An Introduction to Modelling Queensland's Sugar Cane Railways

Invicta Sugar Mill's *Scott* (B-B DH, rebuilt 1995) brings back the last cane from the Dalbeg area for the 1999 season. The locomotive was converted from 1435mm gauge in 1995 when rebuilt from ex-State Rail Authority of New South Wales 7310 of 1971. Carl Millington, photographer.

Introduction

Sugar cane is a tropical grass with a fibrous stalk that requires sunny frost-free weather, fertile well-drained soils and either lots of rain or very good irrigation. A clump of about 12 stalks grows from a cut length of mature cane which has been planted in well-spaced furrows to allow for mechanical cultivation. Cane grows for 12 to 16 months before being harvested in the second half of the year, with a second or 'ratoon' crop sometimes being grown from the same planting.

Harvesting is controlled by the mill, both to ensure a smooth delivery of cane for crushing and to share harvesting risks (weather, prices, etc.) across the whole cane district. Most Queensland mills developed mill-owned narrow gauge (610mm) tramlines during the late 19th and early 20th centuries but road development changed transport economics and the current mix of rail and truck haulage varies from mill to mill.

Mill tramlines (and road transport trucks to a lesser extent) double as a cane storage system, the cane in transit ensuring a continuous crush. Cane cut during the day is loaded into tractor- or truck-hauled bins or infield transporters for hauling to the mill, weighing, tipping and crushing.

A tractor-hauled infield transporter being filled by an Austoft cane harvester. This type of transporter elevates and tips to fill cane bins on the nearby cane tramway. Other infield options include one or more cane bins on a tractor-hauled trailer or semi-trailer truck. Greg Stephenson, photographer.

Historical Timeline (Queensland)

1888: First government sponsored cooperative mills begin operation. Subsequently mill ownership essentially divides into 'central' (cooperative) and CSR (Colonial Sugar Refining Company) mills with government control of many aspects of the industry.

1952: 170 steam, some petrol, and 7 diesel locomotives in sugar mill use; mill tramways continue to operate much the same as for the previous 50-60 years since steam began replacing horse- and man-powered lines.

1955: First Australian-built diesel locomotive (Bundaberg licensed Jenbach) is built for the sugar industry. Other firms follow suit and rapid dieselisation occurs.

1960s: Mechanised harvesting and cut cane billets change the industry, leading to an increase in size of cane bins from 3-4 tons to 6 tons for some mills

1970: 50% of cane carried in bulk bins, 50% wholestick.

1970s: Radio-controlled remote brakevans begin to supplement locomotive brakes and the first bogie cane locos appear.

1975: Industry primarily converted from wholestick cane carried on open wagons to chopped cane in bulk bins.

1980: Sugar industry essentially 100% dieselised.

1990s: Mills use larger locomotives, often ex-mainline rebuilt and regauged, and upgrade longer lines for higher speed traffic (track standards often exceeding Queensland Rail mainline practice). Bins still primarily four wheel 4-6 ton unbraked but some bogie and 10-20 ton. World sugar prices very volatile.

The Steam Era

'Horse lines' and portable track to move wholestick cane from the field to the more permanent way were common in the first half of the 20th century. Speeds were slow, seldom as much as 20 kph, and derailments were common on track that ran along shire roads or through farmer's fields, often without proper drainage or ballast.

CSR-type wholestick cane truck in Fiji mid-2007, although no longer used in Australia since the 1970s. On30 and SM32 kits are available and HOn30 models are easily scratchbuilt. Lynn Zelmer, photographer.

Cane was still being cut by hand and hauled in wholestick form, and steam locomotives were still being built for the Australian sugar industry (Bundaberg Fowlers, 1952-3), as dieselisation began in earnest. Full dieselisation took only a quarter century as the change to mechanised harvesting brought in chopped cane billets, cane bins and a need for quicker delivery to the mill.

Bundaberg-built Fowler 0-6-0T *#5* pulling a rake of chopped cane bins out of Seaview, Qunaba Mill, c 1977. The Bundaberg Fowler locomotives have been preserved and On30 kits are available. Ross Driver, photographer.

Internal Combustion and the First Diesels

The first internal combustion locomotives were small and used for shifting rakes of cane at the mill, etc. For example, at least 37 Simplex 4w PM (petrol mechanical), mostly 4 ton locos, were used in Australian mills from 1920. Many were later converted to diesel as were at least 20 Malcolm Moore 4w PM locos that came to the mills after WWII.

Proserpine Mill's *#1* (Clyde 0-6-0 DH of 1954) in navvy service, 1997. Clyde loco models are available in several gauges and scales. Rob Nesbitt, photographer.

While the first diesel locomotive was introduced to the canefields in 1935, it wasn't until 1954 when Clyde Engineering built its 18 ton 0-6-0 DH (diesel hydraulic) loco, 54 of which went to Australian mills, that dieselisation commenced.

Locomotives in the Modern Era

Bogie locomotives provided the next major development and allowed heavier loads to be hauled at higher speeds, provided the track and other infrastructure was also upgraded. While initially the bogie locos weren't much heavier than the fixed frame units they replaced, later locos were much heavier and more powerful, with the most recent purchases being rebuilt and regauged ex-mainline DH locomotives (photo pg 1).

Millaquin Mill's EM Baldwin B-B DH *Barolin* (6456.1 of 1975) in 2002. Note the elevated light array to shine over the top of the cane bins. Bogie models in HOn30 or On30 are usually scratchbuilt. Lynn Zelmer, photographer.

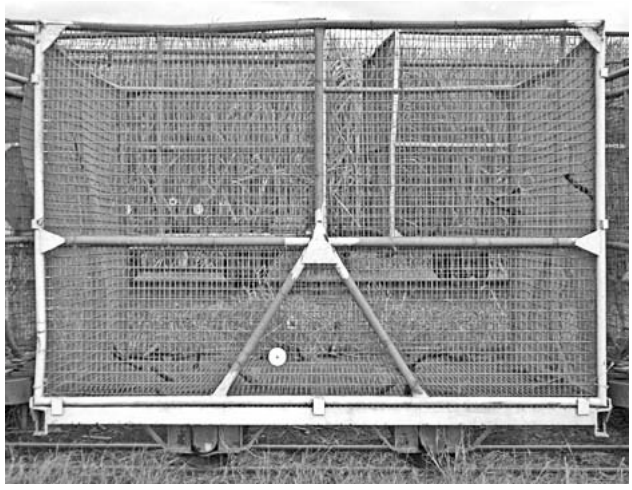
Modern cane loco fleets are computer controlled with air conditioned cabs, GPS transponders and even remote driving facilities to permit single driver operation. Many, like Invicta's *Scott* (title photo pg 1), have been rebuilt and regauged from ex-mainline DH locomotives.

Transporting the Cane

Cane railways move cane from the field to a nearby mill. In the earliest years wholestick cane was loaded on open wagons, the most common being a small four wheeled flat wagon with corner posts and a wire/chain and winch to hold the load in place.

Most Queensland cane today is carried in wire mesh bins of 4-6 ton capacity, still on a four wheel chassis. However, some mills use larger capacity bins and a few even have large capacity bogie bins.

Bin sizes are constrained by tipping facilities at the mill. A single bin tipper, for example, is slow and restrictive; one that handles three 4 ton bins will also usually accept two 6 ton bins. Extending the capacity of existing bins also leads to fleet variety.



Older 3-4 ton bin. Almost every mill has a different bin style; kits have been available for some bins but currently only O scale (1:48 and 7mm). Lynn Zelmer, photographer.

Mackay Sugar 0-6-0 DH #54 Oakenden (ComEng FB3169 of 1963) with older style (lower half solid) and newer style 5-6 ton bins, 2005. Jonathan Bayliss, photographer.

New (2006) Isis Mill extended capacity bin (ends bend out, width remains the same, side extension panels are galvanised iron) unloading from a tractor-hauled trailer. The trailer has a hinged rear 'gate' which drops down to guide the bin onto the rails. Lynn Zelmer, photographer.

Marion Mill 14 ton bogie bin, 2005—it resembles three 4-6 ton bins on one frame. Jonathan Bayliss, photographer.

Other Rollingstock and Infrastructure

Much of the cane railway rollingstock for navvy transport, weed control, track maintenance, etc. is built in mill workshops.

Mulgrave Mill bogie brake van. Since cane bins are unbraked some mills use a mid-train or end-of-train brake van, essentially a compressor, radio controls and a heavy braked frame. Greg Stephenson, photographer.

Marian Mill navvy equipment, 1986. The far wagon is likely built on an old cane bin frame, the centre metal cabinet on an old wholestick truck. Greg Stephenson, photographer.

Locomotives, rollingstock and track require maintenance facilities, both near the mill and at overnight out-depots. Basic requirements include water, fuel, sand, a secure lock-up and a place for crews to eat. Bins also need loading and maintenance facilities, as well as weigh scales, tippers, etc.

Herbert River Mills' (Victoria and Macknade) side dumping bulk sugar wagons, 2005. Brian McWilliam, photographer.

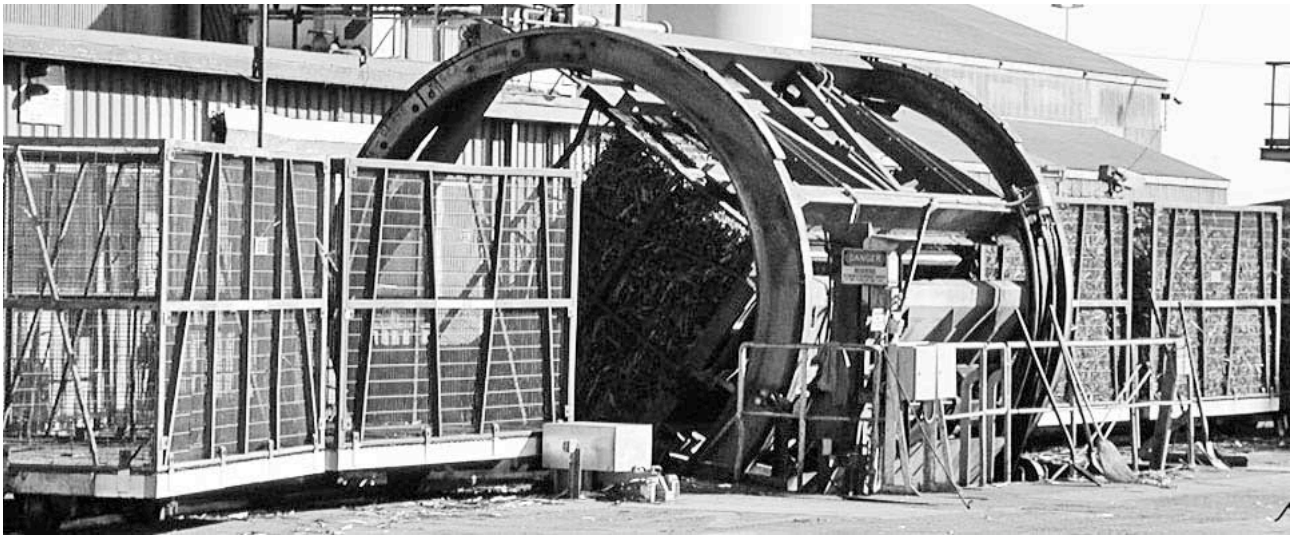
The front compartment of the two compartment tractor-hauled infield transporter (right) has already been emptied and is descending back into place. The rear compartment is still being elevated and will tip far enough to completely empty. Lynn Zelmer, photographer.

Bingera Mill's *Sharon* (ComEng 0-6-0 DH of 1959) at the Wallaville out-depot, located on the ex-QR formation, 2003. The ex-QR station, sand dryer, diesel bowser and storage tank (far side of building) and nearby fenced loco compound makes up the out-depot. Empty bins are despatched from here to the several out-lying branches and full rakes of cane are assembled for heavier locos to transfer over a grade to the mill. Lynn Zelmer, photographer.

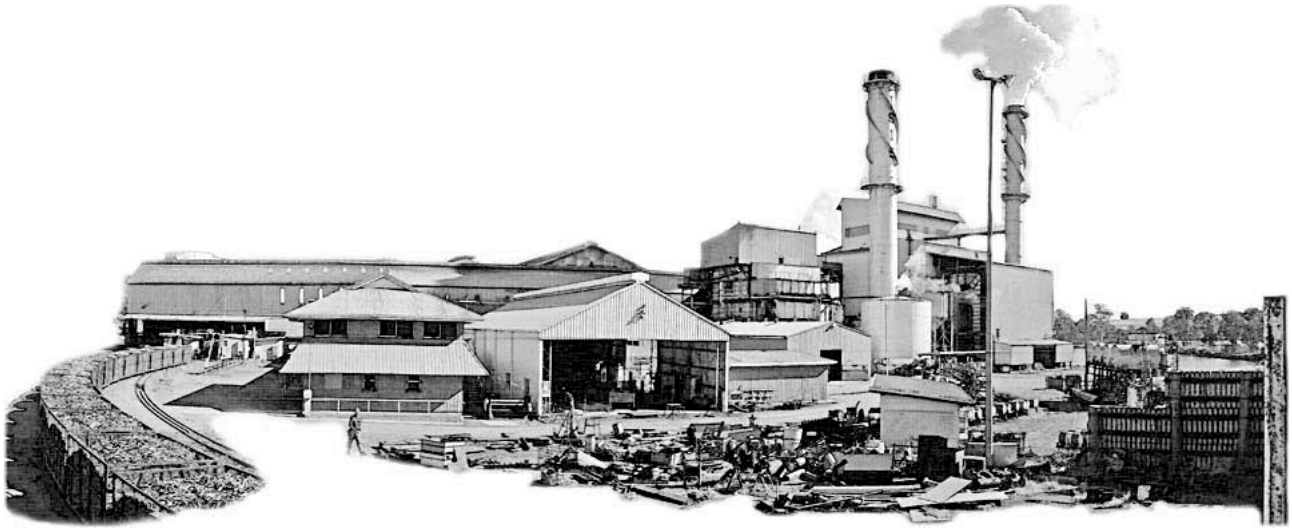
Modelling

Cane railway modellers form a very small part of the worldwide modelling fraternity, but it's still (just) possible in the twenty-first century to find the whole range of prototype operations from the use of wholestick trucks (eg Fiji) and steam locomotives (eg Indonesia) to the most modern (eg Queensland).

Worldwide some sugar cane is hauled on standard gauge railways but in Queensland, as well as most parts of Asia, cane railways are usually narrow gauge (2' or 610mm in Queensland). As a result, cane railway modellers are generally also narrow gauge modellers.



Bins move automatically through Fairymead Mill's bin tipper in 2002, prior to closure. Lynn Zelmer, photographer.



Isis Mill composite panorama, full bins cross the weighbridge, then enter tipping, at left. Lynn Zelmer, photographer.

Hart of the South coconut palms with French modeller Fabrice Fayolle's On30 models: *Backwoods Miniature* superstructure on a *Bachmann* gas mechanical mechanism and a *RJ Models* Moreton Mill cane bin. *DCC Concepts* also supply high quality palm trees. Fabrice Fayolle, photographer.

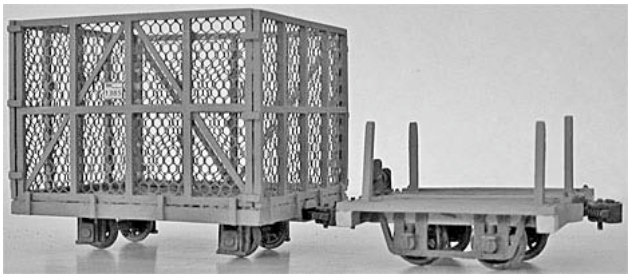
Cane railway modellers worldwide work in almost every scale and gauge combination, but HOn30/OO9 (3.5mm/4mm scale) using 'N' scale mechanisms and track components, and On30/On16.5 (1/4"/7mm scale) using HO mechanisms and track components are currently the most popular. While these scale/gauge combinations simplify the kit-bashing and scratchbuilding required for such a niche modelling area, some do model a more prototypically correct gauge.

At the time of writing there are no readily available bin or wholestick models, kit or ready-to-run (RTR), in HOn30/OO9 but both are available as O scale kits and wholestick truck kits are also available in SM32.

However, prototypically correct or readily modifyable locomotives, steam and diesel, kits or RTR, are available for most scales. HOn30/OO9 bulk sugar bins are commercially available and appropriate building materials and scenery items are available in all scales.

From the modeller's perspective, the most difficult tasks will likely be modelling the sugar mill itself, as

most are major industrial plants occupying several hundred acres with specialised buildings, and the accompanying cane fields. For many modellers, these challenges are overcome by focussing on rail operations while depicting both cane fields and mill on the backdrop.



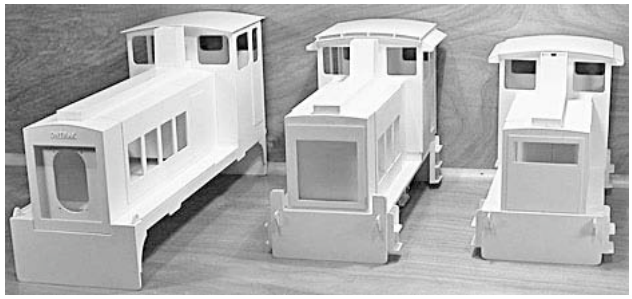
RJ Models On30 pewter kits of Moreton Mill 4 ton bin and wholestick truck. Lynn Zelmer, photographer.

Comeng Model A inspired On30 4w DM locomotive, scratchbuilt styrene superstructure on a *Boulder Valley* resin chassis, power unit from a HO Bachmann 44 ton diesel and working *Circuitron* flashing light. Lynn Zelmer, model builder and photographer.

Carl Millington's HOn30 Isis Mill bogie loco #11 and its brakevan. Lynn Zelmer, photographer.

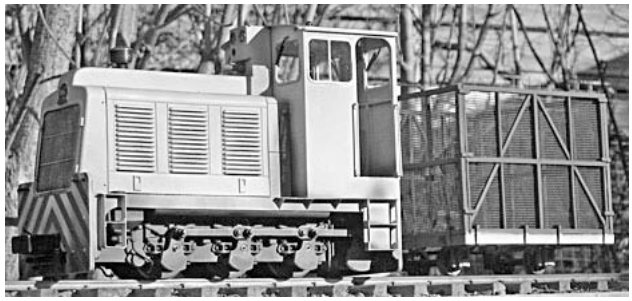
This brief introduction to Queensland's sugar cane railways has only hinted at their modelling potential. The diversity of the mill systems is what makes them of greatest interest to modellers since, for example, modifications due to accidents and maintenance result in an individual appearance for every locomotive.

Modern cane railways utilise the most modern track maintenance facilities; here is Carl Millington's scratchbuilt HOn30 Plasser tamper. Lynn Zelmer, photographer.



Styrene mock-ups of 7/8th scale 8, 6 and 4 ton Walkers B-B diesels to help decide which to build for a garden layout. Plans from the CaneSIG site, details from a recently published EM Baldwin book. Jim Russell, Columbus, Ohio, model builder and photographer.

Partially completed *Badger Bits'* recently released On30 etched brass kit for Moreton Mill's Bli-Bli 6w DM loco. Rob Nesbitt, model builder and photographer.



SM32 (16mm scale) Clyde 6w DH and Moreton Mill cane bin from *Tootle Engineering*. Tim Boulton, photographer.

A fully operating sugar cane system might require several hundred bins or wholestick trucks but a reasonable representation is possible with a smaller

number. Scratchbuilding need not be intimidating, especially with styrene, giving you a unique collection of models and improved skills. Resin casting or special order brass etching could even result in long rakes of wholestick trucks or bins.

John Henshaw's HOn30 500mm x 500mm micro-layout 'Tooleybuc Sugar Tramways' still under construction but with the mill buildings fairly well developed. John Henshaw, photographer.

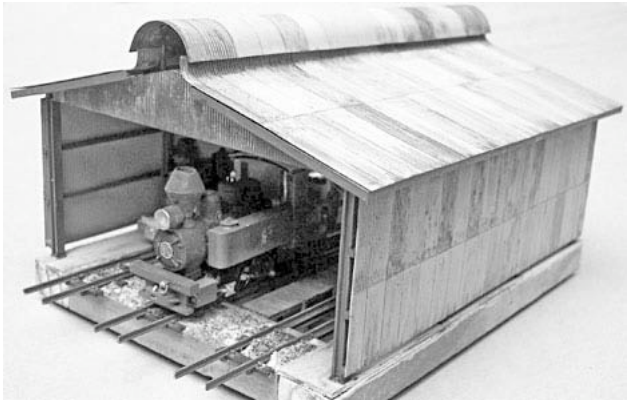
Bundy Fowler, *RJ Models* kit professionally assembled and painted by *The Model Works Australia*. Fowler locos can be seen at the Australian Sugar Cane Railway (Bundaberg) and ANGRMS' Durundur Railway (Woodford, QLD). Lynn Zelmer, photographer.

Acknowledgements and References

Cane railway modellers are a small but thriving part of the model railway fraternity; many thanks for their continued support.

John Browning's lists for the Light Railway Research Society are the best references for identifying diesels in the Queensland canefields. Their web site has a number of articles on Queensland and Fijian sugar cane railway motive power and history; the historical timeline is from McKillop, Robert F and Browning, John (2000). *Sugar Cane Transport*, LRRSA: www.lrrsa.org.au/LRR_SGRb.htm, downloaded 19/05/07.

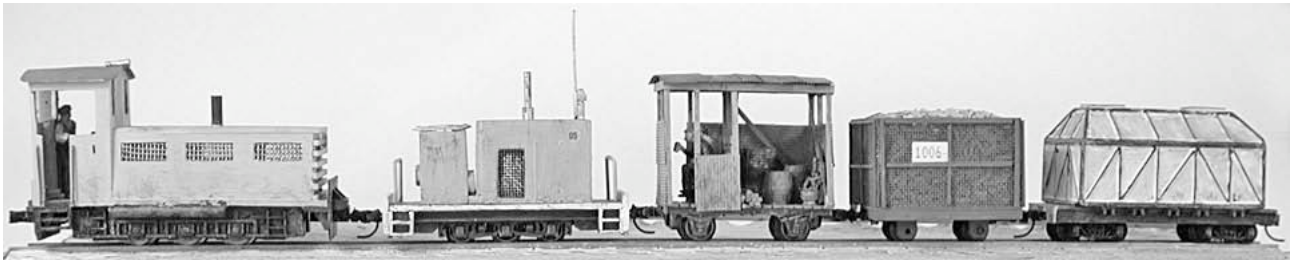
CaneSIG is a NMRA-affiliated special interest group for modellers of sugar cane railways (tramlines). Begun in the early 1990s, its 100 plus photographer and railfan contributors have provided 5000+ photographs and drawings, 'how to' tutorials, card models and other online resources for novice and experienced modellers.



HOn30 Wallaville loco shed as built by Jim Hutchinson. Note the use of corrugated iron sheeting and the typical steam-era roof vent. Prototype photos, plans and model construction details are on the CaneSIG web site. Jim Hutchinson, photographer.

Don Fraser combines sugar cane modelled with Yarra grass at the seeding stage, and painted to match background photographs, photos and painted clouds to create cane fields for his layout. Don Fraser, photographer.

Lincoln Driver's Wallaville smoothly running HOn30 display layout at the Brisbane Miniature Train Show, 2005. The Wallaville yard has numerous cross-overs to allow for the efficient marshalling of long (100 bin) trains with mid-train slave locomotives that assist on the adverse grades heading to the Bingera Sugar Mill 30km away. Two smaller locomotives are based at Wallaville during the crushing season to service the surrounding cane areas and are maintained here. The display layout is 6.4m x 1.5m with a hidden marshalling yard behind the backdrop. The earlier mill, which closed in 1974, and loco shed were located about .5 km behind the photographer. Lynn Zelmer, photographer.



HOn30 models: scratchbuilt Jenbach 6w DM on a *Bachmann* 'N' scale mechanism, scratchbuilt brakevan on a 'N' scale 6w passenger bogie, scratchbuilt navvy wagon on a 4w *Peco* chassis kit, *Bob Dow* RTR cane bin, and commercial bulk sugar box on a scratchbuilt flat wagon with 'N' scale bogies. Lynn Zelmer, model builder and photographer.

They don't all rust away: Inaugural run of restored *Invicta* (John Fowler 0-6-2T of 1907) at the Australian Sugar Cane Railway, 'A Working Museum' in Bundaberg's Botanic Gardens, 2007. Lynn Zelmer, photographer.

Cane Railways Around the World

This clinic focussed on Queensland's sugar cane railways, however many countries used rail to haul their cane to the mill and several still have sugar cane operations. Although steam is hard to find, diesel-hauled operations can still be found in India, Fiji, the Philippines and Indonesia. CaneSIG and other on-line resources can provide details.

Signs such as this are common on the major roads in sugar cane growing areas. Slow moving vehicles include mechanised cane harvesters, tractors hauling trailers loaded with one or more cane bins, and in-field transporters.

The bins and in-field transporters will be moving between a field being cut and a 'haul-out' siding on a nearby cane railway system or a loading point for a road transport truck. You can also get caught behind a slow-moving mechanical harvester switching fields or being taken away for maintenance.

An Introduction to Modelling Queensland's Sugar Cane Railways

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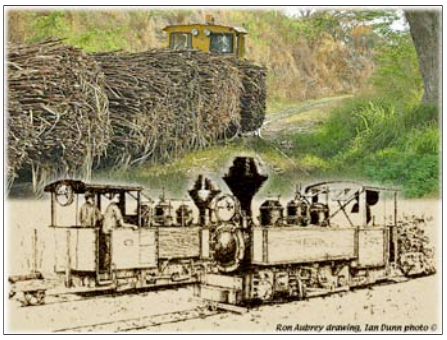
NMRA Australasian Region, Brisbane, September 2008

This presentation focuses on Queensland's sugar cane railways in the diesel era. Many countries used rail to haul their cane to the mill and several still have sugar cane operations. Although steam is hard to find outside of museums and heritage operations, diesel-hauled operations can still be found in India, Fiji, the Philippines and Indonesia. CaneSIG and other on-line resources can provide details.

This is an introduction to the cane railways and complements the NMRA Australasian Region 2008 Convention notes of the same title.

Details of locomotive manufacture, specific photo locations, etc., have been ignored. Interested modellers are directed to the 5000 plus images and other information on the CaneSIG web site or their local library.



The Convention notes include a timeline and general history of the sugar industry in Australia. However, this presentation mostly ignores steam power and wholestick trucks. Both were features of Australian cane railway (tramway) systems for the first half of the 20th century and well into the second half.

Wholestick trucks were replaced by cane bins when mechanised harvesting became common and steam disappeared as small diesel hydraulic locomotives were developed expressly for the sugar industry in the 1950s and 1960s.

Interestingly, Fiji has abandoned all use of chopped cane bins, reverting to the use of wholestick trucks as in the top photo. Some cane is harvested mechanically in Fiji, but the resulting cane billets are now delivered to the mills by truck.

Cane was still being cut by hand and hauled in wholestick form, and steam locomotives were still being built for the Australian sugar industry (Bundaberg Fowlers, 1952-3), as dieselisation began in earnest. Full dieselisation took only a quarter century as the change to mechanised harvesting brought in chopped cane billets, cane bins and a need for quicker delivery to the mill.

Cane railways provide lots of opportunity for the steam-era modellers, with both wholestick, small cane bin and larger bin operations. While small by mainline standards, locomotives were often colourful and invariably were hung about with the kind of detail modellers love.

Cuba, like Indonesia and the Philippines, still ran steam-hauled sugar cane operations until fairly recently, even if only for railfan tours.

Cuban cane mills typically used North American locomotive suppliers and railway practices. Plantation railway systems in many other countries tended to follow United Kingdom or European practice.

While historically some of Queensland's shire-owned tramways hauled some cane, the cane tramways, now generally called railways, are mill owned and operated.

Most Queensland mills developed mill-owned narrow gauge (610mm) tramlines during the late 19th and early 20th centuries but road development changed transport economics and the current mix of rail and truck haulage varies from mill to mill.

Rail lines often run on easements through cane farmer's fields or along shire roads, unlike mainline railways which have a dedicated right-of-way (formation).

Sugar cane is a tropical grass with a fibrous stalk that requires sunny frost-free weather, fertile well-drained soils and either lots of rain or very good irrigation. A clump of about 12 stalks grows from a cut length of mature cane which has been planted in well-spaced furrows to allow for mechanical cultivation. Cane grows for 12 to 16 months before being harvested in the second half of the year, with a second or 'ratoon' crop sometimes being grown from the same planting.

Bingera area, May 2007

While some of the cane growing areas depend upon rainwater, many use irrigation systems… typically either aerial spray or gravity-fed flooding between the rows. Pumps provide the pressure for either and are just one of several components (pipes, valves, meters, pump houses,sprayers, hose, trailers, etc.) for an irrigation system.

Harvesting is controlled by the mill, both to ensure a smooth delivery of cane for crushing and to share harvesting risks (weather, prices, etc.) across the whole cane district.

Queensland led the development of mechanical cane harvesters… originally mostly tractor-mounted implements and later self-propelled wheeled or tracked machines to top and cut the cane, chop it into billets, separate it from much of the associated trash (leaves, etc.), and load the accompanying in-field transporters.

This small yard and haul-out loading points near Bucasia, north of Mackay shows typical late-1990s trackwork standard and the general locale.

The track centre-right is the empty bin loading ramp, with the full bin unloading ramp at the opposite, higher, end of the loop… letting gravity supply much of the power for loading/unloading. Speeds on the main/through line (left) might reach 20 km/hr.

Another nearby siding and loading ramps is located on boggy land. It requires a light locomotive and slow order operation (max 2-5 km/hr).

Here the driver prepares to load two bins onto a tractor-hauled trailer for in-field loading.

While gravity helps roll the bins into place, the driver may need to hook a short electric winch cable (powered from the tractor) to the lead bin for pulling the bins up onto the trailer itself.

Because of the investment required for harvesters and in-field transporters, most harvesting is done by contractors. Even with a contractor, however, the cane grower will usually provide some equipment and/or labour.

The business end of an empty bin loading ramp. The tractor-hauled trailer with one or two bins will straddle the track and drive towards us down the slope, then back up so that a 'pan' on the back of the trailer lifts and holds the hinged rail section in place for loading.

Mill tramlines (and road transport trucks to a lesser extent) double as a cane storage system, the cane in transit ensuring a continuous crush. Cane cut during the day is loaded into tractor- or truck-hauled bins or infield transporters for hauling to the mill, weighing, tipping and crushing.

Here a mechanical harvester has just finished cutting a load into an in-field transporter. The transporter will haul the cane to the nearby haul-out siding and dump into the waiting bins.

The in-field transporter from the last slide dumping into the waiting bins. As the transporter bin tips the cane falls onto a moving belt which ejects it at right angles to the transporter.

Yet another in-field transporter system. The tractor-hauled trailer has twin bins which each hold one bin's worth of cane.

Millaquin Mill

A truck-based transporter dumping into a portable elevator/loader.

Transporters such as these can only operate on firm, dry ground, otherwise they become bogged or excessively compact the field where they work… and this vehicle may have been loaded off-field for a long distance haul to the rail transfer point.

Road transport can be used to retrieve cane from isolated sections of the growing area. This transport truck is headed towards Millaquin Mill, Bundaberg, 2007.

Ferries on this river have moved cane in either direction, depending upon the needs of the season and breakdowns at one or another of Bundaberg Sugar's mills.

The truck in the last slide is headed towards this modern yard at Strathdees, Millaquin Mill, Bundaberg 2007. Empty bins are collected from here and full bins unloaded for assembling into long rakes for a short run to the mill on new, high standard track.

Unloading at Strathdees, Millaquin Mill, Bundaberg 2007.

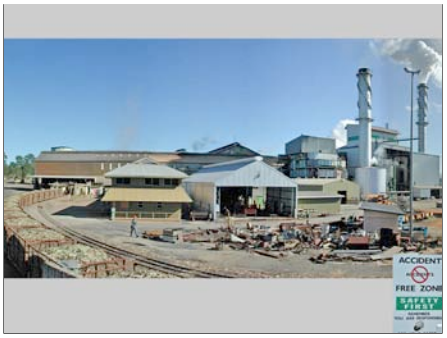
Strathdees, Millaquin Mill, Bundaberg 2007.
Automatic bin mover

Once gravity has delivered the bins down the ramp, the automatic system aids coupling and moves them into place for pick-up by a mill locomotive. Rubber tires provide the momentum for the system. Other mill automation systems typically use some form of axle pusher in a trench between the rails.

Bin sizes are constrained by tipping facilities at the mill. A single bin tipper, for example, is slow and restrictive; one that handles three 4 ton bins will also usually accept two 6 ton bins.

Fairymead Mill (Bundaberg Sugar) is now closed but this was its bin tipper.

The type of coupling used by the mill determines whether the bins have to be uncoupled before tipping or simply rotated around the coupling.



A modern sugar mill is a large industrial complex with dozens of buildings and even more specialised facilities.

This photo of Isis Mill shows a rake of full bins being shunted through the weigh scale and into the tipper, with part of the maintenance facility in the foreground.

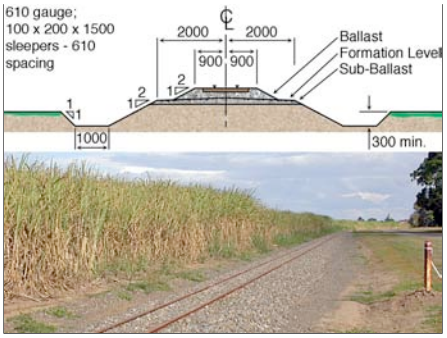
The loco shed and main full/empty yards are located elsewhere.

From a modelling perspective it would be much easier to put the mill on the backdrop as a photo or painting… and many modellers concentrate on locomotive facilities with the mill implied, rather than being built on the layout.

Millaquin Mill, Bundaberg, 31 August 2002.

Mills were somewhat smaller and simpler in earlier eras, with the earliest mills built of timber rather than metal. Mills in Fiji, Cuba, Indonesia, etc., have often not been upgraded in many years and provide working examples of mills in the 1950s or earlier.

A common sight in the cane areas, the line runs from one cane field to another as it crosses an unsurfaced local road and disappears between the rows of cane. At left, a growing crop, with a more mature stand to the right.



Modern track standards include drainage and a properly ballasted formation. Contrast this with the in-field trackage in the last photo.

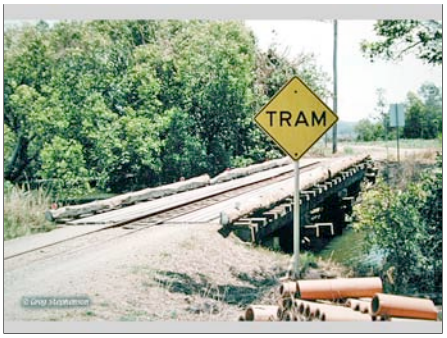
Precast drains and culverts make new construction easy c 2006.

Earlier eras would likely have had very small bridges, perhaps only a couple of logs supporting the track over a hollow, or a metal culvert.

This is an ex-government railway bridge, with the cane railway running on the now-closed standard gauge (3’ 6”) railway formation.

A narrow gauge does not imply lower standards, and modern bridges have to carry quite heavy loads for much faster moving trains than in the past.

This steel girder bridge appears to have been built on the abutments from an earlier bridge, likely wooden.



As mentioned earlier, cane railways often run in the road allowance of a shire road. They sometimes also share bridges, with the train likely having the right-of-way.

Cane was still being cut by hand and hauled in wholestick form, and steam locomotives (Bundaberg Fowlers, 1952-3) were still being built for the Australian sugar industry as dieselisation began in earnest. Full dieselisation took only a quarter century as the change to mechanised harvesting brought in chopped cane billets, cane bins and a need for quicker delivery to the mill.

By 1975 the Australian industry had essentially converted from wholestick cane carried in open wagons/trucks to chopped cane in bins.

While the first bins were built on old wholestick truck frames, and may have only carried 1.5-3 tons, newer bins were built on standardised (for each mill) wagons designed to carry larger loads.

And even larger loads… while the bin on the last screen likely carried 3.5-4 tons, these carried 6 tons with some of the earlier bins of the design receiving ‘hungry boards’ to increase the capacity.

Another version of the 6 ton bin. The metal side maintains the bin’s shape under rough handling and makes dumping somewhat easier.

While most mills use a 4 wheel bin, even in the larger (longer) sizes, this Victoria Mill bogie bin is roughly twice the size of a 6 ton bin.

1996, Greg Stephenson, photographer.

Isis Mill's extended bins provide extra capacity but would have difficulties on very sharp curves. The top bin, with it's galvanised panels and tipped ends, was obviously experimental; the lower bin was built from the start in an extended form and has a different pattern of uprights.

Cane isn't the only thing that the 2' gauge railways carry. Here side dumping sugar boxes are being hauled to the port for shipping to the refinery by sea.

The mill at Lautoka, in Fiji, on the other hand, is located close enough to the wharf that it uses a conveyor belt system to transfer raw cane to the ship for loading.

Some of Victoria Mill's molasses wagons, likely about 1970. Note the open-deck steel underframes, the variation in tank diameter, and the mix of riveted and welded tank construction.

The John Browning Collection (available from the CaneSIG or QldRailheritage.com web sites) contains over 200 images from the late steam era in Queensland, and has some coverage of almost every mill of the era.

Ethanol and molasses are often shipped by truck, especially where the bulk of the molasses are sold to local cattle producers. Over the years a variety of tankers have hauled molasses (and cane 'juice') but these extended tankers are part of a fleet that operates over QR's standard gauge (ie 3' 6") tracks.

Ethanol on QR, Sarina, 2005

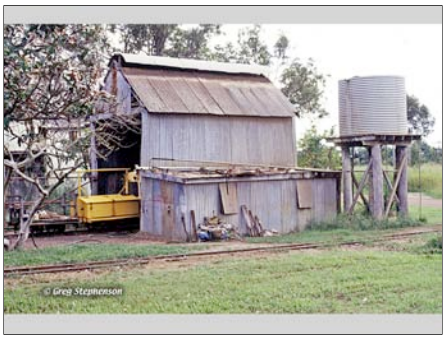
Much of the cane railway rollingstock for navvy transport, weed control, track maintenance, etc. is built in mill workshops.

Marian Mill navvy equipment, 1986. The far wagon is likely built on an old cane bin frame, the centre metal cabinet on an old wholestick truck. The lead unit is used for crew transport. It is unlikely to be motorised, but would certainly work well as a small motorised model. Greg Stephenson, photographer.

Locomotives, rollingstock and track require maintenance facilities, both near the mill and at overnight out-depots. Basic requirements include water, fuel, sand, a secure lock-up and a place for crews to eat. Bins also need loading and maintenance facilities, as well as weigh scales, tippers, etc.

This loco shed has survived since the steam era, as evidenced by the roof vents. Large diesel storage tanks would be located nearby, and would require proper spill protection, etc., in the modern era.

Millaquin Mill, January 1995.



This out-depot has been photographed well after the end of steam but is still in use. Located at some distance from the mill, it provides overnight servicing and stabling for locomotives working the branch.

With the addition of appropriate fuel and sand facilities it would make an ideal model loco depot for any era, steam or diesel.

Septimus, Qld (Mackay Sugar), 8 Sept 1994

A late twentieth century out-depot… with fuel facilities in the back it blends discretely into the rural landscape.

As a model the large doors would require extensive interior detailing, perhaps including an inspection pit, tool benches, lockers, etc.

Incidentally, thus site has been cleaned up significantly in the previous decade as photos taken in the mid-1990s will illustrate.

Silkwood (South Johnstone), September 2005.

Bingera Mill's *Sharon* (ComEng 0-6-0 DH of 1959) at the Wallaville out-depot, located on the ex-QR formation, 2003. The ex-QR station, sand dryer, diesel bowser and storage tank (to the right of the building) and nearby fenced loco compound (to left) makes up the out-depot.

Empty bins are despatched from here to the several out-lying branches and full rakes of cane are assembled for heavier locos to transfer over a grade to the mill.

The fuel dump, bowser and office for the Wallaville out-depot, 2002.

The old mill, now closed, was located roughly .5 km away on what was the old cane railway formation., now replaced by the ex-QR formation.

The first internal combustion locomotives were small and used for shifting rakes of cane at the mill, etc. For example, at least 37 Simplex 4w PM (petrol mechanical), mostly 4 ton locos, were used in Australian mills from 1920. Many were later converted to diesel as were at least 20 Malcolm Moore 4w PM locos that came to the mills after WWII.

Farleigh Mill, Calen Depot; 12 Sep 1996. [4w DH EM Baldwin, navvy loco, built 1963 or 1964], Greg Stephenson, photographer.

While the first diesel locomotive was introduced to the canefields in 1935, it wasn't until 1954 when Clyde Engineering built its 18 ton 0-6-0 DH (diesel hydraulic) loco, 54 of which went to Australian mills, that dieselisation commenced.

This is a Clyde-built loco on the South Johnstone Mill near Silkwood. Rob Nesbitt photographer.

Tully #12 is a Com-Eng-built 0-6-0 DH of 1961, and is the rough equivalent of the Clyde in the last slide. The building in the background is the Tully Mill office. Rob Nesbitt photographer.

Bogie locomotives provided the next major development and allowed heavier loads to be hauled at higher speeds, provided the track and other infrastructure was also upgraded. While initially the bogie locos weren't much heavier than the fixed frame units they replaced, later locos were much heavier and more powerful, with the most recent purchases being rebuilt and regauged ex-mainline DH locomotives.

EM Baldwin 'Calavos', near Millaquin Mill, Bundaberg 2007. Note the high set headlights to show over a rake of cane bins.

Modern cane loco fleets are computer controlled with air conditioned cabs, GPS transponders and even remote driving facilities to permit single driver operation.

This distinctive appearing Eimco was one of the last locomotives built specifically for the sugar industry. It is now on the Mackay Sugar roster.

Since cane bins are unbraked some mills use a mid-train or end-of-train brake van, essentially a compressor, radio controls and a heavy braked frame. The locomotive has been rebuilt and regauged from a mainlineDH locomotive.

Mackay Sugar: rebuilt DH and bogie brake van, 2005, Jonathan Bayliss, photographer

Does restoration of 12” to the foot locomotives count as modelling?

This is ‘Invicta’ (Leeds Fowler 0-6-2T) at the Australian Sugar Cane Railway in Bundaberg on the first day of normal operation following restoration, 17 Nov 2007.

This is the locomotive’s original cab configuration and paint scheme. It later had a yellow paint scheme and a major restoration decision involved choosing the era of restoration.

Cane railway modellers worldwide work in almost every scale and gauge combination, but HOn30/OO9 (3.5mm/4mm scale) using ‘N’ scale mechanisms and track components, and On30/On16.5 (1/4”/7mm scale) using HO mechanisms and track components are currently the most popular.

While these scale/gauge combinations simplify the kit-bashing and scratchbuilding required for such a niche modelling area, some do model a more prototypically correct gauge.

This is likely SM32 (16mm scale or 1:19, with a 32mm track gauge), and is a model of one of the two lift bridges operated by Moreton Mill, Nambour.

Battery powered SM32 Clyde (ready-to-run) and wholestick truck (assembled from metal and wood kit) from Tootle Engineering.

A selection of mostly scratchbuilt O-16.5 locos and rollingstock built by Brisbane modellers using a variety of construction materials including brass, styrene and resin-molded components.

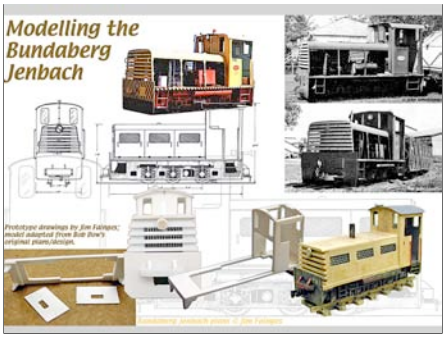
A Badger Bits 'Bli-Bli' (EM Baldwin, owned by Moreton Mill) On30 kit, partially completed by Rob Nesbitt, 2008. This model is primarily etched brass and uses a custom-built BullAnt chassis.

Comeng Model A inspired On30 4w DM locomotive, scratchbuilt styrene superstructure on a *Boulder Valley* resin chassis, power unit from a HO Bachmann 44 ton diesel and *Circuitron* flashing light. The white pole and sign on the rear of the loco is an end-of-rake marker.

Construction details are available in a CaneSIG Handbook article.

Top: Bundy Fowler, *RJ Models* kit professionally assembled and painted by *The Model Works Australia*. Fowler locos can be seen at the Australian Sugar Cane Railway (Bundaberg) and ANGRMS' Durundur Railway (Woodford, QLD).

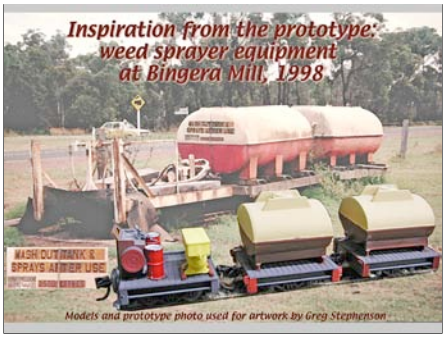
Bottom: A Bachmann 0-4-0, minimally modified with a new cab for tropical service plus a driver and some detail parts.



Scratchbuilt HOn30 Jenbach 6w DM on a *Bachmann* 'N' scale mechanism. The Jenbach, two of which were built, was the first diesel built in Australia specifically for the sugar industry.

The locomotive went through several alterations over the years, including cab and bonnet modifications or replacement. Both have been saved (Woodford and Mackay) and at least one is operational.

This model was inspired by Bob Dow's clinic presentations in the late 1990s; construction details are available in a CaneSIG Handbook article.



Greg Stephenson built these three navvy wagons for his HOn30 layout after photographing Bingera Mill's weed spraying equipment.

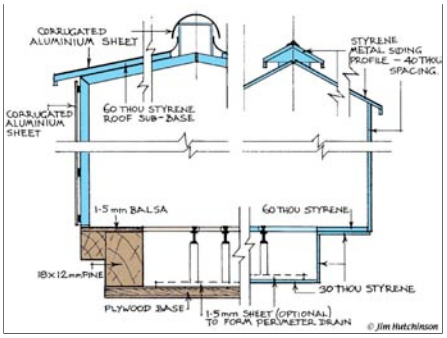
Greg used a commercial underframe and a tank from kit parts to build these 'inspired by' models, rather than trying to scratchbuild them absolutely to prototype.

We saw a Mackay Sugar bogie brake van in an earlier slide, but the cane mills had non-bogie brake vans as well. Some were constructed as brake vans by locomotive manufacturers, other were mill-built and might use an old locomotive frame or a mill-built wagon. Essentially a brake van is a heavy wagon (sometimes a concrete weight) with radio-controlled brakes and compressor/motor.

The HOn30 models use an 'N' scale bogie as their base, plus a variety of scratchbuilt and 'junk box' parts. One has a *Circuitron* flashing light buried in the superstructure.

Navvy wagons are often mill-built and some are quite unique. While older wagons are often timber and corrugated sheet, newer wagons likely use coated steel or aluminium sheet, perhaps even a domestic garden shed mounted on an ex-cane bin underframe.

These HOn30 wagons have been built on Peco 'N' scale chassis. The crew car uses styrene strip and scale corrugated sheet, the water wagon has a tank from a WWI era HO scale truck. While they lack a direct prototype, they're representative of the general style of mill-built equipment.



Jim Hutchinson is well known in Queensland for his HO buildings based on real prototypes. These cross-section diagrams indicate his general construction methods.

A series of CaneSIG Handbook articles provide full construction details and plans for several Queensland loco sheds.

From the modeller's perspective, the most difficult tasks will likely be modelling the sugar mill itself, as most are major industrial plants occupying several hundred acres with specialised buildings, and the accompanying cane fields.

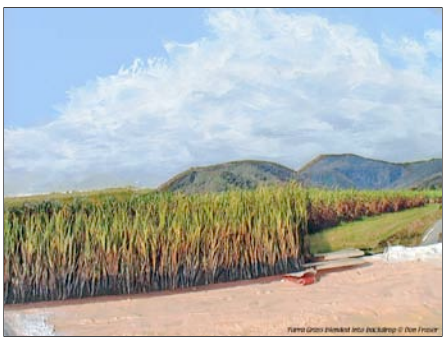
For many modellers, these challenges are overcome by focussing on rail operations, probably with an out-depot and/or loco shed and related facilities, while depicting both cane fields and mill on the backdrop.

However some are willing to take on the challenge of depicting the mill. This HOn30 model is the result of John's return to narrow gauge after a 15 year break. The base is surfboard foam, and will be covered with a thin screed of plaster.

This micro-layout is built to the unusual scale of 3mm to the foot, with 9mm track for true 3' gauge.

The layout is intriguing because of its irregular shape and the mill building construction.

Incidentally, straw is not a by-product of the cane crushing process, presumably the 'Gallery' copy writer is referring to the use of bigasse, which is the fibre left after crushing, as a fuel.



Don Fraser combines sugar cane modelled with Yarra grass collected at the seeding stage, stripped of seeds, and painted to match the background… photos with the sky removed in front of painted sky with clouds… to create cane fields for his layout.

Lincoln Driver's Wallaville HOn30 display layout at the Brisbane Miniature Train Show, 2005.

The Wallaville yard has numerous cross-overs to allow for the efficient marshalling of long (100 bin) trains with mid-train slave locomotives that assist on the adverse grades heading to the Bingera Sugar Mill 30km away.

Two smaller locomotives are based at Wallaville during the crushing season to service the surrounding cane areas and are maintained here. The earlier mill, which closed in 1974, and its loco shed were located about .5 km to the right of the out-depot (above) or behind the photographer (bottom).

The display layout is 6.4m x 1.5m with a hidden marshalling yard behind the backdrop.

The Australian, 28 April 2004, p 12

Finally, we should remember that politics and the sugar industry seem inseparable.

The sugar industry has been highly regulated and growers often had no choice in where they sent their cane, thus the cooperative mills.

The current average age of a cane grower is over 50; young people are either unwilling or financially unable to go into the industry.

Conversion of cane paddocks to housing is a major problem in places like Nambour, Mackay and Cairns.

Several mills have closed in the last decade… the contraction of cane growing areas, high labour costs, lack of adequate water, and the instability of sugar prices being some of the causes.

Mill closures since 1955:

- Gin Gin, 1974
- Qunaba, 1985
- Goondi, 1986
- North Eton, 1988
- Cattle Creek, 1990
- Hambledon, 1991
- Moreton, 2003
- Fairymead, 2004
- Mourilyan, 2006

Here, just after sunrise, loco crews discuss their morning runs a few months prior to closure of the Moreton Mill.

End of the run… end-of-rake markers can be a simple as a length of wholestick waving from the last truck or bin.

Alternatives include triangular or round markers on a pole, flashing lights, or even a GPS locator on the trailing brake van.

Happy modelling, and be sure to visit the CaneSIG web site for additional details. This NMRA-affiliated SIG also welcomes your contributions… model or prototype photos, modelling tips, etc.

Best wishes,

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