

U.S. DEPARTMENT OF THE ARMY
HEADQUARTERS
WASHINGTON, D.C.

REC'D - 5 JUL 1951

ACK'D REF. TO	ACK'D ACTION RECEIVED NOTING
------------------	---------------------------------------

TRAMWAY MAINTENANCE

MINUTES

OF

CONFERENCE - APRIL 26 AND 27, 1951

MINUTES OF TRAMWAY MAINTENANCE CONFERENCE HEID
ON THURSDAY AND FRIDAY, 26TH AND 27TH APRIL, 1951, AT
CONFERENCE ROOM, ELECTRICITY SUPPLY DEPARTMENT BUILDING
238 FLINDERS STREET, MELBOURNE

PRESENT :	Mr. E. W. Bryceson	- Works Manager (Chairman)
	Mr. F. J. Fay	- Works Division
	Mr. A. V. Mawby	- Departmental Tramways Superintendent
	Mr. T.A.L. Farr	- Manager, Ballarat Branch
	Mr. F. K. Mounter	- Works Superintendent, Ballarat
	Mr. J. N. Sutherland	- Manager, Bendigo Branch
	Mr. N. G. Daws	- Works Superintendent, Bendigo
	Mr. H. N. Hornabrook	- Manager, Geelong Branch
	Mr. F. J. Ponting	- Works Superintendent, Geelong
	Mr. H. J. Hale	- Supplies and Transport Officer
	Mr. A. H. Smith	- Assistant Chief Distribution Engineer (Item 8 only)

The Chairman opened the Conference and stated that, on advice from the Engineer and Manager, discussions would be based on the assumption that the Commission would have to operate provincial tramways indefinitely.

..

..

..

ITEM 1. TYRES AND WHEEL CENTRES.

(a) Standardisation of tyre sizes.

REMARKS:

It was stated by Works Division that there is always an extended delivery of tyres from Thompsons (Castlemaine), the reason being the small number of odd sizes ordered. "Since 1947, 18 orders have been placed, the maximum number requested in any one order being 50, mainly in 12 lots only. A visit to Thompsons at Castlemaine revealed that these small orders are troublesome to them and take longer to fulfil than large Tramways Board orders. Difficulty is experienced by them in getting sufficient supplies from Commonwealth Steel of odd sized cheeses. They agreed that a consolidated order from all Branches would enable them to produce tyres more quickly. Differences in thickness and dimensions were discussed with them, and it was stated that Ballarat and Bendigo request tyres in the rough-turned state and Geelong require the finished-turned tyres. Would it be possible to adopt the standard M. & M.T.B. tyres? These are made in 20", 26 $\frac{1}{2}$ " and 33" sizes. Could we reduce ours to these dimensions, thereby using the Melbourne Tramways Board cheeses?"

Supplies and Transport Officer suggested that a contract should be entered into to cover say five years' requirements.

A drawing produced by Works Division showing M. & M.T.B. tyres was submitted to the conference.

From a hurried survey of this drawing it appeared that adoption may be possible.

Geelong, however, pointed out that the use of M. & M.T.B. tyres would increase turning work on their obsolete lathe, and to date they had endeavoured to limit this type of work (as detailed in Item 1 (b)). With a modern lathe or some improved method of tyre turning there would be no objection.

Ballarat considered that better tyre life is obtained from the extra diameter and width used in that Branch. The reason they asked for tyres in the unfinished condition was that no standard wheel centres exist and each tyre is individually turned to suit the particular centre it is going on. This procedure was found desirable because of the slight variation in the gauge of the wheel centres. There had been a difference of up to 3/16" or 1/4" in gauge.

Works Division also pointed out that as the machining did not appear to worry Thompsons the extra machining required by Geelong possibly could be carried out by them. The following summary was made :-

As far as machining is concerned the Ballarat lathe is good enough and there would be no disadvantage in having the tyre unturned. Bendigo lathe also is quite suitable. Geelong lathe will have to be considered as a separate subject in the near future. It was suggested that, in considering the suitability of M. & M.T.B. tyres, the annual requirements also be considered so that some indication of bulk orders to be placed could be arranged for a period of one or five years.

ACTION:

To be the subject of further correspondence. After thorough persual of drawing supplied and a survey of wheel centres, Branches to advise Works Division of the possibility of adopting M. & M.T.B. tyres, and to give the average annual usage.

ITEM 1. TYRES AND WHEEL CENTRES.

- (b) Limit to which centres may be trued without detriment to safe working.

REMARKS:

This question was raised in order to determine a standard tyre size should the adoption of M. & M.T.B. tyres not be possible.

Ballarat considered the limit to be 5/8", depending on the design of the centre, and Bendigo also work to this figure.

Geelong, however, have endeavoured to maintain standard wheel centre diameter for each size of tyre, and in this regard passed the following remarks:-

"It has not been the practice in this Branch to return wheel centres which may be slightly 'out of truth', thereby permitting us to maintain a wheel centre diameter of 28". A recent check of the outside diameters of four wheel centres revealed a maximum 'out of truth' of .002". While this local practice of not returning wheel centres may not be mechanically sound, it has enabled us to decrease considerably the turning required. Due to the obsolete type of Buck & Hickman lathe used for wheel turning we have attempted to limit the amount of turning carried out by endeavouring to purchase tyres completely machined. Also, this machine is not always available for wheel turning because of other demands. If a wheel centre is badly 'out of truth' it would be turned down and then banded to restore it to the original diameter of 28" or, in some cases, we have turned the wheel centre down to 27.708" and fitted a Brill tyre. Having in mind the procedure carried out in Geelong, it could be assumed that we may have a large number of tyres coming loose, but this is not the case, it being an extremely rare occurrence. Also, it may be assumed that, by shrinking tyres on to a wheel centre which is slightly 'out of truth', we may have a large number of centre replacements due to cracked spokes. We do have some of these, but it is very doubtful whether this is caused by our procedure, or whether it may be due to letting tyres get too thin, or whether it is just due to the fatigue of the metal."

ACTION:

Nil.

ITEM 1. TYRES AND WHEEL CENTRES

- (c) (i) Tools found most suitable for turning tyres.

REMARKS:

As Bendigo have been having trouble with tipped tools they raised this question to ascertain the views of the other Branches.

Geelong stated that they had never found an entirely satisfactory tool steel for wheel turning but considered the poor condition of the lathe the main reason. With tipped tools a modern robust lathe is required. However, some steels have given reasonable satisfaction. One of the difficulties experienced by Geelong is that in most cases the particular steel requisitioned is not supplied and some steel of unknown specification is substituted. It is often found difficult to obtain the analysis of these steels.

Ballarat have used nothing but high speed tool steel,

"Ultra Capital" being the best to date. Consideration, however, has been given to the use of carbide tipped tools since reconditioning of the lathe. Work hardened tyres have always presented a difficulty.

Geelong referred to a type of cutter used by Adelaide Tramways for turning tyres, and Works Division remarked that a similar tool also was used by Thompsons (Castlemaine).

ACTION:

Works Division to make inquiries regarding the type of tool mentioned by Geelong.

When requisitioning tool steels, full specification should be given in order that an equivalent can be supplied if the requisitioned brand is unobtainable.

ITEM 1. TYRES AND WHEEL CENTRES.

(c) (ii) Interference clearance for tyres and axles.

REMARKS:

The allowances used in the three Branches are as follows:

	Geelong	Ballarat	Bendigo
33" dia. tyre shrinkage fit	.031	.050	.030
20" " " " "	.018	.020 - .025	-
4" dia. axle forced fit	.0045	.0055	.006

Further to this it is understood that M. & M.T.B. work on .042" for 33" tyres and .008" on 4½" axles.

Ballarat stressed that they had no trouble with loose tyres on broken spokes. Geelong also stated that they had no wheel centres or tyres moving but had noticed wheel centres and tyres move on maximum traction trams received from M. & M.T.B.

ACTION:

Any alteration considered necessary in present procedure is purely a matter for local practice.

ITEM 2. TRUCK MAINTENANCE.

REMARKS:

Works Division doubted whether it was right and proper to expect shedmen who are not tradesmen to be responsible for truck maintenance.

Bendigo and Ballarat considered that the long experience gained by shedmen elevating from shed assistants and car cleaners qualified them for the work required. Ballarat thought that tradesmen would not be willing to undertake all the work, some of which was very dirty, connected with truck maintenance.

It was agreed that the standard of work was not always as high as desired in good engineering practice, but it was considered quite adequate for tramways.

Both Branches stated that additional staff would be required for either the actual work or the supervision, and such action was considered unwarranted.

Ballarat expressed the desire for some finality with regard to laid-down duties of shedmen.

Geelong differs slightly from the other two Branches in that it is the custom, in general, to have the mechanical fitting work on tram cars carried out by mechanical fitters. Shedmen replace parts and make adjustments only, involving very little actual fitting work.

In all Branches it appears that actual machining and/or general complete truck overhaul is carried out in the workshops by tradesmen.

Ballarat did not consider that the present margin for shedmen and assistants was sufficient in view of the long experience required.

ACTION:

Works Manager to take up with Industrial Officer the question of definition of duties of shedmen, etc.

ITEM 3. SUSPENSION BEARINGS.

REMARKS:

Raised by Works Division to ascertain if the recent supply of oversized suspension bearings to Ballarat was likely to become a standard procedure, and if the supply of such bearings would be an advantage to other Branches.

However, it appears that the supply of oversized bearings will not be a regular matter.

The Departmental Tramways Superintendent stated that Ballarat are using oversized bearing shells for armature bearings on W.H. 225 motors, and Bendigo considered that they may require some for armatures in the near future. Geelong already use a pattern for armature bearings that permits the turning up to approximately 1/32" oversize.

ACTION:

Nil.

ITEM 4. BEARING METAL (WHITE METAL).

REMARKS:

Ballarat for many years have used "Microid all-duty" which gives results comparable with higher-priced metals. However, they now are changing over to "Microid No. 9" from which it is hoped to obtain higher mileage.

Geelong, in general, have been using the high tin content bearing metal, viz. "Hoyts I.C.I.", but in view of the great difference in price between high tin and high lead content metal they now are experimenting with "Microid improved all-duty".

The "Improved all-duty" has a recommended pouring temperature of 600°F. against 932°F. for the old "Microid all-duty", but has a comparable high lead content. The old "Microid all-duty" was tried some years ago in Geelong but difficulty was experienced in pouring at the then-recommended temperature of 932°F. because of the lack of satisfactory temperature measurement.

Bendigo use "Microid all-duty" and find it very satisfactory.

It is assumed that the "all-duty" being supplied to Ballarat and Bendigo is the "Improved all-duty".

It is understood that M. & M.T.B. use "Graphine No. 2" bearing metal at present but still are experimenting with the lead base metals.

It was apparent that the life of a bearing in W.H.225 motors is nowhere as great as in other motors, due to design.

From the discussion it appeared that no Branch is experiencing any great difficulty, and it is a matter of deciding whether the high tin content metal is any better than the high lead content metal.

ACTION:

Geelong to continue their experiments with high lead content metal and decide whether they would be satisfied with it.

Works Division to contact M. & M.T.B. to ascertain the stage of their experiments.

ITEM 5. MOTOR ARMATURES.

- (a) Delivery condition of motor armature coils manufactured at Richmond.

REMARKS:

Due to a recent request from Yallourn to supply in future armature coils in the unvarnished condition, it was decided to approach Branches to ascertain if this procedure also may be of interest in connection with tramway supplies. This was detailed in letter dated 2nd March, 1951.

Ballarat definitely prefer to obtain coils in the unvarnished condition, as they consider that the cambric tape prevents thorough penetration of the finishing varnish.

Bendigo, however, still are satisfied with varnished coils but requested that cotton sleeves should be fitted on leads after the coils have been varnished, due to difficulty experienced in connecting leads to commutators.

Works Division pointed out that the trouble Bendigo have experienced in this regard must have been an exceptional case only, as the sleeves are left unvarnished for a length suitable for cutting to requirement.

Coils for use in Geelong are mostly manufactured in the local workshop. These coils manufactured locally are varnished upon completion and placed in storage, where they may be held for up to 12 months before use. No difficulty is experienced in inserting these coils in the slots provided they have been properly formed.

ACTION:

All coils in the future will be produced for stock as follows :-

Coil formed to shape with wires individually varnished. Light spiral of cotton tape added to maintain shape and the whole brush varnished.

When a request is received from Bendigo, varnish impregnation and cambric taping will take place before despatch of the coil.

ITEM 5. MOTOR ARMATURES.

(b) Binding wire.

REMARKS:

Works Division stated that at present 19 s.w.g. binding wire was unobtainable in Melbourne. An outstanding requisition from Ballarat could not be satisfied, but 19 s.w.g. stainless piano wire had been sent in lieu.

From past experience, Ballarat are not satisfied with ordinary piano wire, due to the difficulty of soldering and the fact that supplies previously had rusted. Bendigo are using piano wire.

Geelong to date had had no difficulty with the supply of binding wire, and store all such wire in a box of "Limel" to eliminate corrosion owing to climatic conditions.

From remarks it was obvious that the use of recovered binding wire for armatures was not practicable.

Works Division considered that all items such as binding wire, which from time to time becomes difficult to procure, should be included in tramways annual requirements in order that bulk supplies can be obtained. Supplies and Transport Officer, however, pointed out that according to standard procedure this should already be done.

ACTION:

Supply of 19 s.w.g. binding wire to be further investigated.

ITEM 6. CARBON BRUSHES.REMARKS:

A representative from Morgan Crucible Co. visited Works Division some time ago and advised that they would be unable in future to hold stocks of numerous types of brushes. He also inquired whether the Commission could make use of 249 Link C-6 W.H. 225 brushes which they intended to convert into carbon if not disposed of.

In view of this it was also desired to ascertain if the number of types of brushes at present in use could be reduced.

Ballarat remarked that in the early days of tramway operation in Ballarat, the W.225 motors were fitted with straight carbon Morganite brushes, whilst the G.E. 202 motors were fitted with E.G. brushes. Experience demonstrated that much less wear was found on the G.E. 202 motors, and they accordingly changed all brushes to E.G. type. These have given very satisfactory results, and even some motors with non-undercut micas were running without any trouble.

Geelong are using Morganite E.G.3 brushes on all traction motors (including W.H. 225 motors), and Morganite Link A on compressor motors. Bendigo are using four different types as shown in the summary below.

Geelong	Ballarat	Bendigo
Morganite E.G.3 (traction motors)	E.G. brushes for all applications.	Link E.G.0 "Birney"
Morganite Link A		Link C.6 W.H. 225
(compressor motors)		Link C.4 G.E. 202
		Link E.G.11SG.E. 201

Even although Bendigo are using Link C.6 brushes on W.H. 225 motors it would seem that it would be possible to use E.G. 11S.

ACTION:

Bendigo to confirm with Works Division as far as C.6 brushes are concerned.

ITEM 7. AIR RECEIVERS.

REMARKS:

The question of regular testing of air receivers was raised by Ballarat because, although they understood that by law this was not required, it was felt that the Branch should be responsible for general safety and the tramcar receivers now were very old. These receivers are located under tramway seats and in such a position are a hazard to passengers.

Works Division confirmed that air receivers on tramcars belonging to the M. & M.T.B. and S.E.C. were excluded by gazette from the provisions of the Mines Department regulations appertaining to their periodical inspection and testing.

Geelong and Bendigo also favoured regular testing, although Bendigo already test receivers at odd intervals by bringing air pressure up to safety valve setting. The Departmental Tramways Superintendent advised that no formula for testing receivers existed in the M. & M.T.B. and examination was superficial only.

Geelong suggested that testing could be carried out annually at the same time as fire extinguishers are tested.

Various other periods for testing were suggested and a compromise of three years was arrived at.

ACTION:

All receivers to be hydraulically tested within 18 months and thereafter every three years from the date of test.

ITEM 8. OVERHEAD EQUIPMENT.

- (a) Standard method of handling fallen trolley wires by tram crews.

REMARKS:

Bendigo raised this question as the method recently adopted in handling a fallen trolley wire in that city appeared hazardous. However, since preparation of the conference agenda this matter has been the subject of a letter from the Engineer and Manager dated 30th March, 1951. Discussion relative to this letter then took place.

One point brought out was that all trams at Ballarat are equipped with a hooked broomstick with which crews are able to drag the trolley wire to the desired position, and such an article may be advantageous to the other Branches.

ACTION :

In the light of the comments and criticisms, the Departmental Tramways Superintendent and Chief Distribution Engineer to go into this question with the idea of deciding whether an addition should be made to the book of instructions, and also to advise regarding the supply of a suitably hooked stick for handling wires.

ITEM 8. OVERHEAD EQUIPMENT.

- (b) Augmentation of overhead feeders.

REMARKS:

This matter is primarily a Bendigo problem. The feeders in that city are all underground and approximately 40 years old, and it was considered that augmentation by overhead distribution was necessary in certain places. This will be particularly so when more maximum traction cars are used on the Eaglehawk line as the supply from trolley wire alone could not possibly meet the demand.

Ballarat have had no breakdowns to date and do not anticipate any major trouble in this regard during the life of the tramway system.

Geelong feeders are all of the overhead type and are adequate for present requirements.

The Chief Distribution Engineer did not consider that it would be justified to have duplicate cables just to meet normal voltage on the trolley wire on the few occasions that a breakdown would occur, and that some reduction in service would have to be made. In addition, due to the world shortage of copper it may be difficult to obtain the material for such a long length of feed, and rectifier plant for Eaglehawk may have to be considered.

ACTION:

Bendigo to submit a recommendation to the Chief Distribution Engineer on action required.

ITEM 9. TRACKS.

- (a) Replacement of special work castings for points and crossings.

REMARKS:

Comments relative to this subject were as follows :-

Geelong : "As far as repair or replacement of special work is concerned we can see four alternatives :

- (a) Building up by welding;
- (b) Welding to the head or check a steel strip, thereby expediting the job and economising in electrodes;
- (c) Fabrication of special work from grooved rails;
- (d) New manganese castings.

Our special work is in a bad condition, and a high percentage of it will need replacement within the next five years. It is understood that a report on special work for all provincial cities was prepared some years ago.

(At this stage the Departmental Tramways Superintendent quoted paragraphs from this report.)

As far as method (a) is concerned, that has been used in Geelong for the last 25 years. It has been satisfactory if performed correctly, but is extremely slow where large 'build-ups' are required. Method (b) has recently been tried in Geelong to build up the head and checks of special work. A $1\frac{3}{4}$ " wide strip is used. This is welded on each side as well as through $\frac{3}{4}$ " dia. holes 4" apart. It also has been used to build up curved rails at busy intersections where replacement has been difficult. Spring steel and mild steel strip have been used. Spring steel in the annealed state is better than mild steel. Ramping up by electrodes is dependent on height.

ITEM 8. OVERHEAD EQUIPMENT.

(b) Augmentation of overhead feeders.

REMARKS:

This matter is primarily a Bendigo problem. The feeders in that city are all underground and approximately 40 years old, and it was considered that augmentation by overhead distribution was necessary in certain places. This will be particularly so when more maximum traction cars are used on the Eaglehawk line as the supply from trolley wire alone could not possibly meet the demand.

Ballarat have had no breakdowns to date and do not anticipate any major trouble in this regard during the life of the tramway system.

Geelong feeders are all of the overhead type and are adequate for present requirements.

The Chief Distribution Engineer did not consider that it would be justified to have duplicate cables just to meet normal voltage on the trolley wire on the few occasions that a breakdown would occur, and that some reduction in service would have to be made. In addition, due to the world shortage of copper it may be difficult to obtain the material for such a long length of feed, and rectifier plant for Eaglehawk may have to be considered.

ACTION:

Bendigo to submit a recommendation to the Chief Distribution Engineer on action required.

ITEM 9. TRACKS.

(a) Replacement of special work castings for points and crossings.

REMARKS:

Comments relative to this subject were as follows :-

Geelong : "As far as repair or replacement of special work is concerned we can see four alternatives :

- (a) Building up by welding;
- (b) Welding to the head or check a steel strip, thereby expediting the job and economising in electrodes;
- (c) Fabrication of special work from grooved rails;
- (d) New manganese castings.

Our special work is in a bad condition, and a high percentage of it will need replacement within the next five years. It is understood that a report on special work for all provincial cities was prepared some years ago.

(At this stage the Departmental Tramways Superintendent quoted paragraphs from this report.)

As far as method (a) is concerned, that has been used in Geelong for the last 25 years. It has been satisfactory if performed correctly, but is extremely slow where large 'build-ups' are required. Method (b) has recently been tried in Geelong to build up the head and checks of special work. A $1\frac{3}{4}$ " wide strip is used. This is welded on each side as well as through $\frac{3}{4}$ " dia. holes 4" apart. It also has been used to build up curved rails at busy intersections where replacement has been difficult. Spring steel and mild steel strip have been used. Spring steel in the annealed state is better than mild steel. Ramping up by electrodes is dependent on height.

In regard to fabrication of special work from the grooved rail, this definitely has possibilities but it is not as simple as it appears on the surface. A lot of special work that is fabricated needs surface hardening. To surface harden you want special equipment which we do not think is warranted within the Branches. It appears to us that if this fabrication is to be done it should be done properly and surface hardening is essential. We are doubtful if Branches could warrant the installation of special equipment to do that, and think that fabrication should be done centrally."

Bendigo : "Tracks are in fair condition. Approximately 50 castings are used in the system. The only method we are using is building up by electrodes and we have had little difficulty with this.

Our idea is that if the tramways are to continue to be operated, some provision should be made for special work, and it seems preferable that, if the requirements are uniform, some central stock should be held."

Ballarat : With regard to the general condition, the suggested figures produced for the report are in order. By continued patching you can keep cars on the line more or less indefinitely. The difficulty in continuing to make patches on manganese castings is to get down to the parent metal. We also have the problem of cracked castings that are extremely difficult to hold together to weld. It would be possible to fabricate all special work including points, if necessary, and no great difficulty would be experienced in securing 15 years' life from purely fabricated steel work including points. We think undoubtedly it would be more economical and quicker to use fabricated crossings.

We think that we could handle the manufacture of mates and crossings ourselves, but points would be a job better handled by a central establishment. It is necessary to make crossings individually to suit particular conditions.

We have had a number of cases in connection with crossings where the flange, comprising about 15 inches length, has broken out and cracked. Various means have been adopted for repairing this trouble. A sketch has been produced showing repairs recently made."

Departmental Tramways Superintendent : "There has been a lot of fabrication in Ballarat. Track crossings were patched up during reconstruction by welding, but during the war years they crumbled. Electrodes were a problem. In the end it was decided to fabricate from original grooved rail or B.H.P. T-rail, and these are standing up fairly well.

The majority of crossings listed in the report for replacement would be a standard 8' crossing which I think would lend itself to bulk manufacture."

Works Manager : "Is the opinion that we should complete our special work gradually? It appears that the first batch of it will be in the terms of the 1948 report. Experience from that can decide whether it is worth while carrying on. The question is, can this special work be fabricated within the Branch or is it preferable to have it done centrally either at Richmond or under contract?

Thompsons (Castlemaine) are fabricating all railway crossings from standard rails.

Apart from the odd special case it would appear that it would be preferable to bulk manufacture and distribute.

At the moment we are not in possession of any drawings for special work, and so these would need to be obtained."

ACTION:

Drawings of special work requirements to be forwarded to Works Division by each Branch.

Ballarat to send copy of special crossing repair drawing to Geelong, Bendigo and Works Division.

ITEM 9. TRACKS.

- (b) Experience with building up.
- (c) Welding rods used - penetration of oil into worn metal.

REMARKS:

Comments relative to this subject were as follows :

Ballarat : "We are using the quasi-arc 'Mancross E' electrode. This electrode is also used for strength welds on fish plate to castings. There is, admittedly, some consequential difficulty in re-welding which requires the removal of the 'Mancross E' metal. However, we are getting better results than with the use of mild steel electrodes. We understand Geelong has used a mild steel electrode which, in the opinion of our foreman, gives better results than we experience in Ballarat with manganese electrodes. We understand this to be 'Lincoln Fleet Weld 6.' We have recently re-introduced the use of stainless steel which we have found very useful in two ways. Where we want a hard face on an original rail, instead of building manganese directly to the rail we use a bonded layer of stainless steel, then the manganese on to the stainless steel. We have found also that in building up bad cases of worn manganese castings we can get a better adhesion to the parent metal by building stainless steel to start with than building manganese directly."

Geelong : "The main welding rod we use is an 8 gauge E.M.F. 'Austerod.' The rod is designed for hard surfacing and welding of manganese and stainless steels. The metal deposited contains approximately 18% of chromium and 8% of nickel. This resists wear similar to manganese steels. For welding on manganese steel rapid cooling of the weld metal is desirable. The parent metal should not develop a high temperature. A continual quenching of the parent metal is advisable. One disadvantage with the use of 'Austerods' is their cost (about 6d. per foot), but they are a very effective electrode and there is no difficulty in application. Water is used for quenching."

Bendigo : "We use 'Mancross' base metal and a manganese rod on top of that. 'Orlekon' rods smoke, making it difficult for the operator to see through, so we are still using 'Mancross' and manganese."

As regards the condition where oil has penetrated the worn metal, Ballarat have found no cure for this except to apply heat and burn the oil out. Geelong agreed that heat will burn the oil out satisfactorily, but in Geelong they clear away surface oil by use of a heavy grinder. It is essential, as far as welding on special work is concerned, to make sure of a good surface.

Bendigo apparently do not heat the rail sufficiently, as the oil keeps bubbling up through the welding metal. Bendigo expressed the desire for further information relative to the Geelong grinder.

ACTION:

Geelong to supply Bendigo with details of their track grinder.

ITEM 9. TRACKS.

(d) Frequency of oiling and materials used.

REMARKS:

Ballarat desired to ascertain the frequency of oiling in other Branches as they had been experimenting to see if the week-end could be spanned. To date no adverse reports have been received regarding the "oil-less" week-end. The mixture used is about a 5% Crater compound in sump oil, which has given good results.

Points and crossings in Bendigo are swept and oiled once per day with sump oil.

Geelong use sump oil mixed with graphite on the curves twice weekly. However, they do consider this may be insufficient as "squealing" is noticed at times. Points are attended to weekly using engine oil. No lubrication is carried out on the surfaces of special work castings.

Works Division inquired if any of the new lanoline base oils had been tried. These oils will stick in wet weather. Crater compounds of course may be cheaper.

ACTION:

Works Division to advise Branches concerning lanoline base oils available.

ITEM 10. CAR RENOVATION.

(a) Painting - Makes and types of enamel used for various sections.

REMARKS:

At present there is no uniform style of finish on tram cars, the outstanding differences being :-

1. Ballarat paint with the deep-skirt effect carried from end to end, and paint window sashes green to give larger window effect.
2. Bendigo use a much darker green than Ballarat, and have grained varnish window sashes.
3. Geelong use a lighter green than Ballarat and paint window sashes cream.

Comments passed by the three Branches were as follows :-

Ballarat : "We have been disappointed in some of the recent batches from Taubman, which vary between batch and batch. The life of the enamel is much less than pre-war, and we seek information from other Branches as to their experience. Recent supplies of Taubman's primers have been very unsatisfactory, and we have been forced to make our own primer. In the early days of tramway reconditioning we experimented with different types and makes of enamel. Synthetic enamels gave better results than we had previously obtained from long-oil enamel as regards retention of gloss. During the war none of the manufacturers would offer a synthetic enamel equivalent to their pre-war product. We have varied from Taubman's long-oil enamel to their synthetic enamel, but there is little to choose between them. We feel that there should be something better than we are getting."

Bendigo : "We have used Taubman's 'Pearline' synthetic enamel since 1946. The gloss disappears after about 12 months' service, and we repaint the cars every four years."

Geelong : "From approximately 1944 until 1947, the cream exteriors of tramcars were painted with Taubman's 'Pearline' long-oil enamel. This enamel has been very durable, was easy to apply, but like all long-oil enamels it dried extremely slowly. In 1947 we changed to, and are still using, Taubman's 'Pearline' synthetic enamel which has been entirely satisfactory. The application is easy, the drying rate considerably faster than the long-oil, the gloss is good, the color consistent, and it appears quite durable. The same cannot be said of the various enamels used on the green exterior. We have been periodically in trouble for a number of years. Some of the enamels used were -

Taubman's Green) Trouble with flotation of pigments and
Long-oil Enamel) not drying.

Taubman's Green) Poor gloss, flotation of pigments.
Synthetic Enamel)

We are now using Spartan 'Green Velox Synthetic' which has the following properties :- Application - good; drying - good; gloss - poor; colour - consistent; durability - satisfactory."

In view of the above it was suggested that experiments be carried out with other brands, in the first place trying "Dulux". Works Division agreed that this should be done as Spartan was being tried at Geelong at present. Geelong considered that the salt-laden atmosphere in that city affects the colour. One of the difficulties in using varnish over enamel is that the whole of the varnish has to be removed before repainting. At Geelong ammonia is used for removing varnish from the surface of the enamel.

Ballarat referred to a pneumatic sanding device which they use for cleaning down enamel.

Bendigo suggested that coloured photographs should be taken of a painted tram to show the uniform style desired, to which the Departmental Tramways Superintendent replied that coloured drawings of the Ballarat tram were produced some years ago. This particular tram was painted for inspection by the Engineer and Manager and has been the standard work to in that Branch since.

Ballarat made reference to a treatment used in Brisbane for window sashes. Instead of putting putty between the glass and the fitting they used an impregnated felt and linseed oil. This may be of use to Commission tramways as Ballarat have been having difficulty with putty. They have recently introduced the use of synthetic resin glue in sashes, this glue - "Urea Syrup" - being obtained from Nightingale Supplies.

ACTION:

Arrangements to be made for a visit to Ballarat in company with a "Dulux" representative.

Ballarat to send a sample of colour at present being used to Works Division to enable a comparable "Dulux" colour to be chosen.

Works Division to forward a pamphlet on sanding device to Branches.

Departmental Tramways Superintendent to locate drawing of Ballarat tram car submitted to Engineer and Manager.

Works Division to contact Tramways Board regarding window sash treatment.

ITEM 10. CAR RENOVATION.

(b) Use of gold lining.

REMARKS:

Bendigo have not used gold lining since 1939, and desired to ascertain if it should be re-introduced.

Ballarat use a $\frac{1}{4}$ " wide line of yellow paint and consider this treatment is essential to improve the colouring scheme.

Geelong also use a cream line on green panels, but no gold leaf is used.

ACTION:

All trams to have cream lines where required to enhance appearance.

ITEM 10. CAR RENOVATION.

(c) Ceiling preparation for best lighting.

REMARKS:

Ballarat stated that all ceilings in their trams had beautiful veneered timber and they were reluctant to cover these with paint of better reflecting value, although it was considered that some experiment was justified in the way of a light coloured paint to give some relief from darkened saloon interiors.

Bendigo already have painted one car with Taubman's "Enameline" white paint and removed light shades, and although the psychological effect is considerable there actually is no difference in the foot candle reading.

Geelong pointed out that the "Birney" trams had white painted ceilings and this lasted quite well, requiring an occasional washing only. It was considered in Geelong that the best finish for ceilings was a white synthetic enamel, but it was not recommended for general use as, in cars with ventilators opening on to the side roof, white ceilings become very dirty with general dust and rain splashes. The added expense of different types of ventilators was not warranted.

Ballarat suggested that one car could be painted and inspected at the proposed Ballarat meeting, but it generally was agreed that this was not worth while.

From the comments it was apparent that painting is favourable because of improved lighting, but because of subsequent maintenance and the beauty of natural grained timber in ceilings the varnish should remain.

ACTION:

All ceilings to remain varnished.

ITEM 10. CAR RENOVATIONS.

(d) Roof : Treatment for water proofing; ideas as to colour and type of finish.

REMARKS:

At the beginning of last winter the greater part of the

rolling stock in Ballarat was leaking badly, many trams coming in with deep cracks in the paint covering which extended in some instances right through the canvas. Correction was attempted by oil paints which gave only temporary relief. The difficulty was solved by treatment with "Sealkote" heavy bituminous compound which leaves a black surface. It was necessary therefore to use a sealing coat of Shellac aluminium paint and finally an oil colour coat.

In view of the necessary after coat of stone colour it was desired to ascertain if roofs could be left an aluminium colour as the lead colouring paint builds up thickness, cracks and flakes off. In addition, repair of roofs would be facilitated. However, it was mentioned that the disadvantage of aluminium finish is that it soon shows up the copper discolouration from the trolley wire.

The question of colour was apart from the method of water proofing as no leaking roofs have been experienced in Ballarat this winter.

Geelong do not find leaking roofs a major problem. The treatment given is one thickness of heavy-duty hession, a coat of lead base paint, one thickness of canvas, followed by two coats of stone colour lead base paint. Geelong paint roofs only when a car receives an overhaul, approximately once every four or five years. It is considered that possibly the first coat of lead base paint put on by Geelong under the canvas is giving the necessary sealing, as it is not exposed to the weather.

The Departmental Tramways Superintendent pointed out that it was unsatisfactory to use a straight lead base paint as a water-proofing medium, as it has the adverse effect of hardening. In Adelaide a paint with a soft soap and linseed oil is used.

Bendigo roofs are painted with white lead and covered with 21 oz. canvas tacked on the outside and then repainted with two coats. The paint used is 4 gallons with linseed oil, white lead, raw sienna, 1 pint turpentine and $\frac{1}{2}$ pint terebine. One coat is given to all cars in Autumn. One Bendigo car has been treated with 3/16 tempered "Easonite" and is standing up well, but such covering is unsuitable where there are small radius sections.

In relation to the aluminium bituminous paint, it was pointed out by Works Division that, from experience, such paint has not proved entirely successful in that it shows bright and uniform when first applied but the bitumen soon comes through and the appearance is spilt. Water proofing qualities, however, are probably quite adequate.

ACTION:

A paint containing soft soap should be tried for water-proofing.

Colour of roof to remain Public Works Department Stone as at present.

ITEM 10. CAR RENOVATION.

(e) Floor - treatment and covering.

REMARKS:

It was generally agreed by all Branches that "Lastoleum" was the best floor covering, but as this is now difficult to obtain various alternatives are being tried.

Ballarat have carried out experiments with "Flintkote"

of $\frac{1}{4}$ " thickness, and one tram thus covered is quite satisfactory after approximately 5 years. The cost of a "Flintkote" covered floor would be about twice that of a cover of "Ormonoid." Further experiment on the mixture and sand grading is necessary.

Bendigo floors are painted with bitumastic paint then covered with 2-ply 1/16 "Ormanoid" and tacked down. The red paint supplied with "Ormanoid" has not been successful of late and "Solpah" now is being used. "Ormanoid" has to be replaced approximately every three months.

Geelong are using "Malthoid" but it is not particularly satisfactory and they are keen to follow Ballarat with "Flintkote" experiments. However "Malthoid" certainly is lasting longer than three months.

The use of rubber flooring was suggested by Works Division, although the Departmental Tramways Superintendent considered that in some places like car entrances it would bulge and, in addition, be very slippery in wet weather. In view of this it was further suggested that rubber should be tried in the saloon and "Flintkote" in the entrances.

The idea of bituminous tiles was queried by Geelong, and some information on this appeared worth while.

As Bendigo are using neither rubber nor "Flintkote" they suggested that they could lay the respective materials in saloon and entrances in one car.

"Flintkote" booklets were obtained by Supplies and Transport Officer and distributed to conference members.

ACTION:

Works Division to obtain information on rubber tiles and bituminous tiles.

Bendigo to cover the floor of one car with rubber in saloon and "Flintkote" in the entrances.

ITEM 11. TROLLEY WHEELS.

REMARKS:

Works Division raised the question of the possibility of standardising on trolley wheels in lieu of Geelong using four-spoke "V" profile and Ballarat and Bendigo three-spoke "U" profile.

Ballarat were emphatic on the "U" profile and Geelong prefer the "V" profile although both Branches have experienced double grooving. Geelong suggested a common pattern that would enable each Branch to retain their particular profile, but they did indicate their willingness to try further test samples of the "U" type wheel.

All Branches stressed that comparatively low mileages have been obtained during recent years with trolley wheels, that is, since the suppliers have not been M. & M.T.B. From chemical test figures read by Geelong it appears that the quality of material during these years has been unreliable and the latter comments were supported by each Branch.

Other factors raised as being contributory to the wear of trolley wheels were - size and condition of trolley wire; out-of-centre trolley wire as used on single tracks; and pressure of wheel on trolley wire, although it generally was agreed that the quality of material was the main cause.

ACTION:

Works Division to arrange for a batch of trolley wheels of 3-spoke "U" profile pattern to be cast to a known specification - these wheels to be sent to each Branch which will put identification marks on them and arrange for a trial.

ITEM 12. PURCHASE REQUISITIONS.REMARKS:

Works Division pointed out that in many instances requisitions were being received with very little detail, necessitating redrafting. This was probably brought about by Stores personnel raising technical requisitions. Supplies and Transport Officer however considered that Stores should be able to raise requisitions quite well provided that the stock card provided full specification and correct nomenclature. The procedure was for the Storekeeper to raise all requisitions to replenish stock but it was not essential for him to raise requisitions for items of an unusual nature.

To overcome such difficulty the Supplies and Transport Officer suggested a section in Stores vocabulary should relate to tramways, thus giving standard nomenclature with a specification where required.

This idea was supported by all Branches although it was agreed that its institution may take some time. In the interim, Works Division requested that all requisitions for technical items be initialled, vetted or signed by a technical officer for the Branch Manager, to make sure that it reads correctly.

Bendigo mentioned a recent case where, because an item was required urgently, the initiation, typing and despatching to Melbourne of the requisition was carried out by the Branch Manager and technical staff, a copy of the requisition being forwarded to Stores. In two days, however, this requisition was returned from Melbourne to the Storekeeper for his attention. Supplies and Transport Officer said this was not the usual practice; requisitions signed by Divisional Heads should never be referred back.

A general complaint from the Branches was the excessive normal delay in receiving an article after requisitioning, even in some instances where delivery was shown on the order as four days. Branches preferred to be informed of the approximate date of delivery if Stores cannot supply the material within the stated time.

Works Division stated that when the supplier makes an offer frequently he does not make any reference to delivery. In this case the Purchasing Officer assumes that it is considered to be immediate and marks down "Four Days." A similar remark by the Supplies and Transport Officer was that firms today quote delivery within a certain time and they really have no idea when they submit their quotation as to whether or not they can abide by the statement.

ACTION:

Branches to arrange for technical requisitions to be vetted by a technical officer, and for each separate item (except small routine ones) to be on a separate requisition.

Works Division to arrange for copies of requisitions raised or re-drafted at Richmond to be forwarded direct to Branches in order that the officers concerned will sight them.

Supplies and Transport Officer, with Works Division, to give consideration to inclusion of a tramway section in Stores Vocabulary.

ITEM 13. ANNUAL REQUIREMENTS.

(a) Requisitioning.

REMARKS:

Works Division have noted that after annual requirements are submitted and consolidated, requisitions are received from time to time for similar items which it appears could have been ordered earlier. It is realised, of course, that in some instances, particularly as far as maintenance is concerned, this is unavoidable, but requisitions have been received from the same Branch within two months for the same particular item, and such procedure is not common to any one Branch.

The Supplies and Transport Officer also expressed the difficulty experienced with tramway supplies because of the small quantities ordered at a time. Ballarat may order six of one casting, Geelong may order six or twelve of the same a few days later. Some would be machine finished, some would be rough castings, with the result that prices and orders, etc., would be in the hands of different firms. For this reason the Branches were requested to forward tramway spares requirements annually. That request was circulated in 1947 but has never been strictly adhered to, small items getting by throughout the year. If much of this material were ordered, as requested, annually, a considerable amount of it could be covered by annual contract. One of the first points, therefore, to consider appears to be how much can be requisitioned and ordered by annual contracts. Where it is known that an item already is covered by contract, the requisition should be marked "Contract."

Ballarat then suggested that Supplies and Transport Officer should circulate a list of material which he had found, from analysis of requisitions, would be best ordered under contract. However, Ballarat further pointed out that there was something about annual contracts which was undesirable. For instance, annual contracts may be made to supply such things as welding electrodes, including mild steel general purpose electrodes. The fact that these vary from make to make may not be important but in tramway work some electrodes suit conditions better than others. The welder becomes used to a certain type of electrode and it is then changed. Over the last few years suppliers seem to have been changed each year. For this reason it may be desirable to provide for the supply of a general purpose mild steel electrode other than that which may be included in the annual contract.

The Supplies and Transport Officer replied that the Mechanical Engineer handles electrode contracts and when he states a certain type of electrode supplies are ordered according to his knowledge. However, if it were found that a special type is preferable for tramway work it may be possible to take action to have it included as a tramway requirement.

ACTION:

Branches to forward as many tramway requisitions as possible annually in order that requirements can be consolidated and thus bulk ordered. In the case of electrodes, as these now are an annual contract, Branches to forward to Works Division a note of the type they find best and a request will be made to Mechanical Branch to have these included as a special.

Supplies and Transport Officer to prepare a list of items that may best be handled as an annual contract.

ITEM 13. ANNUAL REQUIREMENTS.

(b) Kiln dried hardwood.

REMARKS:

Ballarat have experienced considerable difficulty in obtaining suitable timber locally for urgent repair work. With the great diversity of sizes and sections in a tram it is impossible to carry stocks large enough for all sizes that may be required.

Works Division was recently called upon to supply some dressed material, and Ballarat desired to ascertain the time factor involved if this procedure were followed from time to time for special cases.

Geelong in the past also have found purchase difficult, but recently obtained good stocks through normal purchasing channels.

Bendigo have stocks on hand for 12 months, and consider this adequate.

Works Division advised that as long as kiln dried hardwood is readily available the dressing would be treated as urgent, and therefore little delay should result. As far as the timber supply position is concerned, the Supplies and Transport Officer advised that it fluctuates.

ACTION:

If any Branch is unable to procure certain sections of kiln dried hardwood for an urgent repair, a requisition should be forwarded to Supplies and Transport Officer with a note marking the requisition "urgent tramway requirement." The requisition should clearly state finished sizes.

Works Division then will undertake to dress to required sizes after supply of material by Supplies and Transport Officer, if necessary.

ITEM 13. ANNUAL REQUIREMENTS.

(c) Brake shoes.

REMARKS:

Works Division desired to ascertain if industrial disputes had ever affected the supply of brake shoes to the three Branches, and, if so, what steps were being taken to overcome such a condition in the future. It was pointed out that Production Department have arranged a separate supply of pig iron and foundry coke for their own purposes in cases of emergencies, and it was thought that something along these lines may need to be done to guarantee the supply of brake shoes.

Geelong have only just managed to keep all trams running in some strike periods, but the supply of local brake shoes now is threatened through M. & M.T.B. placing large orders in country foundries.

Ballarat also expressed concern at the fact that the Commission are not receiving the attention in local foundries that they did before the M. & M.T.B. started supplementing their supplies from such sources. Ballarat would like to see six months' stocks put aside for emergencies only and not used as working stock.

Bendigo supported this idea for, during the last railway strike, their supplies had to be obtained by road from Ballarat.

As an estimated annual expenditure appears on the contract it will be necessary to obtain the Manager's approval to exceed that for reserve stock purposes, or to base the coming year's estimate inclusive of the additional requirements.

ACTION:

Branches to keep their requisitions against the contract well forward and to ensure that delivery will be greater than consumption in order to build up reserve stocks.

Works Division to ascertain the possibility of obtaining some quantity of pig iron and foundry coke in the general Commission reserve.

ITEM 14. NON-FERROUS CASTINGS.

REMARKS:

The possibility of standardising on casting specifications for different applications was raised by Ballarat. Works Division stated that a start in this direction had been attempted, and all orders for castings now contained a specification. In most cases these specifications had been taken from Geelong drawings except in one instance when Ballarat made a special request, this request being in relation to suspension bearings. Such standardisation to be based on the experience of Branches in the life obtained from various metals together with specifications used by M. & M.T.B.

A list showing castings and specifications asked for was handed to each Branch for future comment. Ballarat immediately pointed out one weakness, that of having all bearings under the one specification, whereas some bearings are lined and others are not, thereby requiring different metal.

All Branches agreed to the necessity of routine chemical analysis on castings due to the doubt of metals being supplied as specified. Works Division stressed the need of advising immediately a casting had failed due to the metal, so that a repetition would not occur.

ACTION:

After further investigation, Works Division to amend specification list, firstly in regard to bearings, and Branches to advise any other changes considered advisable in view of experience.

ITEM 15. TRAMWAY DRAWINGS.

REMARKS:

In all Branches there exists a dearth in the number of tramway component drawings held.

It was suggested by Geelong that an interchange of drawings be made between Branches. In Geelong they are preparing all tramway drawings on "D" size sheets so that sets may be bound and issued to all concerned.

It was obvious that similar drawings were being produced in different Branches and it was this duplication and sometimes triplication that it was desired to eliminate. In addition, Geelong, supported by Ballarat, stressed the necessity of having drawings to identify patterns held at Richmond. Works Division could not include drawing numbers on the pattern list recently supplied as insufficient drawings were held at Richmond.

The Departmental Tramways Superintendent suggested that

the work involved in interchange of drawings could be reduced by producing lists only in the first instance, and where duplication appears to have taken place the actual drawings could be obtained and checked for similarity of dimensions, etc.

ACTION:

Branches agreed to send the lists to Works Division for consolidation. The lists could cover makers' drawings.

Each Branch to send a copy of the list sent to Works Division to the other Branches to give them an opportunity of criticizing the consolidated list when completed.

After this is done, copies of any drawings prepared by any one Branch in the future should be sent automatically to the other Branches and Works Division. In order that each Branch will be fully conversant with all tramway drawings this procedure should be rigidly adhered to.

ITEM 16. PATTERNS.

REMARKS:

As given under Item 15, Geelong stated that the identification of the patterns presented difficulty due to lack of drawing numbers. This statement was supported by Ballarat.

ACTION:

Pattern list to be amended at a later date to include drawing numbers.

Similarly, all drawings produced in the Branches are to show pattern numbers.

.. ..

SUMMARY OF ACTIONWORKS DIVISION:

- Item 1 (c) (i) : Works Division to make inquiries regarding type of tool suitable for turning tyres, as mentioned by Geelong.
- Item 2 : Works Manager to take up with Industrial Officer the question of definition of duties of shedmen, etc.
- Item 4 : Works Division to contact M. & M.T.B. to ascertain the stage of their experiments in the use of bearing metal.
- Item 5 (a) : Works Division in future to produce coils for stock as follows :
Coil formed to shape with wires individually varnished. Light spiral of cotton tape added to maintain shape, and the whole brush varnished.
- When a request is received from Bendigo varnish impregnation and cambric taping will take place before despatch of the coil.
- Item 5 (b) : Supply of 19 s.w.g. binding wire to be further investigated.
- Item 6 : Works Division to advise Morgan Crucible Company regarding carbon brushes.
- Item 9 (d) : Works Division to advise Branches of lanoline base oils available.
- Item 10 (a) : Arrangements to be made for visit to Ballarat in company with a "Dulux representative."
- Works Division to forward pamphlet on sanding device to Branches.
- Works Division to contact Tramways Board regarding window sash treatment.
- Item 10 (e) : Works Division to obtain information on rubber tiles and bituminous tiles.
- Item 11 : Works Division to arrange for a batch of trolley wheels of three-spoke "U" profile pattern to be cast to a known specification - these wheels to be sent to each Branch which will put identification marks on them and arrange for a trial.
- Item 12 : Works Division to arrange for copies of requisitions raised or re-drafted at Richmond to be forwarded direct to Branches in order that the officers concerned will sight them.
- Item 13 (b) : Works Division to undertake to dress kiln dried hardwood to required sizes when required urgently. Supplies & Transport Officer may have to arrange supply of the timber.
- Item 13 (c) : Works Division to ascertain the possibility of obtaining some quantity of pig iron and foundry coke in the general Commission reserve.
- Item 14 : After further investigation, Works Division to amend non-ferrous specification list firstly in regard to bearings.

- Item 16 : Pattern list to be amended at a later date to include drawing numbers.

BRANCHES:

ALL BRANCHES -

- Item 1 (a) : Branches to peruse drawings supplied, survey wheel centres in Branches, and advise Works Division of the possibility of adopting M. & M.T.B. tyres - also to state the average annual usage.
- Item 1 (c) (i) : When requisitioning tool steels, full specification should be given in order that an equivalent can be supplied if the requisitioned brand is unobtainable.
- Item 1 (c) (ii) : Any alteration considered necessary in present procedure is purely a matter for local practice.
- Item 7 : All receivers to be hydraulically tested within 18 months, and thereafter every three years from the date of test.
- Item 9 (a & b) : Drawings of special work requirements to be forwarded to Works Division by each Branch.
- Item 10 (b) : All trams to have cream lines where required to enhance appearance.
- Item 10 (c) : All ceilings to remain varnished.
- Item 10 (d) : A paint containing soft soap to be tried for water proofing.
- Colour of roof to remain Public Works Department Stone as at present.
- Item 12 : Branches to arrange for technical requisitions to be vetted by a technical officer and for each separate item (except small routine ones) to be on a separate requisition.
- Item 13 (a) : Branches to forward as many tramway requisitions as possible annually in order that requirements can be consolidated and thus bulk ordered. In the case of electrodes, as these now are an annual contract Branches to forward to Works Division a note of the type they find best and a request will be made to Mechanical Branch to have these included as a special.
- Item 13 (b) : If any Branch is unable to procure certain sections of kiln dried hardwood for an urgent repair, a requisition should be forwarded to Supplies & Transport Officer with a note marking the requisition "urgent tramway requirement." The requisition should clearly state finished sizes.
- Item 13 (c) : Branches to get their requisitions against the brake shoe contract well forward, and to ensure that delivery will be greater than consumption in order to build up reserve stocks.
- Item 15 : Branches to send lists of tramway drawings to Works Division for consolidation. The list should cover makers' drawings.

- Item 15 : Each Branch to send a copy of the list sent to Works Division to the other Branches to give them an opportunity of criticizing the consolidated list when completed.

After this is done, copies of any drawings prepared by any one Branch in the future should be sent automatically to the other Branches and Works Division.

- Item 16 : All drawings produced in Branches are to show pattern numbers.

GEEELONG BRANCH -

- Item 4 : Geelong to continue their experiments with high lead content bearing metal and decide whether they would be satisfied with it.

- Item 9 (b & c) : Geelong to supply Bendigo with details of their track grinder.

BENDIGO BRANCH -

- Item 6 : Bendigo to confirm with Works Division regarding C-6 brushes.

- Item 8 (b) : Bendigo to submit a recommendation to the Chief Distribution Engineer on action required regarding feeders.

- Item 10 (e) : Bendigo to cover the floor of one car with rubber in saloon and "Flintkote" in the entrances.

BALLARAT BRANCH -

- Item 9 (a) & (b) : Ballarat to send copy of special crossing repair drawing to Geelong, Bendigo and Works Division.

- Item 10 (a) : Ballarat to send a sample of colour at present being used to Works Division to enable a comparable "Dulux" colour to be chosen.

DEPARTMENTAL TRAMWAYS SUPERINTENDENT:

- Item 8 : In the light of the comments and criticisms regarding fallen trolley wires, Departmental Tramways Superintendent and Chief Distribution Engineer to go into this question with the idea of seeing if something should be added to the book of instructions, and to advise regarding the supply of a suitably hooked stick for handling wires.

- Item 10 (a) : Departmental Tramways Superintendent to locate coloured drawing of Ballarat tram car submitted to Engineer and Manager.

SUPPLIES AND TRANSPORT OFFICER:

- Item 13 (a) : Supplies & Transport Officer to prepare list of items that may best be handled as an annual contract.

- Item 12 : Supplies and Transport Officer, with Works Division, to give consideration regarding the inclusion of a tramway section in Stores vocabulary.

