The Greater London 'Ride Bright' campaign— its effect on motorcyclist conspicuity and casualties

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Background. In late 1975 reports of accidents indicated that casualties associated with powered two-wheeled vehicles were on the increase. This rise was sufficiently large to negate the declining trend in total accidents experienced in previous years. Motorcycling as a mode of transport was increasing in popularity, bringing with it a rise of 20 per cent in casualties. On this evidence the Greater London Road Safety Unit chose this topic for their annual publicity campaign. Detailed analysis of the data indicated that a major factor in motorcycling accidents was the failure of other drivers to observe these vehicles in the general street scene.

Publicity. Riders of powered two-wheeled vehicles were encouraged to improve their conspicuity as road users by wearing bright clothing, preferably of fluorescent material, and by switching on headlights during the daytime.

The campaign lasted from August 28 to October 31, 1976, and consisted of:

(1) Advertising on the London Broadcasting Co. and Capital Radio independent stations between August 28 and September 5, 1976. Four different messages each lasting 30 seconds were used, in all, 80 times. Three of the messages were aimed at motorcyclists, encouraging them to 'be seen and not hurt', and one at other drivers warning them to keep a special look-out for motorcyclists. Sixty commercials were broadcast on Capital Radio (estimated weekly listening audience: 3·5m.), 20 on London Broadcasting (2m.). A booster radio campaign consisting of 63 half-minute spots was made in April 1977.

(2) Posters, which were placed on lampposts at the roadside and on public buildings, showed a motorcyclist between two lines of traffic moving in opposite directions with headlights on in the daytime and the rider wearing a bright orange jacket, helmet and gauntlets. The posters carried the legend 'Motorcyclists—SWITCH ON IN DAYTIME—Isn't your life worth a light?'

(3) Leaflets, carrying a miniature of the poster on the front and, on the back, a warning to motorcyclists that they are 20 times more likely to be involved in a road accident than a car driver and an explanation of the reasons for 'Riding bright'. These were distributed to motorcyclists by Road Safety Officers of the 26 London Boroughs participating, through garages, motorcycle dealers, factories, polytechnics and special events, etc., and by the Metropolitan Police.

(4) Give-away items, e.g. combs, pens and keyrings, selected as being articles of use to motorcyclists (and likely to be retained), and each bearing the campaign slogan 'Day or night—ride bright!' were handed out by Road Safety Officers.

(In April 1977 the London Accident Prevention Council launched a poster campaign designed to encourage motorcyclists to wear conspicuous clothing. This, together with the similar efforts of others in the road safety field, may have helped to sustain the increase in the wearing of conspicuous clothing noted below.)

Behavioural study

Behavioural observations. The following observations were made at preselected points on nine major routes into London:

(1) the total number of motorcyclists passing observation point during the observation period;

(2) the number of motorcyclists wearing yellow, orange or white clothing*;

(3) the number of motorcyclists riding with headlights on in daytime; and

(4) the number of motorcyclists wearing conspicuous clothing and with headlights on (in daytime).

The term 'motorcyclists' always includes motorscooter riders, moped riders and motorcyclists with sidecar combinations.

* These particular colours were selected on the basis of recognition distances on a clear sunny day[1].

Observations were made on two days between 0730h and 0930h in the following months:

Before campaign: August 1976
During campaign: October 1976
After campaign (1): January/February 1977
After campaign (2): August/September 1977

Weather and light conditions were good at all sites, during all the observation periods, except at two sites where, during the 'before' observation period, fog was noted.

Results of behavioural changes. Table I summarises the changes in the proportion (%) of motorcyclists with the specified behaviour (statistically significant differences from 'before' data are indicated).

Table I.

Category of behaviour	Before campaign %	During campaign %	After campaign (1) %	After campaign (2) %
Motorcyclists observed wearing conspicuous clothing (in daytime)	7·9	11·3	17·4 (1%)	17·5 (1%)
Motorcycles observed with headlights on (in daytime)	3·2	24·4	28·5 (0·1%)	23·9 (0·1%)
Motorcyclists observed wearing conspicuous clothing and with headlights on (in daytime)	0·8	5·9	8·7 (0·1%)	8·0 (0·2%)

Casualty analysis

Trends before and after the campaign and statistical tests. Casualty data for motorcyclists under analysis include 12 months data prior to and following the commencement of the campaign at the end of August 1976. Overall motorcycle casualties in Greater London and casualties at uncontrolled junctions (where motorcyclists were thought to be most vulnerable) were selected for analysis. The casualties were split into two subgroups:

(1) *Daylight casualties:* All motorcycle casualties in daylight conditions.

(2) *Dark casualties:* All motorcycle casualties in dark conditions but with varying amounts of street lighting.

The Chi-Squared Test. Motorcycle casualties occurring in the dark for the 12 months prior to and after the campaign were used as controls against which to test the daylight casualty trends. The dark casualty

Table II.

Part of day / Casualty category	Dark casualties Before*	After	% Change in dark casualties	Daylight casualties Before	After	% Change daylight casualties	% Change in daylight casualties (control adjusted)
Motorcycle casualties (excluding single motorcycle accident casualties).	2 704	3 106	+ 14·9	7 053	7 531	+ 6·8	−7·0 Significant at 2·5%
Motorcycle casualties at uncontrolled junctions (excluding single motorcycle accident casualties)	1 560	1 722	+ 10·4	4 339	4 516	+ 4·1	− 5·7% (not significant)

*'Before' period: 12 months to August 1976; 'After' period: 12 months to August 1977

trends were selected as suitable controls in the χ^2 test before and after test on daylight casualties (which should have been affected by the campaign) for the following reasons; they were:

(*i*) largely unaffected by the campaign;
(*ii*) best able to reflect and allow for increased usage of motorcycles;
(*iii*) in the same area as the data under test, i.e. daylight casualties in Greater London;
(*iv*) able to reflect any influence of weather patterns; and
(*v*) conservative controls, because conspicuous clothing would also have affected night-time visibility.

The total number of observed daylight casualties occurring in the 12-month period after the campaign was greater than in the 12-month total prior to the campaign through increased usage. The χ^2 test was used to test whether the expected number of daylight casualties as predicted by the control trends (dark casualties) was significantly greater or less than those observed after the campaign.

Table II summarises the motorcycle casualty totals for 12 months prior to and following the campaign and indicates the % change in daylight casualties adjusted by the dark casualty control trends and the χ^2 test significance levels (if better than 10 per cent). Single motorcycle accident casualties, being unaffected by the conspicuity factor, were deemed to be unaffected by the campaign and therefore excluded from the data. Comparing casualty data from the years prior to the campaign, light and dark casualties both increased, by 18 per cent from 1974/75 and by 20 per cent for 1975/76. This differs considerably from the campaign results shown in Table II.

The 'S' Ratio Test. The National Road and Traffic Institute in Sweden[2], when reporting on the effect on road accidents of the recommendation of compulsory daytime use of running lights in Finland, attempted a quantification of the effect of increased use of daytime headlights using single vehicle accidents as a control by calculating the '*S*' ratios. An adapted form of this ratio is described below:

$$S = \frac{\dfrac{\text{Powered two-wheeler daylight casualties in accidents involving a pedestrian or another vehicle}}{\text{Powered two-wheeler dark casualties in accidents involving a pedestrian or another vehicle}}}{\dfrac{\text{Single powered two-wheeler daylight casualties}}{\text{Single powered two-wheeler dark casualties}}}$$

Table III.

Part of day / Casualty category	Dark casualties Before*	After	Daylight casualties Before	After
Motorcycle casualties involving two or more vehicles	2 652	3 055	6 941	7 376
Single motorcycle accident casualties	578	596	885	875
Motorcycle casualties involving two or more vehicles at uncontrolled junctions	1 559	1 718	4 317	4 470
Single motorcycle accident casualties at uncontrolled junctions.	234	253	367	368

*'Before' period: 12 months to August 1976; 'After' period: 12 months to August 1977

The ratio includes any accident casualties involving a powered two-wheeler vehicle and a pedestrian, it being considered that the visibility of these vehicles to pedestrians was also improved by the campaign. Table III summarises the motor-cycle casualty totals for 12 months prior to and following the campaign which were required to calculate the '*S*' ratio.

The values of the '*S*' ratio calculated from the casualty totals in Table III are presented in Table IV. The % change is a straight % change in the value of '*S*' ratio. This change in the '*S*' ratio has not been tested statistically.

Economics of campaign

The total cost of the campaign in publicity material and hire of advertising time was £9 000. The average cost of an accident in an urban area in June 1977 was £4 210. Total daylight motorcycle casualties increased by 6·8 per cent (see Table II), while dark accident casualties rose by 14·9 per cent. Had there been no 'Ride Bright' campaign, daylight motorcycle casulaties would also have increased by 14·9 per cent (this being confirmed by casualty data trends prior to the campaign for the years 1974–1976). A saving of 8·1 per cent daylight casualties can be attributed to the campaign, or alternatively 570 casualties. There are on average 1·25 casualties per accident in the Greater London area, so the number of casualties saved reduces to 456 accidents. The total cost of powered two-wheeler accidents saved by the campaign would therefore have been £1 919 760. This analysis also assumes that the campaign has saved 456 accidents in the first year only. However, this saving could be attributed to all years subsequent to the campaign in which the initial behavioural changes were maintained, thus making the estimated accident cost savings much larger.

Table IV.

Category of behaviour	Value of 'S' ratio Before	After	% change in 'S' ratio
Motorcycle casualties involving two or more vehicles	1·7	1·6	− 4·1
Motorcycle casualties involving two or more vehicles at uncontrolled junctions	1·8	1·8	+ 1·3

Conclusions

Behavioural data. The increased use of headlights in the daytime and the wearing of distinctive clothing brought about by the campaign has been maintained 12 months after. Comparisons of driver behaviour before and after shows highly-significant increases in the number of motorcyclists using their headlights during the day and also wearing distinctive clothing. There has been a small drop in the summer of 1977 in the numbers using headlights, but this is well within the limits of statistical variation.

Casualty data. The statistical problems of detecting changes in casualties attributable to the change in behaviour from the 'Ride Bright' campaign are extremely complicated and difficult. With a continuing rising trend in motorcycle use and accidents the problem is to determine whether the detected increase in accidents to motorcyclists would have been greater had the campaign not taken place. The simple χ^2 test using dark accidents as the control indicates that, whilst there has been an increase of 6·8 per cent in casualties of motorcyclists during daylight hours, the increase of 14·9 per cent at night has been much larger. Using the dark trends as a control we find a significant (2·5 per cent level) drop of 7·0 per cent in daytime motorcycle casulaties from what we would have expected had the campaign not taken place as indicated by the dark controls. When casualties at uncontrolled junctions, one of the particular types of accident at which the campaign was aimed, are considered, the reduction from the expected total is 5·7 per cent (not significant).

The '*S*' ratio test described earlier shows a reduction of 4·1 per cent for motorcycle casualties involving a powered two-wheeler and pedestrian or another vehicle in the daylight from what could have been expected without the campaign. This test shows a rise of 1·3 per cent when uncontrolled junctions are considered, but the numbers are relatively small.

Absolute conclusions from the casualty analysis are difficult since the change in behaviour at best affects only a quarter of the motorcycling population who use daytime headlights and only accidents occurring in daylight are likely to have benefitted. But from the results of this analysis and from those in other countries it seems reasonable to claim that some benefit to motorcycle casualty trends has resulted from the change in motorcycle behaviour. If so, the accident cost reduction is the substantial amount of nearly £2m. in the first year.

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Development work on 'Scoot': proving trial in Coventry in year's time

The traffic-responsive method of co-ordinating signals known as Scoot—for 'Split, Cycle, Offset Optimising Technique'—was initially researched by TRRL in co-operation with industry and the City of Glasgow. Its further development is now being organised by the DTp's Traffic Control and Communication Division in association with Crowthorne, Ferranti, GEC and Plessey as before, and the Department of Industry.

The first trials in Glasgow three years ago, at 40 of the 96 junctions in the city's UTC system, showed that for most of the working day Scoot and fixed-time plans derived by Transyt performed equally well—but in the evening peak, when flows were heaviest, Scoot improved average journey speeds by 8 per cent, a statistically-significant result. It can be argued that the standard of fixed-time control with which Scoot was compared was probably better than can normally be expected in other cities, even with a computer in use, because: firstly, TRRL staff had the time and knowledge to produce up-to-date and optimum plans with Transyt; and secondly, traffic flow data had been extensively monitored for research purposes and were readily available. But as Scoot adapts automatically to the latest traffic situation it may achieve additional benefits where the fixed-time plans are out-of-date and serviced from poor data—the size of this advantage to the responsive strategy would depend upon the traffic engineering practices of each city.

The additional facilities provided by a Scoot UTC system were demonstrated during the trial and are thought to be of considerable potential value. For example, at any instant of time, Scoot measures the efficiency of traffic movement within the city. The sizes of queues on all streets in the Scoot area are estimated continuously and are one important measure of efficiency. This type of information may be vaulable both for short-term strategic control and for longer-term traffic management.

Current development programme. The work led by the DTp/TCC with a view to the method's eventual application in other cities has been running for nearly two years and the main software package, the research philosophy translated into Coral 66 and portable to a number of different computers, is almost complete. Next comes the proving of software on the Ferranti Argus 700, GEC 4080 and Digital Equipment PDP-11 computers. An on-street proving trial in Coventry in the autumn of next year will demonstrate the on-line, real-time function of the Scoot strategy and establish criteria for applications.

A control loop closing simulator package called STEP (Scoot Test Execution Program) allows the performance of traffic to be modelled off-line during system construction for a particular application. A set-up package permits a valid data-base to be created using a simple interactive operator/machine dialogue.

The potential of microprocessor-based intelligent colour visual display units is being examined. It is hoped that semi-graphical displays will simplify the presentation of control and monitor information to the operator and reduce the need for mimic diagrams and print-out. The intention is to present data suited to traffic engineering needs.

A UTC system that uses any form of traffic-responsive strategy of control will cost more than a fixed-time system, because of the cost of vehicle detectors, additional data transmission, and computer hardware and software. Recommendations for the use of Scoot will be based on the estimated benefits in relation to these additional costs. It seems likely that Scoot will be most beneficial in heavily-congested central urban areas and where traffic flows are variable and unpredictable. Other, less critical, parts of the urban area may retain fixed-time strategies of control. The area under Scoot control may be expanded progressively as the need arises. The development work at the DTp includes provision for the application of Scoot to existing UTC systems.

- Late in June, OECD Road Research Groups met for the first time to deal with traffic control in saturated conditions; and with methods for evaluating road safety measures. Discussion on the development, design and operation of urban parking systems was postponed until the autumn.

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moved from financial break-even to a subsidy amounting to 27 per cent of total operating cost, and this subsidy offset the second-round effects to a considerable extent. It is calculated that, had services been required to break-even right up to 1976, the number of passengers carried would have declined by 53 per cent, compared with the 40 per cent decline observed, and, of this, the direct effects of increased car ownership would have accounted for 32 per cent, the second-round effects of this initial loss for a further 26 per cent, while the remaining 42 per cent would have been due to increased costs of operation and various background trends. Over the period 1964 to 1968, when bus services actually did break-even, it is estimated that the total effects of increased car ownership (both direct and second-round effects) accounted for 78 per cent of the overall decline in bus patronage.

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