

SUBMISSION TO IPART

RURAL AND REGIONAL BUS FARES

Background – NSW Rural and Regional Fares

BusNSW represents the NSW Private Bus Industry and has been a partner with the NSW Government in reforming bus contracts in Rural and Regional (RR) NSW.

Now that these reforms (new contracts) have been implemented, IPART determines the new maximum fare scales that operators use to set fares. Fares can be set up to or equal to the maximum fare. Fares are distance based and there are concession fares and excursion fares.

There are 2 types of contracts covering RR route and school services. “Contract A’s” for dedicated school services and “Contract B’s” which cover both school and route services. Both types can carry fare / concession paying passengers.

There are 45 country towns in NSW with a population greater than 7,500, which is the level set by the Government to qualify for route services within the town boundary (defined by ABS census data).

Contracts also provide for village to town and town to town services. Journeys over 40km can be provided by non-contracted (deregulated) bus/coach operators who are free to set the fares outside the IPART jurisdiction.

There are also country rail services and CountryLink rail and CountryLink coach services that have different fares and concessions to RR contracted bus services.

Cost Index adopted by IPART

IPART has developed a Cost Index with reference to previous submissions from the industry and have improved and simplified the process of estimating the changes in the Bus Industry Cost Index.

BusNSW supports the inflator methodology used.

Calculation of the change of costs over the past year

BusNSW requests IPART adjust its calculation published in the fact sheet to include 3 cost items not adequately provided in the fare increase approved last year.

27 Villiers Street
North Parramatta NSW 2151
Locked Bag 13
North Parramatta NSW 1750
Phone: (02) 8839 9500
Fax: (02) 9683 1465

ABN: 71 965 227 022
Bus and Coach Industrial Association (NSW)

1. IPART have only allowed \$815 per bus per annum to cover the costs of major reforms to the Bus Operator Accreditation System (BOAS). The Government and Industry agreed that \$2,000 (July 2008) per bus per annum was an appropriate cost for the new accreditation system. There is extensive documentation available on the new system, manuals, audit tools etc.

The bus accreditation standards are based on improving safety and reliability and are underpinned by new Safety Management System requirements which include requirements for Drug & Alcohol Programs, Driver Fatigue Programs, Health Management Programs and a wide range of other safety requirements.

A number of the increased accreditation costs are bus related (the same for each bus eg. bus pre-departure and defect reporting) and some are depot or company related eg. the requirement to maintain a Safety "Risk Register." The size of bus operations varies considerably as does the company structure and operating environments.

In 2008 IPART engaged a consultant to advise IPART on the costs of BOAS and the consultant arrived at an amount of \$815 per bus per annum. This was done without reasonable consultation with the Industry or the Government and without being involved in the development (nor fully understanding the scope and operation of BOAS requirements) of the new accreditation standards. The consultant did not cover all of the relevant compliance costs.

The non-fare payments to operators under new contracts are based on detailed cost analysis and the acceptance that industry averages would not always reflect individual operator's capital costs, however the overall benefit to Government in taking industry averages as opposed to per operator costs are a significant saving to Government in administration cost.

Indec was re-engaged by IPART to assess the reasonableness of the \$2,000 per bus but without the experience and consultation needed to make valid recommendations. Many of the recommendations made by Indec lacked commercial scrutiny.

The Indec Report refers to BusNSW calculations and fails to recognise that the final \$2,000 figure was a negotiated figure set by Government, and not by BusNSW.

The IPART assessment of \$815 per bus made assumptions, which the industry considers under-estimated the actual costs. For example, the \$815 estimate excludes the costs of undertaking pre departure checks and end of shift procedures. These requirements are an integral part of the

accreditation standards and the external audit process, and were part of the negotiations with Industry.

The cost to operators using 15 minutes per day per bus (total two inspections) assuming only 260 running days per year, this cost would be \$1,794 per bus per year (based on the driver's hourly rate plus 30% overhead costs). Extracts of accreditation documents showing the compulsory introduction of these checks is attached.

You can see that this figure alone is more than the \$815 per annum per bus used in the IPART Model. BusNSW requests the Model be adjusted to provide for \$2,000, not \$815 per bus. Contract A operators received an adjustment in the minimum hours paid for these additional costs, but the Type B contract holders (ie. relevant for fare determination) were part of the \$2,000 negotiations.

BusNSW requests the additional \$1,185 p.a. per bus indexed to current value be included in the fare calculation being undertaken by IPART.

2. IPART assessed that 39% of the RR wages related to administration, mechanics and cleaning and did not apply the 7% drivers wage increase to these categories. In RR operations, bus operators' administration staff, cleaners and mechanics carry out driving duties and hence also received the 7% increase.

The award / agreement covering drivers in rural and regional NSW provides for Mixed Function employment. Clause 10 states: "An employee required by his/her employer to work for less than two hours a day on work carrying a higher rate of pay shall be paid at the higher rate for the actual time so worked and when required to work for more than two hours a day on such work he/she shall be paid as for a whole days work."

3. IPART did not allow for the increased fuel consumption and maintenance costs as a result of the decision to make it compulsory that all new vehicles be air-conditioned. However, the Government (NSWTI) did accept these costs in the non fare component of payment to operators.

BusNSW requests that \$1,979 p.a. per bus (July 2008) be indexed to current values be included in the current IPART RR fare determination for air-conditioning maintenance costs. 35% of these costs can be included in the current determination and the balance spread over the next 13 years on a similar basis to the non-fare component.

The increased fuel consumption due to air-conditioning is estimated at 4.2 litres per 100 km. 35% of these costs can be included in the current determination and the balance spread over the next 13 years on a similar basis to the non-fare component.

These were the figures based on the only detailed study that was available to ascertain the increased cost due to air-conditioning buses and was accepted by the NSW Government (copy attached).

SUMMARY

- The indexation applies to maximum fare scales, not the fares necessarily charged to passengers.
- BusNSW accepts IPART's inflators for applying cost increases and requests details of the final calculations with any different data sources IPART is considering.
- BusNSW requests that the Index be adjusted to reflect costs not covered by IPART's calculation as identified by 3 items above.



Darryl Mellish
Executive Director

DJM.499



SATURN CORPORATE RESOURCES PTY LTD

ABN 31 075 607 751

Transport, Economics and Management Consultants

PO Box 16, Flemington VIC 3031

Email scrport@tpg.com.au

Tel & fax 9370 5388

Mbl 0402 070803

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**VICTORIAN COUNTRY SCHOOL BUS
AIR CONDITIONING MAINTENANCE COST STUDY
FINAL REPORT**

**For
Bus Association Victoria (BAV)
29.01.04**

EXECUTIVE SUMMARY

The aim of this study was to estimate the maintenance and servicing costs of air conditioners (ACs) in large country school buses.

Several sources of data were sought. The primary data were gathered via a self-administered questionnaire survey of selected Victorian country school bus operators. A 93% response was achieved which resulted in raw data on 70 buses. The resulting data set was worthy of statistical analysis. It reflected a variety of experiences with some buses that had minimal AC maintenance costs and others with high costs.

The analyses indicated that the average AC maintenance cost of a large bus was \$1,788 p.a. excluding GST for each of the first five years, and \$1,134 p.a. for a midi bus (in June 2003 dollars). The data were not sufficient to estimate how costs may vary (presumably increase) throughout the life of the bus and AC unit. Further research is needed for that.

Given the assumptions and limitations of the analyses, it is important to understand how the above figures could be used as a basis for school bus operators claiming or being reimbursed for AC maintenance costs. Suggestions are made in the 'Interpretation of Results' section of the report.

ACKNOWLEDGEMENTS

This study would not have been possible without the cooperation of AC manufacturers, service agents and Victorian school bus operators and the time they invested in extracting AC maintenance costs and associated information. Saturn Corporate Resources is indebted to the individuals, who are not named, in order to preserve confidentiality.

DISCLAIMER

Saturn Corporate Resources used its best endeavours to ensure the quality of the data on which the analyses and findings in this report are based. Saturn Corporate Resources can take no responsibility for any inaccuracies or errors that may have related to the data, which has been provided by third parties in good faith, or for any misinterpretations by the reader.

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PURPOSE

"The objective of the work is to estimate the maintenance and servicing costs of air conditioners in large country school buses (not mini buses) introduced since the requirement for air conditioners in such vehicles on Government contract.

The estimate is to:-

- exclude initial capital costs of air conditioning systems;
- exclude the increased fuel consumption cost associated with an air conditioner;
- include all other recurrent operating costs i.e. both maintenance costs, servicing/cleaning costs and preventative maintenance costs;
- include occasional replacement costs e.g. of compressors and other large system components at the ends of their lives;
- include any increased engine or chassis maintenance (flow-on) costs, consequential to the fitting of air conditioners;
- include identification of GST and any other tax components; and
- include identification of on-costs to any labour components.

Cost data will ideally pertain to the 2002-03 year as measured in June 2003 dollars. Where a bus has mixed use, the school use costs will be segregated from charter, route operations, dead running, etc. where possible."

Only buses with fully ducted, refrigerant-based, reverse-cycle type air conditioning are considered. Buses without full ducting or with only evaporative cooling systems are excluded.

APPROACH

There are three potential sources of maintenance cost information: air conditioning system manufacturers, air conditioning service agents and contracted school bus operators. Each of these sources may have drawbacks, for example:

- manufacturers may not know or may tend to understate the maintenance requirements of their products in use;
- service agents may not be aware of all work on, or keep records by, individual buses; and
- most operators have had limited experience with air conditioner costs in school buses since year 2000.

This study of maintenance costs includes surveys of all three sources of data, with a view to providing a comprehensive basis for estimating the costs. Manufacturers' maintenance schedules are expected to cover the life of the air conditioners. Service agents' information is expected to shed light on the extra costs of minor failures and breakdowns under various operating conditions that may not be anticipated by manufacturers. School bus operators' accounting records are expected to provide the most accurate records of actual costs, albeit for only the first few years, when warranties apply and before major breakdowns and refurbishments are scheduled.

Tasks

The following three complementary tasks were proposed to provide a comprehensive basis for estimating the costs.

Task 1 Manufacturers' theoretical whole-of-life cost estimates: The four main equipment manufacturers were consulted about their makes, models, capacities, power ratings, warranties, preventative maintenance and service schedules over the

life of a bus (assumed to be 20 years). Spare parts costs were to be obtained and tallied together with the manufacturer's estimate of, or charge for, parts replacement, lubrication, servicing, cleaning, etc. over the life of a bus.

This information may reflect the recommended or ideal rate of servicing, which may not be known or adopted by all operators. In practice, a higher or lower servicing rate may be adopted due to operating conditions, etc. For example, dusty operating conditions and passenger hygiene considerations may result in more than the recommended servicing rate. This theoretical cost information may provide a lower bound estimate of the minimal maintenance that an operator should be performing. It is unlikely to reflect engine, transmission or other problems that result from extra air conditioner loads/incompatibilities or other circumstances.

As this task was not expected to adequately reflect unforeseen breakdowns and other costs that occur in practice, it needed to be complemented by information from service agents, as proposed in Task 2.

Task 2 Refrigeration engineering cost estimates: Here, the task was to assess the variation of actual costs from manufacturers' theoretical costs (in Task 1), based on the experience of air conditioning service agents, maintenance specialists, refrigeration engineering practitioners and coach operators who perform their own air conditioning maintenance. This was intended to provide a practical insight into whole-of-life costs, industry-wide air conditioning problems/costs, labour rates charged, and spare parts cost mark-ups. Eight face-to-face or telephone interviews were proposed. The data were expected to be useful to build on the information gathered in Task 1 and to derive realistic whole-of-life costs.

Such a practical whole-of-life cost perspective is not available from school bus operators with only limited experience of air conditioners (since the requirement for air conditioning became mandatory) or from operators who have substantially contracted out their new air conditioner maintenance for the initial part of its life. However, their accounting system information will be particularly useful to assess costs over the first few years, as proposed in Task 3.

Task 3 Survey of school bus air conditioning maintenance costs

This task aimed to gather actual annual data on a sample of 30 or more individual school buses for the years that they were fitted with air conditioners (2002-03, 2001-02, 2000-01, 1999-2000 and 1998-99, where appropriate). A self-administered questionnaire was used for gathering the data from selected school bus operators under contract to the Government. At best, this produced 5 years of data from operators who had air conditioners before they were mandated, which were used to compare with the equivalent costs identified in Tasks 1 and 2.

Questionnaire responses were discussed with all bus operator respondents to understand what costs may have been included/excluded in relation to the full range of costs identified from Tasks 1 and 2 (and which costs were covered by warranty). This helped to identify any tendency of operators to under-estimate certain air-conditioning related costs.

Task 4 Synthesis of Results from Tables 1 to 3

This task aimed to synthesise the results of Tasks 1 to 3 to provide estimates of air conditioning maintenance costs over the life of a school bus. To produce comparative data, the costs from Tasks 1, 2 and 3 were standardised. The use of standardised costs as a basis reimbursing contracted school bus operators was briefly discussed.

Methodology

The work undertaken for each of the four tasks is described below.

For **Task 1**: document manufacturers' main makes and models, identify preventative maintenance schedules and hours assigned for each activity, draft interview format, make prior request for spare parts costs, consult the four main manufacturers, tabulate and tally spare parts costs over life of bus, document assumptions, findings, conclusions and limitations, verify with manufacturers.

For **Task 2**: identify major refrigeration service centres for each make of air conditioner and other major maintenance practitioners, draft interview format, make prior request for costs, consult the practitioners, identify nature of scheduled and unscheduled work performed over the life of a bus vis-à-vis manufacturers' schedules, tabulate and tally costs over life of a bus, document assumptions, findings, conclusions and limitations, verify with interviewees.

For **Task 3**: draft questionnaire, receive BAV feedback, pilot and refine questionnaire with two bus operators, assist drafting of letter of introduction, assist launch of questionnaire, conduct initial round of phone calls to ensure questionnaire is in the hands of the right respondent at each bus company sampled, emphasise its importance and field any questions.

Follow-up phone calls (where necessary) to encourage completion and return of questionnaire; receive responses, data entry, discussion with operators of gaps, assumptions and impediments, recording of any of these impediments remaining, data corrections and adjustments.

Analyse data statistically, develop cost functions (mathematical constructs), and carry out regression analyses if appropriate, estimate accuracy limits, tabulate findings.

The BAV provided contact details for operators and distributed questionnaires. No allowance was made to visit operators, as it was believed that communication by telephone was adequate.

Task 4: synthesise findings and conclusions from the three tasks above, compare results with earlier survey of bus air conditioning operating costs (BAV3Rpt601.doc), draft a report; present to a discussion meeting with BAV, receive feedback; conduct additional analysis if required; finalise report.

TASK 1 RESULTS

The most common makes of ACs encountered in the survey of school bus operators (Task 3 reported below) were Coachair (76%) followed by Thermo King (9%), Carrier (7%), Denso (6%) and Custom Air (1%). This incidence of AC makes is not necessarily representative of actual market shares. The total sales by manufacturer in Victoria is not known.

The maintenance costs associated with each AC make was analysed according to information provided by the companies and telephone discussions of the information. These are reported below. Any information or interpretations drawn in the following sections cannot be interpreted to compare the quality or maintenance costs of alternative makes of ACs, as the methods and assumptions used varied. No evidence was available to test the contention that certain brands of AC are less costly to maintain and service.

Coachair's 10-year servicing and maintenance program was costed using recommended spare parts prices and a \$65 mechanic's hourly labour rate as at June 2003. This includes checking at normal service intervals and replacement of parts at typical ends of lives under normal conditions. It includes monthly servicing of filters but not minor troubleshooting and repairs, usually carried out by operators.

This analysis, shown in Appendix 2, produces an estimate of \$10,373 per country school bus excluding GST for the first 10 years of life or an average maintenance cost of \$1,037 p.a. excluding GST. The manufacturer's proviso was that these figures could underestimate the actual costs of school bus on unsealed roads or where preventative maintenance was lacking and breakdowns are common.

The relative significance of the maintenance item costs is summarised in the list below in order of descending cost.

- Compressor seals, drive belts & oil
- Cleaning filters
- Hoses
- Heating booster pump
- AC control circuitry
- Evaporator & condenser fan motor, bearings & brushes
- Idler pulley/ bearing
- Refrigeration filter dryer
- Compressor clutch bearing
- Evaporator & condenser coils (cleaning)
- Pressure switches
- Refrigerant testing and topping up
- Sealing rubbers
- Condensate drains
- Wear & tear inspections
- Condenser pressure switch
- Mounting brackets for motor, condenser, evaporator, etc.

With compressor seals being the most expensive item, the benefit of automatic short-duration operation of the AC unit even when the driver has it switched off is easy to appreciate i.e. the need to regularly operate the compressor for long enough (even for just a minute or two) to lubricate the seals.

The second most expensive item even when costed at only \$25 per hour labour rate is (monthly) cleaning of filters (usually performed by the driver or bus operator). In dusty conditions when cleaning is needed weekly, air filter maintenance becomes the most expensive maintenance expense according to this manufacturer. If weekly not monthly cleaning of filters is needed, the annual AC maintenance cost increases from \$1,037 to \$1,262 excluding GST.

Thermo King has commenced monitoring of a large fleet of route buses whose preliminary results indicated an AC maintenance cost of about \$2,000 p.a. including all work but with no allowance for travel time to country locations.

Carrier offers a 5-year fully maintained service package for new systems. The price varies according to the operator's proximity to service centres, the number of buses covered and the particular options chosen to suit the operator/vehicle/service. Presumably Carrier's package breaks even financially and is not intended to either subsidise operators or make above-normal profits – to that extent Carrier's package price may be a reasonable indicator of average expected AC maintenance cost. The package is designed for two services a year but covers more if needed. Despite

variations amongst operators, the package is priced excluding GST at about \$1,000 a year and \$1,500 a year from years 6 to 10 but this has exclusions such as:

- the cost of weekly filter cleaning;
- the cost of spare parts that are subject to wear and tear (eg. belts & bearings); and
- the cost of travel time to the bus location by the 'mechanic'.

If one were to argue that the first two years' maintenance were covered by warranty, then the cost of each of the first five years cost could be assumed to be \$250, \$250, \$1,500, \$1,500 and \$1,500, which produces a total of \$5,000 for 5 year package or \$1,000 p.a., as is typically charged. It is interesting that Carrier considers the average annual AC maintenance cost to increase by about 50% after year 5.

If weekly filter cleaning, troubleshooting and other 'missing' operator costs are added, as done in Task 4 below, the total cost of AC maintenance can be estimated from this base cost.

Denso has been to some length in cooperation with bus operators to monitor the maintenance costs of their ACs versus their competitors. The results of two detailed fleet comparisons were made available and these are intended to exemplify the order of magnitude of AC maintenance costs in recent times.

Denso's promotional brochure showed that the average AC maintenance cost of buses with other than Denso ACs was \$1,678/bus p.a. in July 1997, which is about \$1,973/bus p.a. in 2003 dollars (using as the inflator ABS' CPI All Groups Weighted Average of 8 Capital Cities). However, this cost only included costs recorded at the operator's service agent and did not include minor servicing, troubleshooting and repairs by the operator. The comparative average maintenance cost of the operator's buses fitted with Denso ACs was supposedly considerably less but it too did not include minor servicing, troubleshooting and repairs, and cannot be quoted here for confidentiality. The buses were city (route) buses operated in Sydney, which may have slightly higher AC maintenance than school buses in Country Victoria (because of Sydney's generally warmer weather, etc.).

Denso's second analysis was sourced from an operator of coaches in NSW and Queensland. The information was based on fleet records and was believed to include minor servicing, troubleshooting and all repair work by the operator, and hence be more complete. The first three years data were removed so as to exclude any effect of warranty repairs. The overall average maintenance cost was \$1,143 when converted to 2003 dollars. There were considerable variations of AC maintenance costs for the same types of buses and for different coaches ranging between \$112 p.a. and \$1,913 p.a. - lending weight to a hypothesis that AC maintenance costs are largely a function of each individual vehicle (the luck is in the draw!). As the fleet operator was highly experienced, it is believed that the maximum service lives were being achieved with AC parts, replacements were minimal and costs were kept to a minimum, more so than with country school bus operators. Coach operations on highway may involve less maintenance than on school buses on country roads. To extrapolate this average cost to Victorian school buses is difficult - the intent of including this information is only to give confidence in the order of magnitude of estimates.

TASK 2 RESULTS

Telephone Survey of Service Agents

Major city service agents were interviewed by telephone as well as some small country agents (six in all). There was consensus that the average hourly rate was \$65/hour as at June 2003 including on-costs (but excluding GST). On other matters,

such as AC business experience, maintenance philosophies and cost estimates, diversity was encountered. Realistic AC maintenance costs probably lie between the two extremes sampled.

At one extreme, were two very experienced agents who claimed that the AC maintenance cost of a country school bus in the first four years was only \$380 to \$400 p.a. (i.e. labour and parts excluding GST). This excluded:

- air filter cleaning and checking;
- breakdowns (which they said were rare); and
- travel.

Both agents felt they had learned through extensive experience how to minimise AC maintenance costs and this was said to be due to factors such as appropriate selection of bus and AC unit at the outset, servicing from the time of purchase and education of operators about monthly maintenance (mostly large fleet operators with economies of scale, the 'right' equipment, etc.). They were prepared to allow some low kilometre buses to run for two years without a service. Both agents felt unnecessary servicing was prevalent in the industry, particularly with inexperienced bus operators (possibly meaning too much preventative maintenance is done). One of the agents admitted once-off expenditure was needed to upgrade many of the brackets and fittings of town buses for use as school buses on unsealed roads but such costs were regarded as capital not maintenance costs.

At the other extreme were agents whose businesses involved a number of unscheduled AC breakdowns involving small fleet operators. These agents would not be willing to enter a contract to do AC maintenance under about \$1,600 p.a. labour only or \$2,000 labour and parts, both excluding GST. Travel costs were regarded as additional, where required. Some agents would insist on quarterly checks to attempt to avoid any problems becoming serious, especially where the operator could not be relied upon to do more than air filter cleaning and basic routine checking and initial troubleshooting – this implies a philosophy of needing more preventative maintenance. Their customers typically included operators of small fleets with a range of AC-bus combinations. Some agents' experience is coloured by repeated problems with TX valves, electronic/electrical or other components on certain AC systems. The views of these agents could have been biased if their bus operator customers serviced their own buses up to the level of serious problems, which would mean that these agents are seeing the worst cases – this was mentioned by one agent.

TASK 3 RESULTS

The Bus Operator Questionnaire

The design of the questionnaire evolved from previous BAV questionnaires developed by Saturn, feedback from John Stanley and Keith Foote at BAV as well as pilot tests by Stuart Lock at Seymour Bus Service and Larry Fallon at Fallon's Bus Service.

It was assumed that there were five main categories of maintenance as follows.

A Cleaning/replacing air filters & frequent checking (usually performed internally by your driver or cleaner, not mechanic, but sometimes contracted out).

B AC maintenance and servicing, conducted annually or as required (work may be internal technician and/or contracted out). This includes both preventative and scheduled maintenance including testing, electrical,

refrigeration & mechanical repairs e.g. replacing electronics, switches, thermostats, pressure switches, fan motor parts, gas, seals, belts, other parts and un-clogging/servicing drains, condenser, evaporator, magnetic clutch and internal parts. All maintenance except the 'extraordinary' below.

C Major overhauls, part replacements and re-builds, which are usually nil for new and young AC systems except where a major part has worn out or failed prematurely (work may be internal and/or contracted out). Subtract any costs covered by warranty. Include costs of AC overhauls that were recommended by the manufacture after say 10,000 hours.

D Engine & bus problems caused by the fitting and operation of air conditioning e.g. pulley/crankshaft problems, roof/window leaks, broken mountings (work may be internal and/or external). These consequential costs of damage to the bus are usually nil but occasionally when incurred they are not offset by the warranty, which only covers the AC system itself.

E Internal effort associated with any contracting out of B, C & D type work e.g. booking service agent, delivering or towing bus, hiring replacement bus, accommodation, fuel, etc.

B-type costs are usually incurred by operators and are delineated in their accounts. A-type costs are incurred but may sometimes be covered by drivers or cleaners wages, so these needed to be segregated or estimated by operators rather than merely transcribed from the past year's accounts. C, D and E -type costs may not be incurred by every operator in the early years or at all. If they had zero costs they have been fortunate. If they incurred some C, D or E-type costs, they have experienced problems that are (according to the manufacturers) somewhat abnormal or premature.

The questionnaire is given in **Appendix 1**.

Assumptions Made in the Questionnaire

One assumption is that the occasional use of buses on different routes and by different drivers is not significant from an AC maintenance cost point of view. However, no data were available from operators on the kilometres for each route, dead-running or non-school activities.

The questionnaire assumed that all buses were properly maintained i.e. that buses do not have higher-than-normal or less-than-normal AC maintenance cost as a result of them not being properly maintained.

It was assumed that costs recorded by operators were the residuals after any reimbursements received under warranty, as was stated by most, but not all, operators.

Previous years' AC maintenance cost data were not inflated (i.e. compounded) using a price index as most bus operators estimated the previous years' costs in current 2002-03 dollars. The cost data set was treated as being in June 2003 dollars and it excludes the opportunity cost of funds expended by bus operators over previous years. Task 4 results (later) make allowance for this.

One operator had spent over \$4,000 per bus on initial AC modifications and upgrades upon taking delivery of each new bus; however, after discussions it was agreed that these be treated as capital costs not category C costs.

Questionnaire Response

Thirteen of the operators originally sent the questionnaire did not own the type of air conditioner and bus on contract that was being studied, or had not owned one for at least one full year. A second round of questionnaires was distributed with a response date in November 2003. This was intended to achieve an adequate statistical sample.

The potential maximum response from 'eligible' operators targeted was 29 operators. By 4 December 2003, two weeks after the questionnaire completion date set, the following response was achieved:

- 27 completed questionnaires (93%)
- 2 promised but not received after three reminders were given.

This response rate is considered to be very high and indicative of the strong interest by school bus operators in full recovery of all bus costs, particularly air conditioning maintenance costs.

These responses produced data for 70 buses. The largest respondent had 7 buses and the smallest had one. Eleven of the buses had seating for 29 to 45 passengers with around 60,000 to 62,000 BTU/hr AC rated output. This left 59 large buses with seating for 43 to 67 passengers and AC rated output of 90,000 to 120,000 BTU/hr. Analysis of AC maintenance costs was therefore conducted separately for mid-buses and large buses.

Follow-up Telephone Interview Responses

Data gaps and apparent errors were corrected in consultation with respondents where possible in December 2003 and January 2004. Where uncertainties remained, information was obtained from bus equipment manufacturers and representatives of BAV to improve or complete the data.

Analysis of Data

The following comments pertain to the 27 operator questionnaire responses (70 buses).

The inadequacies of answers to questions and the way these were dealt with are listed below.

Question 1

- Main Route Used by each bus was used to incorporate non-survey data on Climate. This was intended to indicate geographic and climatic operating conditions – the lower the value the more arduous service operating conditions due to climatic extremes in temperature and terrain.
- Model of Air-conditioner was not known for 11 buses.

'Annual Data & Estimates' Question

- The percentage of bus kilometres that the AC operated was not recorded for 4 buses, which limited the use of this variable.
- Air-conditioning (AC) Operating Hours was not available for 11 of the buses, which limited the use of this variable as well.

AC Maintenance Costs Question

- Operators' cost estimates were verified by inclusion of invoices in several cases. There were no GST costs in years 1998-99 and 1999-2000. Operators generally estimated costs without GST in the subsequent three years. In cases where this

was not stated, it was clarified with the operator or assumed to be exclusive of GST. If GST was included by the operator, it was removed for the following analysis.

Ignoring any data imperfections for the time being, the AC maintenance cost statistics are as tabulated below. All costs are net of warranty reimbursements and exclude GST.

**Table 1 Maintenance Costs for Country School Buses of All Ages
in 2002-03 Dollars**

	Cost (\$p.a.) Mean	Cost (\$p.a.) Std. Devn.	Cost (\$p.a.) Minimum	Cost (\$p.a.) Maximum	No. of Buses in Sample
Large Buses					
1 st Year	1,300	1,188	0	7,375	58
2 nd Year	1,967	1,786	390	9,050	36
3 rd Year	2,043	1,406	390	5,375	17
4 th Year	2,065	1,281	800	3,850	4
5 th Year	1,565	0	1,565	1,565	1
Average	1,788				
Midi-Buses					
1 st Year	996	297	522	1,202	11
2 nd Year	988	358	522	1,246	11
3 rd Year	1,133	278	522	1,295	10
4 th Year	1,240	290	522	1,343	8
5 th Year	1,313	229	747	1,394	8
Average	1,134				

The costs in this table are net of any warranty rebates from AC manufacturers.

The above statistics indicate that:

- In spite of manufacturers' warranties, AC maintenance costs are rarely zero in the first year of bus ownership. This is due to:
 - equipment weaknesses coming to light in the first two years
 - initial trouble-shooting costs of operators
 - regular servicing/cleaning by operators (not covered by warranty)
 - minor repair costs not worth operators claiming under warranty; and
 - inability of operators to successfully claim under warranty all the costs incurred (Only certain B and C-type costs would be eligible).
- AC maintenance costs appear to increase with bus age for the first 4 or 5 years, but there was one bus with a 5-year history and it broke this upward trend in the fifth year.
- AC maintenance costs of midi-buses are about 63% of those for large buses. This could be partly explained by their reduced AC operating hours p.a. (308 versus 632) as well as their lower bus kilometres run p.a. (22,001 versus 26,364 in their first year).
- The variance of maintenance costs amongst operators is large, particularly as some large bus operators experienced catastrophically high AC maintenance costs in the first 3 years while others had negligible costs.

The statistical breakdown above indicates that while AC average maintenance costs increase with bus age for the first 4 or 5 years in general, there may be cost variations up and down from year to year (corresponding with the particular service levels and maintenance/repairs encountered by the operators surveyed).

The survey encountered type A, B, C, D and E maintenance costs for some large buses and type A, B and E type maintenance costs for some midi buses. In other words, no midi buses experienced major overhauls/rebuilds prematurely or engine/chassis problems related to AC.

The cost of AC maintenance experienced by operators over the first five years averaged \$1,788 for large buses and \$1,134 for midi buses, if the generally increasing cost trends from year to year were ignored. These figures have been expressed in 2002-03 dollars. In this survey, large buses refer to buses with seating for 43 to 67 passengers and AC rated output of 90,000 to 120,000 running 632 hours p.a. on average. The midi-buses had 29 to 45 seats with around 60,000 to 62,000 BTU/hr AC rated output running 308 hours p.a. on average. Given the upward trends, these averages would underestimate the actual AC maintenance costs after the fifth year of AC operating life. Further research is needed on the costs after year 4.

The breakdown of these averages is presented in the following table. The implicit average hourly labour rates charged by operators for internal category A air filter cleaning and checking were \$24.91 for large buses and \$40.60 for midi buses, probably indicating that these duties were typically carried out by drivers and mechanics respectively.

Table 2 Average AC Maintenance Cost for the First 5 Years by Cost Category

Cost Category	Item	Item	Large Bus	Midi Bus
A	Cleaning, AC filters	Hours	32	15
		Labour	797	609
		Parts	28	26
B	Maint & servicing Intl. & extl.	Labour	364	424
		Parts	156	69
C	Overhauls & rebuilds Intl. & extl.	Labour	70	0
		Parts	30	0
D	Engine & chassis Intl. & extl.	Labour	81	2
		Parts	136	1
E	Bus delivery & replacement	Labour	65	4
		Parts	61	0
		Total Labour	\$1,377	\$1,039
		Total Parts	\$411	\$96
	Total	Labour & Parts	\$1,788	\$1,134

Maintenance and servicing schedules submitted by two operators exemplified the range of tasks involved particularly in category B above. Some schedules are extremely rigorous and others superficial.

Estimated costs and invoices submitted further indicated the wide range of problems encountered. Problems included thermostats, solenoids, pressure switches, electricals, wiring, other electronics, condenser drain blockages, rust, evaporator fans, blower motors, dryer problems, pump repairs, refrigerant leaks, v-belts, pulleys, engine problems, mounting bracket fractures, chassis problems, roof problems, window problems – all of which would not have been experienced had the bus not had ACs. Clearly all these costs are part of the costs of ACs, directly or indirectly. In rare cases towing, bus delivery and overnight accommodation costs have added to the service agents costs.

The following table further illustrates a tendency for increasing average AC maintenance costs with bus age.

**Table 3 Maintenance Costs for Country School Buses by Age of Bus,
2002-03 Dollars**

Age of Bus	1 Year Old	2 Years Old	3 Years Old	4 Years Old	5 Years Old
Large Buses					
<i>No. Buses in Sample</i>	22	19	13	4	1
1 st Year Cost	1,161	1,417	951	2,645	NA
2 nd Year Cost		1,718	1,990	3,075	NA
3 rd Year Cost			2,114	1,810	NA
4 th Year cost				2,065	NA
5 th Year Cost					1,565
Average	1,161	1,568	1,685	2,149	1,565
Midi-Buses					
<i>No. Buses in Sample</i>	0	1	2	0	8
1 st Year Cost	NA	837	594	NA	1,117
2 nd Year Cost		555	536	NA	1,155
3 rd Year Cost			869	NA	1,198
4 th Year Cost				NA	1,240
5 th Year cost					1,313
Average	NA	696	1,999	NA	1,205

The costs in this table are net of any warranty rebates from AC manufacturers.
NA means no data available in these categories.

TASK 4 RESULTS

Standardised Cost Estimates

The cost estimates from each of the above tasks were standardised in the following table to enable a comparison. After standardising, the estimates from the different sources varied between \$1,403p.a. and \$3,057 p.a. excluding GST.

**Table 4 Standardised AC Maintenance Cost Estimates from Various Sources,
\$2003 (Excl. GST)**

	Coachair	Thermo King	Denso A	Denso B	Carrier	High Cost Agent	Low Cost Agent	Bus Operator Survey
<i>Notes</i>	<i>Vic. school buses</i>	<i>Estimate for Vic. Route buses</i>	<i>NSW city buses</i>	<i>NSW & Qld coaches</i>	<i>Vic service package</i>	<i>Vic. school buses</i>	<i>Vic. school buses</i>	<i>Vic. school buses</i>
Base Cost	1037	2000	1678	1143	1000	2000	390	991
Filter Cleaning	300*		797		797	797	797	797
Spare Parts					200			
Travelling	260	260	260	260	260	260	260	
Standardised Cost	\$1597	\$2260	\$2735	\$1403	\$2257	\$3057	\$1447	\$1788

Notes

- The costs in this table have been standardised by adding to the base costs any components to produce a standardised AC maintenance cost that have similar composition.
- Costs are net of any warranty rebates from AC manufacturers.
- Filter cleaning and initial trouble shooting are based on \$797 from the bus operator survey, or \$300 for operator's initial troubleshooting only.
- Travelling is estimated at 4 hours p.a. @ \$65/hour.

Only the data from AC service agents and the survey of operators were based on actual country school buses (i.e. the last 3 columns of the above Table). Coachair's estimates for country school buses in the second column are theoretical estimates

based on extensive experience but not actual vehicle records. All other columns of data were for coach or route buses operations without any basis for making their costs equivalent to Victorian country school bus costs.

The most representative source of actual AC maintenance cost data for Victorian school bus operations is from the survey of operators contracted by the Government (shown in the last column). This is not perfect as it contains estimates and assumptions, as explained earlier. It suggests that \$1,788 p.a. excluding GST is the average cost of AC maintenance on a Victorian country school bus for the first 4 or 5 years (in June 2003 dollars).

Interpretation of Results

Although there is evidence of increasing annual AC maintenance costs with increasing bus age, it would be convenient to use an average annual cost as the basis for claiming/ reimbursing such costs as part of the school contract subsidy formula.

If the \$1,788 figure is used as a basis for reimbursing bus operators, it would first need to be inflated/ compounded to the point in time at which the subsidy commences. For example, assuming an inflator of 3%, $\$1,788 \times (1+0.03)^1$ becomes \$1,842 as at June 2004. Once a figure is established for the first year of future subsidies, it should be indexed using an inflator which takes into consideration the likelihood that new technologies and AC designs together with increased operator education may curb the rate of increase in costs. Investment in collective AC training for country school bus operators could be another consideration in parallel with individual operator subsidies.

Whatever figure is used, it will be fair to some operators but not others, given the diversity of experiences in practice. Should a figure lower than, say, \$1,788 be used as the basis in 2003, provision could be allowed for relevant operators to claim costs in excess of the lower figure, upon production of receipts. A series of AC breakdowns could involve expenses that could make an operator insolvent, if not recovered.

Furthermore, if \$1,788 is used as a basis for reimbursing contracted operators for their AC expenses in previous years, back to 2000-01, the opportunity cost of funds to operators should be factored in (say, using a social time preference rate of 6.5% p.a.). Thus the reimbursements in 2003 for previous years would become:

- for 2000-01: $\$1,788 \times (1+0.065)^2 \Rightarrow \$2,028$
- for 2001-02: $\$1,788 \times (1+0.065)^1 \Rightarrow \$1,904$
- for 2002-03: $\$1,788 \times (1+0.065)^0 \Rightarrow \$1,788$.

These amounts would on average compensate a contracted operator for the 'loss of interest' on his monies that would have been 'invested' in AC maintenance instead of the operator's preferred use.

CONCLUSIONS

The four main AC manufacturers were contacted and whole-of-life AC maintenance costs discussed for country school buses. No manufacturer had been keeping track of AC maintenance costs of individual school buses but estimates were obtained and inferences drawn from their experiences.

Six AC service agents were interviewed and their varied experiences discussed and reported.

A questionnaire survey was used successfully to gather cost information from 27 operators covering 70 buses. A 5-way breakdown of AC maintenance costs was used to gather cost information for the last 5 years (or for as long as they had operated a school bus). This helped ensure operators did not overlook certain cost components but it required them to make estimates. Costs and estimates were supported with invoices by a small number of operators.

It has been concluded that the average annual cost of AC maintenance of a large country school bus for the first five years is \$1,788 p.a. in June 2003 dollars excluding GST and net of any warranty reimbursements. The equivalent cost of a midi bus is 63% of this or \$1,134 p.a. Use of these figures to claim or reimburse operators has been explained in the section above.

Alternative sources of data obtained generally give confidence in the order of magnitude of AC maintenance cost found for country school buses. However, individual operators are likely to continue to experience wide variations from this average from year to year and from bus to bus.

APPENDIX 1**QUESTIONNAIRE AND INTRODUCTORY LETTER**

BAV6doiLTRv6O03.doc

10 October 2003

Full Name
 Position
 Country School Bus Service
 Fax No.

Dear Name,

COUNTRY SCHOOL BUS AIR CONDITIONING (AC) COSTS

Bus Association Victoria is looking for evidence of the costs of school bus AC maintenance. This evidence is needed to support a claim to the Department of Infrastructure for full reimbursement of these costs to bus operators in contract payments. I am writing to ask for your assistance in completing the attached questionnaire.

The purpose of this questionnaire is to gather data on the maintenance costs of ducted, refrigerant-based, reverse-cycle type AC, over the life of each air-conditioned school bus in your fleet. Expenditure information is sought based on your accounts, invoices and estimates for each of the financial years that you have operated each AC school bus.

The questionnaire collects AC maintenance in five categories, as follows

A Cleaning/replacing air filters & frequent checking (usually performed internally by your driver or cleaner, not mechanic, but sometimes contracted out).

B AC maintenance and servicing, conducted annually or as required (work may be internal technician and/or contracted out). This includes both preventative and scheduled maintenance including testing, electrical, refrigeration & mechanical repairs e.g. replacing electronics, switches, thermostats, pressure switches, fan motor parts, gas, seals, belts, other parts and un-clogging/servicing drains, condenser, evaporator, magnetic clutch and internal parts. All maintenance except the 'extraordinary' below.

C Major overhauls, part replacements and re-builds, which are usually nil for new and young AC systems except where a major part has worn out or failed prematurely (work may be internal and/or contracted out). Subtract any costs covered by warranty. Include costs of AC overhauls that were recommended by the manufacture after say 10,000 hours.

D Engine & bus problems caused by the fitting and operation of air conditioning e.g. pulley/crankshaft problems, roof/window leaks, broken mountings (work may be internal and/or external). These consequential costs of damage to the bus are usually nil but occasionally when incurred they are not offset by the warranty, which only covers the AC system itself.

E Internal effort associated with any contracting out of B, C & D type work e.g. booking service agent, delivering or towing bus, hiring replacement bus, accommodation, fuel, etc.

Do not be concerned if your bus has had zero costs in the C, D and /or E type categories above, as these costs may not be incurred by every operator in the early years or at all. If you have had zero costs, it will not lead us to under-estimate the total AC maintenance costs because we are doing separate research with manufacturers and agents to quantify these costs and other costs over the 20-year life of a school bus. All we need from you is your actual past year costs for each bus, divided into the above categories.

Russell Smith, of Saturn Corporate Resources, has been engaged to analyse the questionnaire responses received. If you have any queries, he can be telephoned on 03 9370 5388 or 0402 070803. He may need to clarify certain responses in a follow-up telephone call to you.

Please be assured that your information will be treated in the strictest confidence by Saturn Corporate Resources and Bus Association Victoria. It shall not be made known to other parties except in anonymous form.

Please photocopy the blank questionnaire form and complete one copy for each country school bus with air conditioning that you operate. The survey is intended to cover the large school buses, not midi or mini buses (like Toyota Coasters).

Please return the forms by **Tuesday 20 October 2003** to:-

Russell Smith, Director, Saturn Corporate Resources P/L

PO Box 16 Flemington Vic 3031

Fax & tel 03 9370 5388 Email scrport@tpgi.com.au

Thank you for your assistance.

Regards,

John Stanley
Executive Director

Attached: Questionnaire (BAV6doiV4903.doc)

B.A.V. SCHOOL BUS AIR CONDITIONING (AC) MAINTENANCE COSTS SURVEY QUESTIONNAIRE October 2003 BAV6Qv5003.doc

Question	Answer	Question	Answer	Question	Answer
Your name		Year of manufacture		Area of school bus use e.g. Ballarat	
Phone number		Date of bus purchase		Engine horsepower (state if KW or HP)	
Bus registration no./ bus id		Date air conditioning was fitted		AC rating (state KW or BTU/hr)	
Make of bus		Tare weight of bus (tonnes)		Make of air conditioner	
Model of bus		No. of seats		Model of air conditioner	

Annual Data & Estimates	Year >	2002-03	2001-02	2000-01	1999-00	1998-99
Usual number of passengers carried per trip						
Bus km p.a. for all uses						
Percentage of km p.a. on school contract (estimate)						
Percentage of km p.a. that bus is operated on rough/unsealed roads (estimate)						
Percentage of km p.a. that air conditioning is operated (estimate)						
Hours p.a. that air conditioning is operated (recorded or estimate)						

AC Maintenance Costs	Year >	2002-03	2001-02	2000-01	1999-00	1998-99
A Cleaning/ replacing air filters, routine checks usually done internally by driver or cleaner, not mechanic, sometimes contracted out.	time (hrs p.a.)					
	labour (\$ p.a.)					
	materials (\$ p.a.)					
B Internal & contracted out AC maintenance & servicing costs, both preventative & scheduled e.g. normal mechanics' & agents' costs. Subtract any cost covered by warranty.	labour (\$ p.a.)					
	materials (\$ p.a.)					
C Internal & contracted out AC overhauls & major replacements/rebuild costs - usually nil for new ACs unless major parts have failed. Subtract costs covered by warranty.	labour (\$ p.a.)					
	materials (\$ p.a.)					
D Internal & contracted out consequential costs caused by AC – usually nil but a bus may experience vibration, mountings, engine, roof or water damage.	labour (\$ p.a.)					
	materials (\$ p.a.)					
E Internal effort associated with contracted out work e.g. booking agent, delivering or towing bus, hiring replacement bus, accommodation, fuel, etc.	time (hrs p.a.)					
	labour (\$ p.a.)					
	materials (\$ p.a.)					
Total AC labour and materials maint. cost (\$ p.a.) (add A,B,C,D & E \$ figures)	—————>					

Please attach invoices, comments & other information that describe the nature of AC maintenance work and give details of any fully maintained service contracts.

APPENDIX 2 ESTIMATE OF COSTS OF MANUFACTURER'S AC MAINTENANCE SCHEDULE FOR TYPICAL COUNTRY SCHOOL BUS

Item	Year >	1	2	3	4	5	6	7	8	9	10	Min. Labor	\$ Labour 8	Parts/ 10yrs	Unit Cost	\$ Parts	\$ Total
		Labour (minutes)															
Clean filters ¹		180	180	180	180	180	180	180	180	180	180	1800	\$750	10	20	\$200	\$950
Test AC controls ²		30	30	30	30	30	30	30	30	30	30	300	\$325	2	180	\$360	\$685
Compressor drive belts		60	60	60	60	60	60	60	60	60	60	600	\$650	10	50	\$500	\$1,150
Compressor seals				60			60			60		180	\$195	3	350	\$1,050	\$1,245
Compressor clutch bearing ³				60			60			60		180	\$195	3	80	\$240	\$435
Idler pulley/bearing			60		60		60		60		60	300	\$325	5	40	\$200	\$525
Compressor oil			60		60		60		60		60	300	\$325	5	120	\$600	\$925
Pressure switches		15	15	15	15	15	15	15	15	15	15	150	\$163	2	80	\$160	\$323
Check evap. & cond. motor & brushes			60		60		60		60		60	300	\$325			\$0	\$325
Replace evap. & cond. brushes						60					60	120	\$130	1	120	\$120	\$250
Motor mounting brackets		5	5	5	5	5	5	5	5	5	5	50	\$54			\$0	\$54
Refrigeration dryer			30		30		30		30		30	150	\$163	5	60	\$300	\$463
Condensate drains		20	20	20	20	20	20	20	20	20	20	200	\$217			\$0	\$217
Refrigerant pressure test & top up ⁴		20	20	20	20	20	20	20	20	20	20	200	\$217	10	10	\$100	\$317
Hoses ⁵		5	5	5	5	5	5	5	5	5	5	50	\$54	2	400	\$800	\$854
Visual wear inspection		20	20	20	20	20	20	20	20	20	20	200	\$217			\$0	\$217
Heating boost pump ⁶		20	40	20	40	20	40	20	40	20	40	300	\$325	5	76	\$380	\$705
Clean evaporator/condenser coils		30	30	30	30	30	30	30	30	30	30	300	\$325			\$0	\$325
Sealing rubbers ⁷		20	20	20	20	20	20	20	20	20	20	200	\$217	1	30	\$30	\$247
Condenser pressure sw		10	10	10	10	10	10	10	10	10	10	100	\$108			\$0	\$108
Check roofpod case housing		5	5	5	5	5	5	5	5	5	5	50	\$54			\$0	\$54
Total excluding GST		440	670	560	670	500	790	440	670	560	730	6030	\$5,333			\$5,040	\$10,373
													Per 10 Yrs		\$10,373		
													Per Yr		\$1,037		

Manufacturer's assumptions

1 0.25 hours/month cleaning @ 25/hr as at 30.6.03

2 replace controller card every 5 yrs

3 oil replaced every 5 years

4 0.5kg top up of refrigerant every year

5 replace every 5 years

6 replace bearings & brushes every 2 yrs

7 check & apply rubber protectant

8 \$65/hr is assumed except for 1 above

APPENDIX 3 DATA ON LARGE SCHOOL BUSES (BAV6dataL.xls)

APPENDIX 4 DATA ON MIDI SCHOOL BUSES (BAV6dataM.xls)

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Pre-Departure Vehicle Check Record

The Ministry of Transport requires a daily pre-departure check to be conducted on each vehicle prior to being used.

The Pre-departure check is a documented instruction for simple roadworthiness. The individual completing the daily check shall acknowledge the vehicle to be roadworthy within the limits of the inspection.

DRIVER..... DRIVER No.....

VEHICLE..... DATE.....

DRIVER PRE-DEPARTURE CHECKLIST:

- Check for flat tyres.
- Check indicators.
- Check lights & school flashing lights.
- Check for body damage.
- Check mirrors.
- Start bus (oil/water/battery lights go off).
- Check gauges.
- Check that two-way radio is working (if appropriate)
- Ensure that air bags are up before moving the bus.
- Write defects and/or body damage in defect book and/or report to yard person.
- **Make sure ticket machine is operational before leaving depot.**

Pre departure check completed (Please tick) ☐

Signature.....

OFFICE USE ONLY:

End of Shift Procedure

Each driver has a responsibility to ensure that the bus is checked at the end of each shift or any other time that the driver leaves the bus for an extended period. The purpose of the check is to ensure:

- No Passengers (particularly pre-school and other children) remain on the bus;
 - Any lost property is collected and
 - The bus is swept and any rubbish is collected.
-

DRIVER INSTRUCTION:

At the end of each shift and prior to leaving the bus the driver shall:

- Undertake a walk-through on the bus to ensure no passengers remain on the bus;
- Collect any property left on the bus;
- Sweep the bus and pick up any rubbish.

Lost Property:

Where lost property is collected:

- if the identity of the owner is known, the driver shall return the item to its owner.
- If the identity is unknown or for some other reason the item cannot be returned to its owner, the driver shall place the item in the lost property section of the depot.

Signature: _____
Proprietor/Managing Director

Date: _____

"END OF SHIFT" PROCEDURE

In response to a recent incident where a pre-school child was left on a school bus at the end of a run, the Ministry of Transport will include a new item to be audited as part of the Bus Operator Accreditation Scheme.

All operators will be expected to demonstrate that they have a system in place for *internally checking the bus at the end of a shift*.

Currently many operators have a "sweep out" procedure whereby the driver checks for any lost property and gives the bus a clean at the end of each shift. Such a procedure would constitute an "end of shift" procedure. For operators who are yet to develop such a procedure it is recommended that a simple instruction be developed which requires the driver to check bus seats for sleeping passengers and lost property, and to give the bus a general clean-up at the end of each run. An example of such a procedure is outlined below. This procedure has been included as part of the *BCA Bus Operator Accreditation Manual* provided to members.

It is recommended that operators instruct drivers to ensure they understand the procedure and include the document in their Drivers' Manuals.

Bus Cleaning and End of Shift Procedure

Each driver has a responsibility to ensure that the bus is checked at the end of each shift or any other time that the driver leaves the bus for an extended period. The purpose of the check is to ensure:

- No Passengers (particularly pre-school and other children) remain on the bus;
- Any lost property is collected and
- The bus is swept and any rubbish is collected.

DRIVER INSTRUCTION:

At the end of each shift and prior to leaving the bus the driver shall:

- Undertake a walk-through on the bus to ensure no passengers remain on the bus;
- Collect any property left on the bus;
- Sweep the bus and pick up any rubbish left on the bus.

Lost Property:

Where lost property is collected:

- if the identity of the owner is known the driver shall return the item to its owner.
- If the identity is unknown or for some other reason the item cannot be returned to its owner, the driver shall place the item in the lost property section of the depot.

Signature: _____
Proprietor/Managing Director

Date: _____

SECTION 9: Safety Management Systems (SMS) - Continued**Vehicle Maintenance**

The accredited bus operator must not carry out maintenance on, or repairs to, a bus and must not permit any other person to carry out maintenance on, or repairs to, a bus unless the operator or such other person is licensed for the purposes of the Motor Vehicle Repair Industry Authority (MVRIA) to carry out such work.

Note: Whilst it is required that the carrying out of repairs to, and maintenance on, buses is only carried out by licensed repairers, the Ministry of Transport has no objection to an unlicensed owner/operator of a bus undertaking basic maintenance tasks including: changing light bulbs, changing engine oil, greasing a bus, replacing seats, changing wheels/tyres and topping up fluid levels.

8. Can the Operator provide details of the person/s carrying out maintenance work on buses and their relevant MVRIA licence details and/or repairer licence numbers? Yes ☐ No ☐

Notes and Comments

9. Has it been identified during the audit that the accredited operator, or someone other than an MVRIA qualified person, has carried out any maintenance or repairs on any Safety Critical Component? If yes, what type of work was identified? Yes ☐ No ☐

Note: Safety Critical Components refer to any item of a vehicle relating to:

- Brakes ☐
- Steering ☐
- Suspension ☐

Notes and Comments

Cleaning of Buses

10. Does the operator ensure that all vehicles operated under the accreditation are clean and tidy? Yes ☐ No ☐

Notes and Comments

(b). Bus Pre-Departure and End of shift Procedures

1. Does the Operator ensure that documented pre departure safety checks are completed? Yes ☐ No ☐

Notes and Comments

2. Has the operator developed and implemented a documented End of Shift procedure? Yes ☐ No ☐

Notes and Comments