

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.

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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 navy service, 1997. Clyde loco models are available in several gauges and scales. Rob Nesbitt, photographer.

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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 HO_n30 or On30 are usually scratchbuilt. Lynn Zelmer, photographer.

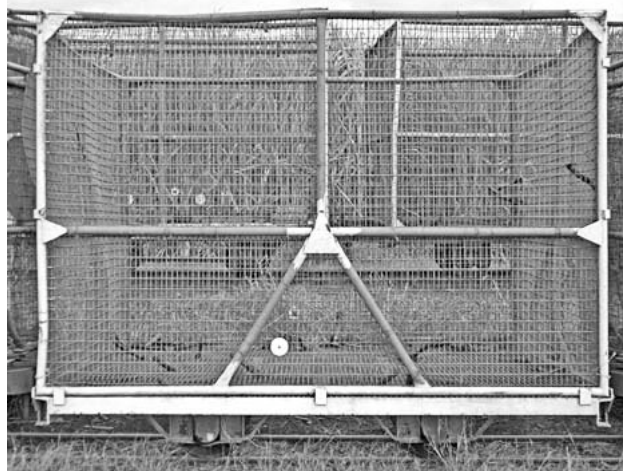
Modern cane loco fleets are computer controlled with air conditioned cabs, GPS transponders and even remote driving facilities to permit single driver operation. Many, like Invicta's *Scott* (title photo pg 1), have been rebuilt and regauged from ex-mainline DH locomotives.

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.

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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 navy 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.



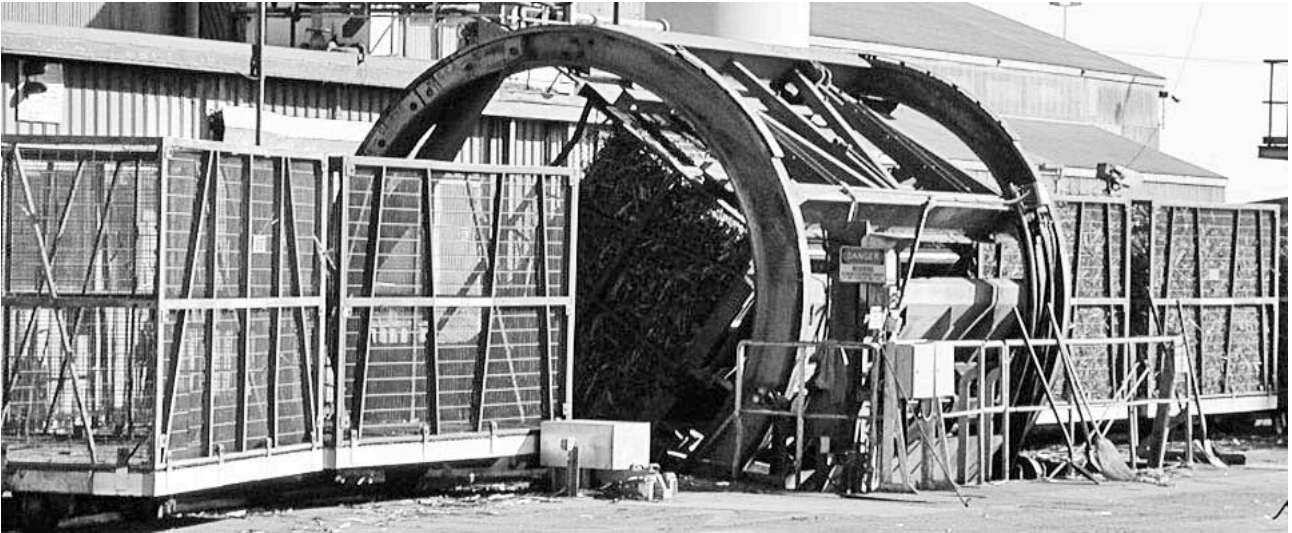
Bingera Mill's *Sharon* (ComEng 0-6-0 DH of 1959) at the Wallaville out-depot, located on the ex-QR formation, 2003. The ex-QR station, sand dryer, diesel bowser and storage tank (far side of building) and nearby fenced loco compound makes up the out-depot. Empty bins are despatched from here to the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

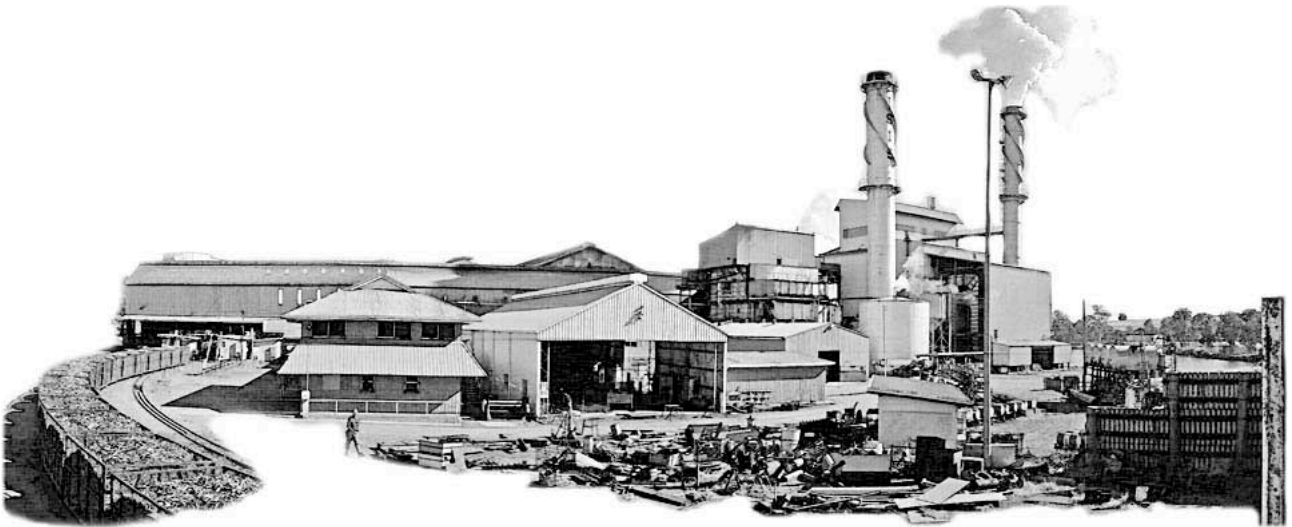
Cane railway modellers form a very small part of the worldwide modelling fraternity, but it's still (just) possible in the twenty-first century to find the whole range of prototype operations from the use of wholestick trucks (eg Fiji) and steam locomotives (eg Indonesia) to the most modern (eg Queensland).

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.

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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.

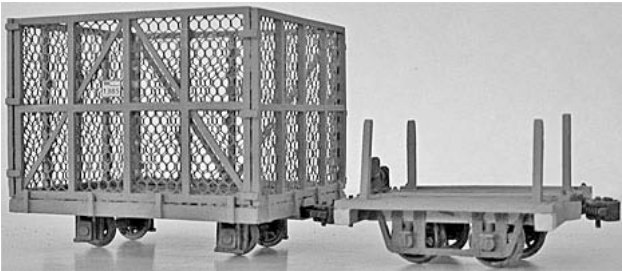
At the time of writing there are no readily available bin or wholestick models, kit or ready-to-run (RTR), in HOn30/OO9 but both are available as O scale kits and wholestick truck kits are also available in SM32.

However, prototypically correct or readily modifiable 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

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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.

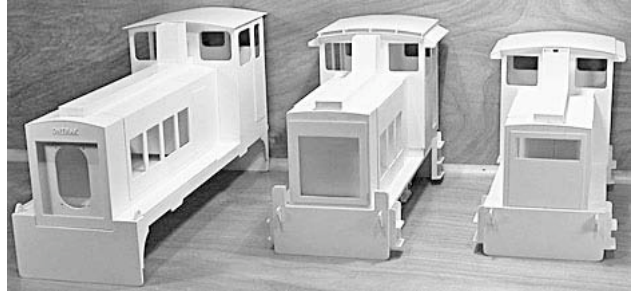


Carl Millington's HOn30 Isis Mill bogie loco #11 and its brakevan. Lynn Zelmer, photographer.

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

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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 HO_n30 500mm x 500mm micro-layout 'Tooleybuc Sugar Tramways' still under construction but with the mill buildings fairly well developed. John Henshaw, photographer.



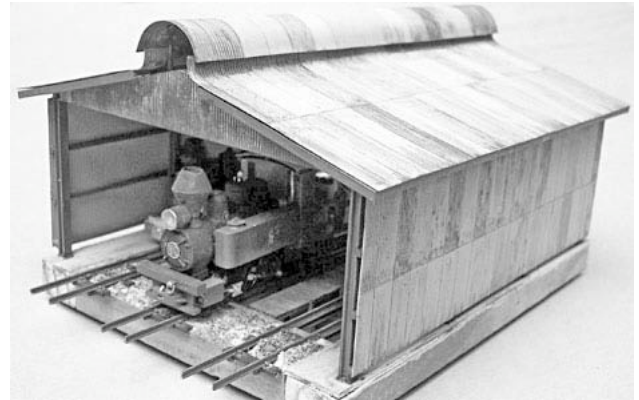
Bundy Fowler, *RJ Models* kit professionally assembled and painted by *The Model Works Australia*. Fowler locos can be seen at the Australian Sugar Cane Railway (Bundaberg) and ANGRMS' Durundur Railway (Woodford, QLD). Lynn Zelmer, photographer.

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.



HO_n30 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.

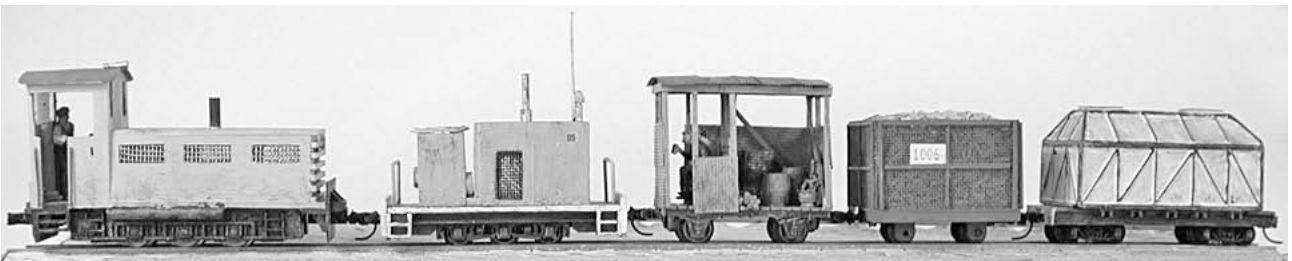


Don Fraser combines sugar cane modelled with Yarra grass at the seeding stage, and painted to match background photographs, photos and painted clouds to create cane fields for his layout. Don Fraser, photographer.

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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 navy 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.