# SECTION 2

# WORKSHOPS

NATIONAL FEDERATION of RAIL SOCIETIES
INCORPORATED
NEW ZEALAND

# WORKSHOPS

## CONTENTS

# DEVELOPMENT OF THE VOLUNTEER WORKER

*Led by John Burrows, Human Resource Development*

Delegates were led through an "experiential learning exercise" which highlighted issues relevant to the management of our volunteer work-forces.

The conference delegates were divided into 14 groups each of 6-7 people. The groups were as follows:

| | | | | | |
|---|---|---|---|---|---|
| 1. | S. Porter | 2. | I. Tibbles | 3. | R. Paul |
| | J. Stichbury | | B. Mann | | L. Stewart |
| | C. Simmonds | | T. Pointon | | K. Henderson |
| | F. Rowlands | | P. Heighton | | D. Hinman |
| | A. Campbell | | A. Rockcliff | | J. Radcliffe |
| | R. Taylor | | G. Allen | | B. Kingsley |
| 4. | C. Dean | 5. | P. Hyde | 6. | J. Pointon |
| | L. Richardson | | K. Stodden | | A. Mitchell |
| | J. Shanks | | C. Tooke | | R. Brown |
| | R. Gilbert | | B. King | | A. Spooner |
| | D. Campbell | | K. Kings | | D. Cumming |
| | J. Shaw | | R. Jones | | B. Tibbles |
| 7. | C. Bachop | 8. | I. Cranston | 9. | R. Scott |
| | J. Savage | | R. Brown | | P. McCallum |
| | N. Meek | | G. Trim | | M. Austin |
| | J. Clayton | | C. Northover | | G. Murrell |
| | B. Serle | | G. Summers | | B. Peacock |
| | B. Ollerenshaw | | L. Nyman | | T. Borchers |
| 10. | F. Doherty | 11. | K. Parker | 12. | T. Day |
| | I. Stewart | | M. Grant | | J. Brewerton |
| | D. O"Hoy | | R. Gray | | M. Moller |
| | B. Shakes | | A. Cody | | D. Filgate |
| | L. Day | | N. Blackmore | | M. Skinner |
| | C. Jacobsen | | B. Worthington | | S. Parker |

13. G. Richardson
C. Andrews
B. Gamble
A. Roi
L. Millar
M. Sanders

14. D. Bell
W. Day
D. Parkes
J. Nyman
B. Merchant
J. Phillips

In his opening comments, John Burrows pondered why people might be drawn to our sort of organisation. He raised the question of his son's car - a VW - and asked delegates what were its characteristics. It was suggested they were:

- Slow
- Noisy
- Smelly
- Unstable

but that these qualities were more than outweighed by positive qualities:

- Reliable
- Has character
- Durable

Our organisations are based on empathy with machinery - however John asked us to concentrate in this session on the "human machinery" - (the voluntary worker - our VW!) and how to keep it "well oiled".

A good starting point was to draw on and share the collective experience of the group. (With more than 80 delegates participating and, on average, probably 10 years experience to draw on probably 800+ man-years of knowledge was available)

**Satisfactions and Dissatisfactions**

Delegates were asked to consider the following statement:

> *Personally your involvement in the pursuit of your interest will have given you "satisfactions" - what are they? - the "highs"*
>
> *and also disappointments or dissatisfactions - what are they - the "lows"*

Each delegate wrote a list of own highs and lows and a group discussion was held in an endeavour to rank the most important. The most important satisfactions were:

- Challenge
- Team Effort (producing result)
- Friendship/Fellowship
- Team Work
- Realisation of a Goal
- Satisfied Customers (lots of loot!)
- Relaxation
- Part of Decision Making
- Support of Spouse
- Obsessions fulfilled
- Learning new skills
- Planning for the future
- Emotional impact of achieving
- Public Recognition

Important dissatisfactions were:

- Personality clashes
- Lack of Human Resources
- Factionalism
- Negative attitudes
- Establishing new members
- Frustration
- Lack of communication
- Lack of priority
- Lack of skills
- Unwillingness to accept standards
- Lack of recognition
- Dishonesty
- Skills not being called upon
- Inconsideration
- Too many chiefs

John made the point that if the above are the important things to the delegates they are most likely to be important to our volunteer workers.

**Quality of Decision**

| Q | x | A | = | ED |
|---|---|---|---|---|
| Quality of Decision | | Acceptance by those actioning the Decision | | Effective Decision |

Three situations were proposed:

1. I'm an experienced leader and I tell the team what to do.

Q = 8 (out of 10)
A = 1 (out of 10)
ED = 8

Typically: Decision Time |----|
Implementation Time |----------|

2. I'm an experienced leader and I involve the team in coming to the decision.

Q = 8 (out of 10)
A = 8 (out of 10)
ED = 64

Typically: Decision Time |--------|
Implementation Time |----|

3. I have a damn good idea and I dictate that it be done.

Q = 9 (out of 10)
A = 0 (or negative)
ED = 0 (or negative)

i.e. the job never gets done

Typically the total time involved in decision making and implementation is typically minimised in situation 2 above.

**Desert Survival Exercise**

Delegates took part in a major team exercise entitled *Desert Survival* The exercise require each individual, and later each team, to determine which items in a given list were the most essential for survival in an American desert. The exercise was designed to demonstrate the differences in quality of decision between an individual's decision making process and that of a team.

In the team debriefing after the exercise John stressed the importance of identifying:

- The problem i.e. biggest problem - dehydration
- The objective i.e. survival
- The best strategy i.e. get found

John raised the idea that team work provides the opportunity for SYNERGY - that is, that the total output of the team will be greater than the sum of the individuals' outputs alone.

Teams, he said, can do it better provided they have:

- Task Skills (they share or pool their knowledge of the task)
- People Skills

For the record, the team results in the Desert Survival exercise were:

| Team | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Average individual | 57 | 60 | 58 | 56 | 64 | 70 | Not recorded | |
| Team result | 42 | 48 | 38 | 40 | 54 | 50 | ? | |
| Gain | 15 | 12 | 20 | 16 | 10 | 20 | | |
| Best | 44 | 50 | 34 | 41 | 33 | 60 | | |
| Number Better | 0 | 0 | 1 | 0 | 1 | 0 | | |

| Team | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|
| Average individual | 49 | 70 | 68 | 69 | 57 | 68 | 51 |
| Team result | 26 | 62 | 58 | 38 | 40 | 52 | 46 |
| Gain | 23 | 8 | 10 | 31 | 17 | 16 | 5 |
| Best | 31 | 52 | 53 | 54 | 32 | 42 | 38 |
| Number Better | 0 | 2 | 1 | 0 | 1 | 2 | 1 |

## Training and Induction

An important issue is "how do we get to train and induct the new volunteer worker?

Sometimes attendance is sporadic.
Sometimes repeat training is needed.
Sometimes the "trainer" would rather be "doing".

There is a lot of knowledge about this locked up in our 'collective brain'. So here is our task. Blank cards were handed out and delegates were asked to record their ideas, one per card, on:

*"How can we effectively induct and train the new voluntary worker?"*

The cards were collected, shuffled and dealt out to the teams. The teams' job was to sort and prioritise the ideas and report back on those ideas considered to be most important by the team.

Important requirements for effective induction and training of new voluntary workers.

- Inform (about the facility, it's history)
- Introduction (aims, objectives, people)
- Encourage by involving
- Develop personal relationship
- Immediate involvement
- Avoid cliques
- On-going involvement
- 'Buddy' system - training
- Determine skills/abilities/needs/wants (i.e. interests)
- Encouragement and thanks
- Involvement in social activities
- Morale (of the whole place)
- Diplomacy and tact
- Provide a chance for fulfilment

## Conclusion

The voluntary worker will respond if we understand and act upon what switches him or her on or off. We should think of our own "satisfactions" and "dissatisfactions", use team work and team knowledge to solve problems and to create the right climate to motivate the voluntary worker.

# NEW ZEALAND RAILWAY AND TRAMWAY SAFETY REGIME

*Presented by Roger Toleman, Ministry of Transport*

## Legislative Scope of Review

A review of current legislation which deals with railways, tramways and other transport systems using fixed infrastructure has been carried out. The following acts and associated regulations are involved:

District Railways Act 1908;
Local Government Act 1974;
Local Railways Act 1914;
NZ Railways Corporation Act 1981;
Public Works Act 1981; and the
Tramways Act 1908

## Requirements for Licensing

There is obviously an initial need to identify railway and tramway operators, particularly in regard to Government monitoring of safe operation. The simplest and most logical way to do this would be to require operators to be licensed under the Transport Services Licensing Act 1989. This involves no quantity control, but would provide a simple form of identification as a basis for the safety audit procedures covered later.

There are also a large number of small railway systems used by fairground railways and model engineering clubs that can carry passengers. These are presently covered by the Machinery Act 1950 (Amusement Devices Regulations). To eliminate any conflict between these regulations and the safety regime proposed for "large" railways, the most simple division point is the track gauge. The systems covered by the Machinery Act all effectively have a track gauge of less than 550mm, while the systems covered by this proposal all exceed this gauge.

Any person responsible for providing or using a system using track with a gauge between the rails greater than 550mm and/or providing or using rail vehicles for the public carriage of passengers or freight would then be required to hold a licence under the general terms of the Transport Services Licensing Act 1989.

Private sidings off a railway system, involving no ownership of rolling stock, would be deemed to be part of that system and not require a separate licence. Works railways, providing they did not cross a public road, would be treated as industrial machinery for safety control.

## Safety Audit Model

A safety audit model applied to the railway and tramway mode can therefore have following procedural stages:

a) Legislation sets general safety principles for railway systems, including the scope of Safety Agreements;

b) The general scope of the Safety Agreement would be specified by Regulation to include inspections; infrastructure design and maintenance standards; vehicle design and maintenance standards; train crew and operating staff training and certification; operating, signalling and traffic control practices. The document would be restricted to matters relating to safety;

c) All existing railways and tramways are identified by the procedures already outlined;

d) Each identified railway or tramway operator sets minimum safety targets and prepares detailed documentation of proposed safety practices, in terms of legislative requirements and its business aims;

e) Ministry of Transport appoints a competent auditor who examines and recommends approval of safety practices set out in the draft Safety Agreement;

f) Agreement concluded between Ministry and operator;

g) Operator is then responsible for operating within agreed Safety Agreement;

h) Amendments to the Safety Agreement would be processed in the same manner;

i) Ministry of Transport would be responsible for periodic audit of operator compliance with Safety Agreement, either directly or by use of a third party.

j) In the event of repeated non compliance, legislation would have penalty provisions, up to and including licence restriction, suspension or removal.

## Steam Boilers and Overhead Electricity Supply

Two aspects of railway and tramway engineering are currently dealt with in separate general legislation.

a) For all railways other than the NZ Railways, boilers of steam locomotives are currently inspected in terms of the Boilers, Lifts and Cranes Act 1950. The NZ Railways Corporation still have powers to certify boilers to its own standards. Given the specialist nature of railway steam boilers, it seems appropriate that inspection by "proper persons" of the standards relating to these should be included in the particular Safety Agreements, through an amendment to the requirements of the Boilers, Lifts and Cranes Act or successor legislation, including regulations. All operators would then be on the same basis.

b) Matters relating to supply of electricity for tramways and railways are currently covered by the Electricity Act 1968 and the Electrical Registration Act 1979 and related regulations. New Zealand Railways again has an exemption. In order to be consistent for all operators, it would be appropriate to include responsibility for these matters in the particular Safety Agreement, by amending the appropriate legislation.

## Transitional Arrangements

The initial development and preparation of Safety Agreements is likely to take some time, particularly for the enthusiast railways, who rely on volunteer work forces. There will therefore need to be a significant period of transition, as follows:

a) All operators to hold an appropriate transport service licence within three months of the legislation being passed;

b) Existing safety legislation in the Public Works Act or the NZ Railways Corporation Act 1981 to apply as appropriate to all operators for an agreed interim period, subject to satisfactory progress towards completion of a Safety Agreement;

c) All Safety Agreements to be completed by 1993, with provision for reasonable extension at the Secretary for Transport's discretion where justified;

d) Any new operator proposing to start after the legislation is passed, other than a former component of the NZ Railways Corporation, to have a Safety Agreement in place before operations start.

## Accident Investigation

There needs to be an accident and incident reporting (and investigation) mechanism that:

a) Applies to all operators;

b) Provides adequate information for identification of adverse trends;

c) Provides for external investigation and public reporting of serious accidents.

All serious accidents on any railway and tramway system should be required to be reported to the Ministry of Transport. At that stage, there would be a mechanism for identifying accidents that were serious enough to warrant detailed public investigation. The procedures would be similar to those introduced in the Civil Aviation Law Reform Bill.

The Ministry has already developed a proposal for an independent Air Accidents Investigation Commission, and has signalled that it is ultimately intended to develop this into a Transport Accidents Investigation Commission to investigate serious transport accidents across all modes.

Extending the scope of the Commission to include investigation of railway accidents, together with the reporting system noted above, would provide the necessary structure to monitor and investigate railway and tramway accidents.

## Transport Corridor Management

A number of existing legislative provisions also relate to the safety management powers of the railway operator over the transport corridor for which it is responsible. These particularly relate to:

a) level crossings, particularly of roads;

b) control over lights adjacent to railway signalling;

c) protection of the integrity of the track bed and other structures from erosion or other soil destabilisation;

d) rights of action against trees and other external structures overhanging onto the railway.

e) stock trespass

These matters, which are presently divided between the NZ Railways Corporation Act 1981 and the Public Works Act 1981, apply equally to all fixed infrastructure transport systems and should be retained in legislation.

There is also a legislative requirement for addressing issues of management responsibility;

a) where two corridors, such as road and rail, cross;

b) where two systems run together, such as in a tramway line along a street, or on combined road and rail bridges.

These are required to establish appropriate areas of responsibility for maintenance and construction. Again, they should apply equally to all operators.

# CODE OF ELECTRICAL PRACTICE FOR COTMA GROUPS

*Chaired by Craig Tooke, Melbourne Tramcar Preservation Association*

## Introduction and Background

The main aim of the session was to reach agreement in principle that museums will look at the draft "Electrical Operations Rules 1988" produced by the Melbourne Tramcar Preservation Association

Following some bad electrical accidents in Melbourne the coroner had been directed to enquire into the reasons for the accidents. Craig Tooke felt strongly that any accidents on museum operations could result in severe repercussions on all museum operations, and felt that a common standard should be produced and used as a guide.

A draft standard, based mainly on Melbourne Tramway practice, has been produced and distributed to all member groups following agreement at the last COTMA conference to progress this matter. However, there had been limited response from museums.

## General Discussion

Mark Skinner (Australian Electric Transport Museum) asked whether the SEC (State Electricity (Victoria)) had been involved in drafting the code because if the document is to be worthwhile there is a need to keep the SEC involved. Craig advised that no approach to SEC at this early stage.

Richard Gilbert (Ballarat Tramway Preservation Society) questioned the need for the amount of detail in the document.

Jack Nyman (Maitland Tramway and Museum) advised that his museum had already put the document to their local supply authority who are considering it.

Tim Borchers (Bendigo Trust) felt that to put the present document to SEC at this stage would be counter-productive because of repercussions which could ensue although Mr Borchers added that the SEC would no doubt like to have an input.

Bill Kingsley (Ballarat Tramway Preservation Society) mentioned that the SEC were perfectly happy with the expertise that Ballarat had, even allowing Ballarat staff to work on the tram overhead attached to their own poles.

Richard Gilbert (Ballarat Tramway Preservation Society) advised that Ballarat is looking at its operational standards and agreed that some regulation is better than none. He was of the view it was better to have our own rules than rules imposed from outside.

Jack Nyman (Maitland Tramway and Museum) was concerned that an accident, where there are no regulations, could have serious repercussions.

Tim Borchers (Bendigo Trust) noted that museums were already required to comply with Occupational Health and Safety regulations. He advised that Bendigo would not be bound by the draft regulations.

Craig Tooke asked the meeting whether it felt there was a need, in principle, for a self-regulatory document.

It was moved by Jack Nyman (Maitland Tramway and Museum) and seconded by Mark Skinner (Australian Electric Transport Museum)

> "that the meeting agree that there is a need in principle for a self-regulatory document."

Discussion on the motion:

Murray Sanders (Tramway Historical Society) considered the present draft is excessively complex but the motion is supported in principle.

Mr Campbell (South Pacific Electric Railway) advised that he felt the draft document was well meaning but SPER would not be directed by it as it has its own procedures.

Richard Gilbert (Ballarat Tramway Preservation Society) felt the draft document should be broadened.

Messrs Kingsley and Skinner (Australian Electric Transport Museum) commented that the draft is oriented to operational considerations as opposed to construction.

The motion was put and carried with Bendigo Trust dissenting

Craig Tooke recommended to the meeting that a way to proceed would be to recommend the COTMA General Meeting that a sub-committee be formed to formulate the proposed regulations.

After considerable discussion this was agreed to by concensus.
Bill Kingsley (Ballarat Tramway Preservation Society) felt that persons for the sub-committee should be nominated now and it was agreed that the meeting recommend to the COTMA General Meeting that:

- a sub-committee be formed to progress this matter consisting of a representative of each of the four Victorian museums plus Mr Noel Blackmore of Perth.

- Craig Tooke be Chairman .

- that a draft code of practice be available by Christmas 1990 with a full report to the COTMA AGM in 1991.

It was noted that there would be no compulsion on any individual museum to adopt the rules that they should be basic and simple. Any further comments should be directed to Craig Tooke or Bill Kingsley.

# ARCHIVES

*Presented by Alan Smith, past Deputy National Librarian, National Library of New Zealand*

- Consideration of what constitutes archives.

- The way in which archives are preserved is as, or more, important than the act of preservation.

- In NZ the National Archive has first call on any material emanating from Central or Local Government or Public Body.

- Important therefore to come to arrangement with local branch of the National Archives so that:

    - importance of material held by them is recognised.
    - understanding is reached on dealing with new material.

- Don't overlook the 'Oral History Archive' (Hugo Manson and Judith Fyfe). Includes $1 million grant from Australia.

- Also the NZ Film Archive

  Tram and railway history may appear incidentally in movie footage of other items, e.g. street scenes, celebrations etc.

- Pragmatics of Archives Preservation

    - If in doubt preserve it - catalogue later - keep the material in the order acquired.

    - A stable environment is important.

- Sales Potential

  Don't overlook the market for nostalgia/memorabilia.

# PHOTOGRAPHY AS AN AID IN THE MUSEUM

*Presented by John Le Cren, former Staff Photographer, New Zealand Railways*

John Le Cren worked for 38 years in New Zealand Railways Photographic Library. In his prepared notes, reproduced below, he backgrounded the role of the Photographic Library and cited specific examples of how photographs assisted the Railways in various aspects of its business. Throughout the session, John illustrated his talk with examples of some of the photographs referred to. He also cited other examples where photographs had been used in claims against manufacturers, as evidence in Court after accidents and to assist in planning new civil works such as new tunnels and rail yards.

## Introduction

In July 1966 the *Evening Post* newspaper published, across ten columns, a photograph of Railways Cook Strait Ferry, *Aramoana*, clearing Wellington Harbour into the teeth of a southerly gale. "If you are not a good sailor," said the caption, "Don't look at this picture." It showed the ferry deep down by the bow into a giant swell, decks angled steeply, with the stern well out of the water. Surf foamed down from propellers revolving in mid-air and the twin tank rudders were also clearly to be seen. A *Post* photographer had used a 600mm lens on his 35mm camera from Fort Dorset to gain an impressive set of pictures, one which was published and several others donated to Railways where they were filed in the photo library. So impressed was the department with these scenes of their first Cook Strait Ferry, the illustration became top promotion.

Sir Alan Gandell, General Manager of Railways asked me to prepare quite a number of [prints of the] one that was selected. The prints were to be small enough to pack into a brief case for world-wide distribution. He was off to find another shipbuilder to build the second ferry of the fleet which in turn became the *Aranui*. On his return, he told us "The Japanese refused to believe the picture was real. They thought it was faked. And they have typhoon seas." He also gave the views of the shipbuilders in Europe and the U.K. who had viewed [the picture] or been given a copy. Denny Brown shipbuilders of Dumbarton were delighted to receive a copy of the sturdy ship they had built and see how it coped with enormous seas far across the world. So too were the English Electric Company which built the six traction motors in the *Aramoana*, as well

as three alternator engines. They too were to power the new ship *Aranui* and a copy of their first N.Z. Railways ship was proudly displayed in the office of the Chief Executive.

As I explain, elsewhere in this talk, Railways' staff photographers built up considerable experience in making pictures of cracks, breaks, and damage to expensive engine components under guarantee from overseas makers. In the course of several years, five main engine crankshafts of *Aramoana's* 1745 h.p. twelve cylinder diesel engines were cracked or broken. Each one was photographed, the breaks on all occurring on the centre main bearing journal. The sixth was removed from its engine as a precaution, and all were replaced with later model, counter-balanced crankshafts, as were fitted to the *Aranui*. Many tests were carried out in the engine rooms of *Aramoana* in order to prepare a claim against the manufacturers for replacement under the terms of guarantee. Engineers waited several months for a suitable big southerly storm to test the electric governors which effectively control speed up and spin of ship propellers when they are raised above the water. Many other examinations were made of crankcases, engine mounts etc. to determine whether distortion was to blame. No other cause, except weakness in the crankshaft, being found, Railways put their claim to English Electric.

The response was to be shown the Evening Post photograph. "What did you expect?" Not one penny piece was ever received for those broken crankshafts.

It was often asked why such a comprehensive library of photographs, negatives and written information concerning a great many occasions and property in the affairs of New Zealand Railways, from topics which were current at the time to events reaching far back in time, to well beyond the turn of the century, was held and staffed by the Publicity and Advertising Branch of the Railways Head Office, and what part this material played in the promotion of transport systems operated by the Department.

The very interesting contents of that photo library and some of the uses it was put to is the subject I am talking about.

I must first point out that the Publicity and Advertising Branch is now closed and the photo library has been located in the care of the National Archives in Wellington, where it is freely accessible to the public for viewing, researching or purchasing prints from negatives filed there.

## Photo Library Wins a Compensation Claim

During the fifties, a shipment of twin-car railcars from the Drury Car Company of Lancashire arrived in Wellington as deck cargo. The bodies of the cars were too long for the holds of the ship. The end cab windows of the consignment had

been protected by traditional timber boxing, but not the windows along the sides. Heavy seas had broken through these side windows and raged up and down the interiors of several cars, resulting in extensive damage.

Shipping agents refuted a claim against them by New Zealand Railways for the damages, pointing out that all previous consignments of passenger rolling stock had been given end windows only protection against the actions of steel slings during lifting by dock cranes at either end of the voyage.

"Not so," Railways claimed, "All previous cars, multiple electric unit bodies had timber protection on all windows for sea voyage."

Electric multiple units had been shipped to New Zealand from the U.K. in 1938 and early in the 1950's. Staff searched the records of letters and accounts for details of the timber protection. None could be found. Possibly arrangements had been made verbally at the time of shipment by engineers when the cars were loaded. It was not the sort of statement needed to win a compensation claim.

Normal procedure included photographic coverage by staff of the Publicity and Advertising Branch of all cargoes of new locomotives or rolling stock. A search of the library confirmed this, but it transpired all the timber side boxing was removed aboard the ship before the floating crane *Hikitea* drew alongside the vessel. Luck changed when it was found that one of the photographers had climbed a wharf crane ladder for a vantage view which showed several multiple units as they sat, welded tightly to the deck of the ship *Huntington*. All had the entire window areas protected by timber boxing.

Fully repaired, these railcar twin-car sets entered service. Often known by the public as Fiat railcars because of their Italian engines.

## Centenary of Driving First Spike on the North Island Main Trunk

During the planning of the programme for an official celebration of the driving of the first spike on the North Island Main Trunk Railway, on land beside the Puhunui Stream near Te Awamutu, the photo library produced a copy of an official group taken one hundred years before, at the original ceremony. The illustration (reference no. E-4596) enabled Railways staff to identify the various speakers while in other libraries searches were carried out for the reported, newspaper published speeches made by these people. The exciting archival photograph became a central key to the celebration. Tailored costumes and top hats were produced akin to the personalities, while Waikato Maori elders offered the original cloak worn during the freeing of the land for the entry of the railway. A visit to Te Awamutu met with enthusiastic amateur actors from a Te Awamutu College and the wheelbarrow shown in the historical scene was tracked down in an Otorohanga Historical Society museum where it had been

preserved for a hundred years. The newspapers' speeches were transcribed and became lines which were well rehearsed by the Te Awamutu College group of actors.

The day of the centennial celebration began with the re-enactment ceremony beside the Puhunui Stream, south of Te Awamutu. Restored Ka and Ja steam locomotives were on the site with a train of vintage museum carriages. It was a most successful day for all the parties concerned.

# TRAM AND RAILWAY CARRIAGE ROOF COVERINGS

*Chaired by Les Stewart, Wellington Tramway Museum*

Tram and railway carriage roofs were traditionally covered with canvas stretched over the roof and sealed with a heavy linseed oil based paint. However, over time with exposure to sunlight and the weather the canvas and paint has a tendency to crack and allow rain water to leak through the roof. Other materials are now available which have advantages over canvas and the workshop examined two alternatives - butyl rubber and fibre glass.

## Butyl Rubber

Bruce Gamble from MOTAT spoke about their experience in re-roofing Fiducia 257 with butyl rubber and showed a video of the actual re-roofing.

Butyl rubber is marketed under several different trade names including Butynol and Butylclad. Useful information on materials and application methods can be obtained from Skellerup Industries.

Benefits of Butyl rubber include:

1. Longevity
2. Good resistance to ultraviolet light and ozone
3. Impervious to water
4. Unaffected by normal ambient temperature levels
5. Easily moulded around compound curves and retains its flexibility
6. Can be painted with water-based acrylic coatings

Butyl rubber comes in rolled sheet of various colours (greys, tans, black) and thicknesses (0.75, 1.0, 1.5, 2.0mm) and in a normal width of 1500mm. It is widely used in building construction as a roofing membrane, laid directly over plywood or concrete decking with a contact adhesive. There are numerous commercial installers, although installation is well within the capabilities of most skilled tram and railway restorers who have watched the process.

On Fiducia 257, two lengths of mid-grey, 1.5mm butyl rubber were laid with a 70mm lap down the centre-line of the roof. A special lap tape was used to ensure the roof was completely weather tight. The roof on this tram is a

mixture of plywood, curved sheet metal and wooden battens. Good adhesion was ensured by giving all areas a priming coat of diluted contact adhesive well before the final stage. No problems were found where it was necessary to stretch the sheet slightly at the tight compound curves over the cabs. The final appearance is indistinguishable from canvas.


Laying butyl rubber on the roof of Fiducia 257 at MOTAT. *Photograph: Ian Stewart.*

It is intended to keep the roof painted with acrylic roof paint. If this is maintained, the normal guaranteed life of 25 years should be extended indefinitely.

The cost for 257 was $1,100 which included supply of the material and installation which took 2.5 hours. The cost compares favourably with canvas which costs approximately the same.

In answer to questions:

- Butyl rubber can easily be repaired by applying contact adhesive to the patch and the area to be patched.
- As with any organic material, fire-resistance is not high. It is no worse than painted canvas.
- Application over timber treated with CCA preservatives may require a

barrier coat to prevent the residual oily solvents in the wood from softening and degrading the butyl rubber.

Bruce showed a video of the tradesmen laying the butyl rubber on tram 257's roof. Any enquiries regarding copies of this video should be made to the Tramway section of MOTAT.

**Fibreglass**

Arthur Rockliff of The Otago Excursion Train Trust spoke on their experience of using fibre glass for re-roofing their rolling stock. The first one was completed approximately 12 years ago and it has caused no problems since.

One advantage fibre glass has over butyl rubber is its rigidity. Because of its composition it stiffens up the whole carriage and assists in the carriage's stability.

Before application all old canvas and other old coverings should be removed, all holes in the wood patched, protruding nails removed or punched under the surface and the whole roof surface smoothed off.

A standard fibre glass mat is laid over the roof first and then the epoxy resin mixture is spread over the mat. It takes about 20 minutes to harden at a temperature of 15$^{o}$C. Once the fibre glass has fully cured a coat of acrylic paint can be applied to assist in preventing deterioration from ultra violet light.

Holes for roof mounted items such as ventilators are stuffed with newspaper before fibre glassing. Once cured, the fibre glass covering the hole can be cut out, the newspaper removed an the ventilators reinstated.

Current costs are unknown but fibre glass is probably dearer than butyl rubber.

There is a possibility that stress fractures could occur if the fibre glass forms too hard a shell and prevents flexibility of the car frame.

# HANDY HINTS AND NEW IDEAS FOR RESTORATION AND MAINTENANCE

*Chaired by Trevor Burling, Wellington Tramway Museum*

This workshop provided an opportunity to exchange handy hints and new ideas to assist in all aspects of maintenance and restoration of tramcars, railway carriages and permanent way - mechanical, electrical, woodwork etc.

## Epoxy Resin Compounds in Wood Restoration/Conservation

Bruce Gamble (MOTAT) described MOTAT's experience of using epoxy resin compounds for:

1. Repair of structural timber work
2. Plugging holes
3. Re-lamination
4. Preserving timber by impregnation

MOTAT have been using low-viscosity epoxy resins and hardeners marketed (in N.Z.) by West Systems for use in boat building. However, other similar low-viscosity epoxies (e.g. Ciba-Geigy's Araldite range of materials) are also suitable for tram and railway carriage restoration work. After mixing with an appropriate hardener, the syrup can either be thinned or mixed with various fillers and pigments depending on the end purpose.

In load-bearing timbers where strength is important, a careful balance must be struck between removing rot or other damage, maintaining as much of the original strength as possible and ensuring that the epoxy replacement has a good bond to sound timber. The alternative of splicing in a new section of timber should be considered, particularly where appearance is a factor. However, the use of epoxies to impregnate doubtful areas surrounding the slice and/or as an adhesive can be helpful even in these cases. If in doubt get a qualified opinion!

For structural work MOTAT's preferred procedure is:

- Trim out any rot back to sound timber (drill, chisel or rotary burr).

- Saturate the cavity with a primer of thinned down epoxy and leave until it starts to harden (this may be up to 12 hours) - a very important step.

- Fill the hole with epoxy compound and leave to harden

- Trim the surface

Several types of fillers have been tried in these mixtures, including saw dust, wood flour (saw dust sieved to get only the finest particles), lightweight micro silica ("micro balloons") and polyester micro-fibres. These artificial wood mixtures are like making concrete - liquid binder, course filler and fine filler. The more binder, the more fluid the mix. By juggling the proportions everything from a dough (used on vertical surfaces) to a "self-levelling" compound can be produced.

A high proportion of wood allows the area to be shaped, sawn, and screwed into, and provides resilience. However, too much wood reduces the strength. Mixing in polyester micro-fibres improves the strength. Too much epoxy makes the patch hard to work and somewhat brittle. A good general purpose mixture, where little reworking is required is (proportions rough and by volume):

- 40% epoxy resin
- 20% wood flour (or micro-silica)
- 40% polyester micro-fibres

MOTAT uses epoxies a lot for plugging holes, particularly where rusted nails and screws have had to be (painfully) extracted, or where oversized screws have enlarged the holes. Where the hole is in a vertical surface, the first step is to form a dam. MOTAT usually just uses masking tape. (in difficult or critical cases, a glass pipette with a right angled bend can be inserted.) A runny mixture of epoxy and a small volume of polyester micro-fibre is then poured in - preferably preceded by the primer treatment. Usually, a nail or piece of wire must be jiggled around in the hole to get out all the air bubbles. A little pigment in the mix helps if the area is eventually to be varnished.

Thinned epoxy is used not only as a primer, but also as a means of re-laminating areas of plywood where water has damaged the original glue (e.g. the casein type) and in strengthening/stabilising/sterilising rot. A good publication on the last application is available from Ciba-Geigy: "Araldite in Wood Conservation", Publication No. 24714/e

A solvent/thinner with the following composition is recommended:

- 75% xylene
- 15% isopropanol
- 10% ethyl acetate

However, MOTAT has used PA10 thinners and other epoxy solvents and found them satisfactory. Dilution of not more than 20% solvent to 80% epoxy, decreases the viscosity significantly allowing saturation of the wood.
When re-laminating ply, MOTAT's method is to pepper the panel with holes, leaving the front ply intact. The panel is then propped up or clamped and diluted epoxy poured in from the rear. A similar approach is used for areas of rot in other timbers, using a series of holes radiating from a small number of points at the surface.

Jack Nyman (Maitland) noted that experts say to dry wood properly and use paraloid micro balloon filler as long as there is no fungus present.

In answer to other questions:

- Holes do not have to be primed to bond the filler, but it does help in stopping the filler shrinking into the wood pores, leaving a void.

- MOTAT has no experience in repairing or laminating Masonite with epoxy.

- The filler MOTAT uses for plugging holes can be shaved with a chisel and is very resilient. Pull out tests on screws have demonstrated equal strength to the original timber.

Any further queries can be forwarded to MOTAT

**Overhead Poles**

Overhead poles need to be treated to stop white ants and Perth Electric Tramway Society have found that a suitable treatment is bitumen oil. It was noted that in NZ tanalised pinus radiata poles are used but this would not stop white ants as they will burrow underground and up the centre of pole.

## Sleepers

The Tramway Historical Society have had success in using ground treated tanalised pinus radiata sleepers coated with engine oil on the exposed top surface to stop water penetration.

Maitland Tramway Park and Museum suggested that, as Australia Rail are using steel sleepers, it may be worth looking into if the costs are acceptable.

Wellington Tramway Museum are using ground treated tanalised half rounds on a section of track to evaluate if they are suitable.

Bendigo Trust are using red gum sleepers at A$16 per sleeper.

Delegates were warned that they should be careful if using creosote as it is carcinogenic.

## Conservation of Timber

When disposing of trams, timber should be recovered for future use rather than burning it.

# TROLLEY BUSES

*Chaired by Peter Rendall, Wellington Tramway Museum*

Each museum present advised the group on their current situation in respect to trolley buses.

## Tramway Historical Society

The trolley bus side of the museum is an integral part of the organisation and is part of tramway history in Christchurch.

The museum has an example of a trolley bus from every city in New Zealand which operated them, however they do not have sufficient overhead erected to permit running. Wellington 103 has had a short trial run only. Within the museum a diesel bus group exists and this compliments the trolley bus aspect of preservation.

Trolley buses have been part of the Tramway Historical Society's philosophy for the past 25 years and much restoration is needed before the section will have a viable operation in a museum setting.

## Melbourne Tramcar Preservation Association

Nothing established yet and are still thinking about the concept.

## Museum of Transport and Technology

MOTAT owns quite a few trolley buses and has a small running loop erected but it is not complete and needs upgrading. Museum interest is not high and future is not clear. Unless this interest picks up there is a strong possibility that the buses could end up as static exhibits.

## Australian Electric Transport Museum

AETM has only one diesel bus but 4 trolley buses, however interest in buses is not high. None of the buses are operable but parts are on hand to allow restoration if interest can be generated. One, a Sunbeam, is in the same condition as it was when it ceased duty and should not be difficult to get going.

The buses are all under cover and are used as static exhibits.

**Perth Electric Tramway Society**

PETS has two Sunbeam buses, one could go without too much trouble, however operation of these two trolley buses is difficult in competition with trams, and may well end up as static exhibits.

**Tasmanian Transport Museum Society**

TTMS has two operable trolley buses but no suitable site to operate them. Would like to get them a road setting to permit proper operation.

**Wellington Tramway Museum**

WTM possesses four trolley buses, two at Queen Elizabeth Park, one leased to the Motor Coach Museum Trust at Foxton and one in storage at Ormondville. However, member interest is not high, especially as Wellington City Transport still operates trolley buses. As the future of trolley buses is uncertain, a watching brief is being kept to see what happens. WCT is still a source of spare parts.

**General Discussion**

Bill Kingsley asked if Wellington City Transport (WCT) could just keep the Courtenay Place Railway Route open so as to keep the trolleys running or whether the Wellington Tramway Museum had ever considered taking over a route.

Peter Rendall explained the changes currently being implemented in the public transport sector in New Zealand with the WCT and other local authority operators having to form companies to run their services. If the trolley buses survive in Wellington it would be as a single entity with only one or two closures. The Wellington Tramway Museum has never considered taking over a route. The WCT also has four preserved trolley buses and their future is questionable if trolley buses are phased out.

John Radcliffe noted that spare parts are important especially as Wellington is the only system in operation in this part of the world and asked whether WTM co-ordinate between WCT and museum wanting to acquire parts including overhead.

General discussion then took place about the need to have access to WCT supplies, especially if they were disposing of them. It was agreed that:

1. Ian Little be approached in order to ascertain whether he was interested in being the contact for trolley bus parts and liaising with WCT.

2. COTMA should consider inviting the Motor Coach Museum Trust at Foxton to join (proposed by Mark Skinner), especially as trolley buses are part of COTMA's constitution, but the wording of the constitution might need to be modified.

3. If Ian Little is interested, museums be invited to prepare a list of parts they need.

John Bettle noted that WCT still manufactured parts, including overhead parts, and these were available for both tram and trolley bus operation.

# IS YOUR MUSEUM DYING?

*Presented by Richard Gilbert, Ballarat Tramway Preservation Society*

This talk is about the membership of museums or more particular, as I see it, the ageing membership and lack of new entrants to membership.

Let's look at the formation of our museums. They were formed during 1950's, '60's and '70's. Those formed in the 1950-60's were formed at times of great change.

The war had been over for some years and a whole new boom of development and changes were taking place in communities. The old shackles and values were out.

Transport, of course, was in this field of change.

In the railways, the overgrown tramways, the steam locomotive was being displaced by the diesel locomotives. In street transport, the tram and the trolley bus were being replaced by the diesel bus.

There was a clamour among the few who were interested, to record them on film, and there were those who took the unprecedented steps to purchase vehicles with the intention of operating them.

The museums formed in the '70's were an ongoing pursuit of the same ideals of the museums set up earlier. To those who formed the museums of the '70's it seemed that anything formed 10 to 20 years before was something that happened in the dark ages. Now it has snuck up on those who formed these museums of the '70's. Our museums have been going for virtually 20 years.

We should look back and take stock of ourselves.

Are we going well? Does the enthusiasm and the drive of those formative years still exist or have we slowed down, had a loss of some members and not much of a gain of new members?

A lot of people who started these museums are still running them.

Puffing Billy - the popular 2'6" gauge railway operating near Melbourne, which was at the height of its membership in the 1960's, had a schools section. A lot of schools around Melbourne had railway clubs and as such, groups from these

schools lent a hand at restoring the railway, along with the many volunteers directly working for the Society and I was one of those workers. I think it is fair to say that most of us joined at a time when this type of recreation was fashionable. In the days past, there weren't many other recreational interests other than using your abilities to perform physical tasks.

We must look around and say, do we have a problem of gaining new members and do we have an ageing membership? **Is your museum dying?**

Today there is so much to do on a Sunday, things that you just couldn't do in the times our museums were set up. You couldn't buy butter, petrol or beer. There were no markets, shopping or picture theatres operating. Some councils even chained up playground equipment.

And so - we joined and helped create a tramway museum, or else we stayed home and mowed the lawns.

But for the younger generation there are a lot of activities. Electronic games, computers, sporting competitions and changes in perceived ideas of recreation. **Is it still acceptable to young people as a recreation today?**

We should say, was our museum set up for a cause, or a certain euphoria which existed at the time, or has it created its own dynamics and laid some foundations that will see it go on to up and coming generations?

We must keep gaining new members. We can't hog our museum - we can't have too many members. We heard at the workshop yesterday, the discussion about welcoming and involving new members.

How do we get new members? In the pursuit of our pastime and the pressure of running it, are we overlooking our ageing situation and should we take time to collectively think about and plan a strategy?

Do members here feel they have the same situation that I have spoken about here? Do any feel they don't have a problem?

Young people like to experience new things. They may not stay with a tramway interest but they must be fostered and for those who do stay, or at least come back some years later, the museum has gained. The museum gains even if they stay for only a short time. Young people don't want to be involved in rule stricken societies. Where an age requirement to achieve a particular position is some time away, it seems like centuries to some people. We all have to have these minimum age rules in the Traffic areas, but our tramway has gotten around it in one way - assistants on single trucks. we have to have rules - let's be as welcoming as we can.

We have to relate to what young people see of our tramway when they join it. Unlike many of us, who by being involved in our museum, have rekindled the memories we have of trams running around the system we know, the new member develops his interest because of what he sees now in front of him as it exists.

Do we have a plan of welcome, in the form of productive tasks for a new member? Do museums continually get new member applications, say monthly? Do we see those new members or are they armchair ones?

Getting the new members: You can't create them. They usually have a basic interest in the tramway/railway world and from that point you foster it. There are new generations of young people around us, and although we know of our museum and its membership facility we tend to forget these new generations have to be informed of what we offer. Advertising our society to them in the tramway/railway publications may make them aware of our membership that is offered. When they join us we can then follow through the steps of welcoming them and fostering their particular interest in the museum, in the ways that were discussed in the workshop yesterday.

Do you feel that the point exists that we have to put our societies before the potential younger members who have a basic railway interest?

Look at the reasons members may join:

Not necessarily historical
Technical, Educational, sense of achievement purely pastime.

Achieve something they wouldn't otherwise do - drive and work trams.

Applies to older - new members.

We have all put so much into our respective museums, both for the pursuit of our personal interest and for the betterment of the heritage of the nation, so much so that we must put an effort into tempting the community, the new generations about us, to joining up and thereby ensuring a continuity of the preservation and operation of our dearly loved collections.

**General Discussion**

Bruce Gamble (MOTAT) said we have to develop an aggressive marketing approach. Railways are possibly getting interest at the expense of tramway

museums. The profile of trams in the public eye is not high and may be we have to get families involved in addition to individuals.

John Radcliffe (Australian Electric Transport Museum) quoted extracts from a UK Museum publication regarding population trends in society and its effect on the number of volunteers available, i.e. falling birth rates and older populations with its consequent effect on people who normally make themselves available. The problem is how to address the change in society.

Dick Jones (South Pacific Electric Railway) felt that we must encourage those who wish to join a museum to actively participate such as driving trams, which have the advantage over trains as they are much easier to actually drive.

Martin Grant (Perth Electric Tramway Society) questioned whether anybody had thought about canvassing schools

Richard Gray (Wellington Tramway Museum) noted that they had written to all the schools in our area but apart from one or two applications to join, results have been disappointing although there could be long term results.

Martin Grant (Perth Electric Tramway Society) suggested that maybe we should be looking for teenagers who are taking woodwork and metal work at school.

Lewis Nyman (Maitland Tramway Park and Museum) noted that sporting groups are competing with us and in some instances parents are reluctant to let their children join museums as they will be unattended. We must encourage parents and their families to come to museums and participate in its activities. We must try and identify those people who simply want to get away from home as distinct from those with a genuine interest in tramways.

Richard Gilbert (Ballarat Tramway Preservation Society) asked whether it is because people want an alternative to their normal work and join a museum to further this interest? Armchair members still play an important role in keeping membership numbers up. The Western Australian Railway Society at Hoffen Valley has a large number of junior members who are very active. The railway has a high profile and people join and stay.

Bruce Gamble (MOTAT) said we should invest in younger children by making ourselves available by talking to them, running special trips etc.

John Phillips (Ballarat Tramway Preservation Society) posed the question - if we join up younger members will they keep their interest up? We have to ensure we don't develop into a child minding organisation and we also need to have a balance of compatible ages. The average age of many members is between 40 and 50 and very few younger members. What we really need is a plan of welcome to induct new and potential members. Interpersonal relationships can

either help or hinder co-operation amongst members. We need to:

1. advertise in Rail magazines.
2. Develop a welcoming/admission policy.
3. Parent members to encourage their children if they show an interest.
4. Invite participation/membership.

Kevin Parker (Perth Electric Tramway Society) noted that Sunday papers in Perth have a tourist feature and suggested that use could be made of such a facility to advertise and promote patronage and membership.

John Radcliffe (Australian Electric Transport Museum) concluded the session stating that we need to raise our social status to a higher level to avoid the image that we are a bunch of nuts. We must encourage newspapers and TV to take more interest in our activities. We need to make more use of special occasions and maximise our publicity before the general public including some gimmicky things if this can be done. We have to get away from the image that we are a bunch of hobbyists - we are in the tourist industry and must project ourselves.

# BRILL 21E TRUCK AND OTHER TRAM BOGIE/TRUCK REQUIREMENTS

*Chaired by Tim Borchers, Bendigo Trust*

## Background

Tim Borcher's engineering firm has been investigating the feasibility of manufacturing a batch of 21E trucks if there was sufficient demand. The purpose of the meeting was to gauge the likely demand and to decide on the next steps.

## Progress to Date

- Originally they were all going to be of one gauge and design (for cost efficiency). However Tasmania wanted 3ft 6ins gauge and Wellington 4ft.

- Issues considered have been:

    - do we need a large production run involving overseas (American) exports
    - can they be fabricated cheaply.
    - do museum's have the purchasing power
    - overseas sales could provide export incentives (up to 70% on setting up costs).
    - practical needs

- The following are available:

    - Working diagram
    - Pattern parts list
    - Patterns
    - Foundry
    - Specialised machinery

    So all is on hand to enable manufacture.

- Considered best to use a standard motor.

- The output would be a fully tested, braked and motored truck.

- Envisaged payment 50% up front, 50% on delivery.

- Cost will depend on numbers but likely to be in the range $10,000-$20,000. Unless large numbers are produced the cost will probably be at the high end of the range..

**Museum Requirements**

| | Wish List | Likely Actual Purchase |
|---|---|---|
| THS | - | - |
| WTM | 3* | 1* |
| MOTAT | nil but some parts may be purchased | |
| Maitland | 2 | 1 |
| TMSV | - | - |
| Bendigo | 1 | - |
| Ballarat | - | - |
| MTPS | - | - |
| Adelaide | - | - |
| Perth | 5 | 2 |
| Tasmania | 2 | 2** |
| Total | 13 | 6 |

* 4ft gauge
** not present so to be confirmed. Would be 3ft 6ins gauge

**Gauging**

Motors will fit within a 3ft 6in gauge truck. Regauging seems possible.

**Wheels and Axles**

Tim Borchers advised that it is usually better to order new wheels and axle sets from Commonwealth Steel because of their reasonable price.

Keith Kings advised that 26.5"/28" tyres will probably be available from Melbourne.

Murray Sanders (Tramway Historical Society) mentioned that they had had success with building up worn tyres but other delegates advised of possible cracking/splitting problems. Ian Stewart (MOTAT) said the process was probably okay if the tyre was thick enough.

## Wheel and Axle Set Requirements

| | |
|---|---|
| Perth | 6 x 33" wheels |
| THS | 4 sets of spoked 33" |
| MOTAT | 30" tyres, 20" tyres |
| Adelaide | 26" tyres |

## Conclusion

Mr Borchers advised that he will continue to work on the 21E trucks proposal and, as a next step, will come up with a price.

# OVERHEAD CONSTRUCTION AND MAINTENANCE

*Presented by Craig Tooke, Melbourne Tramcar Preservation Association*

Craig's presentation, based on Melbourne experience, referenced the following:

1. Melbourne and Metropolitan Tramways Board Instructions in Overhead Construction.

2. Facts and Data on Overhead Trolley Wire Construction - Compiled by T.G. Stiff.

3. Trolley Wire Renewal.

It was noted that in any museum, there are normally only 3 or 4 people who have an aptitude for overhead.

There was a view that COTMA itself should have centralised person who has an inventory of what overhead spares and skills/knowledge are held by museums in order that individual museums can assist one another. This could also encompass other facts such as where overhead can be purchased. It was felt there is no common understanding between museums at present.

Overhead maintenance is often only a spare time activity and it is important that tram drivers report any maintenance that is required. It was recommended that a form should be made available for tram drivers to note faults as an aid to ongoing preventative maintenance. Overhead procedures should be updated at regular intervals and then conveyed to each museum.

Many museums are using overhead fittings from trolley bus systems but in some instances old fittings are best used, especially if the old style image is to be attained. It was suggested that a list of patterns for the various old style overhead fittings held by various museums be prepared and circulated.

Care has to be taken when purchasing used trolley wire as it can be false economy if the wire is too well used. To help reduce costs new wire could well be purchased in bulk by a number of museums and shared amongst them.

The COTMA store in Australia has a limited amount of overhead stocks available which can be made available.

# MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

# INSTRUCTIONS IN OVERHEAD CONSTRUCTION

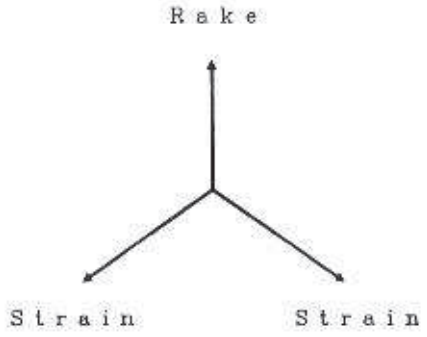
## 1. Hole Digging

A step must on no account be dug. Hole must be taken down at the same diameter all the way. When it is necessary to blast, the hole must be covered with heavy wood sleepers.

Special boring tool is to be used for digging hole below 3ft deep, if ground is suitable.

## 2. Pole Setting

All poles must be given exact rakes given in paragraph 4. Use special plumb for this purpose. In cases where poles are under strain in two directions, rake must divide the angle between them thus. All poles shall be set with tops approximately in line.




Concrete shall be mixed on footpath if available, otherwise small mixing platform to be used. Mix twice dry and twice wet, not using too much water.

## 3. Pole Base

Neatly finish off surface of concrete with trowel slightly above surface on footpath, sloping up all round from outside edge to pole. Apply plaster of 1 cement to 3 sand to concrete before it has set.

## 4. Rake of Poles

Poles shall be set with the following rakes:-

| | | |
|---|---|---|
| Steel Poles: | Anchor | 1" in 3 feet |
| | Span | 0.5" in 2 feet |
| Wood Poles: | Anchor | 1.5" in 2 feet |
| | Span | 1" in 2 feet |

## 5. Stringing Trolley Wire

Mount trolley reel on shaft to run freely thereon. Anchor end to anchor or trolley already installed.

Maintain tension by brake on rim of wheel, never on the copper.

Pull to correct sag and tie to span with temporary tie.

Use long parallel faced clamps.

Use no cam come alongs, chains or other short grip devices.

## 6. Sag of Trolley

100 ft. Span

| | | | |
|---|---|---|---|
| (a) | 30°F | 3.5" | 2350 lb. tension |
| (b) | 60°F | 4.25" | 1800 lb. tension |
| (c) | 90°F | 5.25" | 1450 lb. tension |
| (d) | 120°F | 7.25" | 1050 lb. tension |

120 ft. Span

| | | | |
|---|---|---|---|
| (a) | 30°F | 4.75" | 2350 lb. tension |
| (b) | 60°F | 6.25" | 1800 lb. tension |
| (c) | 90°F | 7.5" | 1450 lb. tension |
| (d) | 120°F | 10.5" | 1050 lb. tension |

Sags vary as square of length.

## 7. Permanent Installation of Trolley

After the trolley wire has been temporarily tied up with the proper sags and the line anchored, the trolley wire must be carefully traced for twists or turns, and as this operation progresses, place line ears and hangers in correct position and attach.

Remove all kinks with a wooden mallet and block.

Upset all clamp screws of mechanical ears to prevent slacking back. File off ragged edges.

## 8. Trolley Wire Anchor Wires

Use heavy span wire, 5/8 inch turnbuckles, and egg insulators.

## 9. Location of Poles and Trolley on Curves

Poles shall be spaced and the trolley wire shall have pull overs located as shown on table hereunder, and the pull overs offset inside the centre line of track as shown on diagram herewith.

Use mirror gauge if track is in position, if track is not in position read offset diagram and add 8 inches for super-elevation (taken as 2 inches).

| | | |
|---|---|---|
| Thus for 100 ft. radius curve, | Offset from diagram | 4 inches |
| | Add for super-elevation | 8 inches |
| | Total offset at centre of curve. | 12 inches |

All offsets towards inside of track.

| Radius of Curve (feet) | Spacing of Pull off (feet) | No. of Pulls between supports | Distance apart of poles (feet) |
|---|---|---|---|
| 50 | 7 | 4 | 35 |
| 60 | 8 | 4 | 40 |
| 70 | 9 | 4 | 45 |
| 80 | 10 | 4 | 50 |
| 90 | 11 | 4 | 55 |
| 100 | 12 | 4 | 60 |
| 125 | 13 | 4 | 65 |

| Radius of Curve (feet) | Spacing of Pull off (feet) | No. of Pulls between supports | Distance apart of poles (feet) |
|---|---|---|---|
| 150 | 14 | 4 | 70 |
| 200-300 | 18 | 3 | 72 |
| 300-400 | 19 | 3 | 76 |
| 500 | 20 | 3 | 80 |
| 750 | 25 | 3 | 100 |
| 1000 | 33 1/3 | 2 | 100 |
| 1500-2000 | 50 | 1 | 100 |
| Above 2000 | 100 | 0 | 100 |

## 10. Span Wires

Close Tie all loops, cut in egg insulators at 6 feet from pole and at 2 ft 6 ins" from trolley wire. Measure all spans at ground level and make up in shop, allowing for rake of poles.

## 11. Curve Wiring

All pull off points should be marked on the ground level and all necessary measurements for lengths of pull off wires and tie wires taken there from and supporting network made up accordingly. "After completion all nozzles to be given a coat of Biturene paint".

With new type of pull off no turnbuckles or span wire adjusters are required on outside of curve. Use span wire adjusters as may be required on inside of curve. All curves should be carefully watched and adjusted after cars start running.

## 12. Height of Trolley Wire

Adjust all spans so that trolley is 18 ft 6 ins" above rail at fittings.

## 13. Sag of Feeders

Sags shall be as follows:-

100 ft spans

| | |
|---|---|
| 60°F | 17 inches |
| 90°F | 20.25 inches |
| 120°F | 23.5 inches |

110 ft spans

| | |
|---|---|
| 60°F | 20.5 inches |
| 90°F | 25 inches |
| 120°F | 28.5 inches |

120 ft spans

| | |
|---|---|
| 60°F | 25 inches |
| 90°F | 29 inches |
| 120°F | 35 inches |

## 14. Painting Poles

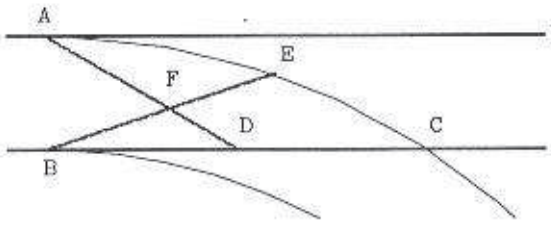
a) All steel poles shall be thoroughly cleaned down with scraper and wire brush before any paint is applied. They shall then be given two coats of approved paint, green on base and grey from 5 ft 6 ins upwards. All numbers shall be stencilled on in black, and all stopmarks in red, black and white. For 18 ins at ground level poles shall be given two coats of asphalt paint - 15 ins above and 3 ins below top of concrete.

b) Wood poles - after erection and completion of concrete base, the pole shall be given two coats of asphalt paint to a height of 18 ins above ground level.

c) Lettering - all poles shall be numbered.

## 15. Locating Frogs

All preliminary location of frogs should be made as shown on the diagram hereunder:




A & B = Ends of switch castings
C = Nose of track frog
D = Midpoint of BC
E = Midpoint of AC
F = Location of Frog

## 16. Erection of Crossing

All overhead crossings should be fixed in a bay of the trolley wire, i.e. pull off wires should not be attached to the crossing but to pull off fittings in positions to put the crossing between them. This gives a straight run through the crossing and minimises wear and dewirements.

# FACTS AND DATA ON OVERHEAD HEAD TROLLEY WIRE CONSTRUCTION

COMPILED BY T.G. STIFF

Few people who travel daily on the tramway network stop to consider the work necessary to provide and maintain an efficient and continuous transport system.

Considering one phase only, that of supplying power to drive the trams: This requires an intricate system of overhead wiring with its inherent electrical and mechanical problems.

To transmit power from the 25 automatic substations strategically placed over the system to the trolley wire and thence to the actual tramcar it has been necessary to erect approx. 13,168 poles, 534 wall attachments (in lieu of poles) to support 274 miles of trolley wire weighing 341 tons, and 116 miles of feeder cable weighing 538 tons.

In addition, in order to provide facilities for track telephones, supervisory control and testing approximately 544 miles of overhead pilot wire are attached to these poles.

## Erection of Poles

Unless the nature of the ground is rocky and requires the use of a crow bar or blasting, all poles are dug by special boring tools which gives a hole of uniform diameter for the full depth of the pole which is 5 ft for a 30 ft centre pole, 6 ft for a 32 ft pole and 7 ft for a 35 ft pole. All poles must be given exact rake (for which a special plumb is used). In cases where poles are under strain in more than one direction, rake must divide the angle between them. Rake is necessary on poles so that, when the load is applied, the pole will not pull up quite perpendicular. Poles erected exactly perpendicular appear to the eye to be converging at the top. Poles are set in concrete and neatly finished off slightly above ground level sloping up all round from outside edge to pole.

In the case of anchor poles which will be subjected to heavy loading, it is necessary to put in additional concrete at the heel and breast.

## Steel Poles

The most satisfactory means of preserving steel poles has been found to be a heavy coating of (red lead) and then two coats of aluminium paint. This should last approximately 5 years before poles require further painting.

## Wood Poles

The danger line of wood poles is approximately 1 ft above and below ground lines where air and dampness are able to attack the wood. The most satisfactory method of staying this decay is to "char" the pole over this section with oxyacetylene flame and then, when the pole is hot, treat with "Creosote".

## Suspension of Trolley Wire

The trolley wire is clipped into an ear which is bolted to a hanger. This hanger slips on to the span wire which is supported between poles on either side of roadway.

Pole bands anchoring the span wires are attached to the pole in such a position varying with the width of the road to provide a sag of 1 in 10 for 0.126 trolley wire and a sag of 1 in 7 for 0.2 trolley wire.

The trolley wire is maintained at a height of 18 ft 6 ins above rail level in the span support. Efforts are made to keep the maximum distance between spans to 110 ft giving a trolley wire sag of 6.5 ins at a temperature of $60^{o}$F midway between poles.

With span spacings in excess of 110 ft, keeping the normal tension to 1800 lbs. would incur too much sag and excessive freedom of movement causing abnormal side wear of the trolley wire. Excessive sag in trolley is also not pleasing to the eye and the only alternative is to excessively strain the wire. As the section of the wire decreases with wear, it will not stand this strain but will only stretch and excessive sag is the result.

The span wire is a 7 strand 12 gauge galvanised steel wire. A 5 ins reel insulator is attached to pole band by means of a shackle. At a distance of 5 ft from the pole an egg insulator is cut into the span likewise an egg insulator is cut in midway between trolley wires, and at a distance of 30 ins outside each trolley wire. Thus there is treble insulation between trolley wire and pole and single insulation between trolley wires. Trolley wires are jumpered by 0.25 or 0.3 VIR cable every 10 poles for 0.126 wire and every 5 poles for 0.2 wire.

Over a number of years, trouble was experienced in the corrosion of span wires, particularly on routes adjacent to the sea front. The cause of this trouble was the accumulation of road dust and dampness on the insulator which built up and finally allowed passage for a low current across the insulator. This was most pronounced near the sea front where the salt spray deposited on the insulators.

Various types of insulation were tried, but it was found that the 5 ins reel insulator gave the best protection due to a better drip surface, a larger protection surface, a better appearance and was easier to erect and maintain.

## Curve Construction

The distance between pull-offs on curve work will vary according to the radius of the curve. As shown in the table hereunder, it will be seen that the smaller the radius of the curve the shorter the distance will be between pull-offs. The reduction of angle at each pull-off is approx. $5^{o}$ to $7^{o}$. Thus in a 60 ft radius $90^{o}$ curve, it will be necessary to have approximately 18 pull-offs. If the change of angle at each pull-off is greater, excessive wear on the trolley wire will result.

| Radius of curve in feet | Space of pull-offs in feet (max) | Radius | Spacing of pull-offs in feet (max) |
|---|---|---|---|
| 50 | 7 | 200-300 | 18 |
| 60 | 8 | 300-400 | 19 |
| 70 | 9 | 500 | 20 |
| 80 | 10 | 750 | 25 |
| 90 | 11 | 1000 | 33-1/3 |
| 100 | 12 | 1500-2000 | 50 |
| 125 | 13 | Above 2000 | 100 |
| 150 | 14 | | |

The pull-offs and ears will be offset inside the centre line of track. This offset will vary according to the radius of the curve, the smaller the radius of the curve the greater the offset. The main object is to endeavour to keep the trolley skid at a tangent to the curve. The amount of offset to allow for on curves was first arrived at from the following formulae:

$$S = \frac{EH}{G} + R - \sqrt{R^2 + P^2 - Q^2 - L^2}$$

Where

S = Radial offset of trolley wire towards centre of curve
E = Super elevation of outer rail
H = Height of trolley wire above rail

| | | |
|---|---|---|
| G | = | Track gauge |
| R | = | Radius of curve |
| P | = | Distance from centre of car to pivot of trolley base |
| Q | = | Distance from centre of car to centre of track |
| L | = | Horizontal distance from pivot of trolley base to point of contact between trolley skid and trolley wire |

All values in terms of feet

This formula was found to have its limitations on account of so many different types of cars in operation. It was found that by multiplying the formula by a constant of 0.73 it gave a good theoretical figure for offsets on curves, and all curves are installed at these offsets. As there are a number of different types of cars in service and some routes have a majority of a certain type of car running on them, it is necessary in practice to adjust each curve according to wear.

The offsets vary from 7.5 ins for a 60 ft radius curve, to nil for a 500 ft radius curve. This offset does not include offset for super elevation of tracks.

As the trolley wire around a curve has a tendency to "roll", it is necessary that care be taken to put the pull-off wire through the correct slot in the double pull-off in order to counteract this tendency.

To obtain the best working conditions on a curve it is necessary to ease the tension in the trolley and make the curve "float". To do this the straight trolley wire is anchored back at the entrance of the curve. This gives a cushioning effect when the trolley wheel comes into contact with the fittings. This cushioning effect reduces the wear on both fittings and wire cuts down dewirements and the trolley wire remains in its correct position for longer periods.

## Crossings on Special Work

Pull-off wires should not be attached to crossings, but crossings should be placed in between spans or between pull-offs. This gives a straight run through the crossing and minimise both the wear on the crossings and the chance of dewirements.

## Locating Frog Positions

For the standard switch now being used on the system, the preliminary location of the overhead frog may be taken as 9 ft from the end of the switch casting. This will be found to be a good working figure on installation but adjustments must be made to give the best working position. Guard bars should be installed

with frogs where the frog is likely to cause a trolley wheel trap.

## Design of Overhead Network on Curves and Junctions

The only hard and fast rules that can be applied to the design of overhead network is the maximum spacing for the radius of curve concerned and the correct placing of crossings and frogs. Every curve and crossing must be wired on its own particular layout. Some of the points that have to be considered are:

1. The angle of intersection of the streets concerned.
2. The width of the streets.
3. The layout of footpaths.
4. Obstructions on kerb, lines of trees, poles, electric light poles, fire alarms, post office boxes and booths, underground obstructions etc.
5. "Drive-ins" and entrances to shops, factories or homes must be left clear.
6. Contour of locations. It is significant that of all the curves on the system of the MMTB there are only two curves which are identically wired. Junctions which have identical track layouts have had to be wired totally different because of some of the above features.

## Maintenance and Renewal of Trolley Wire

Once the trolley wire is erected, its life can be shortened to a very marked degree unless the wire is correctly centred. If the wire is incorrectly centred, excessive side wear will shorten the life of the wire whereas correctly centred wire will give uniform wear and longer life. In adjusting wire, the ear should always be knocked away from the wear.

In the event of the trolley wire being gouged into at the entering or trailing end of an ear, it is often possible to cover up this weak point by knocking the ear either forwards or backwards, this bringing the weak point actually into the ear. This should be done before the fault becomes bad enough to warrant either a chafer plate or an anchor across the ear. In the event of the wear near the ear becoming spread over a section too long for the shifting of the ear to cover up the wear a chafer plate should be fitted. The length of the chafer plate can be increased from time to time if the wear continues to show up outside the existing plate. If the trolley wire near an ear has been worn so thin or damaged so that there is doubt about its strength an anchor ear should be placed on either side of the ear and anchored across.

When to renew trolley wire on any particular route is a problem for the Engineer. The Leading Hand Linesmen will have gauges with which to measure the wire and when this gauge will go over the trolley wire (depth) it is his duty to notify the Mains Engineer who will then inspect the route and decide whether

to renew the wire or otherwise. Some of the points to be considered are as follows:

1. Location: This is a very important factor for, if the locality carries heavy pedestrian and vehicular traffic, the risk of a falling 600 volt wire cannot be taken.

In the case of a city area, a broken trolley wire could easily mean a long delay to traffic on a number of routes.

A congested area would impede a tower waggon getting to the seat of the trouble as well as delaying them in carrying out repairs.

2. Position of feeders relating to trolley wire: If the trolley wire has a feeder running parallel with it or a number of feeder taps at regular intervals, the loss of section in trolley wire is not so vital, but, if the trolley wire is a stub end feed resulting in a long trolley wire feed, the loss of section would cause a voltage drop, and cause overheating of the wire which would increase the probability of a broken or burnt down wire. The time this is most likely to happen is at peak period and the dense city area where we rely on "trolley wire feed" is the most likely locality.

3. The condition of the wire at fittings: The condition of the wire at fittings must be closely examined. If the wire has been subjected to excessive wear at the ears, necessitating long chafer plates and a number of places where the trolley has to be anchored over, it means that additional danger points have been created on the route.

4. The number of bad bays of trolley wire in the section: The number of bad bays in the section must be considered as it may mean that, by replacing these bays, the section would be okay for some considerable time, but the replacement of bays must not exceed the economic limit.

It can readily be seen that the renewals of trolley wire cannot be decided by measurements at each span alone, but must be taken on general conditions of wire, locality, density of service and accessibility. Thus every route must be considered on its own economical merits, for where wire of a certain size would be quite safe to leave on one route, it would not be wise to leave it on another route.

## Overhead Feeder Cables

The feeders used by the Board consist of 0.1, 0.3, 0.5, and 0.6 copper cable although there are a few sections of 0.5 and 0.8 aluminium. The majority of the feeders consist of 0.5 and 0.6 copper cable. In running feeders, the sag

measured in the centre of the bay should be as follows:

| | 100 ft span | 110 ft span | 120 ft span |
|---|---|---|---|
| 60°F | 17 ins | 20.5 ins | 25 ins |
| 90°F | 20-1/8 ins | 25 ins | 29 ins |

In the early days of the Board, trouble was experienced in jointing feeder cable. Owing to the high cost of the heavy feeder cable, it was not economical to terminate and anchor feeder cable at a pole and then jumper across. If this method was used it may have meant cutting off 80 ft or 90 ft or perhaps 100 ft of cable as waste. The splicing and thimbling of cable was found to be slow and expensive as well as not being mechanically sound in the event of a fire in a building close to the cable. A cone splicing sleeve was then developed. This sleeve gave a perfect mechanical as well as an electrical joint, and, in addition, was easy and quick to install. It has the added advantage of being placed anywhere in the bay of cable. When running this heavy feeder cable, a wheel is mounted on a bracket; this bracket has a shank which fits into a hole in the cross arm; the feeder cable runs on the wheel, thus doing away with any scraping or damage to the cable as well as relieving the load necessary to pull the cable into position. In anchoring feeder cable, it has been found that good practice is to reduce the length of the last two bays of cable and on the second last pole to put an anchor strain clamp on the cable as a preliminary anchor. The final anchor is made by means of a cone anchor terminal which is the same principal as the splicing cone.

With the exception of the various Porcelain Insulators, practically every fitting used on the overhead network has been designed by the Board's Staff and is manufactured in the Board's Workshops. These fittings have been designed for lightness, ease of erection and replacement, ease of adjustments and to give a better job of work. Over the years, it has been the aim of the Mains Branch to improve the type of network, and fittings, especially any that has been the cause of any trouble.

## Trolley Wire Sections

Over the years, a number of various types and sizes of wire have been used. In the early days some 4/0 "Brown and Sharpe" section was used but this section did not allow for a non-fouling ear.

Then there was the British Standard non-fouling section of wire which enabled a non-fouling ear to be designed. Another good feature of this wire was that the head was small, giving a larger wearing section of wire, but this advantage was likewise a great disadvantage as the wire was not drawn from a round section and the small head and narrow throat being so much smaller in area than the

base section, overheating was caused in drawing the wire. This overheating caused flaws in the wire and many broken trolley wires were the result. The British Standard grooved wire 0.125 sq ins was then tried but this did not give a non-fouling section and was not persevered with. A design was then taken out for a grooved wire which was drawn from a round section and enabled a non-fouling ear to be used with it. A wire of 0.126 sq ins section and 0.2 sq ins section was then developed and has been used with success by the Board since 1935. The new British Standard wire very closely resembles these sections.

# Trolley Wire Renewal

| | | |
|---|---|---|
| 0.126 sq inch Trolley Wire: | | |
| | Depth of New Wire | 0.424 in |
| | Depth When Considered "Worn Out" | 0.3 in |
| 0.2 sq inch Trolley Wire: | | |
| | Depth of New Wire | 0.530 in |
| | Depth When Considered "Worn Out" | 0.4 in |

These measurements are taken as a datum figure only. When the trolley wire reaches these figures it is considered to be nearing the end of its economical as well as its safe life and needs constant attention and careful watching.

In practice when the depth of the wire is down to these figures it has been found that the section has been reduced to approximately 50% of the original wire, more particularly over the last few years. This has been brought about by:

a) the excessive speed and non-observance of rules by the average present day motorman.

b) the irregularities in most of the tracks on the system.

The combination of these two factors make it almost impossible to get good even wear on trolley wire, the result being side wear on the wire and hammering at fittings. Excessive side wear greatly reduces the section and hammering at fittings causes crystallisation of the wire thus increasing the danger of "breaks".

Some further points to be considered before deciding to renew trolley wire are as follows:

## Location

The location is a very important factor for a number of reasons:

a) if the locality carries dense vehicular and pedestrian traffic the danger of a falling 600 V wire is very grave and could easily result in death, serious injuries or both.

b) in the case of the "City Area" a broken trolley wire could easily mean a long delay to traffic on a number of routes, thus incurring a big lose in revenue and inconvenience to the travelling public.

c) A congested area would impede a tower waggon getting to the seat of the trouble, as well as delaying the crew in making quick progress in repairing the break.

**Position of Feeders Relating to Trolley Wire**

If the trolley wire has a feeder running parallel with it, or a number of feeder taps at regular intervals the loss of section in trolley wire is not so vital, but if the trolley wire is a stud end feed resulting in a long trolley wire feed, the loss of section would cause a big voltage drop resulting in power losses as well as unsatisfactory operation of Rolling Stock equipment due to low voltage. It could also cause overheating of the trolley wire which would increase the probability of a broken or burnt down wire. The time this is most likely to happen is at "peak period" and the dense city area where we rely on "trolley wire feed" is the most likely locality.

**Overall Condition of Wire at Fittings**

The condition of the wire at fittings must be closely examined. If the wire has been subjected to excessive wear at the ears, necessitating long chafer plates, and a number of places where the trolley has been "anchored over", it means that additional danger points have been created on the route.

**Bad Bays of Trolley Wire**

The number of bad bays of trolley wire must be taken into consideration for the following reasons.

If the wire is not renewed, but a number of bays are so bad that new wire would have to be spliced in, the number of bays must be considered, as the price of two splicing ears are equivalent to approx. four-fifths the price of a new bay of wire. This is for the material only and would not include labour charges which would be considerable for each bay. It would therefore not be economical to put many single or double bays of wire in a section, as the remaining wire would only have a comparatively short life and the presence of extra fittings are potential danger points which need extra maintenance; whereas, if new wire was installed throughout the section, it would only need ordinary maintenance.

It can readily be seen that the renewal of trolley wire cannot be decided by measurements at each span alone, but must be taken on general condition of wire, locality, density of service and accessibility. Thus every route must be considered on its own economical merits, for where wire of a certain size would be quite safe to leave on one route, it would not be wise to leave it on another route.

# WELLINGTON TRAMWAY MUSEUM

# 1990 PROJECTS

*Presented by Les Stewart, Wellington Tramway Museum*

As part of New Zealand's 1990 Celebrations the Wellington Tramway Museum undertook three major projects.

- 1990 Illuminated Tram
- Display of Double Saloon Tram 159 at the Sesqui Carnival
- Conference 1990

I don't need to talk about Conference 1990 at this forum, the fact that you are here speaks for itself. However, I will brief you on the other two to set the scene for the trip to the Museum this afternoon.

## 1990 Illuminated Tram

Just as was common practice for tramway operators in New Zealand and other parts of the world to celebrate special occasions with decorated and illuminated trams, the Wellington Tramway Museum chose to celebrate 1990 by decorating Wellington Double Saloon Tram 151 with hundreds of coloured lights.

A total of 560 lights were used, 84 on each of the two Kotuku boards, 160 on each of the NEW ZEALAND 1990 roof boards and 18 on each of the four dash boards. In addition to the lights, special 1990 bunting was draped around the tram.

The tram is operated in the evenings approximately once each month. Public response has been limited, although on the days when the tram is promoted over local radio patronage picks up.

In financing the project, the Wellington Tramway Museum acknowledges the assistance of:

- The New Zealand Lottery Board through the New Zealand 1990 Commission
- Fishermans Table Restaurant, Paekakariki
- Beach Road Takeaways, Paekakariki
- Parapine Timber (Paraparaumu) Ltd.
- Horowhenua Electric Power Board


Installing the roof mounted "NEW ZEALAND 1990" lights on tram 151, 1 January 1990.
*Photograph: Les Stewart.*

Also refer to "1990 Illuminated Tram" page 3 - 18

## Double Saloon Tram 159 at the New Zealand Sesqui 1990 Carnival

The New Zealand Sesqui 1990 Carnival was planned to be the major 1990 celebration event in the Wellington region. Its organisers had promoted it as being "a showcase of our own past, our present and our future and a learning experience from others whose nations are older or diverse to ours". Unfortunately, Sesqui did not live up to its promises and closed its doors after only 12 days out of a scheduled 37 day season owing millions of dollars.

However, the Wellington Tramway Museum can look back on the whole sad affair with pride in the professional way it went about putting together a display for Sesqui.

In May 1989 the Sesqui organisers first approached the Museum to enquire whether we would be interested in displaying a tram at the proposed carnival. At this stage they were considering the possibility of organising a "Hall of Transport" in the Overseas Passenger Terminal on the Waterfront and the tram would be one of many old transport exhibits. We were interested and began negotiations with Sesqui.

However, it soon became evident that Sesqui was not really interested in giving away free space and we would be expected to pay the same rental as commercial exhibitors. Rather than give up, we turned our attention to obtaining sponsorship money to cover our costs. I put together an information pack backgrounding our project for Sesqui and sent it out to selected four potential sponsors. Much to our surprise and delight, Mike Flinn and myself secured a deal with Electricorp Marketing within one week of posting out the material.

Meanwhile, Peter Berry was leading a dedicated little team of workers on the renovation of Double Saloon Tram 159. It had sat in the barn untouched since the late 1960's when some restoration work was started but never finished. The roof was recanvassed, side panels replaced, new ceiling panels fitted, interior re-varnished and the exterior sanded down and repainted.

Much of our success in having a professional display ready on time lay in the way we organised ourselves. We deliberately opted for a very small committee of just three - Mike Flinn, Peter Berry and myself. Peter's responsibility was to organise the renovation of 159 and its transport to Sesqui, while I looked after the negotiations with Sesqui and Electricorp Marketing and organised the photographic display to go around the tram. We deliberately left Mike without any special responsibilities. His role was to provide an objective overview to the whole event making sure that Peter and I didn't get lost in the detail.

Naturally, there were many more people involved in the project than just Mike, Peter and myself. Without the entire membership team supporting and assisting the project we would not have made it to Sesqui on time and as planned.


Tram 159 on display at the Sesqui 1990 Carnival, February 1990. *Photograph: Les Stewart.*

Our display received favourable comments from the organisers and members of the public. However, Sesqui failed. Why? There are a number of reasons and many of them will probably never be known. However, our analysis of the situation points to four primary ones.

- **Timing**

  To break even people from all over the lower North Island, not just the Wellington Region, would have had to attend. However, Sesqui was not held during school holidays.

- **Cost**

  Ticket prices were simply too high given the economic conditions and for what the show offered.

- **It didn't deliver what was promised**

  In the lead up to its opening, Sesqui had been promoted as a "mini-expo" but it turned out to be only an up-market Winter Show

- **Lack of Media Backing**

  At some time the organisers must have got off side with the media because the media gave Sesqui very poor coverage in the weeks before opening and when it opened, the media tended to concentrate on the negatives rather than the positives. The Museum had sent its own media releases out when the tram went into the city but not one of the major papers covered the story yet we usually get our stories into one of the papers, even if it is only a small paragraph in the "of interest" columns.

All of these are useful lessons to us all here today. Make sure you never make these sort of mistakes when organising any special event.

It is also important to note that the Museum did not suffer any financial loss as a result of the failure of Sesqui.

Since its return from Sesqui, all the mechanical and electrical equipment on 159 has been checked and overhauled. The re-commissioning of 159 this afternoon marks the end of 12 months of hard work by a small dedicated team of workers. A year ago it was only a dream.