Scratchbuilding with Photorealistic Card Textures

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Modelling with card has become reasonably popular (again) over the past decade. Part of this trend has undoubtedly been cost related, however I believe that the driving force has been the advent of photorealistic textures. Photorealistic textures are simply photos of surfaces (boards, corrugated iron sheathing, brick, etc.), scaled and applied to a scale drawing to create realistic model surfaces. Coupled with better designed kits and laser cutting of cardstock it's become easy to build very credible models using card.

However, I'm a modeller of Queensland's cane and shire railways and the available products didn't meet my locale-specific needs. This presentation looks at the process of developing card models from scratch to meet such needs and focuses on my most recent model, a QR 32' timber camp wagon.

Background

Many in this audience will be familiar with my structure models using card—the Queensland cottage, cream shed, small halt and navvy shed have all featured in the Australian modelling press as well as at conventions and exhibitions. Before attempting these scratchbuilt structures I built, and kitbashed, several commercial card kits to update my card modelling skills.

Paper Creek was my first commercial source of railway-oriented photorealistic kits and modelling materials, followed by Clever Models llc with their downloadable kits, textures and theme CDs for both structures and rolling stock. I'll show textures from their kits that inspired my modelling.

Using the photographic and image manipulation skills I already possessed I was able to begin modifying these commercial kits, and then to create my own textures and use the computer to combine them with drawings of the structures being modelled.

Just as with a model built using more conventional materials (styrene, brass, timber, etc.), I needed good scale drawings of all surfaces of the model, a plan for how the model was to be assembled, all of the required components (windows, doors, walls, roofing materials, etc.) collected, and techniques for assembly and finishing. The only real difference was that the surface finishing (textures), including weathering, was created from photographs and printed on card (or paper), rather than being applied separately.

Finally, I use a digital camera and get most of my texture materials by photographing things I see in my local or regional travels. Since I've always photographed the 'surrounds' as much as the locomotives and rolling stock this has resulted in a fairly extensive collection of images to support my modelling. On the computer I use Photoshop for image manipulation and kit preparation, and Adobe Acrobat for pdf file preparation and optimisation. There are dozens of other software alternatives, including some dedicated railway and 3d modelling tools, that will accomplish much the same results, but I know these tools—and would rather spend my time modelling than learn how to use other tools.

Once I'd spent the time and energy to create the model's components on the computer, I was also able to package them into pdf files for distribution to other modellers. Interestingly, while I was inspired by Paper Creek and Clever Models to create my own 'kits', Thom Miecznikowski of Clever Models was intrigued enough by my Queensland cottage kit to create a North American (timber clad instead of corrugated iron) version of the same structure for free download by his customers.

Research

While all modelling projects should start with research—seeking out any and all information about the chosen topic—it is even more necessary when contemplating scratchbuilding. The several years I've spent creating Queensland style structures has significantly improved my knowledge of building techniques and materials. It has also provided me with a good grounding in how to construct a card model—essentially how to create a card model kit that can be assembled by almost anyone, or hopefully turned into an outstanding model (most likely kitbashed) by a skilled model builder.

Since I hadn't previously built any rolling stock from card my research was two pronged: first, details of the camp wagon, and second, applicable wagon construction techniques. The former was accomplished by collecting a large number of photos of QR camp wagons, noting their similarities and differences, and obtaining several QR wagon drawings and other information. As part of the latter I noted that a camp wagon was very little different from a shed or other structure mounted on a specialised underframe. I started by assembling one of Clever's wagon kits far enough to understand their approach to a wagon underframe, and began developing my own QR-type version.

My first underframe build used timber components assembled on a print of the underside of a standard 32' wagon. Since this was simply a trial I didn't bother painting/staining the components, but simply worked on getting the timber scaled and located correctly. As it turned out, a conversation with a retired QT carriage maker sometime later indicated that I had made a structural error, but I more or less understood the basic underframe components.

I then tried constructing the 'timber' components by wrapping card textures around a heavier mat card core. This took some experimenting to get the technique right (textures the right width, scored and bent around the mat board core, glued and cut to size) and resulted in my simplifying the component sizes. Effectively all 'timbers' except the pivot beams are the same width and thickness, based on the thickness of the mat board used. The pivot beams use three thickness of mat board with a 210gsm cover, all others use two thicknesses of the mat board.

The same texture wrapping technique should work with scale styrene or timber strips, albeit at extra cost. Gluing the printed textures to timber strips would be easier than to styrene, with paper textures likely easier to fold around the strips than card, especially where the timbers needed to be finished on all four sides.

The next challenge was modelling the chamfer board sheathing. The final result took several trials and involved 210gsm card (base and narrow riser) with a 'photo quality inkjet paper' overlay. Visible edges were coloured with an artist's permanent colour felt pen and the higher quality paper print provided an improved finish over the rougher surfaced card.

Although there were still several unanswered questions, including how to weight the model for operation, and how to create the manual brake gear, buffers, coupling rods, etc., I felt that I could now proceed with constructing the model. The third (and final) underframe build corrected the structural error, the headstocks had cut outs for the coupling rods, 'iron' right angle braces had been added for holding the frame components together, etc.

Modelling with the Computer

Tools

Obviously creating or kitbashing models using a computer require some computer skills, but not as much as might be imagined. There is a need to prepare scale drawings similar to the model drawings you might find in a computer, however most models are composed of basic shapes (rectangles, etc.). The challenge is to isolate each flat surface and accurately locate design elements such as windows, rather than drawing skills per se.

Image manipulation (texture preparation) requires isolating design elements, 'skewing' and scaling or otherwise manipulating them so that they are the correct size and shape for the model. A photograph of a window, for example, generally has some elements of perspective that must be corrected and then it must be reduced to the correct size for the model. While this isn't as easy as using 'red eye' correction and similar tools it can be done using a variety of either commercial, low cost or free-use software tools.

Combining the visual components (drawing and textures) is easiest if your software uses 'layers' so that individual elements can be moved around in three dimensions before reducing them to a single layer for printing.

Preparing the finished components for distribution to other modellers is as simple as 'printing' to a pdf format file. The a tool such as Adobe Acrobat is used to optimise the file (reduce its size) for easier distribution via e-mail or from a web site.

Techniques

As indicated above, step one is to create scale drawings that describe every surface of the item to be modelled. Sometimes drawings will already exist that can be scaled for use. The computer tool that I use (Photoshop) allows me to create a layer with the line drawing as black lines on a transparent background. This simplifies subsequent work as I can place texture images beneath the drawing to fill in surfaces, rather than having to either cut images out carefully or continually replace drawing lines hidden by a texture image.

Once I have the drawings completed I select one or more photographs showing the desired surface with as close to a straight on view as possible. I then squeeze and stretch, resize and adjust the image to fit the drawing. For example, I cloned chamferboard from a wagon side to make a long chamferboard texture that would ensure the boards would be the same width around the wagon.

This texture was then applied to the side and end drawings, and any excess trimmed. I then pasted texture images of the doors, windows, QR logo, etc., in place. Elements such as doors and windows came from more than one camp wagon, thus had to be individually scaled to fit and, in some cases be colour corrected to match the rest of the wagon.

Individual items were printed as required for testing/assembly and revised as needed. After the model was completed the components were assembled into several sheets to minimise the printing required for a subsequent model and the files printed to pdf for distribution.

Techniques for assembling card models have been covered in my Narrow Gauge Downunder articles and on the web, so while I will describe some of them in the presentation I have not included them here.

Acknowledgements

While I also took several hundred photos myself as part of this project I would also like to thank Terry Olsson of ANGRMS for providing photos of the camp wagon he is restoring and for his QR drawings, and QR's Darren Steadfast for access to QR's Heritage wagons in the Rockhampton station precinct. Also thanks to Jim Hutchinson for his QR 32' timber underframe drawings, Ron Aubrey for his assistance including provision of a cast wagon underframe, Peter Kraussof O-Aust for his advice and assistance, and retired QR carriage maker Jack Ilott for his critique of my early construction.

Some of the photorealistic textures used have been adapted from a Clever Models llc CD. Drawings and photos are by the author unless indicated otherwise, additional materials are available from the CaneSIG web site (www.zelmeroz.com/canesig) and Narrow Gauge Downunder magazine.
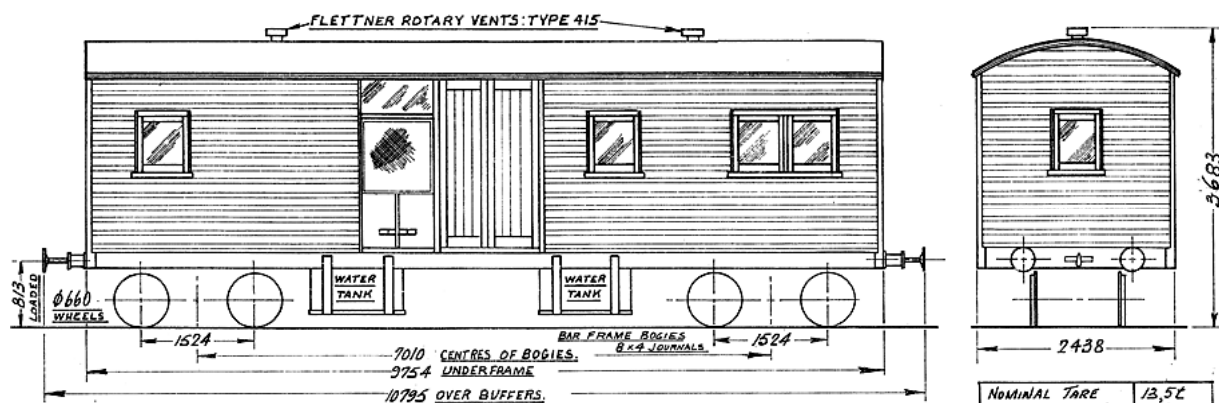
Typical two-man QR camp wagon. Ipswich Workshop drawing #304, courtesy Terry Olsson.

This Mount Morgan Station Museum camp wagon provided several detail textures for the model. A photo of the end has been squared up (right) and stretched so that it has the correct proportions (height and width of wagon end). The white lines, on a separate layer, aided that process. The louvred window (inset) has been rescaled to 1:48 for use on the model.

Brake lever side of the finished On42 scale wagon. The large door was also sourced from the Mount Morgan wagon above. The model is card or paper aside from the truss rods, coupling hooks, bogies, several small pins/nails and a thin lead sheet to bring the model to NMRA recommended weight for operation.