

Traffic Standards and Guidelines
1995/96 Survey

Street Lighting



June 1997

Survey of Traffic Standards and Guidelines

The Land Transport Safety Authority is a stand-alone authority responsible for promoting safety in Land Transport at reasonable cost. Part of its function defined in statute is to “monitor adherence to safety standards within the land transport system”.

For a number of years the regional engineering sections of the Land Transport Safety Authority have had a programme to survey the implementation of various safety standards by road-controlling authorities.

The purpose of the surveys is to:

- assist and advise road controlling authorities on the implementation of selected traffic standards and guidelines that affect traffic safety;
- measure the uptake of standards and guidelines by road controlling authorities;
- provide a national summary of the uptake and compliance with standards and guidelines and report findings to road controlling authorities and other interested parties; and
- identify changes to improve standards, guidelines or traffic rules.

The surveys are usually carried out in two parts:

- Part 1 uses a questionnaire to look at the systems and procedures a road controlling authority has in place to deliver on the standard.
- Part 2 uses a field survey to measure where possible the actual delivery from the users viewpoint. It essentially provides a snapshot of delivery at the date of the survey.

This report presents the national results of one of those surveys. They have previously been presented to the Traffic Management Workshop. I hope you find the information of value and can use it to further the interests of road safety in New Zealand.

Please contact the Regional Engineer at the LTSA’s Auckland, Wellington or Christchurch Office if you would like further information or assistance with implementing traffic standards or guidelines.

Joan Smith,
Group Manager, Regions

Executive Summary

Introduction

- Interview surveys were conducted in mid-1996 at a sample of 30 road controlling authorities to investigate procedures and programmes for three safety areas - traffic signal light output, street lighting, and signing and layout of slip lanes.
- This report details the results of the survey of street lighting. Companion reports detail the results of the other two safety areas.

Results

- The majority (87%) of road controlling authorities determined the needs and priorities for installing and upgrading street lighting rather than the power authority. This is good from a road safety perspective.
- Over 40% of authorities are using established hierarchies and priority lists for improving street lighting. This is also good from a road safety perspective.
- Only 32% of authorities had a full pole by pole maintenance database and only 23% had a regular cycle of bulk lamp replacement.
- In urban areas it was estimated 35% of arterial roads, 45% of collector roads and 60% of local roads had street lighting below the standard the road controlling authorities consider appropriate.

Discussion

- Upgrading all street lighting on traffic routes in New Zealand to the new joint Australia/New Zealand standard would cost an estimated \$65 million.

Recommendations

- All road controlling authorities should:
 - use the joint Australia/New Zealand standard AS/NZS1158:1997 "Road Lighting" which replaced NZS6701 in 1997;
 - exploit the safety benefits of upgrading/installing street lighting to the new standard;

- adopt a pole by pole maintenance database and/or a regular bulk lamp replacement programme.

Contents

	Page
Executive Summary	iii
1. Introduction	1
2. Purpose of the Survey	1
3. Methodology	1
3.1 Sample Selection	1
3.2 Interview Surveys	1
3.3 Field Surveys	2
4. Results	2
4.1 Interview Surveys	2
5. Discussion	5
6. Recommendation	6
7. Reference	6

1. Introduction

In mid-1996 the Regional Offices of the Land Transport Safety Authority (LTSA) conducted surveys of three standards and guidelines in 30 road controlling authorities.

The standards and guidelines surveyed were:

- traffic signal light output (Australian Standard AS 2144)
- street lighting (New Zealand Standard NZS 6701:1983, draft Australia/New Zealand Standard AS/NZS 1158:1997)
- treatment of slip lanes at traffic signals (RTS9 - Guidelines for Signing and Layout of Slip Lanes)

This report describes the procedures for the survey of street lighting and presents the results.

2. Purpose of the Surveys

The purpose of the survey on street lighting was to:

- review procedures used by road controlling authorities for installing and maintaining street lighting;
- determine the state of New Zealand's street lighting against NZS6701 and the proposed new joint Australia / NZ standard.
- assist and advise road controlling authorities on their use of street lighting;
- recommend any justifiable action for implementation of improved standards and policies.

3. Methodology

3.1 Sample Selection

A sample of 30 road controlling authorities was chosen for inclusion in the survey. The sample was biased towards authorities not included in the LTSA's surveys the previous year.

3.2 Interview Surveys

Interview surveys were conducted with representatives in each authority. Survey forms were sent in advance to allow time to research answers if necessary. Questions centred on programmes, procedures and criteria used for installing, maintaining and upgrading street lighting.

3.3 Field Surveys

No formal field surveys were carried out on street lighting. A number of authorities, however, took the opportunity to go on-site with LTSA staff to observe methods used for measuring lighting levels.

4. Results

4.1 Interview Surveys

4.1.1 Responsibility for Street Lighting

There are a number of steps involved in providing and maintaining street lighting. These include:

- determining appropriate lighting levels – i.e. V1 to V4;
- deciding priorities for installing or upgrading lighting
- designing new or upgraded installations
- installing the street lighting hardware
- defining maintenance schedules
- carrying out the maintenance

TABLE 1 ORGANISATIONS RESPONSIBLE FOR PROVIDING AND MAINTAINING STREET LIGHTING

	Road Controlling Authority	RCA and Power Supply Authority	Power Supply Authority	Consultant and/or Contractor	No data
Needs and Priorities	27 (87%)	4 (13%)			
Design of Installations	6 (19%)		9 (29%)	13 (42%)	3 (10%)
Installation of Hardware			11 (35%)	12 (39%)	8 (26%)
Defining Maintenance Schedule	7 (23%)	3 (10%)	5 (16%)		16 (51%)
Doing Maintenance			10 (32%)	6 (19%)	15(49%)

The organisations responsible for each of these steps in the authorities surveyed are summarised in Table 1. This shows:

- needs and priorities for upgrading or installing new street lighting are mostly determined by the road controlling authority;

- design and installation is done mainly by power supply authorities or consultants.

These are desirable arrangements from a road safety perspective. Comments made during the interviews suggested that these arrangements are becoming more prevalent.

4.1.2 Criteria for Upgrading/Installing New Street Lighting

Authorities were asked which of four specific criteria were used for upgrading or installing new street lighting. A fifth criterion ("Other") was provided for which a description was sought. Twenty-nine authorities provided information. Of the five criteria:

- 13 authorities (45%) used an established hierarchy and priority list;
- 27 authorities (89%) installed or upgraded following a crash reduction study;
- 17 authorities (59%) reacted to requests from politicians or the public
- 11 authorities (38%) used decisions by road controlling authority engineers, power authority engineers or consultants;
- 7 authorities (24%) used "other" criteria

Of the "Other" criteria used:

- 7 (23%) upgraded when the power supply was being put underground
- 1 upgraded at the same time as removing PCB's
- 3 upgraded in conjunction with road or intersection reconstruction.

Of the twenty-nine authorities:

- 2 (7%) used one of the criteria;
- 13 (45%) used two;
- 10 (34%) used three;
- 3 (10%) used four;
- 1 (4%) used five.

The most systematic and desirable criterion is to have an established hierarchy of street lighting and to determine priorities based on it. Again, from comments made during interviews, it is clear this is becoming a more common method.

4.1.3 Maintenance Methods

Information was available from twenty-nine authorities on maintenance methods used for street lighting. Of the five methods specified in the questionnaire:

- 23 authorities (74%) replaced lamps and fittings only if they failed;
- 9 (29%) regularly cleaned lamps and fittings according to a fixed schedule;
- 7 (23%) replaced lamps in bulk on a regular cycle (of 2 to 5 years.);
- 10 (32%) kept a full maintenance database on a pole by pole basis;
- 17 (55%) carried out 3 to 9 month cycles of field inspections for outages.

Of the twenty-nine authorities:

- 6 (21%) used one method only.
- 10 (34%) used a combination of two methods
- 10 (34%) used a combination of three methods
- 3 (10%) used a combination of four methods

It is necessary to have either a full pole by pole database or a bulk replacement policy to ensure that lighting performance is maintained at the levels specified in NZS 6701 (now AS/NZS 1158 1997).

4.1.4 Standard/Code of Practice Used for Street Lighting

Standards or codes of practice used by lighting decision-makers and designers were:

- 17 (55%) used NZS6701 alone;
- 9 (29%) used NZS6701 plus local variations;
- 3 (10%) used NZS6701 and Australian Standard AS1158;
- 3 (10%) used only their own local code.

4.1.5 Software for Lighting Design

Software packages used for designing lighting installations were:

- 25 (81%) used manufacturers' software (usually ECG)
- 4 (13%) used SAA STAN (Australian standard)
- 1 (3%) used no software package

4.1.6 Costs of Upgrading Street Lighting

Authorities were asked to estimate the proportion of each category of road in their network where the street lighting met NZS6701 at an appropriate level. They were also asked to estimate how much it would cost to upgrade the remaining roads in their network to that standard. The results of this latter question were extrapolated on a population basis to estimate how much it would cost to upgrade street lighting nationally to meet the standard.

The results are described in Table 2.

TABLE 2 ESTIMATES OF STREETS BELOW LIGHTING STANDARD AND COSTS TO UPGRADE

Road Category	% below standard	Cost to upgrade
Arterial	35%	\$40,000,000
Collector	45%	\$25,000,000
Local	60%	\$30,000,000
		\$95,000,000

5. Discussion

There are some positive trends apparent from the results of the interview surveys on street lighting:

- Road controlling authorities are taking over the role of determining the needs and priorities for upgrading and installing new street lighting.
- An increasing number of authorities are using an established hierarchy of street lighting to determine priorities.
- More authorities are now keeping a full database of street lighting and carrying out bulk replacement of lamps to ensure their street lighting maintains good performance.

These are all trends the LTSA supports.

Crash savings from installing new or upgraded street lighting on traffic routes (Collectors and Arterials) are currently estimated at 30-40%. (1)

From the estimates provided during this survey it would cost around \$65 million to upgrade the nation's street lighting on Collector and Arterial routes to the desired level based on NZS 6701 or AS/NZS 1158 1997.

6. Recommendations

All road controlling authorities should:

- use the new joint Australia/New Zealand standard AS/NZS 1158 "Road Lighting" which replaced NZS6701 in 1997;
- exploit the safety benefits of upgrading or installing street lighting to the new standard;
- adopt a pole by pole maintenance database and/or a regular bulk lamp replacement programme to ensure lighting installations continue to meet AS/NZS 1158.

7. Reference

- (1) M.J. Jackett (1996) - "*Accident Savings from Road Lighting in New Zealand*", Proceedings of Roads '96 Conference, Christchurch 1996.

