SC/98/07a

Results from SCOOT's Commercial Systems

The measured benefits of SCOOT depend on the efficiency of the previous method of control and on site factors, such as the distance between junctions and the flows of vehicles.

Early results showed that SCOOT achieved an average saving in delay of about 12% when compared with up-to-date TRANSYT fixed-time plans. This result was important because TRANSYT is used worldwide and known to set a high standard on which other traffic responsive systems have failed consistently to improve.

Research by Bell (1986) suggests that SCOOT is likely to achieve an extra 3% reduction in delay for every year that a fixed-time plan "ages". Further, the effects of incidents have been excluded from many of the survey results to ensure statistical validity. Since SCOOT is designed to adapt automatically to compensate for ageing and incident effects, it is reasonable to expect that, in many practical situations, SCOOT will achieve savings in delay of 20% or more.

The most recent survey results are listed results first.

- **SÃO PAULO 1997**

São Paulo are using SCOOT 2.4 and SCOOT 3.1 on different areas of the city. The survey was conducted by CET (Companhia de Engenharia de Tráfego) - the municipal traffic engineering company responsible for managing the city's traffic.

Results:

Rio Branco Avenue / Norma Gianotti Avenue: **SCOOT 2.4**.

Period	*% Delay Benefits over previous control method: TRANSYT*
06:00 - 09:00	**40**
17:00 - 20:00	**0**
Average Benefit	**20**

Alvarenga St / Camargo St: **SCOOT 3.1**.

Period	*% Delay Benefits over previous control method: TRANSYT*
06:00 - 10:00	**41**
10:00 - 16:00	**53**
16:00 - 20:00	**0**
20:00 - 23:00	**43**
Average Benefit	**38**

The annual financial benefits were also calculated for each area

AREA	*Annual Benefits in US $*
Rio Branco Avenue / Norma Gianotti Avenue	**637,000**
Rio Alvarenga / Rio Camargo	**976,000**

- **NIJMEGEN 1997**

Witteveen+Bos Consulting Engineers carried out the Nijmegen trials in co-operation with the Transport Research Centre (AVV) and the Municipality of Nijmegen using SCOOT version 2.4. The SCOOT results were compared with those of fixed time plans and also with SCOOT+ (SCOOT+ incorporated split weighting).

	% Benefits of SCOOT over Fixed Time Plans	*% Benefits of SCOOT+ over SCOOT*
Travel Time Benefits	**11**	**14**
Delay Benefits	**25**	**33**

- **TORONTO 1993**

Metro-Transportation undertook a "before" and "after" study of Toronto's SCOOT system between May and June 1993. Toronto were using SCOOT 2.4 at the time.

System: Toronto, Canada. *Previous control: Fixed Time*				
% Reduction using SCOOT (average)				
Journey time	**Delay**	**Stops**	**Fuel consumption**	**Emissions**
8	**17**	**22**	**5.7**	**3.7 (hydrocarbons)** **5 (carbon monoxide)**

- **SANTIAGO 1993**

Results of SCOOT (Version 2.4) field trials in Santiago, Chile are available although they are not expressed as % benefits and therefore not comparable with other results in this document. The survey took place during 1992 and 1993 and was carried out by Pontificia Universidad Catolica de Chile. The following three sub-networks were analysed for comparison:

- Providencia: heavy public transport flows, lots of bus-stops, high pedestrian flow, heavy congestion
- Apoquindo: moderate public transport flow, small number of bus-stops, moderate pedestrian flow and low degree of saturation
- Costanera: mostly used by cars on an arterial route.

The table below illustrates the economic benefits achieved by SCOOT after 1 year of operation.

First year rate of return % ($Benefits / $Investment)		
Providencia	**Apoquindo**	**Costanera**
0.98	**126.4**	**210.4**

- **BEIJING 1989**

SCOOT version 2.3 was installed in Beijing with the capability of controlling cycle traffic as well as motor vehicle. Previously Beijing's urban traffic control was uncoordinated. A survey was carried out by the Beijing Research Institute of Traffic Engineering (BRITE) to assess the benefits of this SCOOT system. The results were as follows:

Time of day	*% Reduction using SCOOT (average on all routes)*		
	Journey time	**Delay (stopped time)**	**Stops**
07:00 - 08:00 (bicycle peak)	**7**	**41**	**26**
08:00 - 09:00 (vehicle peak)	**16**	**32**	**33**
12:30 - 13:30 (off peak)	**4**	**15**	**14**
17:00 - 18:00 (bicycle/vehicle peak)	**2**	**19**	**29**

- **WORCESTER 1986**

SCOOT was introduced in Worcester in the autumn of 1984. Soon after, the DoT and Hereford and Worcester County Council commissioned Transport Planning Associates to undertake an assessment of SCOOT over previous isolated VA control and TRANSYT fixed time plans.

Previous Control	*% Reduction in journey time using SCOOT*			*% Reduction in delay using SCOOT*			*% Reduction in fuel used*		
	AM Peak	**OFF Peak**	**AM Peak**	**OFF Peak**	**PM Peak**	**PM Peak**	**AM Peak**	**OFF Peak**	**PM Peak**
Fixed-time TRANSYT	**5**	**3***	**11**	**7***	**20***	**11***	**5***	**0**	**6**
Isolated Vehicle Actuated	**18***	**7***	**32***	**15***	**23***	**13***	**10***	**4***	**9***

*Results significant at the 95% confidence level.

The replacement of isolated signal control by SCOOT in Worcester was estimated to save 180,000 vehicle hours per annum or £750,000 p.a. at 1985 prices. The use of SCOOT rather than Fixed Time UTC also showed considerable saving which was estimated to be 83,000 vehicle hours or £357,000 p.a.

- **LONDON 1985**

SCOOT operation began in early 1984 in London around the area of Westminster. An assessment of SCOOT was completed by GLC (Greater London Council) which showed that widespread implementation of SCOOT could be recommended.

Previous Control	*% Reduction in journey time using SCOOT*	*% Reduction in delay using SCOOT*	*% Reduction in stops using SCOOT*
Fixed-time	**8 (cars), 6 (buses)**	**19**	**5**

- **SOUTHAMPTON 1985**

Hampshire County Council commissioned the Transportation Research Group (TRG) of the University of Southampton to carry out an assessment of SCOOT in the Portswood/St. Denys area in 1984/1985.

Previous Control	*% Reduction in journey time using SCOOT*			*% Reduction in delay using SCOOT*		
	AM Peak	**OFF Peak**	**PM Peak**	**AM Peak**	**OFF Peak**	**PM Peak**
Isolated Vehicle Actuated	**18***		**26***	**39***	**1**	**48***

*Results significant at the 95% confidence level.

Economic benefit, excluding accident and fire damage savings, amounted to approximately **£140,000 p.a.** for the Portswood/St. Denys area alone.

- **COVENTRY 1981**

SCOOT was assessed in two areas in Coventry by TRL. Foleshill Road is a major arterial connecting the centre of Coventry with the M6. Spon End is a network of streets in the western suburbs of Coventry.

System	*Previous Control*	*% Reduction in journey time using SCOOT*			*% Reduction in delay using SCOOT*		
		AM Peak	**OFF Peak**	**PM Peak**	**AM Peak**	**OFF Peak**	**PM Peak**
Coventry - Foleshill Rd	**Fixed-time TRANSYT**	**5**	**4***	**8***	**23**	**33***	**22***
Coventry - Spon End	**Fixed-time TRANSYT**	**3**	**0**	**1**	**8**	**0**	**4**

*Results significant at the 95% confidence level.

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Bus Priority Survey Results

- **LONDON 1996**

The Transportation Research Group (TRG) carried bus priority field trials in areas of Camden Town and Edgeware Road in London as part of the PROMPT project. The Camden network consisted of 11 nodes and 28 links. The Edgeware Road site was a linear network consisting of 8 nodes and 2 pelican crossings.

The bus routes were surveyed for the periods 07:00 - 12:00 and 14:00 - 19:00.

Site: Camden Town		
Strategy	**Reduction in Bus Delay sec/bus/link**	**Gain in Veh delay sec/veh/link**
Central Extensions	**0.2 (1%)**	**1.7**
C.E. + Recalls	**3.7* (17%)**	**5.3***
Local Extensions	**4.2* (19%)**	**0.4**
L.E. + Recalls	**4.8* (22%)**	**5.0***

* values are statistically significant (5% level).
Percentage changes in brackets

These results (50% saturation) show that greater benefits can be obtained where there is more spare capacity.

Site: Camden Town (Low saturation level: average 50%)		
Strategy	**Reduction in Bus Delay sec/bus/link**	**Gain in Veh delay sec/veh/link**
Central Extensions	**4.8* (44%)**	**-0.1**
C.E. + Recalls	**7.5* (68%)**	**-1.6**
Local Extensions	**7.5* (68%)**	**-1.2**
L.E. + Recalls	**7.8* (71%)**	**-0.6**

* values are statistically significant (5% level).
Percentage changes in brackets

Site: Edgeware Road		
Strategy	**Reduction in Bus Delay sec/bus/link**	**Gain in Veh delay sec/veh/link**
Local Extensions	**2.8* (33%)**	**-0.1**
L.E. + Recalls	**3.1* (35%)**	**4.0***

* values are statistically significant (5% level).
Percentage changes in brackets

- **SOUTHAMPTON (LANCES HILL) 1994/1995**

The trial for bus priority was carried out in the Bitterne area of Southampton at the junction of Lances Hill and Maybray King Way. The ROMANSE office of Hampshire County Council carried out the trial. Normal SCOOT operation (with no bus priority) was compared with SCOOT + Central Extensions and Recalls.

Site: Lances Hill - Southampton	
Time Period	**% Reduction in Journey time**
Morning Peak	**60.7**
Off peak	**3.6**
Evening Peak	**36.8**
All Periods	**41.7**

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