel supply	1	0	0	0	0	0	0	0	0	0	0	0
Faulty appliances/leads	21	26	15	16	11	13	13	11	13	9	13	16
Misuse of equipment	6	15	9	6	6	5	7	5	6	4	2	1
Placing too close to heat	0	0	0	0	0	0	0	0	0	0	0	0
Other accidental causes	1	3	4	1	0	3	2	0	1	1	1	2
Dk/unspec	3	2	0	0	0	0	0	1	0	1	1	0
Total	32	46	28	23	17	21	22	17	20	15	17	19

Table 10.6.3 Table of non-fatal injuries 1985-1996

Non Fatals	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Home Office	N/a	331	300	252	228	243	281	243	265	293	249	262

Note: the table for non fatal injuries 1985 Home Office Fire Statistics is not available.

10.7 HASS/LASS AND HADD data

A search was made of HASS and LASS cases 1985-1996 under the category, electric blanket. A cross check of categories bedding, beds, and electrical wiring was made for 1990 and 1995 and no additional cases were found. The cases were multiplied by the national multiplying factor (n.m.f.) for each year and where cases were only collected for England and Wales (1985-1989) increased by 13% for the total UK population. This provided a

gross figure per annum of electric blanket non fatal injuries as shown in the table below. The number of cases per annum is very small, and therefore the total figures shown provide an indication of the number of injuries and trends and are not statistically valid.

The deaths database (HADD) was search for fatalities due to electric blankets 1985-1995. Records for 1993 and 1994 are believed to represent two-thirds of fatalities, and figures have been increased by a third to take this into account. 1995 records are also known to be inaccurate, and as the number of records (9 fatalities) is the same as in 1993 and 1994, figures for 1995 have also been increased by a third.

Table 10.7.1 Calculation of non-fatal injuries

Year	Cases	x n.m.f.	Eng/Wal	Total UK pa
1985	19	x 21.5	408.5	462
1986	12	x 20.1	241.2	273
1987	16	x 19.6	313.6	355
1988	12	x 17.7	212.4	240
1989	8	x 18.3	n/a	146
1990	15	x 18.6	n/a	279
1991	10	x 19.0	n/a	190
1992	10	x 22.1	n/a	221
1993	6	x 24.85	n/a	149
1994	10	x 20.37	n/a	203
1995	8	x 18.28	n/a	146
1996	25	x 19.21	n/a	480

Table 10.7.2 Table of HASS non fatal injuries caused by electric blankets

Non - Fatals	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Caught fire	365	136	155	180	92	130	114	133	50	61	55	192
Smouldered ¹	49	0	66	0	18	18	19	0	0	0	18	58
Heat contact ²	24	46	89	20	18	56	19	0	0	20	18	38
Overheated ³	0	0	22	20	0	0	0	22	0	0	0	0
Electrocution	0	0	0	0	0	0	0	0	0	0	0	38
Subtotal	438	182	332	220	128	204	152	155	50	81	91	326
Trips ⁴	24	68	22	20	0	56	38	66	99	102	55	154
Other exclusions ⁵	0	23	0	0	18	19	0	0	0	20	0	0
TOTAL	462	273	354	240	146	279	190	221	149	203	146	480

Source: 151 HASS/LASS cases 1985-1996

Note: a search of LASS statistics disclosed no electric blanket non fatal injuries.

1 Smouldered - the electric blanket was giving off smoke but that there is no suggestion in the case description as to whether the electric blanket actually caught fire.

2 Heat contact - the injured person has usually lain in contact with a hot electric blanket causing a burn often to their leg similar to that caused by lying next to a hot water bottle.

3 Overheated - the electric blanket has overheated and it is not known whether it caught fire/smouldered

4 Trips - the injured party falls over the electric blanket or its cable, and no fire is involved. These accidents are excluded from the remit of this research study.

5 Other exclusions (4 cases 1985-1996 out of a total of 151 cases) are mattress, splinter, hot water bottle and bath.

Table 10.7.3 10.7.3 Table of HADD fatal injuries caused by electric blankets

Fatals	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Fatalities	20	7	16	19	14	13	12	7	12	12	12	

Source: HADD cases 1985-1995

Note: figures for 1993-1995 have been increased by a third to take account of underrecording as outlined in the report.

10.8 Assessment of age of blankets involved in fires

Details of electric blankets involved in fires, where known, taken from 1994 HASS database and examination of recent fire reports at Fire Brigades were assessed by ERA Technology for the likely age of the blankets involved. The blankets below account for 130 fires as some models were mentioned more than once. Analysis shows that at least 97% of fires were caused by old blankets which were made before 1991 and were aged from probably 10 to 35 years old. x = manufactured prior to 1991.

Details provided	Probable date	Comments	Made from 1991
Aristocrat	Pre 1972	No overheat protection	X
Blanella	Pre-1985	Name used up to 1985	X
Blanella Cozee	Pre-1985	Name used up to 1985	X
Crater	Liquidated 1980	Unprotected	X
NS41		Unprotected	X
Cozee Cumfort JD3	1974	Unprotected 1974	X
Dreamland CO2H	1990-1992	Probably incorrect insertion of connector	Possible
Dreamland DS11	1972-1976	Unprotected	X
Dreamland DS12	Pre 1972	No overheat protection	X
Dreamland DL14	Pre-1968	No overheat protection	X
Dreamland double p2	Pre 1966		X
Dreamland DM32	Pre 1972	No overheat protection	X
Dreamland FD 130w	Pre 1966	No overheat protection	X
ELECTRA NOB 8/DD	Pre 1980		X
Interwarm double LAD	1978	Unprotected	X
LDK Ltd 4 poster	Pre 1970	No overheat protection	X
Monogram ga62/63	Pre 1976	Full overheat protection	X
Monogram GAG2	Pre 1985	Full overheat protection	X
Monogram u/b 240v	1971 to 1998	Fire records suggest old blanket	X
Morphy Richards	1970s	Manufacturer to 1970s	X
Northern	1960-1990		X
Northern 223	Pre-1988		X

Northern 0512	Pre-1988	Unprotected	X
Northern Star	Pre-1988		X
Northern type B		Overblanket ineffective overheat protection	X
Northern type SH1	Pre-1988		X
No 5011	1960-1990	Northern	X
Phillips	1964-1990		X
Phillips HL2243	1975		X
Phillips HR22226	Pre-1973		X
Phillips Pre-heating	Pre-1988		X
Phillips Type HL	Pre-1988		X
Pifco Nighttime	1970s	Unprotected	X
Pifco 8464	Pre-1988		X
Pifco 62/486493	Pre-1988		X
Pifco 6442	Pre 1988		X
Sunbeam model 110	1970s	No overheat protection	X
Sunbeam model 1/PTC	1986	Overblanket	X
Superheat 3 way	Pre-1971	Probably Slumberheat	X
Swan Cygnet	Pre-1970	No overheat protection	X
Thermalux	1970s	Unprotected	X
Warmalux	1968-1997	Beecroft name	Possible
Warmalux I.DB3P	1983	Protected	X
Winterwarm SINGLESAS	mid 1970s-mid 1980s	Late models protected	X
Winterwarm (Blapo/Dalpo)	mid 1970s-mid 1980s	Late models protected	X

10.9 Findings of overseas research and Internet/literature search

The following findings are based on an Internet/literature search, telephone discussions with 24 respondents among electric blanket manufacturers, consumer safety units and other organisations in nine EU countries and the USA, and face-to-face interviews with two key organisations in Italy.

10.9.1 Electric blanket sales and trends in Europe

Table 10.9-1

Sales of electric blankets	1997
UK	800,000
Germany	400,000
Italy	350,000
Netherlands	150,000
France	150,000
Spain	150,000
Scandinavia	50,000
Austria	50,000
Rest of Europe	150,000
Total sales	2,250,000

Source: discussions with electric blanket manufacturers.

The UK is by far the largest user of electric blankets in Europe, followed by Germany and Italy. Sales of electric blankets in most countries are thought to have fallen steadily over the last 10-15 years, probably as a result of a growth in the installation of central heating systems in homes that results in a reduced need for electric blankets in the bedroom. One exception is Italy, where sales are thought to have been constant over the last 10-15 years, partly to due to strong advertising creating a need for these products.

It is interesting to note that very cold countries, such as Scandinavia, use few electric blankets, mainly because most homes are well insulated and have central heating. However, usage of electric blankets is relatively higher in 'warmer climates' such as Italy, and to a lesser extent France and Spain, and furthermore, usage is thought to be higher in the south than in the north. The main reason is these homes are designed to remain cool in the height of summer and are often not well insulated for winter, which can be quite cold in some areas.

In most countries about 90% of the electric blankets currently sold are underblankets, the two main exceptions being Spain and France, where it is claimed that most blankets used are overblankets. Overall, it is estimated that about 1.9m underblankets are sold annually, compared to 0.35m overblankets.

10.9.2 Electric blanket lifetimes and numbers in use

Electric blanket manufacturers believe that blankets in continental Europe are replaced on a more regular basis than in the UK. Consumers usually throw away their electric blankets after 5-8 years as they want a new clean one, and it is not considered an expensive purchase, whereas in the UK consumers are believed to keep them for at least 10 years and often longer. Estimates of consumer habits in three countries suggest that the average lifetime in Italy and Germany is probably about 7-8 years (7.5 years used) compared to about 10 years or possibly higher for the UK (10 years used for this comparison). This data is used with average sales levels, to provide estimates of the total number of electric blankets in use. When normalised to compare usage per million population, the table below indicates that the usage of electric blankets in the UK is about three times greater than in other countries (similar analysis suggests rates of 20-65 blankets per 1000 population for other countries).

Table 10.9-2

	Germany	Italy	UK
Average sales (last 10 years)	600,000 <i>(800,000 falling to 400,000)</i>	400,000	850,000 <i>(1,000,000 falling to 800,000)</i>
Average lifetimes	7.5 years	7.5 years	10 years
Total electric blankets in use	4.5m	3.0m	8.5m
Population	80.6m	56.9m	58m
Estimated number of electric blankets used per 1,000 population	56	53	145

It is worth noting that the above estimates of electric blankets in use in the UK (8.5m) compare favourably with the estimate derived from the omnibus poll (8m).

10.9.3 Perceived levels of accidents caused by electric blanket fires

Nearly all respondents interviewed in Europe (outside the UK) could not recall any incidents involving electric blanket fires in recent years. This may be due to the lack of statistics available. However, LAPI (Laboratorio Prevenzione Incendi) in Italy, a laboratory that specialises in fire prevention studies, has produced a report on the fire safety of electric blankets. The author found that even in the small province of Prato, several serious electric blanket fires (5) were reported by local newspapers in one month alone in 1995. In addition, Studio Technica has collected several other newspaper cuttings on electric blanket fires. No estimates of electric blanket fires are possible from these two small sources of information, but preliminary analysis would appear to indicate that a fire problem possibly exists in Italy as well as the UK. However, further research would be necessary to identify the scale of the problem, as well as the age of electric blankets involved in fires.

Despite the lack of accurate accident information outside the UK, it is generally believed

that the number of fires caused by electric blankets is considerably higher in the UK than other countries such as Germany and Italy. One of the main reasons (as shown in the above table) is that usage of electric blankets is about three times higher for the UK than Germany and Italy, the two other main users of electric blankets. Several other reasons were given that are thought to contribute to electric blankets being safer on the continent than in the UK. The main factors are given below in approximate order of importance.

1. Continental electric blankets are generally of stiffer construction than in the UK, and are often described as 'ruck resistant'. This makes it harder to create folds in the blanket, where several wires can overlap and cause local overheating, in the worst case resulting in a fire.
2. UK blankets are not ruck resistant. They also require the use of tie tapes. It is thought that many consumers do not bother to tie the blanket in practice, and if tied too tightly, local deformation of the blanket can sometimes damage the heating elements.
3. UK blankets are traditionally made of non-woven fibres, which can lose up to 15-20% of their bulk as the fibres flatten with usage, making the electric blanket even more prone to rucking, and hence risk of over heating. Loss of bulk means that overlapping wires are also closer together. In addition, the soft fibres are more prone to separate (due to mechanical wear and tear) and hence expose the wiring compared to continental blankets, which usually have a durable woven polyester covering.
4. Continental electric blankets are thicker and stiffer, and can only easily be folded two to three times, whereas UK blankets are much more flexible, and are usually folded several times or sometimes 'screwed-up' and are thus more prone to damage.
5. Although the nominal voltage across Europe is 230 volts, in practice, the UK is often at 240 volts (or higher) but Italy is usually 230 volts. This difference in voltage results in UK blankets operating at 15-20% higher power in practice than an identical product used in Italy.
6. It is thought that very few consumers on the continent sleep with the blanket on all night, whereas many UK consumers are now thought to use the all-night mode.
7. Dual protected elements were developed as a way of reducing the number of electric blanket fires occurring. The first system developed was a PVC/PVC system. It is believed that the PVC ages over time, and this aging process can contribute towards electric blanket fires, especially in cases of old blankets exposed to severe mechanical abuse.

Two respondents felt that electric blankets used in France are of a lower safety standard compared to other European countries, although the problems are different, since France mostly uses overblankets rather than underblankets. However, no specific reasons for the lower safety level were given.

Respondents also mentioned a couple of safety innovations that have been introduced on the continent. Firstly, detachable plugs that have a safety clip, which makes it very difficult for the plug to become loose and arc locally. Secondly, the wire at the plug exit has an

additional anti-flex protection that prevents the cable from undue flexing, which can result in the wires becoming exposed in cases of extreme mechanical flexing.

10.9.4 Other electric blanket safety innovations being developed

Research has been carried out in Italy to assess the viability of producing a low voltage electric blanket. Operating at 6 or 12 volts, the main benefit is the elimination of risk of electric shock/electrocution, although it should be noted that in the UK electric shock accounts for very few non-fatal injuries (12%) and no deaths. There is debate whether or not the low voltage blankets would greatly reduce the fire risk, since they operate at much higher currents in order to produce the same power output. However, the designers claim that low voltage blankets are more efficient at dissipating the heat to the blanket and lower operating temperatures are required (ie 40-45°C compared to 60-65°C normally).

One system has been developed (with all the necessary approvals) based on a grille of carbon fibres (derived from technology used to heat car seats). Prototypes have been developed, but to date no manufacturers have gone to the production stage. A second system has been developed that is based on the use of metalised fibres finely distributed within a non-woven fabric. One perceived benefit is that it is able to provide immediate heat rather than needing to warm up (heat needs to dissipate from the wire to the surrounding blanket material in traditional electric blankets). However, one acknowledged drawback is that non-woven fibres have less mechanical resistance than traditional woven fibre blankets. This second product is at the material design stage, but no prototype electric blankets have been developed to date.

Low voltage blankets are expected to cost more than traditional blankets (possibly 35-50% more) and would be targeted at the upper end of the market (where consumers are more likely to pay extra for the latest technology/additional fire safety) as well as specialist applications such as boating or camping, where the blanket could be operated by using a battery.

However, it should be noted that low voltage blankets have not been produced commercially, and further research would be required to ascertain whether or not in practice they offer a greater level of fire protection than traditional blankets, the latter being considered extremely safe by electric blanket manufacturers, especially if they have reliable overheat protection systems based on dual PVC/PE coated wire element system.

10.10 Electric blanket sales and trends in North America

10.10.1 Total usage patterns

It is estimated that about 50 million electric blankets are in regular use in the USA, ie 1.6 blankets per hundred thousand population, which is a similar usage level to the UK (approximately 1.7 blankets per hundred thousand population). Overblankets are very

popular in the USA, accounting for about 85% of sales (and over 90% of all blankets used) with underblankets accounting for about 15% of sales.

The average age of an electric blanket is thought to be around 10 years. Some blankets used are 15-20 years or older, but most are thought to be changed every 7-8 years. This is mainly because they are overblankets which are visible and are changed when they look worn or as a fashion issue if the room is being redecorated, rather than because they no longer function as a heating device.

10.10.2 Trends in sales of electric blankets

Table 10.10-1

	1980	1990	1998
Overblankets	5.0 million	4.0 million	3.0 million
Underblankets	0.4 million	0.5 million	0.5 million
Total electric blanket sales	5.4 million	4.5 million	3.5 million

Source: executive interviews

Annual sales of electric blankets have fallen over the last 10-15 years. One of the factors that helped sales of electric blankets in the 1970s was the oil crisis and hence the promotion of energy saving measures. During the 1980s oil shortages were no longer an issue of major concern in the USA. In addition, there has been a very strong growth in sales of duvets over the last 10 years, and it is thought that many consumers with duvets no longer require additional heat provided by electric blankets. Sales of electric blankets are generally higher (per million population) in the South compared to the Northern states.

There is also a significant market for foot warmers and throw-overs, both used mainly while watching television, but these products have been excluded from the above estimates and following analysis.

10.10.3 Trends in electric blanket design

Electric blanket fires were an issue of serious concern in the late 1970s and early 1980s. Accurate data on fires and associated injuries is not readily available, but it is thought that the number of fires has fallen by a factor of between 5-6 over the last 10-15 years. The main reason for the fall in fires is attributed to the change from electric blankets with thermostats to the development of new 'positive temperature coefficient' (PTC) wire system, which involved an electrically conducting polymer. Two parallel wires are bound into a polymer (bone shaped in cross section). This is wrapped in a cotton sleeve, which is sewn into the electric blanket (one benefit being this does not allow the wires to move about within the electric blanket). If local overheating occurs, the electrical conducting property of the polymer changes and less electrical power passes between the two wires.

Since about 1988 all overblankets have been designed based on the PTC system, and most underblankets as well. However, it is possible that a small number of underblankets which are sold (about 50,000-100,000 a year) are made using a sensing wire overheat protection system similar to those used in the UK.

One key safety advantage of the PTC system is that over time the polymer ages, and less power is conducted through the polymer separating the two heating element wires. (Tests conducted by CPSC suggest that if the blanket is placed in a heat proof box, the equilibrium temperature of blankets that are about 10 years old is often 10-20°C cooler than for new blankets. This results in the blanket getting cooler over time (typically starting after 5-10 years depending on the level of usage). Although some customers complain to the manufacturers, it is likely that many simply accept that, after about 10 years, it is time to buy a new blanket. From a safety point of view, this trend over time is a 'safe' mode of failure, since the power output over time decreases, thus reducing the likelihood of a fire developing. It also acts as a possible trigger, influencing some consumers to replace blankets earlier than they would normally.

Manufacturers recommend that electric blankets are line dried (if washed) since hot dryers can expose the blanket to high temperatures that will age the polymer (and thus shorten the life of the blanket).

10.10.4 Trends in fires/injuries involving electric blankets

There are no accurate data available showing the number of fires or injuries in the USA, involving electric blankets. Manufacturers are notified of about 50-75 fires a year, some of which are clearly not due to the electric blanket. CPSC believes that there are at least 100-150 fires a year (based on the number of cases brought to its attention through consumer complaints, press cuttings etc), and at least 1 fatal injury a year involving electric blanket fires. The data on fatal injuries are likely to be more accurate than fires. A very approximate view was that about half the fires involve blankets with PTC systems and half with thermostat controls. However CPSC is concerned at the number of electric blanket fires (although not unduly at present due to the lack of accurate accident data). It is currently investigating the problem, and accurate data may be available by mid-late 1999.

About 85% of the fires (involving blankets with PTC heater elements) occur at the foot of the bed, in or around the control box/external wire connector (which is usually at the foot of the bed since most blankets are overblankets). It appears that the most common reason for these fires is damage to the cord at the exit point of the junction box, often caused by the external lead being tucked in between the bed base and the mattress or trapped under the corner foot of the bed. As the sleeper turns during the night, the stresses on the cable are greatly increased if one end is trapped (confirmed by laboratory tests). Damage to the circuitry inside the PC boards of the junction box, and the connections between the heating elements and the junction box were also mentioned.

Other fires (involving PTC blankets) involve direct short circuits, where the heating wires have become twisted and/or pinched, or damage to the heating elements in the blanket due to mechanical abuse.

Although it is not known how many fires actually occur in practice, CPSC feels that the investigation may show that it could be as high as 5 times the above estimates, or possibly higher. If an upper limit of 1000 fires a year is used, it would suggest a level of 3.3 fires per million population (pmp) which is less than a quarter of the level in the UK (about 14 fires pmp). (It should be noted that it is thought likely that a high proportion of these additional fires would be thermostat control blankets (15+ years old) rather than PTC system blankets.

This rather approximate analysis supports the consistent qualitative opinion of respondents in the USA that the PTC system is significantly more safe than the sensory wire system used in the UK (where the polymers fail in an 'unsafe' mode and require the back-up of overheat protection devices), although it does have a different safety issue to address, ie the number of fires at the foot of the bed in/around the junction box.

10.10.5 Future product design trends

Manufacturers have improved the design of the wire flex at the point of exit from the control box which now have flex guards to reduce the stresses on the external wires, and thus hopefully reduce the number of electric blanket fires in the future. Manufacturers are also stressing in product literature and operating instructions the importance of not trapping the external lead. However it is thought that these warnings will have limited impact in practice, since it is believed that few people actually read the instructions, especially if buying a replacement blanket, because of the 'I know how these work' mentality.

10.10.6 Conclusion

The qualitative view of respondents in the USA is that although both systems involve polymers that are susceptible to ageing over time, the PTC system used in the USA is intrinsically safer than the sensory wire/overheat protection system used in Europe.

The PTC system fails in a 'safe' mode since the change in the polymer reduces the amount of power conducted by the polymer. However the sensory wire system relies on the internal polymer melting and causing a short circuit between the two heating elements, and the melt temperature usually increases over time (generally quickly for PVC and slowly for PE, although the ageing speed will depend on the type of PE used). Hence this is a potentially 'unsafe' failure mode, since in the worst instance, the melt temperature can exceed the ignition temperature of the surrounding bedding material and result in a fire.

However the above view excludes the problems experienced in the USA with fires in/around the junction box at the foot of the bed, which are less likely to occur in Europe, since underblankets are preferred to over blankets.

An additional safety benefit of the PTC system is that after about 10 years of moderate to high use, the ageing of the polymer tends to result in a reduction of the heat performance of the blanket. This in turn may influence consumers to change their blankets at an earlier date than if they waited for the blanket to fail (ie stop heating altogether), thus potentially reducing the number of older appliance (ie > 10 years old) used by consumers.

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