



**SINGLE/DOUBLE SUMMER TIME  
POSITION PAPER**

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## INTRODUCTION

For many years there has been a debate about the advantages and dis-advantages of Britain changing its system of time-keeping to Single/Double Summertime (SDST). RoSPA, and many other organisations, have long supported such a change because it would reduce the number of people killed or injured in road accidents. However, other groups have opposed the change because it would increase dark mornings, and some argue, it may increase accidents.

This paper explores the history of timekeeping in Britain and the rest of the World and the arguments for and against a move to Single/Double Summertime in the UK.

In the UK, clocks follow Greenwich Mean Time (GMT) from October to March each year and are set forward one hour to British Summer Time (BST) which is GMT + 1 hour from March to October.

GMT is the local mean solar time of the longitude of the former Royal Observatory at Greenwich. The Greenwich meridian – the imaginary line to indicate this longitude – was designated the prime meridian in the late nineteenth century and is used as the basis for the world's standard time zone system. Standard time becomes successively one hour earlier at each 15 degrees longitude east of the Greenwich Meridian and one hour later at each 15 degrees longitude west.

However, two countries may be on the same meridian but adopt different time zones. For example France is in the same meridian as Britain but has adopted Central European Time to align itself with the countries that border it. The majority of European countries lie within the Central European Time Zone, which is one hour ahead of GMT in winter and 2 hours ahead of GMT in summer i.e.: always one hour ahead of Britain.

Single/Double Summertime in Britain would mean that the clocks would still be advanced in March and retarded in October each year but during winter, time would be GMT+1 and during summer, time would be GMT+2. This would put Britain into the Central European Time Zone. To achieve SDST, the clocks would not be put back in October of year 1 and then would be advanced again in March of year 2 by an hour and then would be retarded in October of year 2 by an hour. This would then continue each year thereafter.

The introduction of Single/Double Summertime (SDST) does not increase the number of daylight hours in each day (this depends on the degree to which the earth tilts towards/away from the sun during the year) but it would affect the use of the daylight hours available.

## **'Summertime' in other countries**

### **Europe**

Western European countries, like the UK, now adopt Summertime, moving their clocks forward at the end of March and back at the end of October.

Many countries adopted it during the First World War, abolished it between the Wars but reintroduced it during the Second World War. Summertime in Italy was adopted in 1966 to attract tourists and improve road safety. Countries such as Greece and Finland also change the clocks in March and October but are not in the Central European Time Zone. Instead they are two hours ahead of Britain throughout the year. Russia keeps Summertime in Winter and Double Summertime in Summer. Israel has Summertime (early Friday in Spring to early Sunday in Autumn).

### **North America**

The USA also adopts a system of summer time which currently starts a week later than Europe but finishes on the same day. However, the changes are made at 2 am local time (but not in much of Arizona, in Hawaii, or most of southern Indiana; and not in non-contiguous territories).

Canada also has a system of summertime, (excluding most of Saskatchewan, and with local variations) with changes being made on the same dates, but not everywhere at the same times, as the USA.

### **Australasia**

Australia has three time zones, Eastern, Central and Western. The Western and Central zones do not have Daylight Saving Time (Western Australia, Northern Territory), but some of the Eastern zone does. Queensland, the northern most State, adopted Daylight Saving for a few years about ten years ago but subsequently rejected it. Victoria, New South Wales, South Australia and the Australian Capital Territory put the clocks forward and back in October and March the following year, but not necessarily at exactly the same times. Tasmania also changes by an hour but starts earlier and finishes later than the other States. In 2000 DST was manipulated to start on the last Sunday in August to bring the Olympic Games in Sydney into the summer.

New Zealand adopts Daylight Savings Time which commences at 2.00am on the first Sunday in October each year and ends at 2.00am on the third Sunday in March of the following year. Clocks are advanced and then retarded by one hour on the relevant dates. This system has been in operation since 1990, prior to that Daylight Time was adopted for a shorter period (last Sunday in October each year to the first Sunday in March of the following year). However following several public attitude surveys which showed overwhelming support for Daylight SavingsTime, the period was extended to it's current length.

### **Asia**

India, although a large country, does not have a Winter/Summer change in time, nor a time difference from East to West. Japan does not change and all of China currently stays on GMT + 8 hours all year round.

### **Others**

Some countries, including Iceland, Morocco, and Ghana, keep GMT all year round

## **THE HISTORY OF TIMEKEEPING IN BRITAIN**

Proposals to amend the system of timekeeping have a long history in Britain. The adoption of Single/Double Summer Time (SDST) has been discussed several times and has been the subject of a number of Bills laid before parliament. The adoption of SDST would not alter GMT, but would alter the use of time in Britain in relation to it.

In higher latitudes the days in summer are appreciably longer than those in winter. In Britain, this is accentuated the further north one goes. Therefore, Scotland shows greater extremes in the extent of its daylight hours, it has long summer days and short winter ones.

The introduction of SDST would make the difference in Scotland more pronounced. For example on 31 December 2002 under SDST, dawn would be 09.06 in London and 10.20 in Stornoway (Isle of Lewis), while dusk would be 16.39 in Stornoway and 17.01 in London. This has led to considerable opposition to the introduction of SDST in Scotland, where many feel that the greater light available in the evening would not compensate for the longer dark in periods in the morning.

GMT was adopted by law as the common time in Britain in 1880. Previously local calculations based on the sun were used but the advent of a uniform system was heralded by the adoption of GMT for railway timetables.

In 1908 and again in 1909, the Daylight Saving Bill was laid before Parliament which proposed that clocks would be brought forward one hour from GMT in summer time. It was argued that this would assist in the training of the Territorial Army, improve the general health of the people, increase opportunities for recreation, reduce expenditure on lighting and reduce shunting accidents on the railways. Counter-arguments were put forward suggesting that the suggested change would dislocate traffic between Britain and Europe (which made no provision for summer time), interfere with trans-Atlantic business transactions, encourage people to stay in bed in the mornings and cause difficulties for the agricultural community.

### **The First World War**

Summer time (as proposed in the Daylight Saving Bill) was finally introduced under the Summertime Act 1916. Since other countries had introduced this measure and it was thought that the savings on fuel from lighter evenings would contribute to the War effort. Investigations in 1917 showed that the use of Summertime had slightly reduced traffic accidents, improved public order and health, but had caused problems for farmers harvesting their crops. Summertime was continued through the 1920's and 1930's under the wartime legislation and the Summer Time Acts of 1922 and 1925.

### **The Second World War**

For a period in the Second World War continuous summer time (GMT + 1) was employed together with periods of double summertime (GMT + 2) during the summer months. Although there was statutory provision to continue double summertime in 1947 and future years, it was not utilised and in that year Britain reverted to 'British Summer Time' (GMT + 1) from March to October and GMT from October to March.

### **The 1968/71 Experiment**

In 1968, there was a three-year experiment when British Standard Time (GMT + 1) was employed all year round; the clocks were advanced in March 1968 and not put back until October 1971.<sup>1</sup> This period provided an opportunity to evaluate the effect of the daylight change on a number of things, particularly road accident casualties.<sup>2</sup>

A Parliamentary review of the experiment reported that it was impossible to quantify a great many of the more important advantages and disadvantages of this time system and concluded that the final decision on whether to retain the system would rest largely on a qualitative judgement. The House of Commons debated the issue in December 1970 and voted against continuing the scheme by 366 to 81. The Summer Time Act 1972 was then enacted, embodying the current system of timekeeping. It is this Act, and the Orders made under it, that prevail today.

### **Campaigns in the Eighties**

The Government continued to monitor views on summertime following the 1968/71 experiment and by 1987 concluded that public opinion was shifting in favour of more summertime. The Home Office commissioned a survey of interested groups who were asked to respond to the following five options:

#### **Retain the status quo (summertime clock movements but still an hour ahead of Europe)**

This was supported by the agricultural, forestry, construction, manufacturing and distributive industries

#### **Harmonise the end date with other EC countries (at that time this was end September)**

The steel, chemical and mineral industries and several companies trading in Europe, supported this. It was opposed by most others, particularly outdoor and Scottish workers as it would reduce the amount of afternoon daylight in October, when it is most needed. The tourist industry opposed this and felt that it would curtail their season to the end of September.

#### **Extend summer time in February and November**

None of the groups surveyed supported this option.

#### **Adopt Continuous summer time**

The Department of Energy (as it was then) felt this would produce considerable energy savings and supported it, as did the English Tourist Board and many rural groups.

#### **Adopt Single/Double Summertime (SDST)**

British Rail and British Airways supported this. It was the subject of a detailed study by the Policy Studies Institute.<sup>11</sup>

Overall, 410 responses to the survey were received. Just over half (55%) were in favour of adopting SDST, and one third (34%) favoured retention of the status quo. A small proportion (11%) wanted limited harmonisation with other EC countries.

There was a wealth of support for the proposal from some sections of the public (The Police Federation, The Sports Council, the leisure industry, Age Concern) but strong opposition from others (the building industry, farmers, the Post Office), particularly those in Scotland.

In 1988, RoSPA launched a campaign ('Light Nights Save Lives') for the adoption of British Standard Time, based on the evidence produced by the (then) Transport Road and Research Laboratory (TRRL) about results of the 1968/71 experiment. The campaign highlighted the message that leaving the clocks forward in October would save around 160 lives and 2000 injuries a year.

In 1988, the Government conducted a further survey whose results were examined in the Green Paper, 'Summer Time: A Consultation Document', published in June 1989. The options for consultation had been simplified to:

**Harmonising alteration dates with the rest of Europe**, who were changing clocks back at the end of September, not October as in Britain.

**Single/Double Summer Time** (as described above) which would result in harmonisation of time with Europe completely.

**Retaining the status quo**, continuing to change the clocks twice per year but continuing to be an hour behind Europe.

A total of 30,867 responses were received following publication of the Green Paper, of which 26,029 were in the form of signatories to petitions. Excluding signatories to petitions, 50% were in favour of moving to SDST, 46% were in favour of the status quo, and 4% were in favour of harmonising summertime with other EC countries so that it would finish at the end of September. Of the signatories to the petitions, 22,684 were in support of SDST and 3,345 were against change.

The response in England and Wales was very different from that in Scotland. A total of 59% of letters and 100% of signatories to petitions from England and Wales supported SDST, whereas 90% of letters and 80% of signatories to petitions from Scotland supported the status quo.<sup>3</sup>

The Green Paper carefully detailed the responses received from the various industries and set out arguments for adopting SDST and arguments for maintaining the status quo. The Government's position was summarised as:-

*"The Government notes that, largely as a result of changing patterns of work and leisure, there has been a shift of public opinion in favour of SDST.....but the Government recognises that there are many, particularly in Scotland, who are opposed to any change in the present position. This paper is intended to stimulate discussion on the issue and the options to assist the Government in reaching a decision."*

Nothing more was done at this time.

### **The European Dimension in the Nineties**

In 1997, a European Commission Directive harmonised the ending of summertime across all Member States on the last Sunday in October each year. However, until recently the Directive only provided the dates for five years at a time, requiring a new Directive periodically. The European Union has now adopted *The Ninth European Parliament and Council Directive on Summer Time Arrangements* which states that summer (or daylight saving) time will be kept between the last Sunday in March to the last Sunday in October from 2002 onwards, without the need to issue a new Directive (and subsequent Statutory Instruments in Britain) every five years.

### **Further Campaigns in the Nineties**

There was a fresh wave of campaigns in the early 1990's by interest groups, including RoSPA, and spearheaded by 'Daylight Extra' an action group championing the introduction of SDST. RoSPA commissioned a Gallup poll to test public opinion, which identified that almost over two-thirds (68%) of people approved of SDST (although in Scotland this was only 50%). By comparison with previous polls it showed that approval was increasing. Interestingly, once respondents were told about the TRRL research showing casualty reductions resulting from SDST (of which many of the respondents were ignorant) approval in Scotland rose to 69% and in England and Wales to 77% - more than 3 to 1 in favour of a change.

A number of Private Member's Bills were introduced in Parliament during the 1990's to try to implement a move to SDST. However, none progressed into law. The Western European Time Bill (introduced by John Butterfill MP) sought to amend the Summer Time Act 1972 so that the time in Britain would be one hour in advance of GMT in the winter and two hours ahead of GMT during the summer. The Bill passed through three readings in the House of Lords in the session of 1995/96 and was then passed to the House of Commons. It did not find its way onto the statute books.

In 1998, a report, commissioned by the Government, examined the effect of a move to SDST on road accident casualties.<sup>4</sup> This concluded there would be 450 fewer deaths and serious injuries, the results are referred to in more detail below.

In 1998, when devolution was being considered for Scotland, a backbench Bill was drafted that would have enabled Scotland to continue with the present system, while England and Wales could have an extra hour's daylight in the evening throughout the year. The Bill did not progress to statute and upon devolution the Scottish Parliament was not given the power to change the time in Scotland; this remains the province of Westminster.

### **21<sup>st</sup> Century**

The debate over introducing SDST continues, both inside and outside Parliament. In June 2004, Nigel Beard MP introduced the "Lighter Evenings" Bill in the House of Commons

"to advance time by one hour in England and Wales throughout the year; to provide that the power to make decisions in relation to time zones in Northern Ireland and Scotland be devolved to the Northern Ireland Assembly and the Scottish Parliament; and for connected purposes."<sup>5</sup>

Again, the Bill failed to become law.

## THE EFFECT OF THE INTRODUCTION OF SINGLE/DOUBLE SUMMERTIME

### ROAD SAFETY

#### Road User Casualties in 2004<sup>6</sup>

	<b>ALL</b>	<b>CARS</b>	<b>TWMV</b>	<b>CYCLISTS</b>	<b>PEDS</b>
<b>FATAL</b>	3,221	1,671	585	134	671
<b>SERIOUS</b>	31,130	14,473	6,063	2,174	6,807
<b>SLIGHT</b>	246,489	167,714	18,993	14,340	27,403
<b>TOTAL</b>	280,840	183,858	25,641	16,648	34,881

In 2004, there were 200,067 casualties involved in 149,804 accidents in daylight and 80,773 casualties involved in 57,606 accidents in darkness.

Road casualty rates increase with the arrival of darker evenings and worsening weather conditions. Every Autumn when the clocks go back and sunset occurs earlier in the day, road casualties and the casualty rate rise.

<b>2004</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
Deaths	237	236	230	260	296	269	240	289	272	269	300	323
Casualties	23,225	20,311	22,278	22,089	23,698	23,643	22,764	23,920	24,059	25,785	24,477	24,591
Casualty Rate*	62	54	53	53	56	55	50	53	56	59	60	61

\*Rate per 100 million vehicle kilometres

The effects of clocks going back in October are greatest for the most vulnerable road users. In 2004, pedestrian deaths rose from 56 in October to 76 in November and 78 in December.

During the week, casualty rates peak at 8:00 am and 5:00 pm for adults and 8:00 am and 3.30 pm for children, with the afternoon peak being higher for both the children and adults. The patterns are different at weekends for both adults and children, when casualty rates peak between 12 noon and 1:00 pm and then plateau until about 7:00 pm when they begin to reduce.

The effects may also be worse for specific groups. For example, a study in 1992 found that Asian children made twice as many journeys to and from home each day, compared to white children in similar housing environments. Often the journeys were by unaccompanied children in the late afternoon and evening.<sup>7</sup>



## THE EFFECTS OF CHANGING TO SINGLE/DOUBLE SUMMER TIME ON ROAD CASUALTIES

As an experiment, British Standard Time (GMT +1 hour) was kept all year round for a three year period between 1968 and 1971. Analysis of accident data during this period indicated that this reduced the number of road accident casualties.<sup>2</sup>

Road casualty figures during the morning (7:00 am – 10:00 am) and afternoon (4:00 pm – 7:00 pm) for the period affected by time change in the two winters (1966/67 and 1967/68) before the experiment and in the first two winters (1968/69 and 1969/70) when BST was retained were analysed. The data showed that keeping British Standard time had resulted in an 11% reduction in casualties during the hours affected by the time change in England and Wales and a 17% reduction in Scotland. The overall reduction for Great Britain was 11.7%. Although casualties in the morning had increased, the decrease in casualties in the evening far outweighed this.

Overall, about 2,500 fewer people were killed and seriously injured during the first two winters of the experiment.

In 1970, TRRL published an analysis of the data for the first two winters of the experimental period, which again showed that retaining British Standard Time had reduced the number of road casualties.<sup>8</sup> This compared the numbers of people killed or seriously injured during the hours 7:00 – 10:00 am and 4:00 – 7:00 pm between 29 October and 17 February in the first two years of the experimental period with the estimated numbers that would have occurred during those hours if the clock change had not been adopted.

With the exception of north-west Scotland, where there was a small increase in the number of casualties (possibly because the time change resulted in some commuter journeys in the morning and late afternoon being made in the dark), the reduction in casualties increased fairly steadily from the south-east of England to the north-east of Scotland. The results are summarised in the table below.

	Approximate number of deaths and serious injuries saved	% change compared with number expected under GMT
<b>England</b>		
South East	700	-9
South West	150	-7
Central	450	-11
Northern	900	-19
<b>Wales</b>	About 25	-3
<b>Scotland</b>		
Southern	About 25	-13
Central	350	-20
North East	100	-17
Northern	Small increase - less than 20	+9
<b>Total Great Britain</b>	<b>2700</b>	<b>-12</b>

However, the 1968/71 experiment coincided with the introduction of roadside breath tests and the 70mph speed limit, which may have affected the casualty reduction figures.

In 1989, a TRL report<sup>9</sup> analysed the casualty data from the middle winter (1969/70) of the experimental period and concluded that British Standard Time had resulted in 232 fewer deaths, 1,119 fewer deaths and serious injuries and 2,342 fewer overall casualties during that one winter. The results for the other two winters in this period were similar. \* The study concluded that *"BST was especially effective in reducing the number of fatalities. The groups which benefitted most from the change were those aged 5 – 15, pedestrians and those living in Central England and Southern Scotland"*

The same report then calculated what the likely effects of adopting Single Double British Summertime would have been in the winter of 1986/87. It concluded that this would have saved 160 lives, prevented 810 fewer deaths and serious injuries and reduced overall casualties by about 2,050.

The 1989 study has not been without its critics and its conclusions have been doubted by some.<sup>10</sup>

A 1996 report<sup>11</sup> investigated how the current system of changing to and from British Summertime affected road casualties in Cheshire. Accidents that occurred in Cheshire between 1983 and 1993 during the one-week period either side of the change to and from BST, and between 05.00 - 09.00 and 15.00 - 19.00, were analysed. The results showed when clocks changed to BST in Spring, casualties fell by 6% in the morning and 11% in the evening. When the clocks were changed back to GMT in the Autumn, casualties fell by 6% in the lighter mornings, but increased by 4% in the darker evenings. As there are more casualties in the afternoon and evening period, this resulted in more casualties overall. The report concluded that British Summertime reduces casualties and that the introduction of yearlong BST would reduce road traffic casualties.

Also in 1996, a report set out the case against a move to SDST.<sup>12</sup> The report concluded that SDST would not deliver a reduction in casualties, but would, in fact, produce an increase. The authors stated this would be because children would be more exposed to traffic in the light Summer months (playing near the road for longer hours) and so more likely to be hurt in a road accident.

In January 1996, the Transport Statistics Branch of The Scottish Office published an interim report about the potential effects of SDST on road safety in Scotland<sup>13</sup>. They were concerned that previous estimates of the casualty effects of SDST in Scotland were inaccurate. Their initial analysis of casualty figures between 1988 and 1992 indicated that introducing SDST in Scotland would produce little or no change in total casualties. A final report has not been published.

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\* These results are lower than those found in the 1970 TRRL report because the 1970 report covered two winters while the 1989 report covered one winter.

A 1998 report, commissioned by the Government to resolve the arguments about the likely effects of SDST, used two different methodologies to predict whether there would be casualty savings by switching to SDST.<sup>4</sup> It concluded that there would indeed be casualty savings and stated:

- Overall, there would be around 450 fewer deaths and serious injuries, including between 104 to 138 fewer deaths (depending on which methodology is used).
- In Scotland, the casualty reductions would be slightly lower, proportionately, than for Great Britain as a whole. Nevertheless, it was estimated that SDST would result in 41 fewer deaths and serious injuries and 57 fewer casualties in total. (The smaller numbers in the Scottish data reduced the reliability of the estimate).
- The effects of darkness were found to be greater for pedestrians than for vehicle occupants, in both Winter and Summer
- The effects were found to be greater for fatalities than for non-fatal casualties.

In addition to the casualty savings that would be achieved by a move to SDST, there are other positive effects. The Policy Studies Institute's 1988 report<sup>14</sup> of their comprehensive study into different ways of achieving a better match between daylight and waking hours, gave at least 10 reasons in support of a move to SDST:-

- An overall reduction of about 600 road traffic fatalities and serious injuries in the winter months
- A major saving in energy and fuel costs due to the better matching of waking hours with daylight hours
- Opportunities for making journeys for social and recreational purposes in daylight are considerably extended which is a major advantage for all groups in the population who are apprehensive about going out in the dark
- An overall increase of well over one quarter in the number of hours for daylight-dependent leisure activities in the evening.
- Improvement in general health and well-being
- Small reduction in burglaries and assault carried out in the evenings due to the extra hour of daylight
- Extension of the tourist season and a boost of 4% in tourist related earnings
- Additional annual earnings of £150 million for the leisure industry as a result of the increase in leisure activity
- Improved convenience of travel and goods transport to and from Europe
- Matching time with Europe would benefit trade and communications

In 1993, the Policy Studies Institute updated its 1988 study of the costs and benefits for the UK of adopting SDST<sup>15</sup>, and included additional evidence that was previously unavailable to the 1988 report. The 1993 report concluded:

*“It is now unarguable that the advantages of SDST far outweigh the disadvantages. It would bring about a significant improvement to the overall quality of life for the great majority of the population.”*

The PSI concluded that reform would bring substantial benefits to the bulk of the population and particular benefits to a number of vulnerable groups, including the elderly, children, pedestrians and cyclists. The report discounted many of the objections to SDST as being weak or ill founded.

### **Evaluations of the Effect of changing to Single/Double Summer Time on Road Accidents in Other Countries**

#### **North America**

The USA, like the United Kingdom, began changing the system of timekeeping during the first world war, and, also like the UK, has made changes ever since. It was not until 1986 that the system of beginning Daylight Saving Time (DST) at 2am on the first Sunday in April and ending it at 2am on the last Sunday in October was standardised, although it is still not adopted by all States.

The Insurance Institute for Highway Safety analysed fatal accident data between 1987 and 1991 and estimated that about 900 fatal crashes (727 involving pedestrians and 174 involving vehicle occupants) could have been avoided during the period if Daylight Saving Time had been in effect throughout the year. Although a small increase in fatalities was recorded in the morning this was not sufficient to outweigh the lives saved in the afternoon.<sup>16</sup>

In 1995, an article in the American Journal of Public Health<sup>17</sup> highlighted the dramatic effect DST has on the safety of pedestrians. Fatal crashes were tabulated for 6-hour periods around sunrise and sunset, from 13 weeks before the autumn change to standard time until 9 weeks after the spring change to daylight saving time. During daylight saving time, which shifts an hour of daylight to the busier evening traffic hours, there were fewer fatal crashes. An estimated 901 fewer fatal crashes (727 involving pedestrians, 174 involving vehicle occupants) might have occurred if daylight saving time had been retained year-round from 1987 through 1991.

Research in Canada found that the change to and from DST had a short-term effect on crashes, due to road users being deprived of sleep by an hour. The conclusion was that there was an 8% rise in traffic accidents on the Monday after the clocks are moved ahead in the spring.<sup>18</sup> A further study in the USA confirmed these findings, but also reported an increase in accidents on the Sunday in the Autumn following the clocks being put back. It was thought this might be due to an increase in late night (early Sunday morning) driving when traffic related fatalities tend to be higher anyway, possibly due to alcohol and fatigue.<sup>19</sup>

A recent report<sup>20</sup> examined whether ambient light levels made any difference to fatal crashes. The main purpose of the report was to assess the likely effects of recent innovations in vehicle headlight design in the USA. It examined the influence of ambient light levels on fatal pedestrian and vehicle crashes in three scenarios: pedestrian crashes at intersections, pedestrian crashes on dark rural roads and single-vehicle run-off crashes on dark, curved roads. Each scenarios sensitivity to light level was evaluated by comparing the number of fatal crashes across the changes to and from DST. Estimates drawn from the results of the study, in conjunction with previous studies, showed that pedestrians might be 3 - 6.75 times more vulnerable in the dark than in daylight, depending on the circumstances (eg: whether there was additional street lighting).

### **Australia**

Several research organisations in Australia were asked for details of research into the effects of DST in Australia, but none were aware of any such research. Even in Queensland where they had trialed DST for a few years, the effect on road crash trends had not been evaluated.

### **New Zealand**

The Land Transport Safety Authority in New Zealand was not aware of any research into the impact of DST on accident rates in New Zealand.

### **Sweden**

Researchers in Sweden examined whether the shifts to and from DST in Sweden had short-term effects on the incidence of traffic crashes.<sup>21</sup> The researchers assumed that there would be more crashes on the Monday immediately after the Spring shift and fewer crashes on the Monday after the Autumn shift, due to the lost or gained hour of sleep. The report concluded that there was little evidence that the shift to or from DST had immediate effects on crash incidence in Sweden.

### **Germany**

Summertime was introduced in 1980 in Germany, for reasons of energy saving. After the change, the Federal Highway Research Institute analysed the effects on traffic safety<sup>22</sup>. Fatalities decreased in 1980 compared to 1979, but perhaps not because of the change in Summertime. The daily periods of time with pure darkness showed a clear increase of fatalities after the change of timekeeping in 1980. This was explained by people going out more in the lighter evenings resulting in greater exposure to the road environment. The German study, therefore, concluded that there probably would have been a higher reduction of fatalities without Summertime.

### **France**

In France, the Association Against the Double Summer-time Clock (ACHE) is a strong opponent of summer time. In 1998, ACHE studied the sectors of transport, road safety, leisure and tourism, they concluded that the clock changes constituted a 'negative factor' for the whole of national and international transport connections. ACHE claim that the summer-time clock has a deteriorating effect on transport safety and that there are no advantages to the tourism and leisure sector.

In contrast, public opinion polls in France reveal that the majority of residents (69.5%) want to keep the summer-time clock and possibly even extend it throughout the year.

## Europe

The European Commission commissioned a study into the implications of Summertime arrangements in the Member States, the results of which were published in 1999.<sup>23</sup> The study investigated expert opinions, data sources and existing literature in order to assess whether, and if so in what form, the Summertime clock should be maintained within Europe. The report sets out the history of summertime in each Member State and examined the effects of Summertime in each country on:

- Agriculture
- Environment
- Energy
- Tourism, recreation and leisure
- Transport, communication and road safety
- Health
- Industry and construction
- Trade and services

The report concluded:

*“the most important result of this study has been the finding that in most countries and most sectors the summer-time clock is a non-issue”*

The report identified transport, health and tourism as the sectors most affected by Summertime, but highlighted the lack of ‘hard (quantitative) evidence’. It recommended that extra time and energy be spent on an EU-wide collection of comparable and reliable data in these three sectors, especially where traffic accidents, sleeping problems and extra outdoor activities at night are concerned.

The Agricultural Development Advisory Service (ADAS) published a report in 1995 examining the advantages and disadvantages of three options for Europe:

1. UK and Ireland in GMT and the EU mainland in GMT+1, both with summer-time clock changes (as now)
2. All EU countries in GMT+1, with summer-time clock changes (i.e. SDST)
3. All EU countries in GMT+1, without summer-time clock changes

ADAS found that throughout Europe adjusting clocks did not appear to have a significant effect on the number of road casualties due to an increase of traffic for leisure purposes. ADAS created a statistical model at a European level to simulate the effects of Summertime on road safety. Only limited effects were found if the option of GMT+1 all year were to be adopted for all member states. The model applied to the UK indicated that a change to SDST would lead to 0.75% fewer people being injured on the roads each year and 1.3% fewer killed or seriously injured (on 2001 figures, about 527 fewer deaths and serious injuries). If the UK adopted option 3 above (ie same time as Europe but without clock changes) this would only achieve about half the level of casualty reduction found for adoption of SDST.<sup>24</sup>

## **ATTITUDES TOWARDS SINGLE/DOUBLE SUMMERTIME**

### **RoSPA Survey 2002**

RoSPA issued a questionnaire to seek the views on SDST of 189 organisations, comprising:

- 49 members of the Occupational Road Safety Association (ORSA)
- 51 organisations concerned with agriculture and countryside
- 66 groups concerned with leisure or sporting interests
- 23 other organisations, many with commercial interests from a variety of sectors

40 responses were received (21%) which was relatively low. A list of the organisations who responded appears at Appendix One.

Four organisations indicated that they either did not have a view on the issue or that they wished to observe a 'watching brief' at this time.

Three organisations returned an incomplete response; two confirmed their support for SDST and one supported maintenance of the current system. That organisation did say that if proven research was produced to demonstrate that SDST would benefit their members (users of powered two-wheelers) they would re-consider their position.

34 organisations completed the questionnaire in full, of which 14 (41%) would 'strongly approve' of legislation to introduce SDST, 13 (38%) 'somewhat approved', 3 (9%) 'somewhat disapproved' and 4 (12%) would 'strongly disapprove' of such legislation. Therefore of the respondents, 3 to 1 were in favour of SDST.

Over half of those who responded in full expected there to be fewer road accidents if SDST were adopted. Almost one third did not know if there would be a change; three felt that there would be more road accidents and three indicated that there would be no change in the number.

Seven groups with road safety interests responded. All apart from one indicated that they would 'strongly approve' if Parliament proposed legislation to introduce SDST. The dissenting voice came from the Central Scotland Roads Accident Investigation Unit who felt that it would be easier to change people's habits to utilise available daylight rather than change the clock.

RoSPA acknowledges the limitations of the findings from this survey, which represents only a small sample and not all organisations had canvassed the views of their members.

### **Sport and Leisure Industry**

In 1993, the Policy Studies Institute estimated that a move to SDST would give an average daily gain of 55 minutes of accessible daylight in the evenings, hence providing an increase in the time available for daylight-dependent leisure activity by an annual average of 28%.<sup>12</sup> This was based on the assumption that the UK would harmonise with the rest of Europe and conclude Summertime at the end of September. In fact, the EU has harmonised with the UK and Eire and Summertime across all member states now finishes at the end of October. Therefore, the estimate would have been slightly higher if calculated with an October finish.

The Child Accident Prevention Trust recently surveyed the attitudes of young people about their leisure activities.<sup>25</sup> Young people aged between 10 and 14 years indicated that their activities were restricted by lack of daylight, amongst other things.

Perhaps, therefore not surprisingly, historically the sport and leisure industry has supported a move to SDST. Of the fifteen sport and leisure groups that responded to RoSPA's survey, only one would 'somewhat disapprove' if Parliament proposed legislation to effect a change to SDST. Almost all (93%) supported SDST, of whom almost a third "strongly approved" of such a move. However, less than half of the respondents indicated that they would actively support a campaign to effect legislative change (perhaps being put off by the next question which asked how they would wish to be involved).

Those in support cited the increased opportunity for leisure and sport as one of the main advantages of a change to SDST, particularly for school children in the afternoon. Alignment with Europe was also seen as a positive benefit. The groups did express concern about safety and quality of life in the north of the country where people would be subject to darker mornings. Also one organisation pointed out that children would still be travelling home in the dark after afternoon leisure or sport activity.

### **Health**

The Policy Studies Institute believes that putting the clock one hour forward would increase opportunities for more exposure to daylight and sunlight which would encourage outdoor activity and promote fitness leading to health improvement.

There are also physiological arguments that more exposure to daylight and sunlight increases well-being. Sunlight is a primary source of vitamin D, and whilst all humans have a daily need for vitamin D, this is six times greater in children. Seasonal Affective Disorder (SAD) is thought to affect an estimated half a million people each winter. It is caused by a biochemical imbalance in the hypothalamus (the region of the brain that regulates a variety of physiological processes) due to the shortening of daylight hours and the lack of sunlight in winter. For many people SAD is a seriously disabling illness, preventing them from functioning normally without continuous medical treatment.

### **Tourism**

In a similar way to the sport and leisure industries, the tourist industry supports a move to SDST. Moving an hour of daylight from morning to afternoon is seen as a benefit to this industry.



The Policy Studies Institute estimated in 1992 that SDST would increase tourist related earnings by £1 billion, which would consequently increase employment in tourism and related industries. Income from tourism represents 6% of this country's Gross Domestic Product.

There has been continuing growth in tourism for a number of years, as more people take holidays more frequently. The British tourist economy was hard hit by foot and mouth last year and they are now making every effort to attract visitors to return to this country. An extra hour of daylight may not make much difference to the summer quota of visitors but may encourage people to visit in Spring and Autumn and would extend by two months the part of the tourist season which is dependent on daylight hours. Many tourist attractions close at dusk and therefore SDST would allow later closing times and is unlikely to affect opening times significantly.

The travel industry also supports a move to SDST because it aligns the UK with all other European countries. Air travel to and from European countries has continued to increase over the last 20 years and more is being encouraged by the 'budget' airlines that have emerged in the last few years. The channel tunnel is now established and regularly used. People's holiday habits have changed with more people travelling abroad and also taking more short breaks abroad than previously.

### **Commerce**

Some parts of the service industry require early-morning working hours, for example postal delivery, milk collection and distribution and newspaper delivery. A move to SDST is unpopular amongst those sectors. There are fears that more working hours in winter during the dark will increase the likelihood of accidents.

Of the five commercial organisations that responded to RoSPA's survey, all but one favoured a move to SDST. The one organisation which did not, objected on the basis that it would be confusing to change and that the winter mornings were already dark enough. Those in favour of a change felt that there would be increased efficiency and were keen to be brought in line with the rest of Europe. The European dimension could be considered important to commercial organisations, £132 billion of Britain's trade is with the European Union, which is equivalent to half of Britain's total trade and affects 3 million UK jobs.

None of the organisations were prepared to become involved in a campaign for legislative change; two indicated it was a peripheral issue whilst one said that they already had enough to do. One organisation wanted to see firm evidence of casualty reduction before becoming involved (despite being aware of the TRL evidence).

### **Energy and Pollution**

Reducing fuel consumption and costs was one of the main aims of the Daylight Saving measures in the two world wars. The Policy Studies Institute argued in the mid 1990s that a better matching of waking hours with daylight hours and with the warmer time of day by putting the clock one hour ahead may achieve a substantial fuel saving each year. Their calculations suggested savings on consumers' electricity bills of £260 million could be expected.<sup>11</sup> The UK is a signatory to the Kyoto Treaty, and is committed to reducing greenhouse gas emissions as a whole to 3% below 1990 levels by 2010. A move to SDST would help to reduce the UK's energy consumption which would help to achieve the target for reducing carbon dioxide emissions.

### **Crime**

British Crime Surveys between 1988 and 1992 show that over half of criminal offences take place during the hours of darkness in the late afternoon or evening, and of the small proportion of offences occurring in conditions of semi-darkness, far more occur at dusk rather than dawn. The British Crime Survey 2001 found that 13% of respondents felt 'very unsafe' walking alone in their area after dark and a further 19% felt 'a bit unsafe'.<sup>26</sup>

The Home Office commented in the mid nineties that 'although many crimes are committed when it is dark, definite conclusions are difficult to draw as regards the effect of darkness on overall levels of crime. Increasing daylight may for example have different effects for different crimes.'<sup>27</sup> However with the rise in street crime and personal attacks, many people, particularly the elderly are fearful about going out after dark. Many parents do not allow their children to go out after sunset. The adoption of SDST would postpone this curfew by an hour.

The Association of Chief Police Officers in Scotland (ACPOS) responded to RoSPA's survey indicating that they strongly disapproved of a move to SDST and felt that there would be more road casualties in Scotland as a result and were particularly concerned about the risk to children walking to school in the morning.

### **Agriculture and Construction**

The construction industry have always started work relatively early in the day. They are concerned with darkness and/or icy conditions in the morning, incurring costs for artificial lighting and the possible greater risk of industrial accidents as a result. There is also concern about increased absenteeism and unpunctuality during the dark winter mornings.

In 1995, when a Private Members Bill was introduced which supported a move to SDST, the National Farmers Union commissioned an independent survey of its members to canvass attitudes and views across all sections of the industry. Historically, farmers had always been opposed to a move to SDST. The NFU survey consulted farmers throughout England and Wales and concluded that more farmers felt that evening daylight was of greater importance to their farming business than morning daylight.

Respondents to RoSPA's recent survey included the NFU, the NFU Scotland, the Farmers Union in Wales and the Dairy Industries Association. Of those organisations only the NFU (England and Wales) indicated that they would 'somewhat approve' if Parliament proposed legislation to introduce SDST in Britain. Their position was based on the response to their survey in 1995, referred to above.

The remaining three organisations disapproved of a move to SDST outlining concerns about the darker mornings when agricultural machinery would be on the roads and members of their industry would have to work in the dark. NFU Scotland felt that the reduction in casualties was not sufficiently proven to justify a change. The Dairy Industries Association whilst expressing their opposition to a change did acknowledge that the issue of harmonisation with Europe should be considered.

## CONCLUSION

RoSPA supports the adoption of Single/Double Summer Time.

The most recent research into the potential effect of SDST on road casualties concluded that significant reductions in casualties would be achieved if the UK adopted Single/Double Summer Time. This confirms earlier research which showed that the 1968/71 experiment saved around 2,500 deaths and serious injuries each year of the experiment.

The latest research estimated that a move to SDST would result in around 450 fewer road deaths and serious injuries, including between 104 and 138 fewer deaths.

A reduction would be achieved in Scotland as well, albeit slightly less than for Great Britain as a whole.

Although there would be more casualties in the morning during the Winter, these would be outweighed by the reduction in casualties due to an hour of extra daylight in the Winter evenings, producing a net reduction.

Extra evening daylight protects vulnerable road users like children, the elderly, cyclists and motorcyclists, making them more visible to motorists. There are more accidents in the afternoon rush hour during the week than in the morning. Motorists are more tired after a day at work and concentration levels are lower. Children tend to go straight to school in the morning but may deviate in their journey home, making stops, thus increasing their exposure to the road environment. Social trips are generally made in the afternoon/evening, often on the way home from school/work.

However, many people are still cautious about accepting SDST and many firmly oppose it. A move to SDST is generally opposed by those industries whose workers rise early and utilise morning light, for example some farmers, postal workers, those involved in the collection and delivery of milk and the building industry.

Tourism, leisure and sporting organisations generally support a move to SDST, welcoming the increased opportunities for activity presented by more daylight on weekday evenings. Road Safety organisations are persuaded by the research on casualty reduction and support the adoption of SDST.

Historically, many people and organisations in Scotland have opposed the move to SDST, citing the darker mornings (dawn in the far north of Scotland in the Winter months would be after 10am) as unwelcome and leading to an increase in road casualties. In fact, the most recent research<sup>4</sup> confirms a net reduction in casualties, even in Scotland.

Four Scottish organisations responded to RoSPA's survey. Apart from the Scottish Football Association, all opposed a change to SDST. The Scottish FA welcomed the increased opportunities presented by more afternoon daylight and the possibility of harmonisation with Europe. The opposition from the other organisations derived from a belief that road casualties in Scotland would increase and that darker mornings would be hazardous. One organisation doubted that legislation was appropriate.

Although the power to legislate about Summertime has not been devolved to the Scottish Parliament, there are those who say it should be. Some supporters of SDST responding to the RoSPA survey suggested that Scotland should be able to set its own time and could remain in the current time zone if England and Wales aligned with Europe. The arguments for and against such a split are beyond the remit of this paper.

It is clear that the decision of whether to move to SDST is never going to be purely a quantitative one (i.e., based on statistics) because people's views are too disparate. Therefore, the judgement will partly be a qualitative one. However, RoSPA believes that the effects on road safety are the most important and persuasive considerations.

The only way to reach a conclusion about the effects of a move to SDST in this country, to align the UK clock with that of its European neighbours, is to conduct an experiment similar to that held during 1968/71. A trial implementation of SDST over at least two years, with modern evaluation methods and all data correctly and comprehensively recorded, will result in data that is unequivocal in terms of casualty savings and could cover much wider issues also. Such an experiment would give people an opportunity to experience the change for themselves and may be useful in crystallising opinions.

Since the 1968/71 experiment, the road environment and people's travel habits have changed enormously. Society is more reliant on the car, fewer children walk or cycle to school, opportunities for leisure activities are significantly greater, people take holidays more frequently and overseas travel is much more common. The advancements in communication technology have opened up the opportunities for worldwide trade even further. Even weather conditions are changing as the effects of global warming are felt. None of the research conducted to date is able to address these factors successfully, hence the need for a new trial.

## **APPENDIX ONE**

The following organisations responded to the questionnaire survey:-

Association of British Travel Agents  
Association of Chief Police Officers Scotland  
Age Concern - England  
Association of Industrial Road Safety Officers  
Association of Leading visitor Attractions  
British Association of Leisure Parks, Piers and Attractions  
British Cycling Federation  
British Horseracing Board  
British Motorcyclists Federation  
British Society of Plant Breeders  
British Standards Institution  
Child Accident Prevention Trust  
Central Scottish Roads Accident Investigation Unit (two replies)  
Council for Travel and Tourism  
Dairy Industry Association Ltd  
East Midlands Electricity Distribution  
Engineering Employers Federation  
English Golf Union  
English Nature  
Farmers Union Wales  
Federation of Environmental Trade Associations  
Girlguiding UK  
Greenpeace  
Hockey England  
Intelligent Transport Society for the UK  
Local Authorities Road Safety Officers Association  
Local Government Association  
Motorcycle Industry Association  
National Farmers Union  
National Farmers Union - Scotland  
Parliamentary Advisory Council for Transport Safety  
Perfect Gardens Ltd  
Royal Agricultural Society England  
Royal Society for the Protection of Birds  
Scottish Football Association  
Sports Council of Northern Ireland  
Sports Council of Wales  
The Motor Insurance Repair and Research Centre  
The Stillwell Road Safety Partnership  
Welsh Hockey Union

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