

Chairman - Jim Walker

PAINTING, VARNISHING - REMOVAL AND APPLICATION:

Are there any questions of the speaker?

JOHN RADCLIFFE:

Yes, I would like to make a comment. You did comment on the availability of numbering systems of the original builders in the way of dismantling things. I'd just like to sound a word of warning. We had an occasion to dismantle the strap-rail off H-car 362 which had been in traffic for 55 years and what had actually happened was that these fittings, having not been mass-produced (they were all individually hand-built and by-and-large all different) over the course of 55 years had been re-arranged and, for all I know, rearranged on different cars. So, in actual fact, the numbering system bore no relationship with how they were erected at the time that they were taken down. Therefore, to assume that the numbering system would provide a clue to the erection was invalid so I had to erect all of them by hand to where the best bits fitted and this is precisely the problem that you drew our attention to.

LESLIE STEWART:

In many cases, tram numbers are stamped on the back as well, particularly on the woodwork.

JOHN RADCLIFFE:

You talk about timber colouring. We've had examples where a plywood ceiling has been delaminated and, because of the difficulty of getting the matching ply, we may have to take the plywood from another car, present it to it, and then find that the gold lining then falls in a different location from where it did on the original plywood. What would you do about differences in colour due to the lightened effect on the timber, the part of the timber that hasn't been protected by a joint or a piece of gold leaf or whatever, which then reshows when you finish it?

LESLIE STEWART:

Well, then you'd come down to a selective bleaching of that area.

JOHN RADCLIFFE:

When you bleach of course you argue that, in fact, the uncoated area will differentially fade over time than, I would imagine, the original would?

LESLIE STEWART:

Yes, this is often the case, but it depends on the area that you've got to bleach. With sodium hydrochloride, of course, you can brush it on with a small brush on a small square or triangle or whatever, but in the case of gold leaf or fancy pattern, then it would be extremely difficult.

FLOOR:

Perhaps it's that area we might comment on since you raised the question and that is about exterior finishes. Now, I don't know what other experience there has been in either Australia or New Zealand or whether they'd be interested in this:-

We have varnished quite a few cars in various ways. There are certain principles that seem to come out. Firstly, poly-urethane varnishes should be avoided (and it's very hard to find out which ones they are these days, because almost all of them are). In the case of 282 and 111 which were some of the earlier cars we finished, they were painted probably six months afterwards with an oil-based varnish, and a single coat of it. In general terms, these varnishes have held up pretty well although they have lifted in a few places, after about ten years, on the southerly exposed surfaces. In the case of 192, which was probably varnished about four years ago, the northern and western sides of it are beginning to craze in the varnish. In the case of number 1, which we've just done recently, the custom is, in fact, to rub all the surfaces with steel wool prior to applying the varnish. I suspect the key to a lot of this is, in fact, that it revolves around the brand or the quality of the varnish you use and, I suspect, it's very hard to get information on these. The varnish used on 192, which crazed after 4 years, is probably not as good a quality as some others we used on the earlier cars and I don't know what the key to that is.

Perhaps noteworthy also is that, effectively, all of our trams are kept in the dark for 5 or 6 days a week and I think, if you do value your cars, then that's an important issue as well because it is ultimately ultra-violet light that will effect the varnish.

At Crich, there are a number of trams which had transfers and various things put on the outside of them say, "Sheffield Last Tram Week", which have been protected for 25 years by about every 3 or 4 years just rubbing the surface down very lightly, scuffing the varnish and re-varnishing it and, by using a high quality varnish, they appear not to have darkened the colour to any great degree and thus, they have preserved the original artwork on the tram. So it would appear that a single light coat of varnish on a limited basis can be a useful preservative but I guess we're not really confident of what the technology is, and I'd be interested to know if anybody has any comments on that.

JOHN RADCLIFFE:

There is some evidence that the early varnish, when it 's applied to timber, may create a substantial stain anyway and may oxidise with time so that, to match the colour more accurately is a rather subjective exercise because at what point in time do you determine whether the colour is authentic or not. It may only take a couple of years for a varnish to substantially darken and I think you have to take that into account and allow for any changes. There is a lot of evidence as far as Adelaide is concerned that the exterior varnished finishes were originally applied but then abandoned fairly early on in the piece. Of course, the amount of ultra-violet on the varnish at that particular latitude is probably much higher than it is here but none-the-less, even with the early oil-based varnishes, they must have found were not particularly successful. The exterior varnishing of vehicles was a common procedure in the early days and on railways' rolling stock it was often applied as a preservative.

FLOOR:

It was also common for these authorities to mix their own paints and varnishes from red-ochre or whatever, rather than using proprietary lines. There is evidence in the SDA's records or the MTT's records of what components they used in mixing their own paints and varnishes from first principle.

IAN STEWART:

Going back on the records of the Auckland trams, the painting procedure was 14 coats altogether. This was in the days before the mid-thirties when the car was built up in colour using flat colour and finishing off with about three coats of good quality varnish and this is also before enamels came. When the car went in for overhaul, the workshop records show a certain abbreviation in the maintenance file. I think it's TU/V which is "touch-up and varnish". In other words, they rubbed it down, they touched up this flat colour and then coated it with varnish. So I think that's where the varnishing originally came in.

JOHN RADCLIFFE:

If you're going to use gold-leaf, as they originally did of course, one is obliged to protect it by varnish which I suppose was one reason why they abandoned gold-leaf later on when they went to enamel.

RESEARCH, WOOD TYPES AND COLOUR SCHEMES:

What has been your experience at MOTAT in determining colour schemes from black-and-white photographs?

LESLIE STEWART:

Extremely useful for line detail. There is something that I did not mention in my paper but which is common procedure at MOTAT and that is that during the dismantling part of the structural part of the tram, the exterior finish is actually stripped off, layer by layer, using a proprietary paint stripper. This is good if the tram has never been, or the panels have never been, replaced in the tram's life and usually, you can go right back through all it's various colour schemes. In the case of 47, the double-decker, which would have been originally chocolate, was later painted red although there is no evidence of any chocolate on the exterior panels of the tram due to rebuilding over the years or replacement of panels. There is chocolate and line details on the bulk-heads which appear to be original. In their construction there are always places on a tram where you'll be able to find some of the original colour scheme to help you match paint. Otherwise you must rely on photographic records for lining details.

FLOOR:

I believe it is possible, although we've never tried it, from using a photograph and using light intensity measurements on the greys and blacks etc, on a black and white photograph and you can measure colour provided you have a reference colour somewhere on the photograph.

FLOOR:

The interplay of light and shade on a black and white photograph is also very deceptive. This reflected light makes it less reliable than it may otherwise be.

JIM WALKER:

There was some information requested about a new type of paint. Do we have that information yet?

FLOOR:

Yes, the Taubman Paint Company produce a new varnish that is resistant to ultra-violet light. It requires the application of five coats minimum for the utilisation of this varnish and we've just started using it at Ferrymead in the last three months.

FLOOR:

I guess I'd have some reservations about whether any varnish is going to meet it's claim because the basic ultra-violet resistance of any paint is due to the pigmentation in the surface layers of it and in the absence of any pigmentation then you've still got a risk that the ultra-violet is still going to be absorbed through the number of layers of varnish (although the more layers you put on, presumably the longer it takes to break down all of the layers).

FLOOR:

You can take "152". There were five coats of ordinary varnish and in two years it was falling off.

FLOOR:

There has been some improvement over the years with metallic water-base finishes which are basically a metallised layer with a clear layer over the top but even now, and particularly in Australian climatic conditions, you still see fairly recent model (motor) cars with the paint deteriorating quite badly. As I understand it from articles I've read, it's the UV penetrating through the clear layer causing a break-down in the bonding between the paint and the surface and its very hard to get around that. I'd be very suspicious to any claims that say this.

GRAEME BREYDON:

Can I make a suggestion? Most of you that have seen the museum at Preston will have noticed that out on the back bank near the hump there were some panels just sitting in the sun. What the then MMTB were doing was testing paint fading and most of our restoration on our cars, because of our limited resources and so on, takes a couple of years, some of them many, many more. It may be worth while, although the fading we're talking about often took longer than a couple of years, as soon as we are at the stage of starting on a car, doing what the Board were doing then, and that is putting a few test section out in the sun. By the time you actually come to applying coats of paint and you've done all the structural work on the car, you may have some guidance as to whether some of the things you're going to use will be suitable or not. (That's something we haven't done ourselves but, to take the last conference theme, let's see if we can learn something from the professional, perhaps).

FLOOR:

I think the problem we're facing is particularly relevant to MOTAT and THS and that is that we have the cars outside for long periods of time every day of the week and what is far more relevant - deterioration is showing up a lot quicker in our two operations. Most of the cars are actually stored 7 days a week; sometimes they are not run for a week, or once a month, or once every two months. Where you may not have the same fading problem, it really is a problem that we are facing and to try to deal with this we are giving serious consideration to building a covered shelter for when the tram is actually at one end of it's operation, say at it's departure point, then 50% of the operating time is actually spent under cover.

FLOOR:

That's a very sensible suggestion.

FLOOR:

Let me ask you a question as to historical colour schemes. In a case where you are direct descendants of a tramway, and that you took over shortly after, then you probably would have found some "wet" samples from the last cans of paint. If you didn't, what sort of system would you have to keep track of historical samples that prove the paint is what it was?

FLOOR:

With the double-decker number 10, when it was restored the second time, a lot more research was done on the existing paintwork that was underneath all the other rubbish. We didn't actually remove all this paintwork; we used body filler to bring the line up, so that the original paintwork was still on the pillars. We retained that example to actually keep a physical record with the car so that future generations will be able to find it again if need be. We felt it far more important to retain that original paintwork than to actually scrape it off and have some "paper" record of it.

FLOOR:

There is something of an error inherent in your question and that is the assumption that the original operator or authority would have been consistent in its use of paint of a specific colour. There's plenty of evidence, certainly on the Adelaide trams, to show that Tuscon Red, which was the colour they were painted for forty odd years, varied pretty considerably from virtually a crimson shade through to something approaching almost a brown colour at the time it was applied and I think one is faced with determining what your standard colour is going to be. In the case of St Kilda, over a long period, we standardised on a mixture and that was to be equal parts of DULUX Tawny Brown and Carnation Red. However, there is a slight problem just arisen and that is that Carnation Red was withdrawn from the market about six months ago after having been on the market for 30 years and I'm not sure what we're going to do about that. We've tended to avoid the issue. Now the STA itself, which used to mix it's own paint, went back to painting it's trams tuscon red in the seventies, got tuscon red made up by Dulux in commercial quantities and it turned out that their Dulux Tuscon Red isn't the same colour as the mixture we have been using because they had standardised in a particular part of the range which isn't the same part of the range that we've standardised on, so that when our cars are in on their

lines it becomes obvious.

JIM WALKER:

That's very true. That happened with San Francisco's first tram. The grey was made out of white and lamp-black and was mixed by eye and certainly over the years there were so many cars that when it came to repaint, it was a case of "it looks about right". In Los Angeles, the famous Yellow Car varied wildly over the years, depending on somebody's eye, it was just mixed by "match", by just looking, so you are correct.

JOHN RADCLIFFE:

I comment also on the mixing of paints. Many of you will know that when the Adelaide trams were painted silver, the interior was painted a colour called Asbury Green. This is a peculiar colour which was apparently concocted by the director of the School of Art in Adelaide at the time, for which I guess we got a few bob, and it has never been a commercially available colour and neither could we get it made up by Dulux, unless we were to order 100 gallons of it which we wouldn't need, and our approach to the matter was to, in fact, find a panel which was from a protected interior position of a drop-centre car. There was a window frame from up near the roof which hadn't suffered from ultra-violet exposure. You were then faced with starting with a mixed colour which is somewhere near what you had. Then you take a series of tinters and add them to it. The problem you have, however, is that the dry colour is different from the wet colour.

If you're starting from a dry sample you are therefore faced with tinting it, depending on the specimen, then waiting for it to dry. If not satisfied, you squeeze a bit more purple, or black, or yellow in depending on which way you want to go, and let that dry. Now that's a very tedious business because it takes you weeks to actually get to the point where you want to be. Having got the wet sample then, when you need to mix the next gallon or whatever, you have to match it when it's wet but the colour will change within probably 3 or 4 minutes of when you put it on. Therefore, you do, in fact, have to adjust your colour and then make the comparison with your standard wet sample very quickly and by doing it that way you can "drift" the colour whichever way you want. Also, I think it is a good idea not to mix all the paint at once because if you over-step the mark you can always back off by adding the untinted paint into it. It is a pretty tricky business.

FLOOR:

We've had problems with the utilisation of some of the proprietary brand colours. To avoid variations of batch colours, we have found the best way is to buy enough paint to do the job in the first instance, getting a great big bucket and mixing it all in there and putting it back into its separate cans so that, as you proceed through the car, all your paint is of the same colour.

PROTECTING AND MAINTAINING FINISHES:

JIM WALKER:

The third subject has been touched on and is protecting and maintaining finishes already on the trams. If we are thinking of way ahead in the matching of these paints, then is keeping everything in the dark the answer over decades and decades and decades?

JOHN RADCLIFFE:

Well, you're dealing, of course in questions like a controlled environment. If you go to the Museum of Transport and Technology in Ottawa for example, they have a collection store which probably would be 150 feet wide and 25 feet high and is completely air-conditioned to constant temperature conditions. In ideal terms, that is the thing you're moving towards. Now in a way, it's unfortunate that places like St Kilda, and I guess Ferrymead, and even perhaps here to a degree, are close to the sea because that is really quite counter-productive in some ways to what we are trying to achieve. It is being discussed at the moment in Adelaide in terms of whether or not the Railway Museum at Mile End ought to be moved and if it is moved, an area which is a possibility is Port Adelaide where there is land likely to be available as part of a redevelopment scheme. But the marine environment at Port Adelaide is not a good environment in which to move a large collection of steel objects. When we started, of course, we really couldn't take those issues into account because they were the only people who would have us and because we chose to be there. But there are long term problems and ultimately I think, we do face trying more and more to control the environment in which we keep our vehicles.

To help control the environment at the terminal by putting a shelter up I think is a considerable control rather than leaving the vehicle sit out in the sun. We may never get to the point where we have climate controlled tram windows but among other things, we have the National Motor Museum in Adelaide and one of the issues that we face there is that there are 160 cars in a shed. Do we control that environment? They are all sitting there - each with a gallon of petrol in their fuel tanks - and the temperature inside this building reaches 100 degrees in the summertime. The operating costs of controlling that environment is probably \$20,000 to \$30,000 a year and there is no way that we can afford those sorts of operating costs on top of the operating costs we have now, yet we do have to move as far as we can to that sort of position.

GRAEME BREYDON:

I think one of the things we can do here, and tie it in with the discussion we have had at past COTMA Conferences, is to look at what we are doing because our operation is counter-productive to our preservation effort and we all agree on that. We have previously discussed the subject of "hacked" cars. The other thing that has happened in the TMS, in this case by accident and certainly not by design, has been that some of our best cars are not on-site. Instead, we have a reserve collection and those of you who are familiar with the operation will know that some of our best restored and nicest cars are at Melbourne stored on Tramways property rather than at our museum property. That gives us several things. It gives us cars that need to be preserved away from these nasty environments; it gives us a reserve collection should anything happen at our main site and it so happens, that it is a very dark area. It also happens it's next to a wheel-grinder which gives you a lot of other environmental problems!

GRAEME BREYDON continued:

Maybe we should start and conscientiously say, "Let's put certain cars aside and not operate them". I know there is a temptation to want to operate everything and sometimes it's quite a practical one, but maybe with certain vehicles in our collections we should sit down and say, "That vehicle is too important to operate". Christchurch have got their own considerations but, for example, Ralph Twentymen for many years had always stated that he wouldn't want to see his cars (cable cars) used in an operating situation because they just wouldn't stand up to it and I think most people would agree that a Melbourne cable tram in a Melbourne-based museum is important. I wonder how far we can go in this sort of area in picking out certain cars for special treatment because we can't air-condition the whole shed?

JOHN RADCLIFFE:

By making that statement, what you are really saying is, "Are we an operating museum or are we a 'collection of bones'?" And if we are a collection of bones, then we had better get out of the business because there are agencies within every city that collects static exhibits. You would be better handing it all over and packing it in!

GRAEME BREYDON:

No, I'm saying be selective, but I'm also saying is it better to operate, to take the American situation, a relatively few months of the year for large crowds, or insist on running every day so that we pick up every penny? And think what we are doing to the cars! What is the cost of operating the cars for that one busload that turns up on the third Thursday of the month in the middle of winter?

FLOOR:

The American situation, I would suggest, is very difficult to operate street-cars when you have got three feet of snow and consequently, it would be a good idea to shut down.

JOHN RADCLIFFE:

Yes, well the point that Graeme's getting to is the fact that in Adelaide within a couple of years we will have a car which is basically a 'bodge' one but the public will not know the difference and the one which is historically correct can then be put away in the shed and kept for 'high' days and holidays and, in fact, is a complete and correct historical example. I think we do have to move in that direction for the same reason that you are not scraping all the paint off as mentioned earlier. Equally well, when we can have a duplicate, we should, in fact, put one away.

Consider yourself running an aeronautical museum which Canada does. The Canadian Government have an Aeronautical Museum just out of Ottawa which has over 100 aeroplanes and is being further expanded at the moment. They have a policy that they will only fly an aeroplane of which they have a second copy so that they will fly the 'second' of any plane and they will not fly the 'original'.

If you are going to think 200 years hence, I think we would have to think about that! Our Adelaide No. 1 would be in that category. We have been running it for a month or two now because we have just restored it then, I suspect, it won't see all that much use. It will be put away and kept in the dark because there was just one hell of a lot of work involved and the 'thing' is of such considerable historical importance.

JOHN RADCLIFFE continued:

If you have got a load of school kids you can demonstrate the behaviour of a tram-car with a couple of other trams, a W2 for example, or replica 'drop-centre' of which there are plenty available. I think you do have to have an operating principle that once you get enough cars up and running you can make that sort of choice.

IAN STEWART:

There is a compromise between the two situations of having them sitting static or working them. In the very early days of MOTAT everything was outside. In general terms, the ones that were moving all the time, although we were wearing them out, were in better condition than the ones just sitting there with no air moving through them.

FLOOR:

I think at THS at Ferrymead there is only one thing that we have to bear in mind and that is if we are going to go to firms to obtain sponsorship to restore a particular vehicle, we have got to keep in favour with that sponsor. We have got to show them that we are using the money. You may have seen on TV, the double-decker trailer towed by the Kitson. The gentleman concerned who sponsored that vehicle originally rang up one of our chaps and said, "Oh, I saw my tram on TV last night. I must give you another cheque". So there's a point we have got to remember, if we are restoring a vehicle from sponsorship we have got to keep faith with our sponsor and use it and show it.

FLOOR:

I am glad you said "...and show it" because in both Ferrymead and MOTAT you have an excellent opportunity to do that with some of the key vehicles in that you have got your integrated transport halls where you can show it other than where people can just wander down through the depots if they can fit through the 8" gap and look, instead, at each side of them. You have got an opportunity to take some of these more important cars and show them off very well and keep faith with your sponsor. This is that selective protection aspect again in that the car that is there is probably in a far better protective situation than the car that is in the ordinary car barn or depot that is at most of our museums.