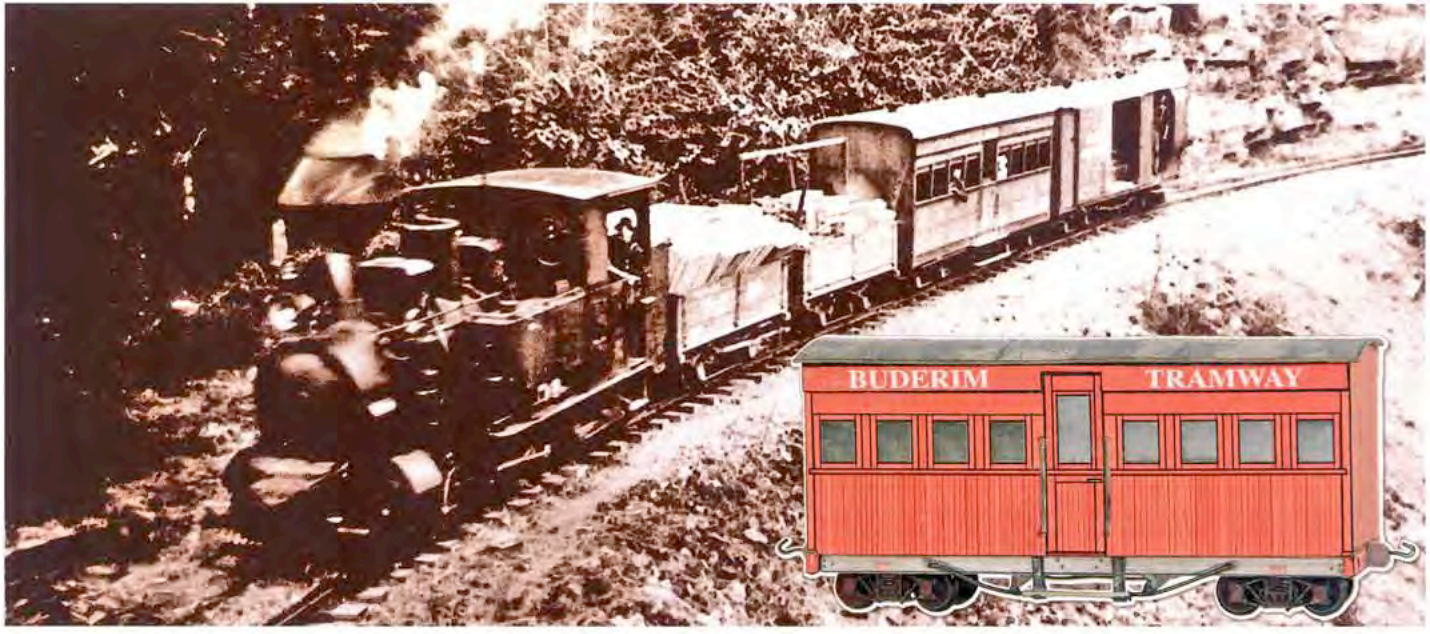


A Buderim Shire Tramway Coach

by Lynn Zelmer

Lynn Zelmer tackles an intriguing project in multiple scales...

As regular readers will know, I've been focusing on structures for much of my photorealistic card modelling, although the QR camp wagon (Narrow Gauge Downunder issue 49) did introduce me to timber wagon construction. My interest in Buderim Tramway rolling stock resulted from Caloundra modeller Garth Fraser's request to locate suitable HOn30 models for a museum diorama to accompany their Krauss locomotive display. I was unable to locate any easily convertible models but since we had Jim Fainges' drawings, and a couple of photos, I offered to use some of my card modelling skills for the coach and brakevan, and eventually maybe some of the freight wagons.

Although Garth wanted HOn30 models (the Buderim Shire tramway was 30" gauge), it was easier for me to work in O scale (1/4" = 1') and rescale the result for printing. At time of writing (May 2014) Garth was building the HOn30 coach, using a timber frame with my photorealistic card textures as a wrapper, and I'd built both the On30 'proof of concept' and HOn30 versions described here. A future article will document the brake van's development and one of these days I hope to build finished quality On30 versions of each.

The Buderim Tramway

The Queensland Government Railways' North Coast rail line reached Palmwoods in the Sunshine Coast hinterlands during 1891, providing a connection to markets in Brisbane and beyond. However access to Palmwoods for the fruit and vegetable growers of the area was difficult due to the terrain and poor roads.

Fortunately by 1911 negotiations with the Maroochy Shire Council resulted in construction starting on a rail link between Buderim and Palmwoods. From 1914 to 1935 the resulting narrow gauge line was an outlet for perishable fruit and vegetables and a means of shipping heavier items, such as timber, more conveniently. It also provided passengers with better access to Brisbane.

Photos from the era often show the Krauss locomotive (now cosmetically restored and soon to be on display locally) pulling a couple of open four wheel freight wagons containing goods in crates and sacks, followed by the bogie coach and then the bogie brake van.

The line is significant in that it was 2'6" (762mm) gauge, rather than the 2' (610mm) gauge of the sugar mill tramways or the 3'6" (1067mm) of the QGR. The 11.5 kilometre line was funded through a government grant to the Shire and privately constructed. Unlike many shire-owned tramlines, it ran on its own well-constructed permanent way, rather than along shire roads or on easements through farmer's fields.

"The tram often ran two trips per day from Palmwoods to Buderim or at times the shorter Palmwoods to Forest Glen run as the freight demanded. A significant social role was also performed taking passengers to Palmwoods to join the train to Brisbane, and transporting excursion passengers to Buderim to stay in the Buderim guest houses or to travel down to the coast. One or two loads per day of up to 150 passengers were carried in the one passenger carriage and on fruit-box and plank seats on the flat-top trucks. The Palmwoods to Buderim trip took about one hour with a 5/- (50c) return fare for passengers. The freight rate was 17/6 ($1.75) per ton." (Buderim Community Web Site)

ABOVE: Photographer and date unknown, on stumps at Buderim after the vehicles were out of service. Note differences in the end hardware, door height and name board. The vehicle behind is the brake van. This is the best photo of the First Class Coach in the CaneSIG online collection, Photoshopped from a print in the Ted Ward Collection.

Proof of Concept/Mockup On30 Model

Both Garth and I are familiar with traditional (ie 1960s-1970s) model wagon and carriage construction, and the car sides distributed in NMRA Bulletin in the 1970s. Many of the commercial kits of the era contained the basic components required for any such model — lengths of timber floor and roof material, corner blocks, miscellaneous timber and metal fittings and cast ends — plus sides printed on heavy card, often embossed to represent tongue and groove siding.

My model development proceeded much as it had for my other card models with an initial computer drawing and the addition of suitable photorealistic textures. The siding texture was rescaled to match the board width in Jim's drawing from the same texture used for the camp wagon. Other details, including the floor and its framing were likewise rescaled from the camp wagon. The roof, miscellaneous metal and timber components, etc., were drawn on the computer for texture 'skins' from Clever Models or CG Textures.

Garth could certainly construct something from the HO and O scale versions of the carriage e-mailed as my texture files were developed. Having gone this far though, I needed to at least trial build a model to be sure that the 'kit' contained everything needed to build the model. This first build was to be somewhat more than a simple cardboard mockup as it would inevitably highlight some 'challenges' still needing resolution, thus a 'proof of concept' model.

The files I provided to Garth had the sides and ends as discrete components to fit his timber block construction. I have an A3 printer and decided to see if I could print the four On30 sides as a single strip and fold them into an open box. This worked well enough, helping to ensure the box shape was square, that the HO distribution version now has the four components as a single strip. While the model is too large for this to work on an A4 page in O scale, its distribution file has an end connected to a side, allowing the box to be built in two pieces.

I began by removing the window panes from the A3 250gsm card print so that I could trial the use of 'glass' in the window openings. I then cut the window frames and panes from photo grade inkjet paper prints (A4 paper) and applied them to the side areas of the card print. I cut end pieces from heavy mat board the width of the end and slightly longer than the distance from the bottom of the headstock to the top of the roof, cut holes for the coupling (in both the card print and the mat board), glued the mat board in place on the back of the card print and trimmed the top to match the roof curvature.

TITLE PHOTO (OPPOSITE PAGE): 'Rounding the Curve, Buderim Mountain Queensland': the 30" gauge Krauss with a mixed goods and passenger train consisting of two 4w open wagons, the Buderim coach and the brake van. The inset shows the completed HOn30 photorealistic model. The main image has been Photoshopped from a print in the Ted Ward Collection, photographer unknown.

The mat board obviously strengthens the coach ends, and thus the coach itself. However a second major purpose is to define the headstock and ensure that it forms an integral part of the end. It's important that the mat board be accurately sized and located as the sides must be able to fold squarely around the edges of the mat board and the 'unpainted' timber component of the headstock print must fold around the bottom to create the bottom and back of the headstock, my next construction step.

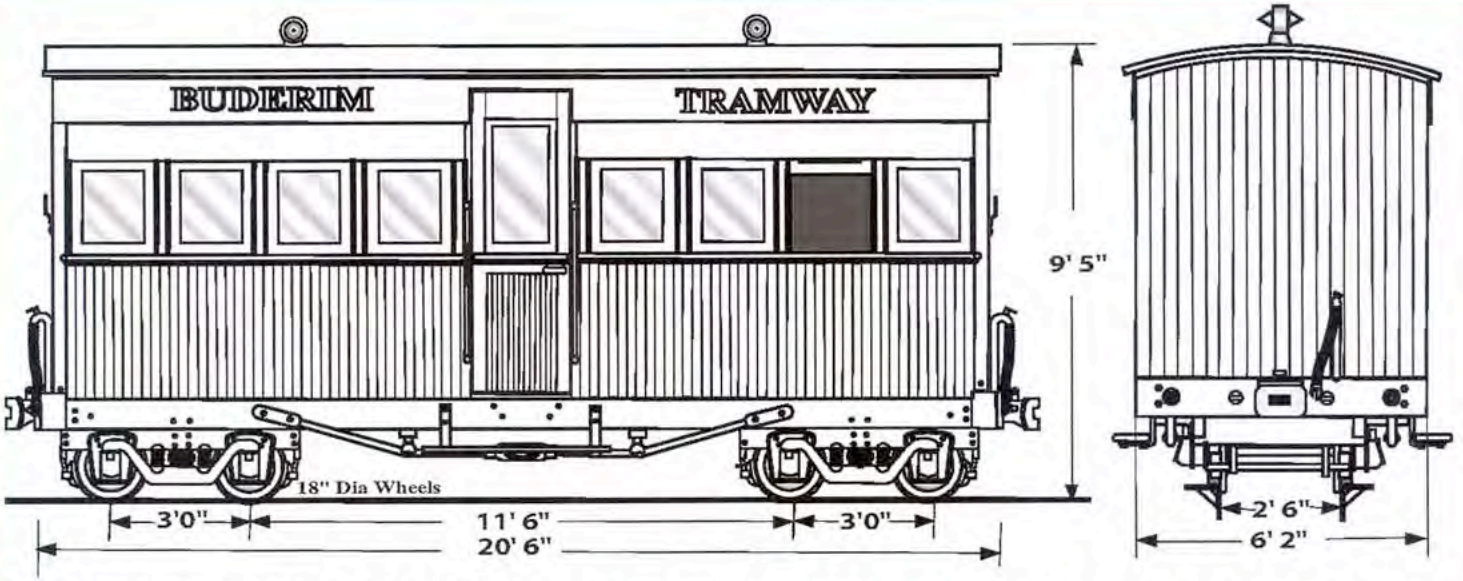
Once the headstock was formed I added a second texture layer printed on inkjet paper to match the sides, again with holes for the coupling. A third texture print of the face of the headstock with wrap around 'wings' to cover the headstock ends could be added now or later. As you can see from the photos, I left this until later to avoid damaging it as I fitted the floor.

Fitting the 'glass' came next using semi-rigid plastic from the packaging for a garden scale model figure. The material was cut oversize and glued (on the card only, not the plastic glass) using water clean-up contact cement. Caution was required to ensure that neither the glass nor the glue interfered with the ends folding in place. Eventually the plastic would also be secured by the interior wall bracing.

It was now time to form the walls into an open box. I had a single strip with the four walls, so it was a simple matter to score the fold location, then fold, glue and brace the module in a metal square until the join was set. If using two side/end prints, or individual side and end prints, this step will be a little more complex — just ensure that all joins are square and the side prints overlap the mat board on the ends.

I now took a second print of the sides (on card), removed the window sections, and fitted the top and bottom strips to the inside of the wall assembly (the letterboard portion shows in the On30 photos). This interior layer helped strengthen the walls; secures the window glass firmly without covering the actual window area, and somewhat cosmetically finished the interior. A competition model would require a proper interior, but Garth didn't need the interior and I'd only included the windows to test their feasibility in O scale. The 'glass' worked, but the multiple wall thickness tended to cause warping, resulting in a need for interior bracing.

I had started working on the floor/underframe module as soon as I could do a trial fold of the walls. This gave me the distance between the mat board ends for cutting the floor texture, already glued to a



BUDERIM TRAMWAY
Coach

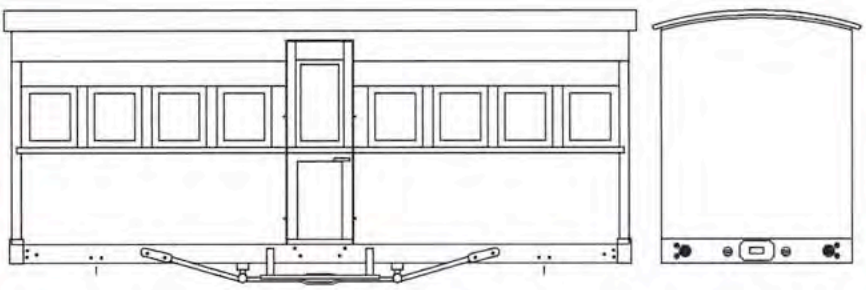
Drawn from Photographs only
100% accuracy not guaranteed

Scale 1/4 inch = 1 foot 1:48

Digitally drawn by Jim Fainges 2003 ©

Redrawing critical portions of Jim Fainges' original drawing (ABOVE), without the siding and other details, was the first step in developing the coach model. Note the location of the headstocks, truss rods and bogies. The truss rods and pivot beams may have to be relocated unless scale length bogies are used.

This produced the first computer drawing (RIGHT), ready for textures to be added to the side and end. Jim's roof profile has been retained for ease of construction, although close examination of the photos indicates the roof should be more of a broad inverted 'U' shape. Note that since the car side extends below the floor, the solebar (and other underframe timbers) are wider than in this view.



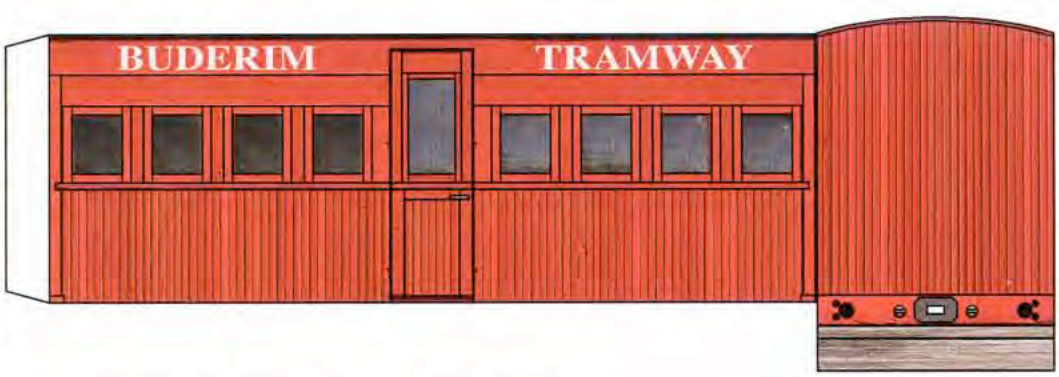
piece of mat board. Measure twice and cut once — both length and width. In an effort to keep the floor removable for potential interior detailing I probably made the floor slightly too small. This is noticeable by the slight gaps at the ends of the solebars and by a small wave to the side walls. This hadn't been a problem with the earlier camp wagon model as its floor was cut to fit tightly for gluing.

Once the bogie pivot beam (bolster) was in place I checked the potential clearances with an HO arch bar bogie, and found that it wouldn't fit/turn without changing the location of the pivot beam. Better late than never, I started searching for a more prototypical bogie (3' wheelbase and 18" diameter wheels). One (expensive) option would be to modify a 7mm Roy Link (now KB Scale) 4w Hudson Rugga wagon kit or a 1:48 RJ Models wholestick cane truck kit. The former uses styrene axle boxes, etc., the latter pewter, so kitbashing either would be possible.

However, a little online searching located pewter archbar bogies from JG Models with the correct dimensions. If nothing else, I suspect that I could have lengthened the coach slightly while also moving the pivot beams, and queenposts, closer to the centre. This would have the would change the model's proportions but would mean that inexpensive HO bogies could be used.

I drilled holes for queenposts as well as truss rod ends, but the nails I used for queenpost substitutes deformed the soleplates so I didn't try installing truss rods. Fine 'sequin and bead' pins, wrapped with a metal texture will work for queenposts without harming the soleplates, a sandwich of mat board wrapped on three sides with the printed texture. Brass or copper wire should work for the truss rods, and wire is also a candidate for the hand rails at the doors.

RIGHT: On30 coach side and end print with textures and glue tab, two required. Note that the heavy mat board backing on the end should be roughly the same thickness as the headstock's timber bottom and should extend only from the top of the roof to the bottom of the 'painted' portion of the headstock so that the unpainted timber texture can be folded under and glued behind. Additional glue tabs could be added to the top of the walls for fitting the roof if making a simple non-operational model.



ABOVE: On30 'Proof of Concept' build: Components essentially fit together, as does the window glass, but better care needs to be taken with edge colouring (the 'splotches' around the window openings). The ends consist of a card print folded around a thickness of mat board, followed by a photo grade inkjet paper print.

Another headstock inkjet print must be added to cover the buffer beam ends, still visible here in white. The sides started with a card print in which the window holes were cut, rigid plastic set in behind with contact cement and further held in place with strips of card print (below window panel and above window panel). The sides are finished with an inkjet paper print over everything except the window frames plus an additional letterboard strip. The interior mat board braces help keep the walls straight and will support the middle of the roof.

Changes for the next build?

As might be expected, there is a significant difference in image quality between prints on card (or plain paper) and the photo grade inkjet paper. I suspect that laser printing on card would provide a similar quality image to the photo grade paper but I haven't tried that as I don't have access to a colour laser printer... except by running to a commercial copy shop every time I need another print.

In this build I added a layer of photo grade texture, minus the windows and their frames, prior to forming the walls into a box shape. This led to colour differences in the woodwork depending on which material was visible. As the photos show, the card-based window frame is a lighter colour than the rest of woodwork, and in places the edge colouring has soaked further into the card.

For the next build I will likely glue a photo grade print onto 250gsm card, then cut out the window panes (through both thicknesses) for my base layer. I will then add the mat board end supports and form the headstocks, followed by forming the assembly into an open box. Adding subsequent detail layers will require a little more care but the outside corners shouldn't be noticeable, although at normal viewing distance they look quite reasonable on the concept model.

Alternatively I could use a sheet of clear plastic cut the full height and width of the interior wall to ensure the wall stays flat. I like the 'glass' appearance of the concept model, but after seeing how much internal bracing is required to keep the walls straight a totally card model would require painting the inside of the windows, or backing them with a photo of seated passengers, to prevent viewing the interior. Of course a competition model would require a fully detailed interior, even if it means guessing the interior details.

So, my proof of concept model is a qualified success. As I've mentioned previously, it usually takes me a couple of builds to iron out all of the bugs and the next build of this carriage, with a bit more care and additional detail, should produce a quite acceptable model reminiscent of the diminutive carriages I've ridden in on the Welsh slate railways. The next project, the Buderim Tramway brake van, shouldn't be any more complex, except for the sidewall extension to allow the guard to view the track, and similar techniques should work for other narrow gauge closed carriages.

ABOVE: On30 'Proof of Concept' build: The underframe is still removable at this point and the loose fitting of the soleplates is a result of that decision. The under floor should be framed very similar to the QR camp wagon but has not been completed for this model and may need some redesign once I take delivery of suitable bogies. The nails used to represent queenposts are too large (see text) and have deformed the single thickness of mat board inside the texture print.

ABOVE: Queenpost and truss rod detail from the O scale QR camp wagon similar to what's required for the On30 coach model. The queenpost is a small pin with the exposed section wrapped with a dark metal texture print and a small fillet of epoxy to hold the truss rod in place.

Jim's coach drawing shows the truss rod for the Buderim coach attaching to the outside of the solebar, so the rod will have to be threaded through the solebar and glued behind, as a texture print representing the metal fitting on the solebar will likely not be sufficient to hold it in place. For anything other than a competition model I would likely not include turnbuckles as they will be partially hidden by the side steps.

LEFT: HOn30 model build: Four walls printed on photo grade paper and glued to 210gsm card (top left), then assembled with matte board backing on each end. The bottom of the headstock was then folded over and balsa strip added to set floor height.

The bogie pivot beam is a styrene strip; the sole bars and queenposts are card with truss rods and couplings formed on either end of a length of copper wire.

The letterboard, handrails and headstock details have been added as extra layers (lower view with floor installed). Note that while the truss rods are wire, I've used a photorealistic print for the handrails rather than wire. (I likely need to get a more varied stock of modelling wire!)

HOn30 Models

As I wrote this (now June 2014) Garth's HOn30 model was progressing well using a solid timber block as a base. I've also constructed my own HOn30 version, described below, using my card techniques. I had thought that the O scale proof of concept coach was small compared to the QR camp wagon, itself a fairly small model, but the HOn30 coach is tiny and the brake van will not be any larger!

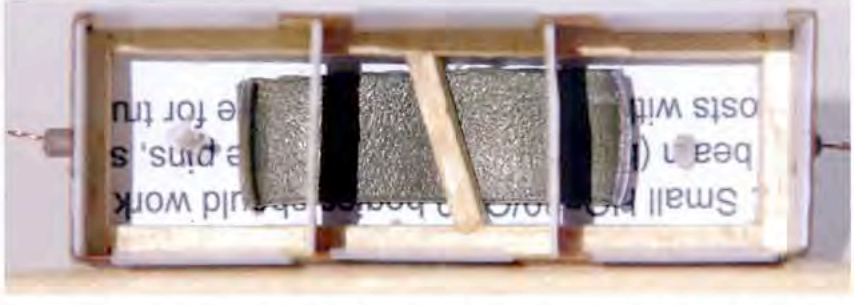
I was able to print the four HO walls as a continuous strip on photo grade paper, so I cut out the paper print with white space around and glued it to 210gsm off-white coloured card. The colour is not important, but it does help some with identifying components in the photos.

End profile boards were cut from matte card and applied to the wall module once cut to size. The prints for the bottom of the headstock were folded around the matte board and the module glued into an open box. The floor print was glued to matte board and cut to fit the interior of the wall module, trimming sides and ends equally so the floor is properly centered and the bogie pivot beam location the same distance from each end.

I wasn't building a competition model, so I've cheated somewhat by not opening up the windows or including all the underframe timbers. The 'Queenposts' are a length of photo-realistic timber, roughly a scale 4" x 10". The truss rods are copper wire, painted dark gray and inserted in holes drilled in the solebars. The bogie pivot beam is a scale 8" x 8" styrene strip to provide a sturdier attachment for the bogie.

Balsa strips and bracing cut from matte board with a roof profile help strengthen the carriage walls and locate the floor. A lead strip adds weight to keep the carriage on the track but was added after the interior braces were in place. Hindsight says that installing it earlier would have been easier.

I drilled holes for handrails formed from wire or fishing line but ultimately decided to represent the handrails with narrow strips of 'metal' texture on photo grade paper. Looked at very closely they aren't absolutely straight but they add texture to the sides and look acceptable from normal viewing distance.



ABOVE: Interior of the HOn30 model with additional balsa bracing and bogie pins in place. Two braces with the roof profile help keep the walls straight and will support the roof. Installing the lead weight would have been easier if it had been done prior to gluing the braces in place.

BELOW: HOn30 model ready for roof installation with six strips of card as glue tabs for securing the roof. The Aussie $1 'gold coin' gives an indication of just how small this model really is.

ABOVE: Garth Fraser's partly completed HOn30 coach with a wooden block for building the brake van in a similar technique to what he used for the coach. Garth has used N scale Micro-Trains archbar bogies and a most realistic coupling fabricated from brass. The structure behind is his model of the Buderim Station. Garth Fraser photographer.

Additional letterboard and headstock prints also add texture, the latter wrapping around the end of the headstock to hide the otherwise exposed matte board.

Glue tabs from scrap card were added along the top of the side walls to help secure the roof in place. I ran a bead of white glue along the top of the walls and the roof profile braces but I didn't want to rely on edge joins to hold the roof, itself a photo grade print glued to 210gsm card.

The couplings are formed from wire bent into a hook shape and tapped with a ball peen hammer to hold their shape. Like the truss rods, they've been fitted into holes drilled through the card and fixed on the back with two-part epoxy. The steps were fabricated from paper and card components, strengthened through the use of super glue, rather than white glue, for their assembly. Finally, I've omitted the torpedo vents and other minor details as not being essential for a static non-competition model.

Building the HOn30 coach has been another learning experience for me as I hadn't really realized just how tiny these shire carriages were. I'm happy with the result and expect that the brake van shouldn't be any more difficult.

BELOW: The Krauss heads a mixed train across the 30" gauge Buderim Tramway's Telco Bridge. Photo courtesy Garth Fraser, Buderim-Palmwoods Heritage Tramway Inc collection.

Acknowledgments and References

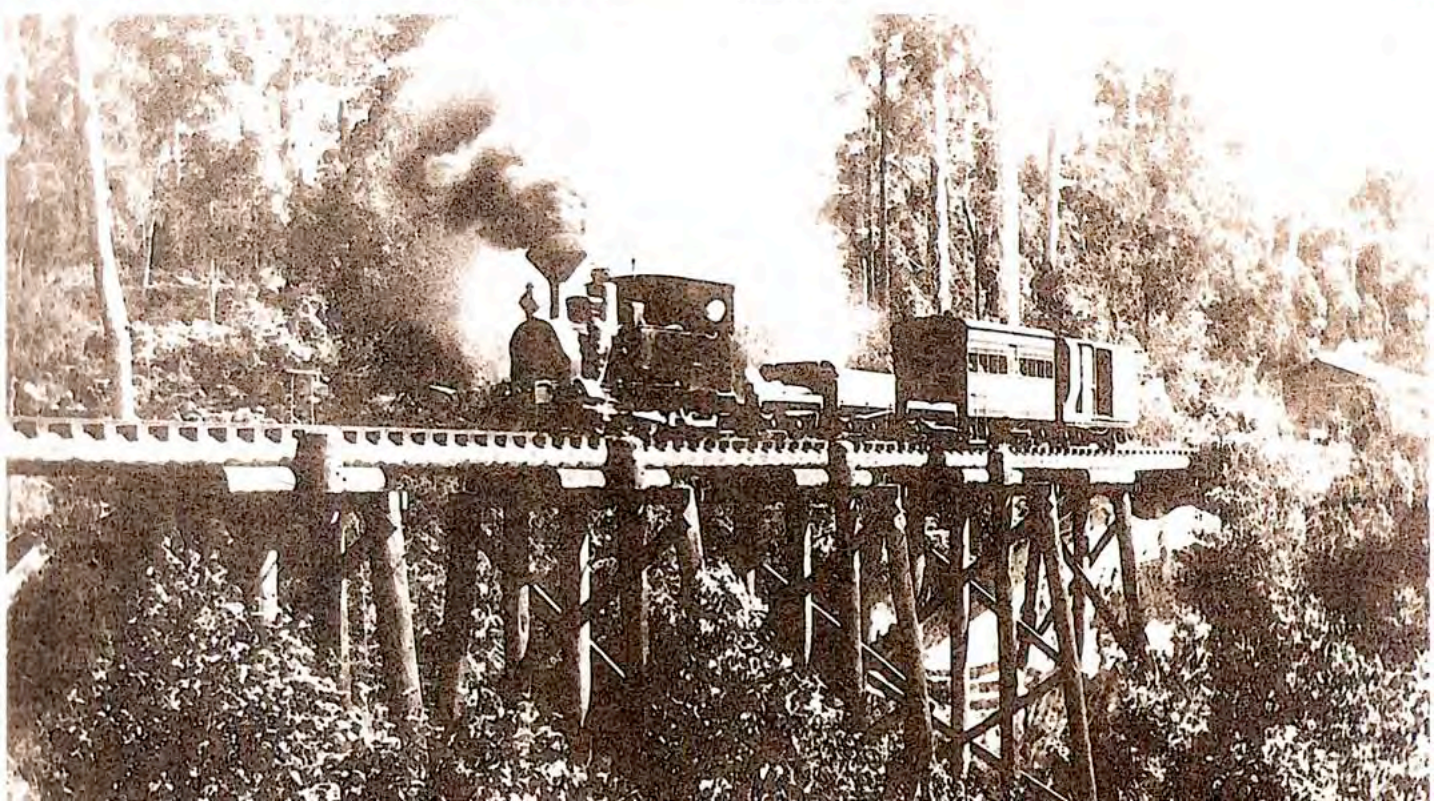
Buderim Community Web Site (2014). The History Of The Palmwoods To Buderim Tramway: 1911 to 1935, Buderim: www.buderim.qld.au/tram/tramway-history/, downloaded 23 May.

Fraser, Garth (2009). Buderim Palmwoods Heritage Tramway Inc: An update to the Krauss Restoration Project, NGDU #35.

Fraser, Garth and McGarvie, Neil (2010). The Buderim-Palmwoods Tramway, Buderim: Buderim-Palmwoods Heritage Tramway Inc.

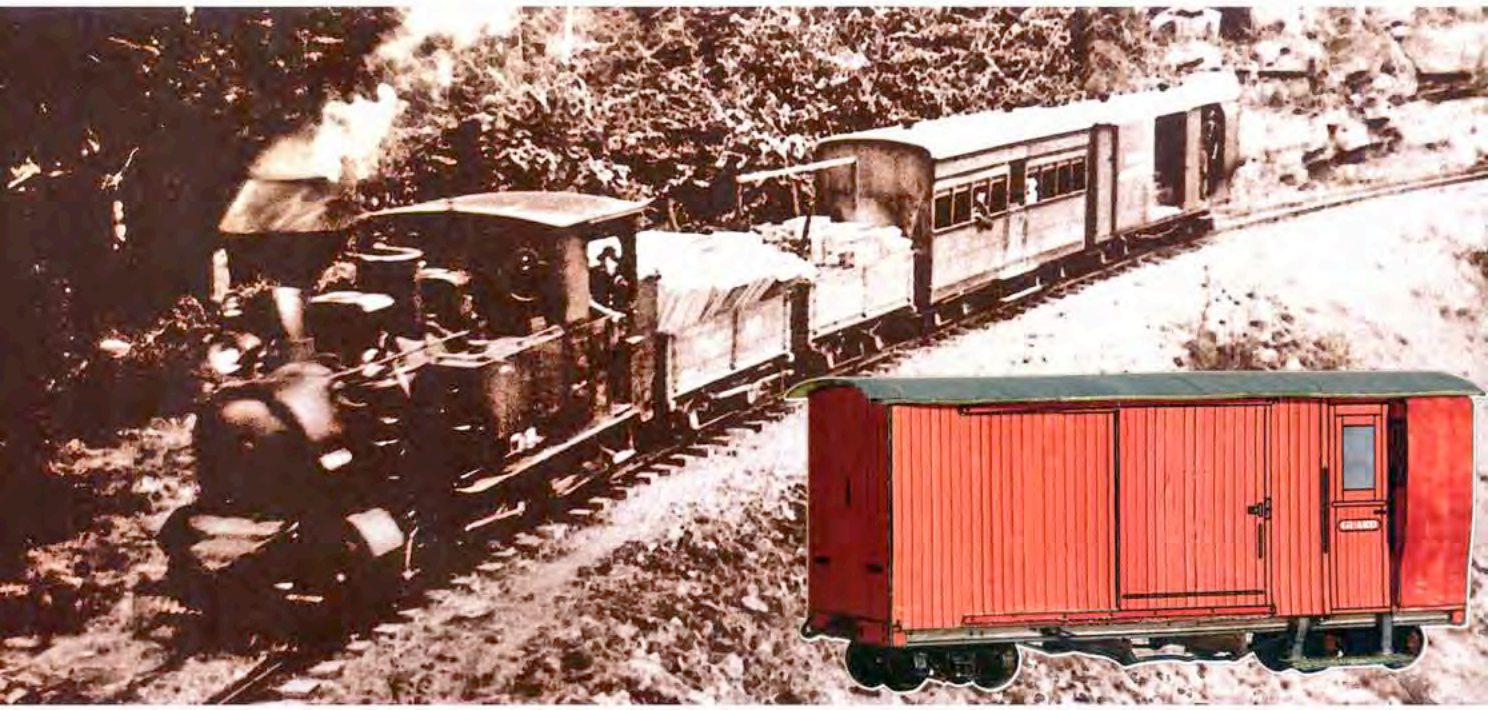
Timber and metal photorealistic textures have been adapted from © Clever Models llc (www.clevermodels.net/), CG Textures (www.cgtextures.com/) and the author's photos.

Unless otherwise credited, photographs were taken by Lynn Zelmer. Additional photos and other resources, including free downloadable kits for theses models, can be found on the CaneSIG (www.zelmeroz.com/canesig/) and Modelling the Railways of Queensland Convention (QldRailHeritage.com/mrqc) web sites. Jim Fainges' complete set of cane and shire railway drawings are available through the rail heritage image album link on either of these web sites. Some dimensional and other errors may be present as many of Jim's drawings were developed from photographs, rather than field dimensions.



A Guard's Van for the Buderim Shire Tramway

by Lynn Zelmer



This article continues the construction of the Buderim Shire carriages requested by Garth Fraser for use in a museum diorama. Successfully working out the challenges presented by the Buderim Shire coach, described in the January 2015 issue, enabled a speedy development of the guard's van. The unique challenge with this model was the side extension, functionally similar to the cupola on a North American caboose.

Computer-Based Card Modelling

Long time NGDU readers will be aware that I use Photoshop for my modelling, rather than vector-based 2D or 3D modelling software. For me it's simply a matter of habit as I've been using Photoshop since version 1 and have over 10 years experience with the version I'm using. There are a number of software packages that could provide similar results, the only stumbling block is getting sufficiently familiar with the software.

For me the most critical requirements are

- Accurate measurement system so that I can keep model components absolutely square, dimensions accurate, line widths consistent, etc.
- Ability to rotate components, both predetermined (eg 90 or 180 degrees) and arbitrary to straighten images and to match the varied angles found on model components such as angled braces
- Convenient zoom in and out (I do much of my design work on a 300dpi image enlarged to 200%)
- Multiple layers that can change their relative position, and
- Transparency, so that textures can be assembled 'behind' component boundaries (outline drawings).

The end view for this carriage, for example, was created with multiple layers. The 'top' or most visible layer is the outline drawing for the grab rails with their texture as the next layer down. Other detail elements (outline layers and textures below) follow, then the main outline drawing of the end. The vertical siding texture is the bottom layer with horizontal painted and unpainted timber textures for the headstock one layer above. Fortunately I can collapse several layers into one, or link them so that they move together as I shift a component around on the page.

By hiding/unhiding layers I can 'print' a simple plan view, or a textured view with markers for hand rails and similar details, or a fully detailed view with included details. Similarly I can include/exclude the extra headstock textures that fold under and around the matte card used for fabricating and bracing the end.

TITLE PHOTO: 'Rounding the Curve, Buderim Mountain Queensland': the 30" gauge Krauss with a mixed goods and passenger train consisting of two 4w open wagons, the Buderim coach and the brake van. The inset shows the completed HOn30 photorealistic model. The main image has been Photoshopped from a print in the Ted Ward Collection, photographer unknown.

My models are designed using a 300 dpi work space. This provides a comfortable working environment with every inch on the computer equaling four feet on the scaled model. It's also convenient for working with NGDU magazine, as publishable images need to be at least 300 dpi. Eventually I rescale the A4 working pages to 144 dpi, 'print' them to pdf format, and 'reduce' the file size in Adobe Acrobat for the downloadable O scale models. HO components are reduced to 55% and assembled on an A4 page before being converted to a similar 144 dpi pdf distribution format.

A typical outline drawing is composed of lines 4 pixels wide. Reducing the images for HO scale means lines will be roughly 2 pixels wide, and small details will be lost. I'm willing to accept this restriction to avoid the steep learning curve of a vector-based software tool, but HO and N scale modellers might choose a different approach.

Some of my textures have come from commercial sources or the web; others are from my own photographs. As I continue developing models I'm building a stock of model textures and components, just as a more conventional timber and styrene modeller builds up a supply of modelling materials (stripwood, door and window frames, nut/bolt castings, etc). I didn't have to create most of the underframe components for this model, as I was able to reuse many components from the Buderim Shire Tramway coach, some of which were initially developed for a QR camp wagon project a couple of years ago.

I've now designed sufficient models using photorealistic techniques that I can fairly quickly do the basics—practice does provide some benefits! Jim Fainges' drawing was the obvious starting point and the basic carriage only differed slightly from the coach.

The bogie brake van's dimensions are slightly different, but with its wider siding and guard's extension it should look quite unique. Underframe dimensions were modified to bring the bogie pivot beams and queenposts slightly closer to the centre, providing additional clearance for the bogies. Jim's drawings were probably developed from photos and 'normal' practice, rather than extensive field measurements, and the changes shouldn't appear obvious to the viewer in any event.

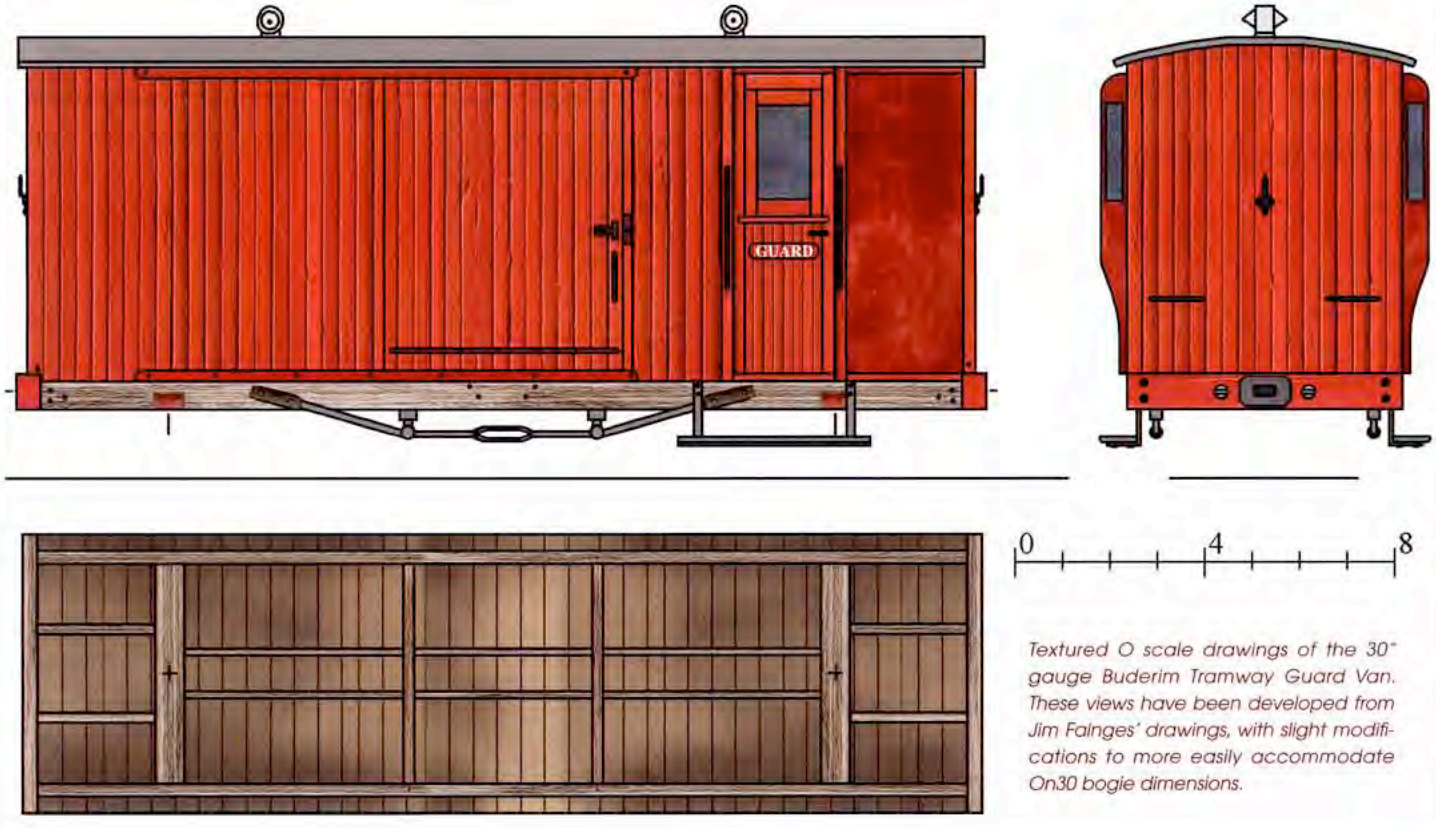
One of my continuing modelling 'gotchas' occurs when I forget that a surface is all or partially hidden by some other structural component in a normal drawing view. The coach model identified the solebar width - not a problem here, as I was able to reuse the coach components. Although I may have had a similar problem with the coach, on this model I had to backtrack several times to ensure that the side walls and other side details were the correct height, since the top few scale inches are hidden by the roof overhang in a normal side view. There isn't much difference, but it's just enough to hide part of the sliding door guides and the space above.

Learning from the coach development I also created two separate views of the sides/ends, one with and one without sliding door, hand rails and similar details. These details can be included as part of the texture print for the HO version, but I will want to add them individually on an O scale model. I would normally add handrails fabricated from wire and might install one of the sliding doors in an open position.

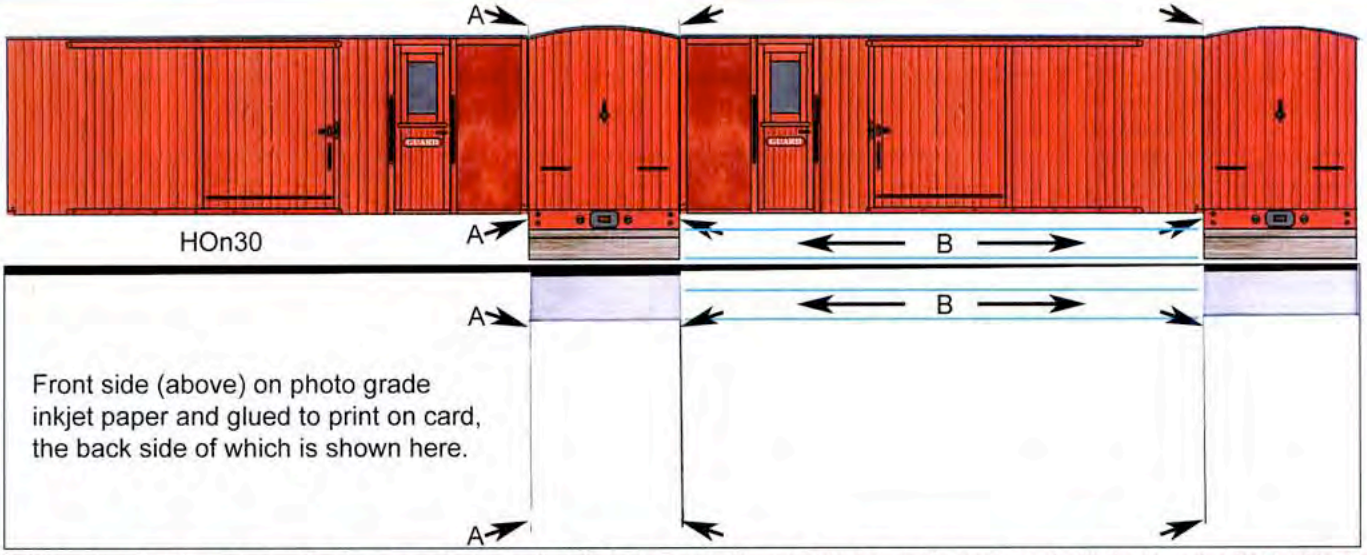
The siding for the guard's van started with the same texture used for the coach, rescaled for a wider board width and rescaled again for the narrower boards of the guard's door. I also partially 'desaturated' and darkened all the photorealistic painted components. In O scale, the colour difference and texture detail show enough wear that further weathering should be unnecessary. In HO scale, the two carriages will appear to either have spent different amounts of time in service, or were painted with a slightly different batch of paint.

The side extension was really the only construction detail that needed testing on this model - and only for the HO version, as I am reasonably sure from previous models that the components can be folded, curved and glued satisfactorily in O scale. I printed the side extension - scaled for HO - on card, and trimmed one side. This window side was folded 90 degrees, and the large curved surface bent to ensure that the print had enough length to fit the required curve and fold under for gluing. The extra 'wings' on the window sides can be bent under as glue tabs, or removed at the builder's discretion.

I create models for my own use, and the downloadable card kits are a bonus, allowing other modellers to share the results of my learning and experimentation. While a properly prepared card kit, such as those from Clever Models llc, includes glue tabs and other aids, I leave these to the creativity of the modeller. A novice will require care to build my card kits but the skills developed will result in a more experienced modeller.

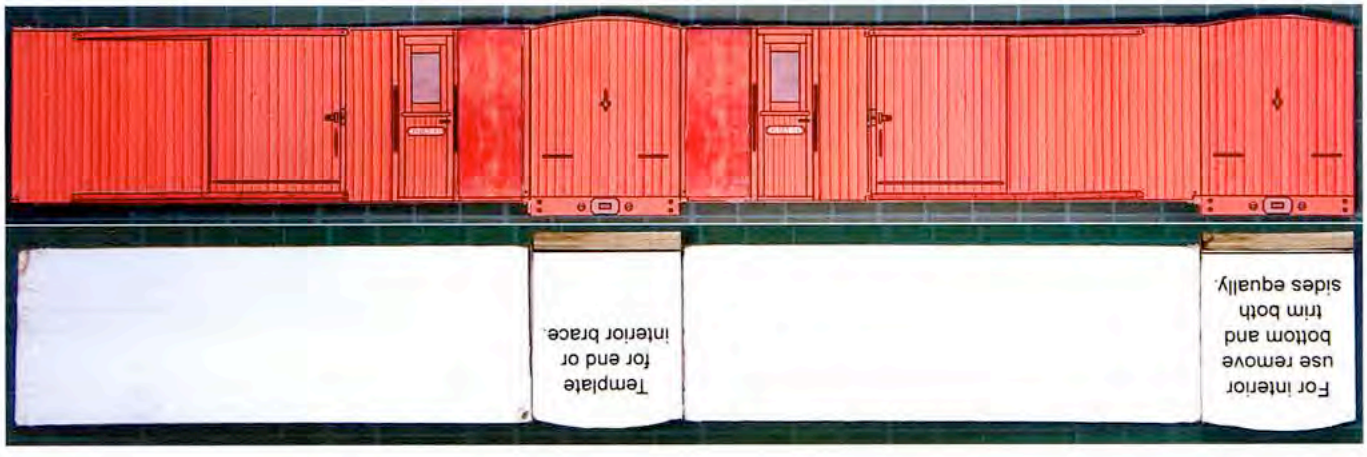


Textured O scale drawings of the 30" gauge Buderim Tramway Guard Van. These views have been developed from Jim Fainges' drawings, with slight modifications to more easily accommodate On30 bogie dimensions.



ABOVE: Scan, back and front, of two layer module, full size for HO. A print on photo grade inkjet paper (upper image) with the top edge trimmed to size has been carefully aligned and glued to a print on card. The oversize card layer has very narrow vertical slits cut where walls/ends fold (A-A and the other arrow points). This aids folding the assembly into an open box. Holes have also been cut in the card layer under part of the headstock (B) so that the photo grade print can be folded around and behind after the module has been trimmed to size.

BELOW: Composite of front and back side photos, thus the slight skewing, slight size differences and colour variation from the earlier scanned image. The door overlays and guard extensions have been added to the front and matte card cut to shape on each of the ends. The headstock texture has been wrapped around the base of the matte card and indicates the eventual underfloor location. It isn't very obvious but the back of the left end has been tapered with a sharp scalpel to ensure the corner join won't be obvious. This module will be ready for assembling into an open box once holes for the couplings have been cut.



Building the Van

As with my other card models, I developed the model components in O scale. However, unlike my O scale proof of concept development with the coach, I began by constructing an HOn30 model. I modified my normal assembly technique slightly for this model. The ends and walls are a single strip in the computer file, so I printed a copy on 250gsm card and another on the photo grade inkjet paper.

On the card copy only, I cut small vertical slits where the sides and ends join. This would allow the strip to be folded into an open box with a square corner. I also removed the portion of the headstock texture that folds under and behind the end and its matte card bracing.

The paper version was cut from the main sheet, leaving some white paper around each side. The top was then trimmed to size. The result was glued to the card strip, aligning the top edge so that it exactly covered the card image. The assembly scan shows the paper copy attached to the card copy, with the slit locations visible (A-A and other arrows). It also shows the back side of the same assembly with both the slits and the cutout for the headstock extensions (B) visible.

Once the glue was dry, I trimmed the assembly to size, checked that the corners would fold properly (removing a bit more of the card along the slit openings where required), and tapered the left hand edge of the wall where it would mate with the end to get a closer join. The guard extensions and sliding door details were added before proceeding further.

The HO version of the model includes a pair of sliding doors with their door glides to give the sides more depth. Care must be taken when cutting the guides, because their size makes them easy to tear off or damage when colouring the edges. Glue must be applied to the destination (the carriage sides) rather than the door detail itself, because of the fragile nature of the door glides.

I initially tried creating the guard extension bays the same way I had prepared the side/end assembly, by gluing a paper print to card. I was able to cut out the extension without problems, however the card-based components were too thick for a smooth bend and edges were too obvious at corners after gluing. Looking at the result more closely, the base of the side extension was barely wider than the thickness of the card and it's almost impossible to make a bend that small in card.

My next attempt was more fruitful and, as can be seen in the drawing, used strips of card and matte board to pad out a paper-based print. It is possible to make a fold in the paper (which is the same width as the thickness of 250gsm card), so I folded the glue tab under to support the card strip. This made a rectangular tube into which I slid a strip of matte board with its top and bottom edges roughly tapered. The side texture strip was then folded and curved as required, and glued in place with the extra length, top and bottom, tucked under and glued.

The rest of the van went together much the same as the coach described in the last issue. This time, I did install a lead weight prior to the interior bracing, but forgot to attach the extra headstock texture prior to installing the couplings. This meant I had to cut individual textures pieces for the exposed headstock ends. And - as with the coach - the finished roof overhangs one side more than the other. I'm not sure whether the carriage isn't quite square, or if it was my problem installing the roof. However, the fault is not obvious under normal viewing conditions.

I used soft copper wire for both couplings and truss rods. Copper is a good choice for the couplings. However, soft wire doesn't allow neat corners and it retains kinks, caused from handling the truss rods with oversized fingers and thumbs. Again, this isn't visible under normal viewing conditions, but is painfully obvious in photographs.

The diagram showing the step construction should probably have been included with the coach article, as these steps are similarly formed. They did cause some difficulty on this model because of their location. The prototype steps may be bolted to the carriage floor; on my model(s) they are glued to the solebar for strength. Some creative bending of one upright, plus gap-filling super glue, fitted them around the truss rods. Finally, a couple of mat spray applications completed the HOn30 model.

For the future...

Garth Fraser's request for help in developing models of Buderim Shire rolling stock was the inspiration for developing these two (very tiny) HOn30 carriages. Readers familiar with my past modelling activities will not be surprised that their development would be turned into NGDU articles.

Having finished the two carriages in mid-July 2014, I'm actually somewhat ahead of my NGDU deadlines. While I might also have exhibition-quality On30 versions built by the time this article is published, they can wait for a future issue, as can the Buderim Shire freight wagons I've also half-promised Garth.

Happy modelling, and remember that you can download free copies of the model kits from the CaneSIG and Modelling the Railways of Queensland Convention web sites.

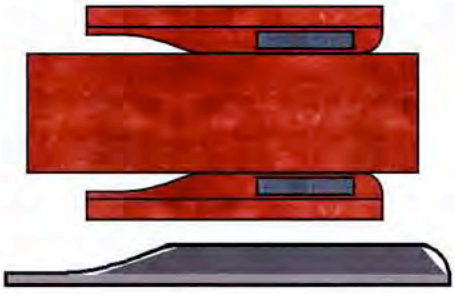
Acknowledgments and References

Timber and metal photorealistic textures have been adapted from © Clever Models llc (www.clevermodels.net/), CG Textures (www.cgtextures.com/) and the author's photographs.

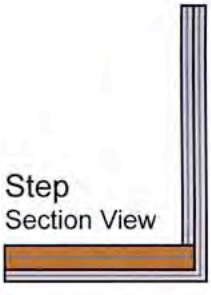
Unless otherwise credited, photographs were taken by Lynn Zelmer. Additional photos and other resources, including free downloadable kits for theses models, can be found on the CaneSIG (www.zelmeroz.com/canesig/) and Modelling the Railways of Queensland Convention (QldRailHeritage.com/mrqc) web sites.

Jim Fainges' complete set of cane and shire railway drawings are available through the rail heritage image album link on either of these web sites. Some dimensional and other errors may be present, as many of Jim's drawings were developed from photographs, rather than field dimensions. →

Detail drawings



ABOVE: Extension assembly for HO model with an enlarged sectional view for clarity. The light gray layer is a strip of 250gsm card and is held in place with the side tabs folded under. The darker gray is a strip of matte card with edges tapered to somewhat match the curves of the extension. The main wall texture curves/folds around, with the extra length tucked under and glued.



ABOVE: The 8" x 2" 'timber plank' step was formed from two thicknesses of texture printed on card, the 'metal' texture was formed from two thicknesses of photo grade paper glued to the bottom of the plank and bent at right angles behind the plank. Another length of metal texture was then butt glued to the plank and to the upright metal texture, securing the right angle. The top was then cut to length for fixing to the solebar.

BELOW: My finished HOn30 Buderim Guard's Van and Coach. The height difference is partly a result of slightly different dimensions for the two carriages and partly because the coach has a thin washer at the kingpin to provide a stable bogie interface. I'll likely add a similar washer to the guard van once I locate another supply.

Buderim Shire Tramway Carriages in On30

by Lynn Zelmer

I described the development of HOn30 versions of the 2' 6" gauge Buderim Shire Tramway coach and guard's van for Garth Fraser in the last two issues of NGDU. This article continues with the development of On30 models of the same carriages - as my household circumstance change, and I'm interrupted by Cyclone Marcia...

Building the On30 Models

Readers of my earlier articles will remember that I design all my models in O scale (1:48) at 300 pixels per inch. This ensures that the quality (and detail) is acceptable for construction in my preferred scale, and I can rescale the files for use in smaller scales. With resolution of 300 pixels per inch, the files can be used full size by NGDU and, I suspect, the models could even be acceptably rescaled (~250%) for use as 16mm (1:19) models if needed.

In practical terms, having built both the O scale proof of concept and HO models, these model's components had been pretty well tested and could be printed with minor modifications. However, building the coach and van in parallel meant that it was more sensible to create several temporary files for printing similar components for both models. This was especially useful when I found components 'missing' from one of the sheets, or damaged components during construction. In other words, I used temporary files to print materials to help rectify my design or construction mistakes.

This was both good and bad. It was often easier to work with similar components, but if an assembly error occurred, another temporary page had to be recreated for reprinting. For example, I assembled a double layer of mat card for the pivot beams (bolsters), applied glue and started wrapping the photograde inkjet paper texture overlay around when I discovered that I needed a triple layer of mat card. Converting the double thickness to three layers was simple, but I also needed to redo the temporary file and print another set of overlays, before I could finish the strip of pivot beams.

The base level for both models was an A3 print (shown reduced, opposite) on card, with the sides and ends for each model connected into single strips. As with the HO version, I didn't immediately cut these out. Instead, I cut a narrow slit where the walls and ends met, and tapered the adjacent card for a smoother joint when folding. Individual side wall and end textures on photograde inkjet paper were then cut out, aligned, and applied to the base sheet. Once the glue was fully dry the two assemblies were cut from the A3 sheet. Minor details were then applied, as well as the profile-shaped mat card reinforcement for the ends, complete with the end textures folded around the bottom and back to form the headstocks.

I had used clear plastic for the windows on the Proof of Concept build (NGDU issue 56) but decided against clear windows for these models. Yes, I'm lazy, but these weren't intended to be competition models and I didn't need interior details! Instead, the "minor details" for the coach included painting the base layer windows with a thin coating of Micro Krystal Klear to simulate glass. The texture layer overlaying the base had window holes cut out to give a three-dimensional effect. A competition model would need several texture layers to really define the windows and doors, etc, but I stopped after adding a letterboard layer to the top of the side walls.

The coach could then be folded into an open box. However, doors, door guides and handrails were applied to the guard's van before the end reinforcement. Next, the texture for the guard's extension was assembled around mat card strips cut to size, and shaped to create an almost solid unit similar to that for the HO model. Once the extensions were fitted (using gap filling superglue rather than white glue), the van's side/end assembly was also folded and glued into an open box.

BELOW: The walls have been assembled into open boxes and the underframes are ready for installation. The ends have been braced with thick card as part of forming the headstock; unfortunately the sides weren't braced until the floors were installed. While not obvious in this photo, the coach is slightly wider and taller than the guard's van. The width of the timber cladding is more obvious.

A hiatus...

Unfortunately, at this point a family emergency meant the assemblies had to be set aside for several weeks. As a result the sides became quite warped (both horizontally and vertically) from Central Queensland's tropical humidity.

Eventually I returned to modelling. The floors (texture print on mat card) were trimmed to size, solebars and other underframe components attached, and the resulting assemblies glued in place. A balsa strip at floor level around the inside of each carriage holds the assembly in place. The base of each wall was now straight, since inserting the floor assembly forced the ends apart and the sides tight against the floor.

However, this did not correct either the vertical warp or the warped top edges of the sides. A layer of mat card fitted to the inside of each side wall more or less corrected the warped top edge, but couldn't completely correct the vertical warping. Looking closely at the models, it appears that fitting the floor resulted in a slight inward lean near the bottom of the walls, obvious in some of the photos. In other words, the wall/floor joint is roughly 85°, rather than 90°.

If I was to build other similar carriages, I'd likely fit the side wall reinforcement prior to fitting the floor. The mat board used would be thick enough to provide a "stop" for the floor, and by extending right to the floor should result in a straighter wall. This is illustrated in the 'Alt' inset on cross-section below. Note that the side bracing shouldn't extend to the bottom of the wall, as only the nominal 1" thick wall sheathing timber extends below the floor.

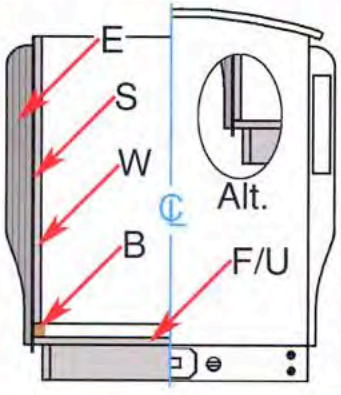
Three mat board interior cross braces were fitted in each carriage, with balsa strips holding them upright and in place. This keeps the wall tops from bowing in when the roof is applied. A longitudinal balsa strip down the centre of the roof rests on the cross bracing and is supported on balsa cross strips at each end. Scrap card was used for glue tabs (see photo) and sub-roofs were fitted, extending from side to side and end to end, to support the overhanging final roof texture.

Cross-section detail

This drawing shows the guard's van - coach construction is similar. Parts of interest are noted on the drawing:

E: side extension showing mat board layers shaped for texture skin
S: side wall base layer and texture extending below floor
W: mat board wall brace
B: balsa strip holding floor in place
F/U: floor and underframe assembly. Internal cross-bracing extends only to top of wall.

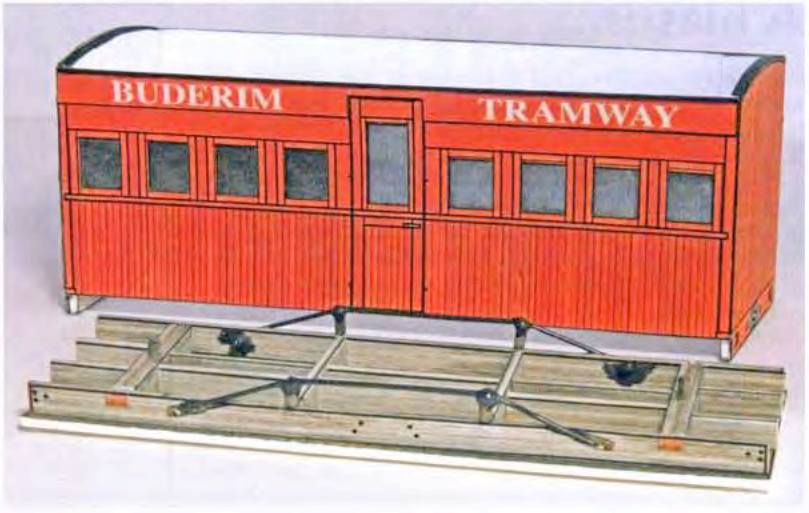
When building another carriage I'd probably omit the balsa strip, and instead extend the wall brace (W) down to act as a stop for the floor (inset image Alt).



ABOVE: The base print (for printing on A3 sized card) for the two models has the sides and ends joined into a single strip and the colour (but not the black lines or window textures) desaturated to make the cut and edge lines easier to see. The blue lines indicate where a narrow strip was cut/shaped for easier folding. Texture prints were aligned and glued in place before cutting out the assembly.

The roof textures were printed on photograde paper, folded over and glued to make a double-sided module. The roofs were trimmed to extend 6-8 scale inches beyond the wall on each side. The double-sided texture ensures that underneath portions (extending beyond the walls) won't appear white in a photo. Both roofs represent a tarred fabric finish, but the texture print is different for each. Alternatively, they could have a corrugated iron roof, or even colorbond sheeting, if representing recently repaired museum or other non-railway use.

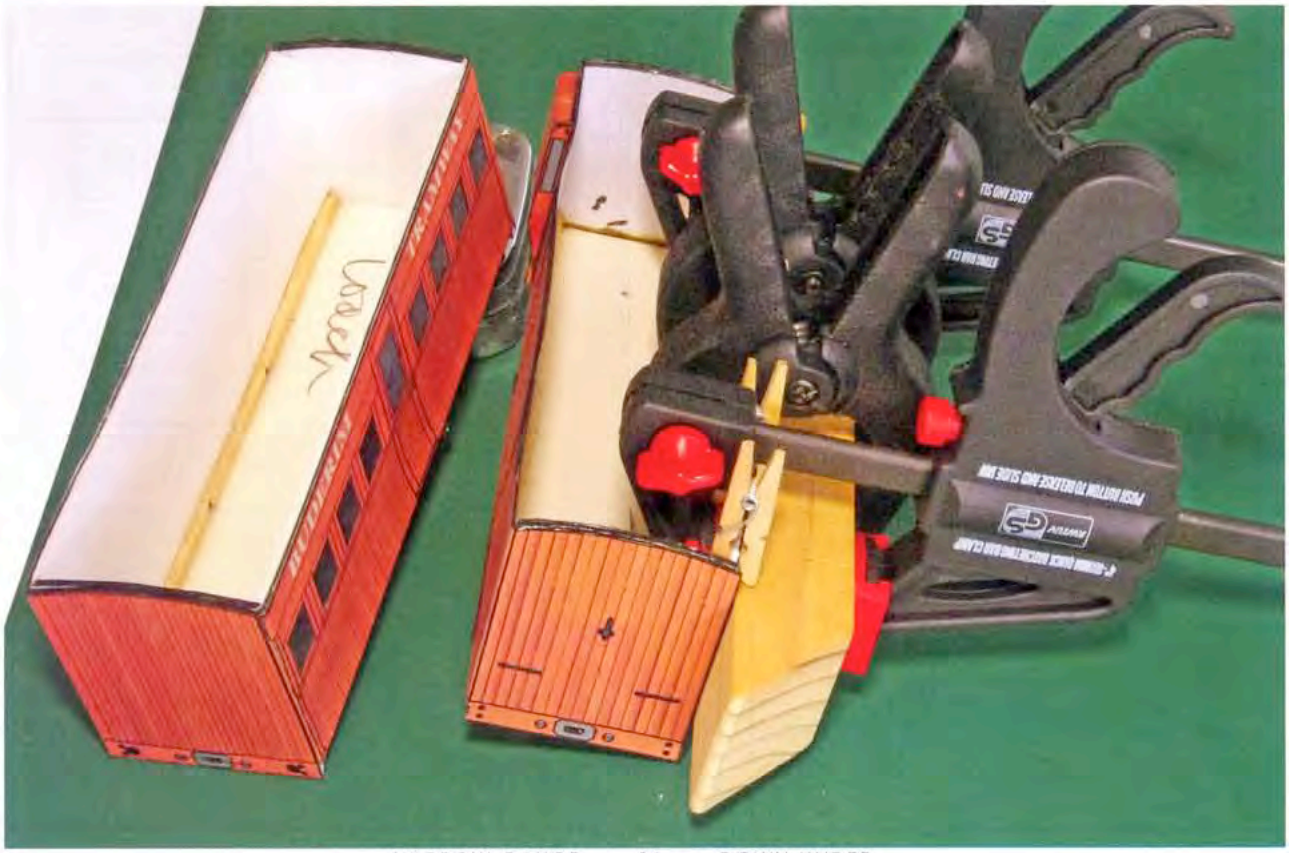
The roof texture module needs to be pre-curled before gluing in place. I generally roll them over a table edge, ensuring that the overhang potion has a definite curl. Care must be taken to get an even coating of glue on the sub-roof, with glue to all the edges of the roof, but not enough to squeeze out when the roof is set in place. I haven't managed to get the roof absolutely centred on any of the carriages I've built but slight misalignment won't be noticed except in photographs. I've not found a way to clamp the roof in place except by hand, so this becomes a 10 minute process until the edges and corners are firmly fixed.

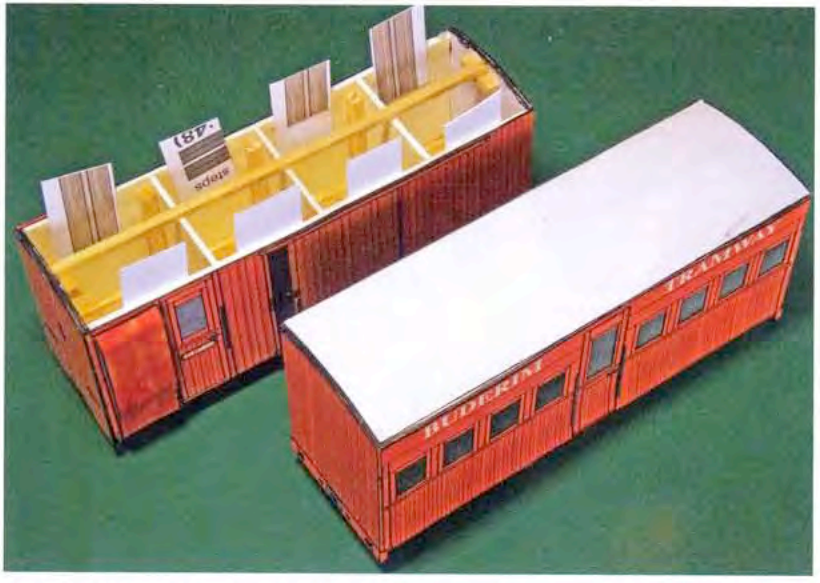


RIGHT, ABOVE: The first On30 test build (NGDU #56) had windows cut out with clear plastic glazing. This build uses a coating of Micro Krystal Klear to give a gloss appearance to the windows. The .032 brass rod used for the truss rods has been tacked to the queenpost pins with gap-filling superglue and held in place with two part epoxy. Hardware texture prints still need to be applied where the truss rods go into the soleplate.

RIGHT: The guard's extension increases the overall width of this van, hopefully it won't affect the fitting of the roof. It was hoped that the warping apparent in the walls would be eliminated once the floor was installed and side wall bracing cut and fitted. The near edge of the underframe floor has been coloured to hide the white edge, making its thickness less obvious against the shadow underneath.

BELOW: Installation of the floor module included a balsa strip to ensure a good join (see cross-section illustration). A modelling hiatus ensued and the high humidity of the tropical summer badly warped the otherwise unsupported car sides, as can be seen on the left side of the guard's van. The right side and the coach on the left have been mostly fixed by reinforcing with mat card from the longitudinal balsa strip to top-of-side using some creative clamping.





ABOVE: *Both carriages have three vertical mat card cross braces, with short balsa strips helping hold them in place. The longitudinal balsa strip rests on top of the cross braces with balsa supports at each end. The scrap card tabs (guard's van, left) fold over to help secure the card sub-roof, as on the coach. The coach sub-roof has been glued to wall top all the way around, as well as to the centre balsa brace and the scrap card tabs.*

Finishing up...

At this point, I finally sealed the carriages with mat spray. While doing so earlier might have prevented some warping (especially in the walls), it would have been even better to have finished the models prior to the humid summer season, which reached over 80% for many days during recent months.

At this point, construction paused due to another family medical emergency, and only recommenced while waiting for power to return following Cyclone Marcia. Working during a tropical summer is a challenge, without power for lighting and air conditioning, but I did manage to finish the models sufficiently for their final photos. Completing this text required waiting several more days for power to operate the computer.

The steps could only be fixed in place once the roof was attached—my 'ten finger clamps' would likely have damaged steps or any other under-floor protrusions if installed prior to this time. Refer back to the step construction diagram in the last issue, as I used a similar technique here.

BELOW: *This view shows the partially-open sliding door on the guard's van; sole plate details and the headstock texture. These are complete on the coach but not the van, and side steps are still required on both carriages. The subroof will hopefully provide good support for a two-sided outer roof module, made of photo grade paper.*

BELOW: *Under side of the coach showing the spacers fitted for both bogie and coupling installation. The coupling pad is a simple piece of heavy (photo mounting) mat card. The bogie spacer was created from a similar section of mat card using a .25" paper punch and the smallest punch on a leather worker's hole punch.*

Obviously, the steps need to be wider for the coach than for the guard's van, but avoiding truss rods and other details on the solebar was just as important as an accurate prototypical width.

The coach steps are straight forward, with the metal strapping extending down from the solebar and under the back of the step. I do have two steps at each door, but I cheated somewhat and the top step is actually fastened to the bottom of the wall, rather than having a few inches clearance. The van's steps are hung from the solebar, with a twisted support extending from side to side under the step.

The JG Models archbar bogies require some cleanup of the pewter castings before careful assembly. Extra hands with tiny fingers would be useful for this step! I used gap-filling superglue and yes, the bogies have cast-on brake shoes, when the carriages have no visible braking systems. I also have some JG bogies without brake shoes, but these were the only ones assembled at the time I took the final photos. I know from experience that bogies assembled with superglue will come apart if dropped, but trust that they will hold together in the light duty service they are likely to see on my modules.

The couplings were fabricated from copper wire, similar to those for my HOn30 carriages but with 20 gauge wire. The prototype had a combined centre buffer and coupling mount that Garth fabricated for his HOn30 models. I've stayed with simple hooks, joined with a single link, since these will likely only be static models.

A final spray of lacquer finished the models - as much as they are going to be for the immediate future. Garth is trying to convince me to model one of the Buderim bridges to use as a display for the models, but that is not feasible in the immediate future.

I trust that you've enjoyed seeing the development of these unique carriages in two different scales. There will never be enough modellers of prototypes such as these represent, to see commercial models developed. But thanks to Jim Fainges' plans and photorealistic modelling techniques, it is possible for an average modeller to build such a model in card.

Acknowledgments and References

Capricorn Sugar Rail Museum, www.zelmeroz.com/csrm.

Timber and metal photorealistic textures have been adapted from © Clever Models llc (www.clevermodels.net/), CG Textures (www.cgtextures.com/) and the author's photos.

Unless otherwise credited, photographs were taken by Lynn Zelmer. Additional photos and other resources, including free downloadable kits for theses models, can be found on the CaneSIG (www.zelmeroz.com/canesig/) and Modelling the Railways of Queensland Convention (QldRailHeritage.com/mrqc) web sites.

Jim Fainges' complete set of cane and shire railway drawings are available through the rail heritage image album link on either of these web sites. Some dimensional and other errors may be present as many of Jim's drawings were developed from photographs, rather than field dimensions.

I've used guards van or guard's van in these articles to describe what is often called a brake van. All three terms are used in publication and by modellers/railfans, sometimes inconsistently, although the QR Rollingstock books refer to brake vans with guard's compartments.

The two completed carriages photographed on my multi-gauge display (On30, On42 and O gauge with cream shed and fettler's sheds behind). The coach steps are a simplified version of the construction diagram in the last issue. The van's steps are similarly formed but with the supports twisted, rather than representing flat strap metal. The partially open door is a multilayer construction, with a black texture on the base level.

Blank page