

Creating Unique Models Using Photorealistic Card Techniques

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This clinic explores the kitbashing and scratchbuilding techniques I used to create unique structures and rolling stock. In particular, it looks at what is required to create photorealistic textures for such models. While my examples come from Queensland practice (QR, cane railways and tramways) the techniques can be used for any modelling era and locale.

As a teenager I built card structure kits (Dover Publications) and rolling stock with card sides distributed in the NMRA Bulletin and other model magazines of the time. I eventually moved with the times (and an increased income) to build kits in styrene and scale lumber, and even participated in a club project to produce semi-commercial craftsman type rolling stock kits using scale lumber and other parts.



HO, N, TT and Z scale car sides on cardboard special insert in the December 1973 NMRA Bulletin. O and S scale sides were separately included in the insert. While the degree of registration error was noted at the time, it was accepted as part of the duplication process (and cost).

Since moving to Australia three decades ago I've primarily modelled Queensland cane railways and tramlines in On30 (1:48). This is a niche modelling interest and while the situation has improved in recent years, there have never been many suitable commercial models. As a result kitbashing and scratchbuilding have been absolute requirements for my modelling—and the subjects for a number of articles in Narrow Gauge Downunder (NGDU) magazine.

I've continued working with both styrene and scale lumber but over the last decade I've also created a number of photorealistic card models, both structures and rolling stock, based on Queensland practice. Since the model components are computer files it's easy to go on to produce a card kit based on the model.

Photorealistic texture: an image used for applying a realistic surface texture on a 2D or 3D model. Normally created from a high definition photograph of the real world surface texture (brick, concrete, rusty metal, timber, etc.) being modelled.

There isn't a large enough market to make commercial distribution feasible, but I make the kits available for free download online. While most of the kits are only distributed in O scale, I generally test build both HO and O versions. Rescaling O scale kit pages (pdf files) for use in smaller scales is easy enough when printing, and I have even upscaled and test built some components in SM32 (1:19).

Photography for Photorealism

Good modelling requires straight-on views of all accessible sides, plus as many other photos (and dimensions) as possible, both overall and detail. Fortunately, digital cameras make it quite inexpensive to gather an extraordinary number of images. And even very inexpensive digital camera or phone camera images are suitable provided they have reasonable resolution.

The overall images set the scene for both the details and your model. From experience I can tell you that without verifying the overall context it's quite possible to misplace detail elements. The draft version of my recent Goods Shed kit (NGDU #72), for example, has a roof support improperly located because I followed a sketch drawing and didn't look closely at the relevant photo(s).

Straight-on shots can sometimes be used to create photorealistic textures, noting that large surfaces may need several overlapping images, later merged into a single image, to overcome in-built lens distortions. Potentially the centre third, both horizontally and vertically of a suitable camera image can be straightened, duplicated and merged several times to create a useable texture. Details, such as doors, windows, locks, etc., may also make useful textures, both for the current and future projects.

Avoid wide angle and telephoto shots when taking images for photorealistic textures as they can introduce distortions. Finally, be aware that image resolution is both your friend and a curse. A high resolution close-up photo of a small detail, for example, may not scale down to modelling size, whereas the same detail can be extracted from a wider shot.

Computer Support

I use an old (2003) version of Photoshop for my image (photo) manipulation and the 2D drawings necessary for model/kit development. Photoshop is a bit-map oriented program that allows me to stack various layers into a complex image.

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Essentially 2D outline drawings form the uppermost layers, with one or more texture layers beneath to provide the photorealistic appearance.

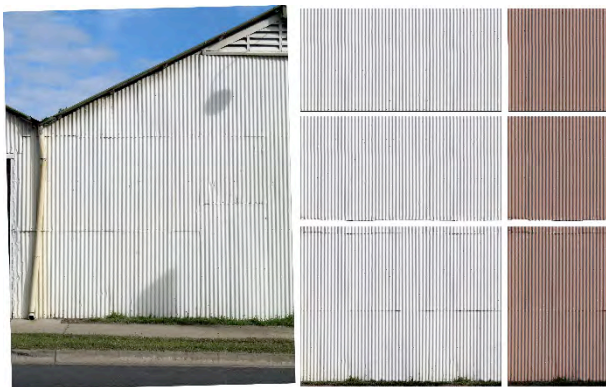
Vector-based programs such as Illustrator and Corel Draw, or 3D programs such as SketchUp or Blender, can be used to create the standard 2D or 3D views but they still require bit-mapped images for the texturing.

Good computer hygiene (work on copies, not originals, save often and make backup copies), a comfortable work station and taking frequent breaks to avoid RSI are much more important than the particular software used.

Boldemans Soaps

The Boldemans Soaps building, close to the roadway, facing the morning sun and usually free of parked cars, was in an almost perfect location for obtaining photorealistic texture source photos. "Almost perfect" because of the location of power poles, signs, etc., and that some of the most appropriate walls were at right angles to the street and behind a locked gate.

However, I was able to get several photos of the front walls of the main buildings, capturing both the corrugated iron (CI) cladding and the various doors and windows.



This 2012 straight-on photo (left) of the now-demolished Boldemans Soaps building in Rockhampton was manipulated to create O scale (1:48) corrugated iron sheathing texture.

The original handheld photo has been straightened only, thus the skewed edges. Shadows and other unwanted details were cloned out and the result copied and merged several times, resulting in a full A4 sheet of the texture, a slice of which is shown (centre).

Another version has been created without the bottom grass border, and the colour can easily be changed as shown on the brown version (right).

A small section of one of the photos was able to be squared up; shadows, etc., cloned out; duplicated and merged, then scaled (1:48 appropriate spacing of ridges) to create an A4 page of O scale CI texture. Some of the more obvious repetitive patterns have also been cloned out so that it can be used on a large wall. I now have several versions of the texture; changing the colour, for example, provides a good roofing material, and I've been able to use the texture on more than one model.

Canecutter's Hotel

The Canecutter's Hotel (see also NGDU issues 62-64) is my most complex structure to date. Rather than build a particular prototype, I designed the hotel to be a generic representation of a rural or regional Queensland hotel.

Selective compression was required given the sprawling nature of a typical hotel with its extensive outbuildings and storage sheds.

The shallow depth (12 scale feet) of the model helps with selective compression and makes it an acceptable size for inclusion on a layout or diorama.

However, it would also be possible to kitbash a full-depth model from the distributed kit materials.



Its peeling paint and faded sign suggest the Canecutter's Hotel has seen better days but it is representative of many such structures in rural and regional Queensland. As a model it contains a number of identifiable elements (windows, doors, etc.) from structures in the Rockhampton area.

The model includes easily recognised doors, windows, signs and other details from local structures. The finished ground floor walls contrasting with the exposed framing on the first floor, and the covered balcony and footpath, provide credibility for the structure.

Pineapple Bins

The pineapple bins are a small component of a recent project to build a QR branch line goods shed. However, because of their small size and design they took almost as much development time to get a functional model as the goods shed itself.



The side view (top left) gave me a good start for this bin but the end view (1) needed quite a bit of modification to achieve a squared up view. The end image was on one side of the photo and subject to lens distortion, so simply straightening the image using the top edge (2) left the corners misaligned. Modifications (3) and (4) fixed the bottom right corner while a more-general skewing aligned the bottom left side (5). The end still needs differential scaling (height and width) to fit the measured dimensions.

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Once one bin was drawn and its texture created the outline drawing was duplicated and used for additional bins. Given the model's tiny size some of the variations simply replaced the bin number using a compatible font and colour.

Out-Depot and Sand Dryer

Moreton Mill's out-depot on the Maroochy River had been vandalised some time before we visited late one afternoon in 2013. While I had basic dimensions from another railfan visiting that day, we didn't get any photos that would be suitable for creating photorealistic textures.

I started modelling this structure and the related sand dryer in styrene and timber but was unhappy with the result. My final model (NGDU #53-55) represents the structure as it might have been built using CI sheathing and set directly on the ground (no stumps), rather than being an exact depiction. This is one of my models that used the Boldemans texture.



Extensive fire damage and a visit late in the day meant none of my photos of Moreton Mill's out-depot were suitable for creating photorealistic textures. As well, my initial attempt at modelling the structure using styrene and timber didn't "look right" with horizontal sheathing, so I substituted vertical CI sheathing for my final model.

The structure is actually three models: the main building, the sand drying shed and the sand dryer itself. The dryer, while normally hidden (the shed roof is removable), is arguably the most complex of the three models as it required producing scale angle iron, etc.

QR Camp Wagon

O scale (1:48) QR 3' 6" gauge camp wagon developed using photorealistic card modelling techniques. Exterior sheathing is modelled using individual boards printed on "photo grade" ink jet paper sculpted over card strips to achieve the 3D effect. Doors, windows, gas tanks and other details are from photographs of several different camp wagons.

The O scale QR 32' camp wagon model was a situation where I had an excess of photos of numerous wagons and a desire to create a photorealistic model with an authentic 3D surface texture as well.

The 3'6" gauge model is weighted for operation and includes doors, windows and other elements from camp wagons in the Rockhampton area plus a 3D representation of the milled timber sheathing.

Almost everything on the model is card, including the brake lever mechanism (card layered with superglue for strength and rigidity), the stirrup steps and the buffers. One bonus from the model is that the underframe, with a change of colouring and numbering, is potentially useable for any 32' QR wagon or carriage I might want to build in the future.

Buderim Shire Carriages

The 2' 6" gauge Buderim Shire Tramway carriages had long been demolished when I started these models, so all I had were a couple of black and white photos and basic plans prepared by the late Jim Fainges. Dimensions, etc., were likely estimates as Jim's drawings were probably prepared from the same photos. Paint colours and construction details were similarly approximated from QR practice of the same era.



These On30 models of the Buderim Shire Tramway's 2' 6" gauge coach and guard's van were created from historical photographs, basic plans and stock photorealistic textures. Models intended for competition should be properly weighted with bogies that swing clear of all undercarriage obstructions and have interior details visible through transparent windows and the open door.

Both HOn30 and On30 versions were built (NGDU #56-58), with the HOn30 models destined for an interpretive centre for the Tramway's cosmetically restored Krauss locomotive. While I had earlier built an O scale QR camp wagon that was properly weighted with bogie clearance for operation in a train, I made no effort to do so with these carriages as they were intended for display only.

For the future

Computer 3D modelling tools are becoming much less expensive and easier to use. Some use conventional mechanical drawings to create a 3D object, while others assemble geometric shapes into a 3D object.

In either case they use texture images to cover the object for the photorealistic view(s) and some have the facility to unfold the object for 2D printing on card. I do like a modelling tool's ability to show what the model will look like but not enough to switch from my more conventional Photoshop use.

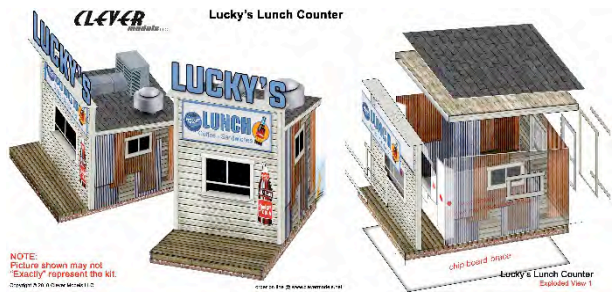
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Of course, some of the same tools can create files for printing on a 3D printer. Unless you want a solid object you'll need to carefully define wall thicknesses, etc., first but the result will be a model that can be finished for direct use (painted and weathered) or as a master for epoxy or resin casting.

www.textures.com

The following photorealistic card model kits – most available only in O scale but easily rescaled in printing for other popular scales – are available for free download.

zelmeroz.com/album_model/cardmodels/cardmodel_index.html



Current good quality commercial photorealistic card models are prepared using 3D modelling tools which can show the model from different directions, explode to show construction details and unfold to create the 2D printed page for modelling.

The Clever Models LLC Lunch Counter kit, comprising 12 A4 pages in O scale, was recently available as a free promotional download.

The learning curve to become an effective 3D modeller is fairly steep but it is a direct outgrowth of my current computer work. As an O scale modeller, I would need to select a printer that has a fairly large build area, and I would have to refurbish my painting and weathering skills. However, I could still use my existing photorealistic card skills for building interiors, etc. Something for the future perhaps ...

QR 32' timber camp wagon, QR cream shed, QR fettler's shed, QR small halt (station), and QR small communications shed.

Queensland-style cottage, garden shed, brick toilet block, and timber picnic tables.

Moreton Mill's River Store lunch room with dryer shed and sand dryer, Queensland-style Country Hotel, Saw Tooth Roof Industrial Building and 20' shipping container.

Buderim Shire Tramway carriages: Coach and Guards' Van.

Many of the photos from the research and development of these models are available from the CaneSIG and *Modelling the Railways of Queensland Convention* web sites.



zelmeroz.com/canesig

References & Acknowledgements

Clever Models LLC

www.clevermodels.net

Textures (formerly CGTextures.com)
(free textures for non-commercial use)



QldRailHeritage.com/mrqc
(www.zelmeroz.com/mrqc after mid-2019)

