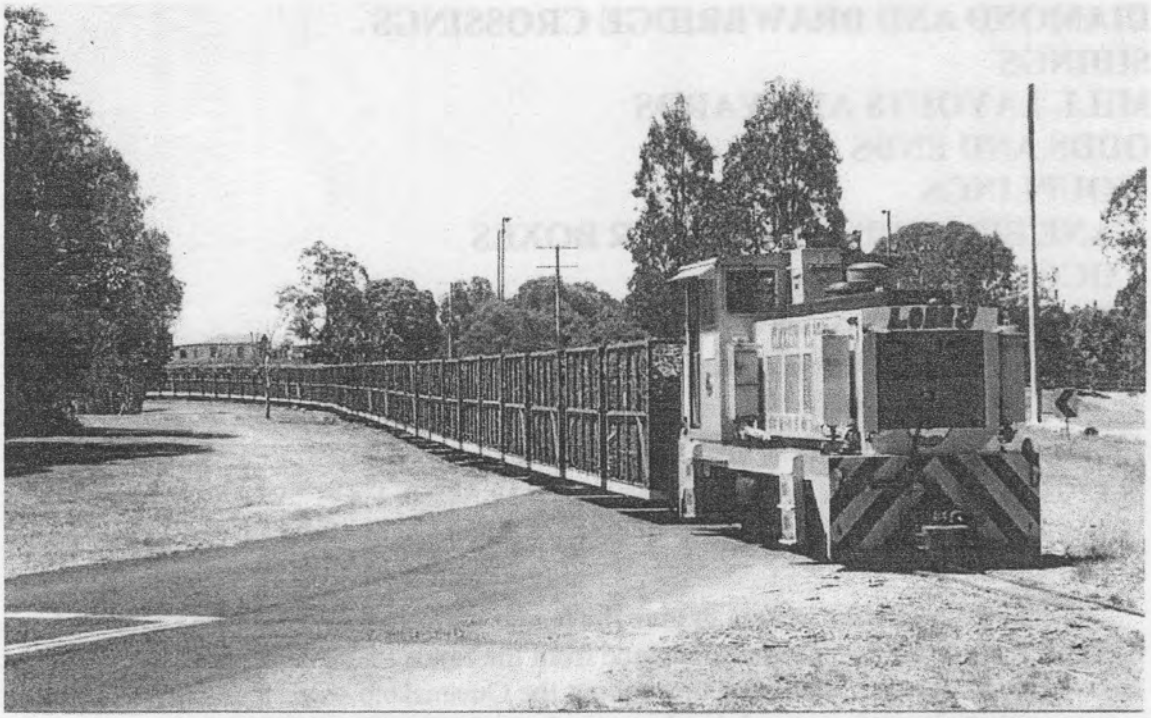
MODERN CANE RAILWAYS OF QUEENSLAND

By Carl Millington



Moreton Sugar mills EMB bogie locomotive Coolum leads a rake of cane through Bli Bli in 2002.
Photo: C.Millington

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MODELLING THE RAILWAYS OF QUEENSLAND
CONVENTION 2004

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These notes were written to give the reader an insight into the operations and equipment used to transport the sugarcane from the fields to the sugar mills over the vast narrow gauge railways been used throughout the Queensland sugar industry.

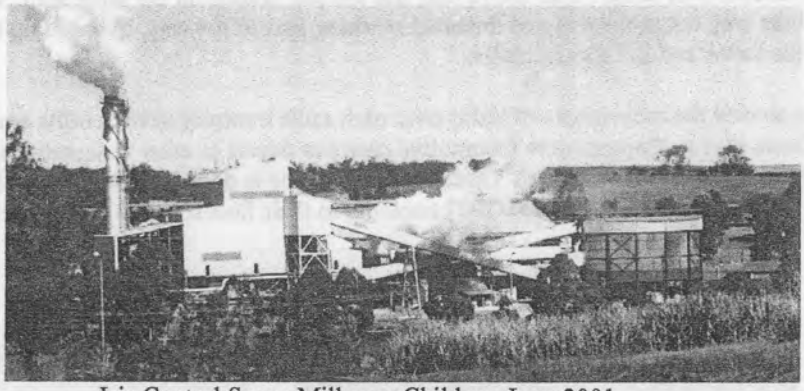
Although much research has been performed to ensure these notes are correct and accurate, errors and mistakes do happen. Most of these notes come from my experience in the sugar industry as an Electrician and Locomotive driver. All photographs used where taken by the author unless credited.

I would appreciate any feedback or corrections from readers. Any feedback or questions can be sent to BLI-BLI@bigpond.com. Happy reading.

Carl Millington.

Background

Sugar mills have 2 seasons, The crushing season (June-December) and the Slack season (January-May). During the crushing season mills employ extra workers known as seasonals to operate the mill equipment like the milling train and to crew their cane trains. During the Slack season mills do heavy overhauls of their plant and tramways.

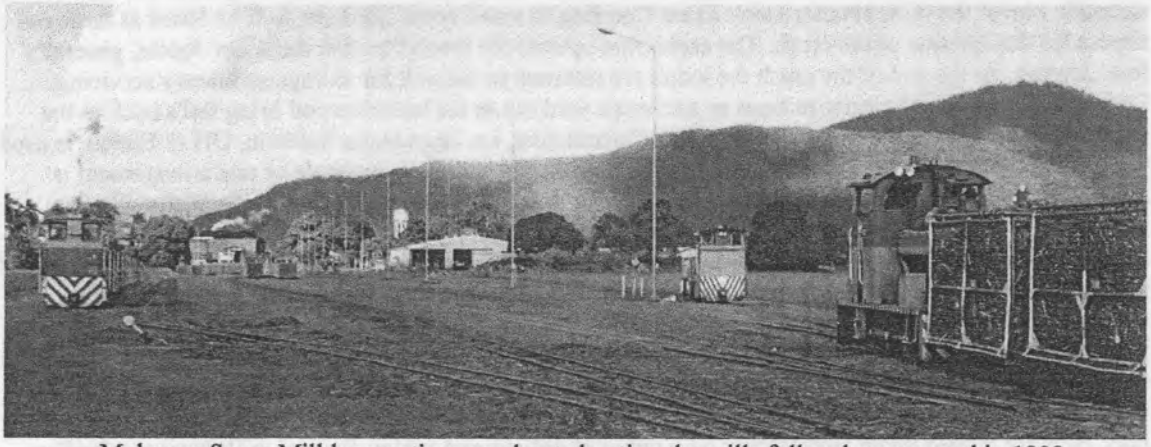


Isis Central Sugar Mill near Childers, June 2001.

The aim of all sugar mill tramways is to transport harvested cane from the fields to the mill in a quick and efficient manner. Harvested sugar cane needs to be crushed within 18 hours, so as to extract the highest possible amount of juice out of each billet of cane. Sometimes this can not be achieved due to mill or loco breakdowns and derailments.

Each mill has a caneinspector who determines which farmers fields will be cut and how many bins are to be allocated to that farm on the day that they are cutting. This information is given to the traffic officer who issues a running or delivery sheet to the loco crews showing them how many empties are to be taken and where they are to be delivered. Several deliveries will need to be made to every siding to make up the allocated number of bins required for the days cutting.

Loco crews collect their allocated empty bins from the empty yard or another storage siding, and head for their designated branch, dropping the allocated number of bins off at the sidings as shown on their running sheet. Some shuffling off bins takes place between sidings as required, generally after a period of wet weather, where farms that where to be cut on the day of wet weather, fields become to wet to operate harvesting equipment when cutting resumes. During times of wet weather were cane cannot be harvested, loco crews are given jobs assisting navvy's, loco shed staff or tasks within the mill itself.



Mulgrave Sugar Mill locomotives go about shunting the mills full and empty yard in 1998.

Full bins are collected on the way back to the mill. Some mills have limits as to the number of fulls, that loco's can bring back to the mill, due to grades, passing loops and the mills full yard capacity. This means that a crew will pickup all the full bins that they can and take them to another siding or outer yard where the rake is then split into a suitable number to enter the mill.

Most branch lines only have one loco that will occupy it during a shift, making controlling or tracking of locomotives easier. Two loco's may use the one branch on the same shift, with one loco working all the way out to the end and the other working part of the way, to speed up the delivery of empties to the farms and full's to the mills.

To control the movements of trains over each mills tramway system mills employ Traffic Officers. Traffic Officers give authorization to locomotive crews to depart or enter designated sections on the system. Communication between loco's and the traffic office is done by 2-way radio. Several mills have introduced Global Positional Satellite (GPS) tracking, to their fleet so quick reference can be made of the location of locomotives.

Invicta Sugar Mills "Scott" brings back the last cane from the Dalbeg area for the 1999 season.

Several mills have small servicing depots located at a point where there are many branch lines radiating from the base of a fairly long main line. These depots are known as "outdepots". At these outdepots you will most likely find fueling and sanding facilities and a small servicing shed. Several loco's, normally one of the mills smaller loco's like a ComEng or small bogie Baldwin, will be based at these out depots for the duration of the crush. The crews that operate the loco's based at these out depots, generally live close by. At the end of the crush the loco's are returned to the mill for storage and heavy servicing. Loco's at out depots take empties from an exchange yard out to the branches and bring full's back to the exchange yard. One of the mills bigger types of locomotive, i.e. large bogie Baldwin, DH or Eimco, is used to take empties or full's between the mill and these exchange yards. An example of this arrangement is South Johnstone mills Japoon line where an out depot is at Silkwood and Bingera mills Wallaville line.

Billets of chopped cane are tipped into the cane bins by several means. There is the roll-on/roll-off method where the bins are rolled onto the back of a trailer towed by a tractor which then parallels the harvester in the field while cutting the cane and conveying it into the bin at the same time. Another is infield loaders. These take the form of tractors towing a bin, which tips the cane directly into the bins at the siding. Transloaders are used by trucks be they semis or rigid fitted with a bin. The truck backs up to the top of the loader and tips its load out onto a conveyor belt. The driver or transloader operator then fills the bins. Bins are moved under transloaders by a series of pulleys and cables. Several mills have semitrailers that carry a number of the mills bins from a dump point to an outer area not covered by the tramway. An example of this is the cartage of cane by truck from the Booyal area to the Adies Pad near Isis mill.

Infielders lined up ready for the next day's work. Maroochy area 2003.

Most mills operate 4 working shifts, with 3 shifts working all the time. Each shift works 8hrs each normally starting at 8am, 4pm and midnight on a 7-day roster depending if the mill is on a continuos crush or a 5 day crush. Some mills have loco crews start and finish earlier so as to be able to deliver bins to farms that are at the end of very long lines. For example Invicta mills Dalbeg line whose terminus is 100 Km from the mill and a one way trip takes approximately 4 hours.

During the slack season heavy overhauls of locomotives, cane bins and the perway takes place. To maintain the perway mills have a variety of track maintenance wagons and machines, like ballast wagons, weed sprayers and track tamping machines. A lot of these wagons have been made by the mill, from old cane frames and locomotives.

Moreton mills "Petrie" and "Maroochy" together with "Jimpy" stand at Jamaica with a work train. December 2003.

Out of the 26 sugar mills in Queensland (as of 2003), 22 of them use 2 foot gauge tramways to transport their cane. Out of the other 4, Pioneer mill uses the gauge of 3'6" for their tramway and the other 3 mills use road transport.

Many mills in the same area are owned by the one company, and their tramway systems are linked. This not only allows loco's from another mill to be transferred to cover a breakdowns it allows cane from one mill to be taken to another to be processed when the mill has a breakdown. Loco's coming from one mill network to another simply change radio channels at the network boundaries. As one mill's crews don't know the others network, maps are carried in the loco's.

Only one mill has a mixed or dual gauge track with Queensland Rail, this being Kalamia mill near Ayr. QR operate bulk sugar trains over the branch from Ayr to the mill, while the mill hauls QR molasses wagons, using their 2 foot gauge locomotives. All traffic over the line is controlled by the mill's traffic

office. Only one gauge type of train can occupy the line at once due to safety reasons. Sidings along dual gauge lines are spread further away from the main line to take in QR's loading gauge.

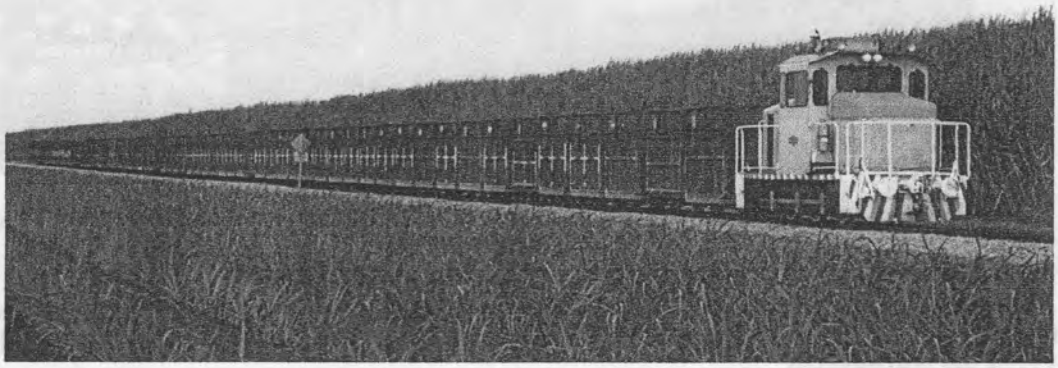
QR operates Bulk sugar trains along this branch with their own locomotives. Molasses trains are hauled by one of the mills 2 foot gauge locomotives fitted with train line air brakes from an exchange yard. A match wagon converted from an old steam loco tender is placed at either end of the rake to match coupling heights and types.

Kalamia Sugar Mill locomotive "Airdmillan" lifts a rake of QR Molasses wagons out of the exchange siding at Ayr. The wagons at each end of the train are match wagons.

The other mixed gauge mill is Pioneer, who operate a 3'6" gauge network that shares several kilometers of dual gauge track with Kalmia and Invicta mill's who operate a 2ft gauge networks.

Its interesting to note that most mills past and present once had dual gauge tracks around the mills, some even operated both gauges.

Over the years the sugar industry has looked at ways of making their tramway operations more efficient. These methods have put into place things like, upgrading track to suit higher speeds and heavier loads. Using remote control locomotives placed mid train to move bigger loads. Installing automatic points to save on wear ant tear of the locomotives and rollingstock. Several sugar mills have main line tracks that are just as good as their bigger cousins.

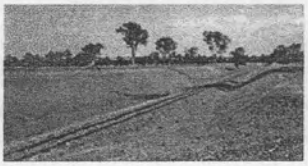


Pioneer sugar mills Walkers built "Aramac" heads a rake of empties on the Colevale branch during the 2003 crush.

Trackwork

Early cane tramways saw lightweight rails laid on wooden sleepers which were placed on a formation that had very little preparation and simply followed the natural ground providing some very ruling grades. Earth that was removed during the construction of the formation was used to provide a "ballast" to stop track movement.

As tramways evolved over the years practices in tramway construction changed and now tramways or as they are more commonly known railways, have formations that have been surveyed to provide gentle grades. Rail sizes range from between 40 to 60 pounds. Most mills at sometime have laid rails recovered from government railway systems. The rails are laid on either wood, steel or concrete sleepers. Crushed quarry stone is used as ballast to provide drainage and to stop sleeper movement. The pictures below show trackwork from Moreton mill (left) and Bingera mill (right).

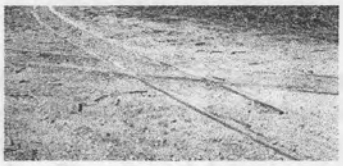


Transitions

Only one transition exists throughout Queensland cane railways. The transition came about after Invicta and Kalamia mills 2 foot gauge systems where linked on the dual gauge system with Pioneer mill. The transition was used because Kalamia mill was bias to the right hand rail and Invicta mill was biased to the left. The photo below shows the transition near Browns Road No 3 siding on the Pioneer system.

Diamond Crossings

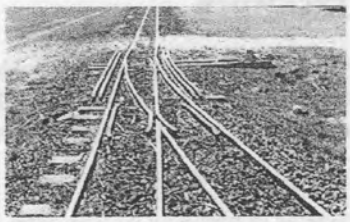
Several mills have diamond crossings where one line crosses the other. Diamond crossings can be at any angle to each other. The example below is from the Kalamia mill system.

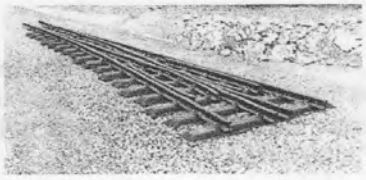


Points and Point indicators

The sugar mills throughout Queensland have points mounted on either wooden, concrete or steel sleepers. The angle of the point depends on the location of the point and the speed permitted over the track. The point blades are moved by way of a point's tumbler. The tumbler can be of a 2 position type or of the "kangaroo" type were they are always set for the main line due to the counter weight arrangement. The

below pictures show a timber sleepered point from Bingera mill and a new steel sleepered point on the Farleigh mill system.





Mills such as Plane Creek and Invicta use "trailable" points at crossing loops so as to speed up the crossing of trains. The points at each end of the loop are set in the opposite direction to each other and a spring system in the point blades allows a train to "run" the point set against it and push the blades over to the right direction. Once the train has past the point blades return to the position they were original set to. A point's tumbler is provided at each set of trailable points so they can be used in manual if the need arises. A point indicator is located at each set of points to show the train crew which way the points are set for.

A handful of mills use remotely controlled points operated by the locomotive crews. Posts with several coloured lights mounted on it indicate to the crew which way the points are set. Once again a tumbler is provided so the points can be used in the manual position. The photo below shows the automatic points at Airdale where the Kalamia and Pioneer systems combine.

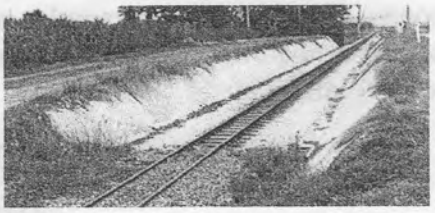
Several mills have point indicators located at points located in key positions like junctions or sidings that are located in or near built up areas and may be tampered with. These indicators show the crew if the points are in the right or wrong position or which branch line has been set. The picture below shows a point indicator on the Invicta mill system at McLain Road Junction. The same type of indicator is used for trailable points.

Dual Gauges

Over the years most mills at one point in time have had dual gauge tracks. Today only 3 mills still use dual gauges. These are Kalamia and Invicta, which have a gauge of 2 foot and Pioneer mill that has a gauge of 3 foot 6 inches. Kalamia and Invicta mills are linked together by dual gauge over Pioneer mills system, while Kalamia has a dual gauge branch from the mill to the town of Ayr to allow QR trains to travel to the mill. The picture below shows the dual gauge track and points at Kalamia mills Town Terminus at Ayr.

Cuttings

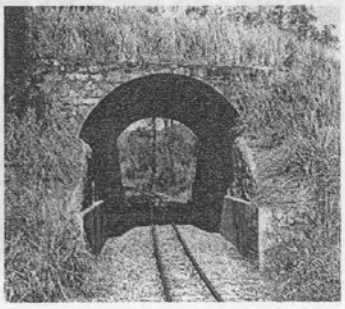
Cane railway cuttings are like any cutting found on any railway system. They all vary in their height, length, width and the materials they are cut from or protected with. Some cuttings in high rainfall areas are designed to let water flow through them by having the two walls and floor coated in concrete. The biggest cutting on any tramway system is to be found on Farleigh mills north coast line. This amazing cutting was made to relieve the grade from 1 in 60 to 1 in 100. The following photos show a couple of cutting examples.



L-R. Cutting coming out of the Herbert River, Victoria mill system; Cement lined cutting on the Kalamia mill system.

Tunnels

There are only a handful of "real" tunnels throughout the sugar tramways of Queensland. The tunnels that do exist are mostly not under mountains or hills but under roads. Some are simple concrete arches mostly of the Pre-cast type with the road overhead to ones that look like proper railway tunnels. Most tunnels are only as wide as the road it goes under. Similar structures are found where tramways pass under roads or railway lines, but are classed as underpasses.



Gorge Tunnel, near Finch Hatton on the Marian system.

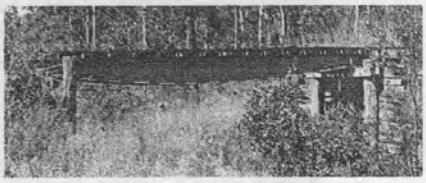
Mill	Tunnel location	Road or Hill
Mulgrave	Brinsmead Gap	Both
Sth Johnstone	Currajah	Road
Marian	Marian/Hampten road	Road
Marian	Finch Hatton Gorge	Road

Bridges

There are many styles and types of bridges to be found throughout Queenslands sugar tramways. The most common type of bridge is the wooden trestle style. As technology changed and new materials became available such as steel and concrete for high stress areas, bridge designs changed. Riveted steel beams, box sections, lattice, welded steel beams and pre-stressed concrete where used to make bridge spans and supports. There are many examples where all types off bridge construction have been used on the one bridge. A good example of this is Bingera mills bridge over Currajong creek at Wallaville.

Currajong Creek bridge, Wallaville, Bingera mill system.

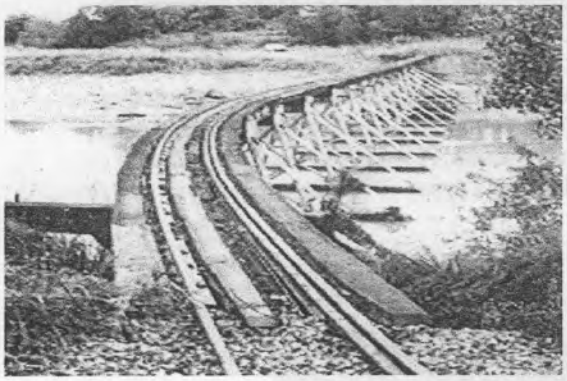
Another type of bridge is the lift span, where a central span is raised by A pulley system to allow watercraft to pass underneath. Only 2 examples exist of this type both on Moreton mills tramway. To save money several mills bought old steel bridge spans from the Government railways, which they have used to replace old wooden trestles. Bingera and Fairymead mills in the Bundaberg area have several bridge spans made from old QR turntables. Not all tramway bridges carry just tramway traffic. Some bridges are dual purpose with combined road/rail, where the tracks are laid in the center or to one side of the bridge.



L-R. Lift bridge, Maroochy River, Moreton mill system; Turntable span bridge, Avondale, Fairymead system; Road Rail bridge, Moreton mill system.

Where sugar mills took over former Queensland rail formations, the existing bridges where simply re-gauged. The design of a bridge may come down to the forces that are applied to it, for example floodwaters and debris cover several tramway bridges in the wet season. An example of this is the bridge over the Barron river on the Mulgrave

mill system. Invicta mill at Giru remove the spans from their bridge over the Haughton river each slack so they don't get damaged. The longest bridge to be found is Macknade mills 294 Metre steel and concrete constructed bridge over the Herbert River. The photos below show some of the other various styles and construction of bridges found throughout Queensland's sugar tramways.



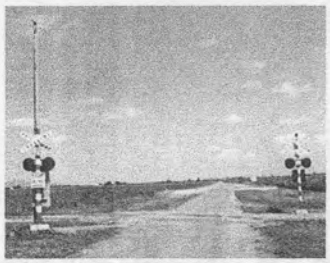
L-R. Galletti's bridge, Liverpool creek, Silkwood, Sth Johnstone mill system; Timber trestle, Messmate range, Marian mill system; Miskin creek bridge, Sth Johnstone system; Herbert River bridge, Victoria mill system; Russell River bridge, Babinda mill system.

Level Crossings

Level crossings are divided into 2 types, Passive and Active.

Passive level crossings are road/rail crossings that are only protected by a "Railway or Tramway crossing" sign, and are normally found on second class roads or roads that have little traffic. Passive level crossings are made up of a simple steel or white timber post (standard) with two white crossed signs with the black words "RAILWAY or TRAMWAY CROSSING" on them. A Giveway or Stop sign is located below the railway crossing signs. The use of "TRAMWAY CROSSING" is been phased out, so "foreign" visitors don't get confused with the meanings. The pictures below show a passive crossing and a typical passive crossing "standard".

Active crossings are crossings that feature flashing lights and are found on first class or roads that are deemed to require high protection. An Active level crossing consist of a pole (standard) painted with red and white stripes, white crossed signs with the black words "RAILWAY or TRAMWAY CROSSING" either by themselves or printed onto a sign with red background. Below the crossing signs is a set of red flashing lights set into a black frame. These flashing lights are either bulbs or rotating beacons, operated by electrical or electronic track circuits or by the crew's "keying" the lights. Below the lights is a white or black sign with black or black lettering depending on what type of background was used, saying, "STOP ON RED SIGNAL". A box containing the control equipment for the lights is found nearby. At some active crossings, especially where several roads intersect each other, there may be two or more light sets to a pole. An example of this is Moreton mills Howard and Currie street intersection. A street light is normal found over Active crossings. The pictures below show an active crossing and 2 types of crossing standards.



Sugar mills use Queensland Rail and Department of Transport standards and regulations for their level crossings layouts and designs.

Diamond and Drawbridge crossings

Were cane railways cross Queensland Rail tracks they use either a diamond crossing or a drawbridge. Diamond crossings are made 2 ways by either joining rails with fishplates or by a solid "casting", were the rails are all welded together. The only disadvantages with diamond crossings are the speed limits applied to QR trains, normally 25-40km/h although the newer cast type crossings allow QR trains to travel over them at 80km/h. The non cast type are also very costly on maintenance as aposed to the cast type crossing. A couple of mills allow QR to remove some of the crossings during the slack so as to allow QR trains to traverse the section at normal road speed.

Diamond crossings are always set in favour of QR, the exception been Victoria mills crossing of the QR at Ingham were due to the location of the mills tramway through town, normal crossing operation would cause severe delays to motor traffic. Cane railway crews manually operate all diamond crossings. Normal practice is for the cane train to stop at the stop signal, offsider to proceed to QR running line and look for any QR traffic. With no traffic in sight the offsider will pull the Kangaroo point lever over changing the QR signals to stop, cane railway signals to proceed and closing the catch points. The cane train will then proceed over the crossing until told to stop by the offsider. Once clear, the offsider lets go of the points lever which returns all signals and catchpoints back in faviour of QR. Several crossings have been fitted with the same type of point levers found in QR yards, thus saving to have the offsider hold the kangaroo lever over for the entire operation. The photo below shows the diamond crossing at Ingham on Victoria mills system.

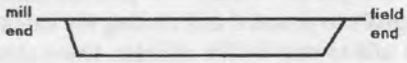
Drawbridges were installed in an attempt to over come the high matinance costs of diamond crossings and increase track section speeds for QR trains. Drawbridges also speed up the crossing of cane trains over QR lines, as they are fully automatic and don't require the crew to hold any point levers over. Drawbridges consist of 2 rails secured to a frame either side of the QR lines that are raised and lowered electrically through 90 degrees. Activation is by remote signal sent from the cane locomotive or at a switch box near the drawbridge. Coloured light signals are located both on the QR and cane railway to show who has right of way. Once activated, a siren sounds to warn persons nearby that the drawbridge is about to lower. When down and locked the signals are cleared for the cane train. A track circuit registers when a cane train is clear of the crossing and raises the drawbridge.

The only disadvantage with drawbridges is the high costs involved in maintain them and for this reason there are only a handful of them installed. Drawbridges are always set in the raised position to favour QR trains. The photo below shows a drawbridge on the Racecourse mill system.

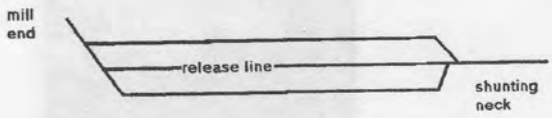
Sidings

There are many types of sidings to be found throughout the sugar railways of Queensland. The lengths of sidings depend on there geographical location, space that is available and what type of transporters (Infielders or Haulouts (piggybacks) will be using the siding. A brief description is given below of the more common types to be found.

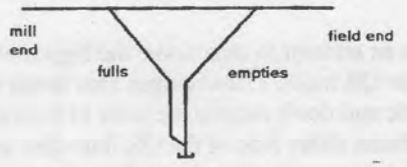
Siding A. This siding is used by either haulouts or infield loaders. It may consist of one or two loops. Empty bins are delivered into the field end and collected from the mill end. Likewise the transporters start loading or dumping from the mill end. This is the most common type of siding to be found through out all mill tramway systems. Were this type of siding is found at the end of branch, loco crews use a rope connected between the loco and bins to shunt them into the siding. This type of shunting is called "rope shunting". Its interesting to note that several mills in order to save a couple of dollars, have removed the non-mill end set of points thus shunting at these sidings now take longer to shunt.



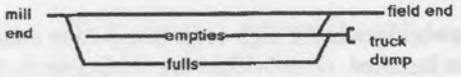
Siding B. This siding is used by either haulouts or infield loaders and is found at the end of a branch. This siding works in the same way as siding A, but has an extra line down the middle to allow locomotives to "escape" and a shunting neck.



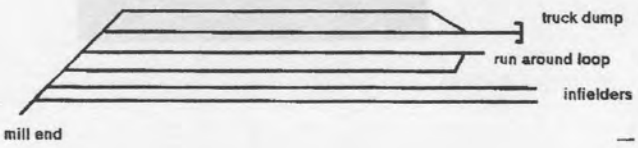
Siding C. This siding is used by bin carrying trucks and haulouts. Empty bins are shunted into the empty bin leg of the angle on the out bound run and the fulls collected from the full bin leg of the angle on the return run.



Siding D. This siding is used by bin carrying trucks. Empty bins are shunted into the middle road, which is on a slight rise, so the bins will roll down onto the haul out vehicle. Full bins are rolled off the haul out vehicle into the full line, which is lower than the main line.



Siding E. This arrangement is known as a **COMPLEX** or **PAD**. All types of bining out equipment are used here. The sidings at the top are used by bin carrying trucks where the ones on the bottom are used by either infielders or haulouts. A locomotive run around loop is provided. This type of siding arrangement is common at the end of branches but can be found part way along some lines. Some pads only cater for the bin carrying trucks.



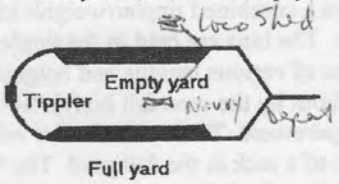
Mill Layouts and Yards

Layouts

Balloon

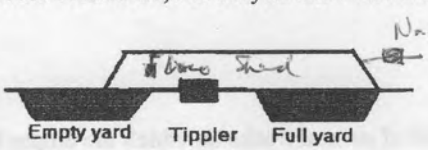
Mills that use the balloon arrangement usually only have one way in and out of the mill or the factory site is an area that limits the space in which the yards can be accommodated.

Mills that use a balloon loop are as follows; Moreton, Isis, Millaquin, Plane Creek, Racecourse, Pleystowe, Marian, Farliegh, Proserpine, Invicta, Victoria, Macknade, Tully and Mossman. The diagram below shows the layout. Normally there are two yards, full and empty. Victoria mill has a combined empty and full yard.



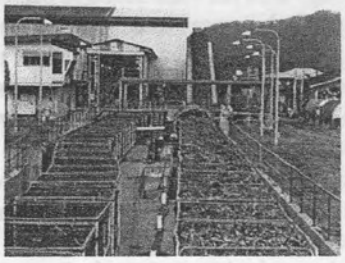
Straight

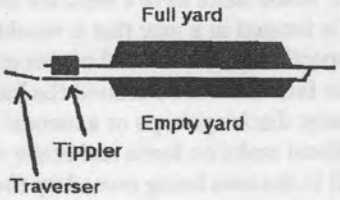
Mills that utilize a straight arrangement are not confined to space limitations like the ones that use a balloon. The diagram below shows this arrangement. Mills, which use this arrangement, are; Fairymead, Bingera, Inkerman, Kalmia, Pioneer, South Johnstone, Mourilyan and Babinda.

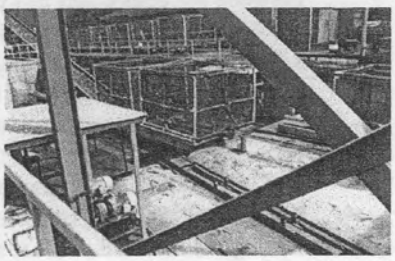


Mulgrave Mill

Mulgrave mill at Gordonvale, has a very interesting operation in that the combined full and empty yard end in a dead end. A traverser is used to move the bins after they have been tipped to the empty yard. This arrangement is shown below.







Yards

The Full yard

Full bins of cut cane arrive at the full yard ready to be brought to the tippler. In the full yard you will find release lines for locomotives, devices to stop bins from rolling forward or backwards known as rollbacks and rollforwards. Rollbacks are steel stops that are located between the rails at far end or arrival end of the yard, and are raised either manually or automatically to stop full rakes of bins rolling away and

entering the running lines. Rollfowards are normally automatic stops that are found on the tippler end of the full line and are there to stop rakes or bins from rolling forward towards the tippler.

Mills with an automated full yard use hydraulic pushers to push rakes of bins to the tippler. These pushers are located on the outside or inside of the rails and are integrated with the rollbacks and rollfowards by electrical/electronic controls

Mills that don't have pushers use winches to bring the rakes from the full yard to the tippler.

The Tippler

The tippler is where the cane is tipped from the cane bin onto the cane carrier that takes it to the shredder and milling train. The tippler is a large steel "can" frame, in which the bins are pushed in by hydraulic pushers. Most mills have a combined tippler/weighbridge, with the tippler frame sitting on pads that measure the weight of the bin. The bins are held in the tippler by very tight tolerances. Some mills tip 2 bins at a time, while others tip bins of various lengths and heights. The bin in the tippler once emptied is again weighed, before it is pushed out by the next full bin(s). Mills have to calibrate their tipplers every 24 hours to satisfy a Government requirement. To do this several mills have made a "Tare weight" wagon which is simply added to the back of a rack in the full yard. The "tare weight" wagon weighs the design weight of a fully loaded bin. Mills that don't have a purpose built wagon use weights placed by crane on the corners of the tippler floor. Before a bin can enter a tippler it has to be uncoupled from the other bins. Mills that use knuckle couplings use automatic bin uncouplers located before the tippler. Mills with hook and ring or link and pin have an employee to uncouple the bins. Bins with knuckle couplers pass over a pneumatic ram once out of the tippler, which closes the coupling allowing it to couple up to other bins. Mills that don't use knuckle couplings have another employee to link the bins up in the empty yard.

The Empty yard

Empty yards consist of several tracks on which the empty bins from the tippler are placed prior to being taken back to the fields. The number of tracks in an empty yard depends on the amount of space the mill has for it. Several mills use a tractor to couple and move bins around in the empty yard.

The Loco Shed

All mills have a loco serving facility of some kind. Again the size of these facilities depends on how much room is available. Location of loco shed is normally at the back of the mill, or opposite/in-between the empty and full yards. Some mills have a separate loco storage area for their locos to use during the crush, because the loco shed is located in a way that it would disrupt tippler operations. Most mills have a full service shed containing inspection pits, overhead cranes or loco jacks to do heavy overhauls on the locomotives and brakevans. Other facilities found around the loco shed include a sand drying and filling facility, be it an overhead pneumatic discharge type or a manual "scoop and pour" type. Diesel pumping bowsers are provided to fill the diesel tanks on locos and brake wagons.

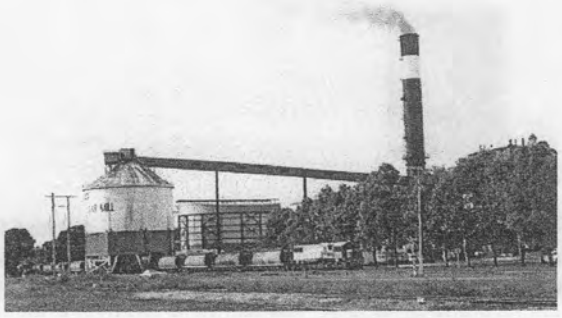
With more than one mill in the area being owned by the one company, and having interconnecting lines, locos are often transferred from one mill to another in the slack to receive heavy overhauls, as the facilitys at one mill make it easier to be completed. By doing this some mill loco sheds have become "running" sheds only. The photo below shows the 3-road loco shed with attached 2-road truck shop at Isis sugar mill.

Navvy yards

Not all mills have a dedicated navvy yard. Some simply have a track near the loco shed or one of the yards for the storage of navvy wagons and track matinance equipment. Mills that do have a navvy yard usually consist of a couple of tracks and a few sheds in a lockable compound. The picture below shows the navvy yard at Mulgrave mill.

Raw Sugar loading facilities

Mills that transport their raw sugar by rail use an overhead-loading bin to fill the wagons. The trains engine is used to move the sugar boxes under the bin, by following colored light signals showing green for moving forward, orange to ease up and red for stop. Sensors next to the bin loading shute control these signals. An operator controls the flow of sugar into the sugar boxes. Several mills that use QR to transport their raw sugar use radio telementry to facilitate loading. As QR have dedicated "sugar" locomotives, they are fitted with a device that communicates with the loading bin by radio signals. The loco's driver simply watches the lights on the box in the cab, which tells him or her when to move or stop the train. The bulk sugar wagons are automatically filled with sugar. The picture below shows a QR train being loaded at Inkerman sugar mill.



Molasses loadouts

Inkerman, Kalmia and Pioneer mills are the only mills that transport molasses by rail, with QR been the carrier. The molasses wagons are placed under an overhead filling nozzle that is manually controlled to fill the wagons. The train's locomotive is used to position the wagons. Communication between filler and train crew is by 2-way radio.

Concrete sleeper plant

Only a handful of mills have their own plant for the manufacturing of pre-stressed concrete sleepers. Finished sleepers are either placed directly onto wagons that will take them directly to the job site or are stock piled for future use. Some mills not only make sleepers for themselves but for other mills.

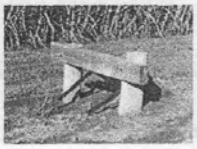
Photo - El Arish navvy depot (Tully Mill)

Odds and Ends

Choke Blocks: Choke blocks are found in some sidings with or without a slight grade. Their purpose is to stop bins from entering the main line. They are made up of either a U shaped metal plate, that is hinged and swings over one of the rails or a triangular metal plat that folds up onto the rail. Some of these choke blocks are fitted with key locks. The picture below shows a siding on Bingera mills system that has both types at the one location.

Siding Rollbacks: Similar to the ones you would find in a mills full yard, they are used to stop bins from running out of sidings. They are most common at sidings where roll on/off transporters are used, and are normally found on the empty bin line. The rollback is hinged so bins can be pushed over it in one direction only and are located in the middle of a sleeper. Moreton mill had one very unusual type of rollback, in that it takes the form of a post made from a length of old rail with several links welded to it. The bins are shunted into the siding, which happens to be on very step grade. With the last bin hard up against the post, the crew places the link into the bin coupling and secure with a pin, as though they were coupling bins together. The pictures below show a rollback at a truck dump and the unusual one used by Moreton mill.

Buffers: Several mills place buffers at the end of their sidings in an attempt to stop runaway bins. These buffers can take the shape of a sleeper and a steel post placed across the track, steel frames, or buffers similar to that of which you may find on the mainline railways. The pictures below show some of these examples.



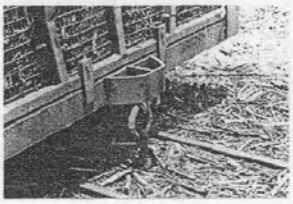
Cattle Grids: Mills that run through areas where livestock graze have installed cattle grids to stop the cattle from getting out of the paddocks for which the tramline passes through. Grids are either a pre-fab metal construction or simply a trench under the track with a couple of rails and sleepers placed either side.

Flood Gates: Several sugar mills that are situated in high rainfall areas have floodgates installed near their major river or creek crossing bridges, to stop floodwaters entering cane land. Most are installed within the cuttings leading to the bridge. They are made up of a high concrete wall with steel gates across the tramline, and are usually kept closed during the slack season. The picture below shows the floodgate installed at Herbert River crossing on Victoria mills system.

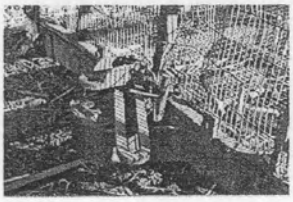
Couplings

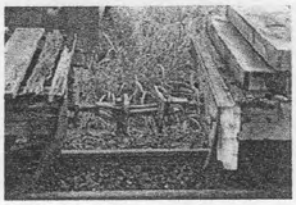
Four types of couplings are been used throughout the industry.

Hook and ring: This is the original coupling used with advent of sugar cane trains. The hooks simply hook into the ring on the other bin. Most mills started out with type of coupling. Only Kalamia mill near Ayr still uses this coupling arrangement today on their bins. Other mills still use this coupling on their navvy wagons.

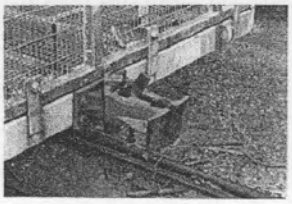


Link and Pin: The next development in couplers was a simple cast or forged oblong link that fits into a slot in the bin buffing plate and a pin passed through it. Moreton, Millaquin, Marian, Farleigh, Proserpine, Tully, Sth Johnstone, Mourilyan, Babinda, Mulgrave and Mossman mills use this coupling arrangement. A similar coupler was used by the Innisfail Tramway, and is still found on some navvy wagons. Once again some mills may have this type of coupler on their navvy wagons.

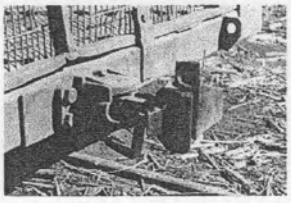




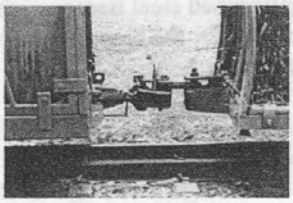
Dumbell or Chopper: A pin located in the coupler slides backwards and forwards and can be dropped down into another bins coupling. Bingera and Racecourse mills use this coupling. These couplings also rotate, so they don't need to be uncoupled at the tippler.



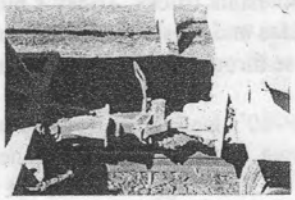
Knuckle or Auto coupling: This coupling is a miniature version of the one found on the bigger railway systems. An arm under the coupling opens an internal knuckle, allowing coupling and uncoupling.
Isis, Millaquin, Fairymead, Plane Creek, Pleystowe, Marian, Farleigh, Inkerman, Invicta, Victoria, and Macknade mills use the auto coupling.



Transition couplers. Mills that use several types of couplings for their bins or whose tramway system is joined to that of another, who's couplers are different, require transition couplers to be carried by locomotives so any loco can couple to any type of coupler. A good example is in the Mackay area where the 4 Mackay Sugar sugar mills use Link, Dumbell and auto type couplers. It is common during the crush to transfer cane between mills, thus the need for transition couplers.

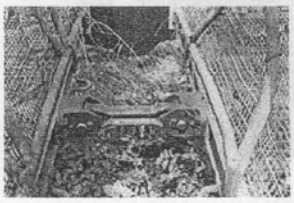


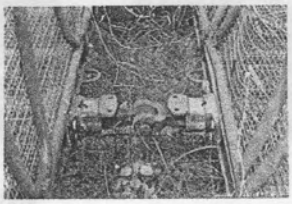
Link to Auto.
Photo: T. Badger



Dumbell to Auto

Permanent links. Tully mill permanently couples its 4 tonne bins in pairs, as the standard bin at Tully is the long 10 tonne bin. Each pair of 4 tonne bins is referred to as "1 bin" and are numbered as such. The reason for doing this is that the tippler is only designed for the 10 tonne bin and a single 4 tonne bin can not be held in the tippler. Other mills have experimented with permanently coupling of bins. The pictures below show 3 permanent links which have been trialed at Victoria mill during the 2002 season.





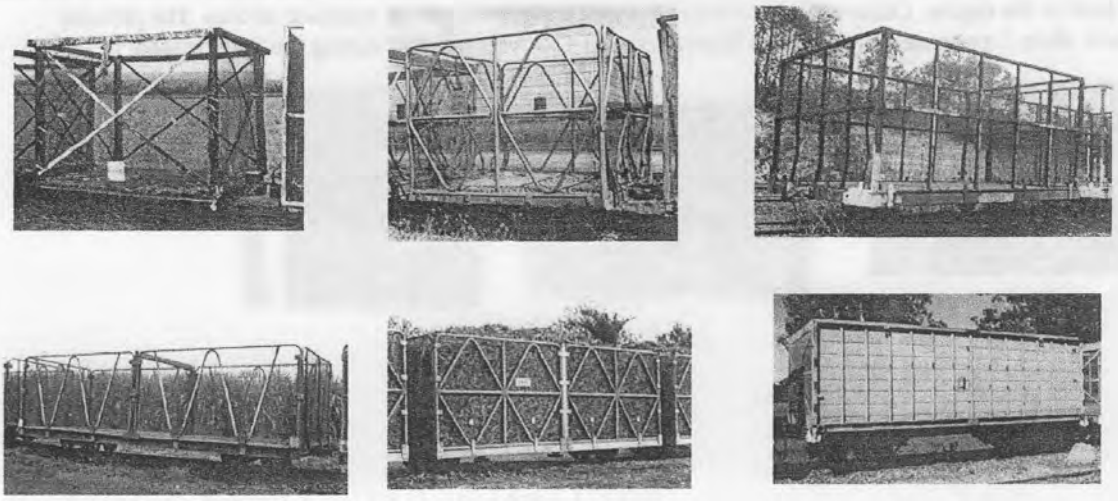
Cane Bins

Cane bins come in many shapes, sizes and capacities. A cane bin simply put is a wire basket on wheels. Some of the first bins constructed were simply this as shown in the pictures below, having being constructed using the frames of wholestalk trucks. Today's bins are made of galvanized steel frames, sides and ends fitted with mesh on the sides and mesh, sheet steel or corrugated iron used for the base of the bin. The majority of bins currently in use throughout Queensland are unsprung 4 wheelers.

Experiments in the early 1980's lead to the development of the bogie bin. Surprising only 3 mills use bogie bins, these being Pleystowe, Victoria and Macknade mills. Mulgrave, Tully & Proserpine have opted for a large 4 wheeled 10 ton bin. The biggest reason for why more mills haven't gone to bogie or the big 4 wheeled 10 tonners, are the cost's involved in purchasing the bins and the modifications needed in the yards and at the tippler to handle such new bins.

Mossman mill use removable open top containers mounted on a frame fitted with bogies. Known as "canetainers" the canetainer is removed sideways from the frame onto trucks or stands for transport to areas not covered by the tramway.

Cane bins are either manufactured at the mill or by an outside contractor.



L-R. Mourilyan mill 2.5 ton bin; Marian mill 4 ton bin; Isis mill 6 ton bin; Mossman mill 9 ton Canetainer; Mulgrave mill 10 ton bin; Victoria mill 11 ton bogie bin.

Bulk Sugar Boxes

The raw sugar produced by Victoria and Macknade mills is transported to the bulk sugar terminal at Lucinda using the mills tramway systems in 11 ton bulk sugar boxes. The boxes are filled from the top and are emptied by tipping the boxes on their sides. The side doors are kept in place by locks that are released prior to tipping. The boxes are removable from their bogied frames for maintenance.

South Johnstone and Mourilyan mills once sent their raw sugar to the terminal at Mourilyan Harbour by rail. Originally this operation was part of QGR's Innisfail Tramway. After the tramway was sold only Mourilyan mill kept shipping bulk sugar by rail until 1997 after which road transport took over.

The picture below shows the bulk sugar boxes used by Victoria and Macknade mills.

Victoria & Macknade now only 2 mills transporting sugar

Pleystowe 14 tonne bogie tonne

Rose comme - 5 tonne steel side bottom

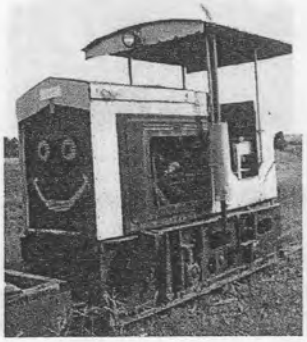
Mossman 9 tonne Canetainer

Proserpine 4 wheel 10 tonne bins

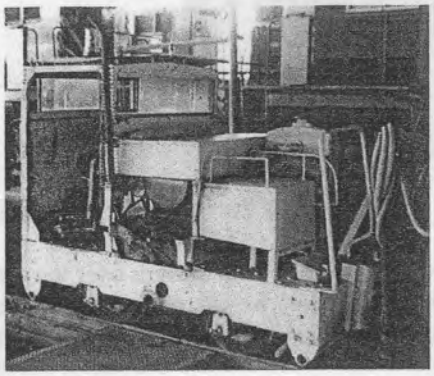
Photos Victoria / Macknade

Locomotives

Sugar cane locomotives come in many sizes, weights, styles and horsepower depending on what the purchasing mill requires of them to perform. The early years of dieslisation saw overseas manufacturers like Fowler, Malcolm Moore, Simplex and Motor Rail produce small locomotives that where ideal for shunting and hauling small loads over the lightly laid tramlines. These early locomotives were powered by small petrol engines with chain drives to the axles through mechanical transmissions.

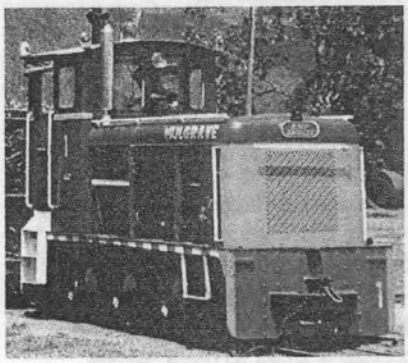


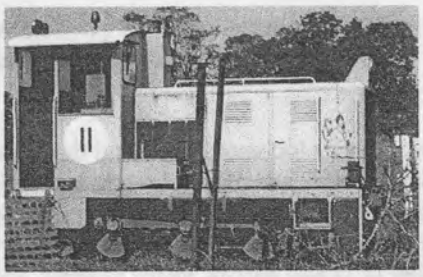
Moreton mill's Malcolm Moore "Jimpy"

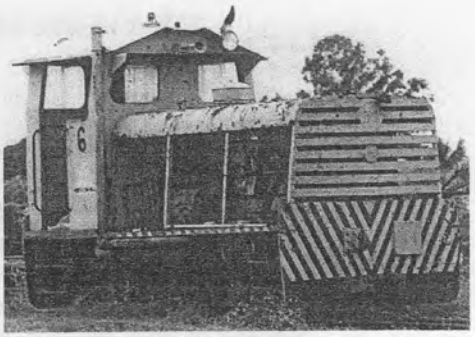


Pleystowe mill's Simplex "Barney Bull"

As tonnages and train lengths became bigger, the need to have heavier and powerful locomotives developed. Manufacturers like the Drewry Car Company, Walkers and Bundaberg Foundry offered light weight but powerful locomotives. These and future rigid locomotives were powered by diesel engines driving mechanical or hydraulic/hydrostatic transmissions to either an axle or to a jackshaft, were side rods would transfer the power to the driving axles.



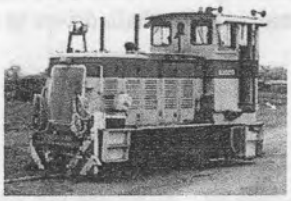




L-R. Mulgrave mill No 1, Drewry; Mourilyan mill No 11, Walkers; North Eton mill D1, Bundaberg Foundry.

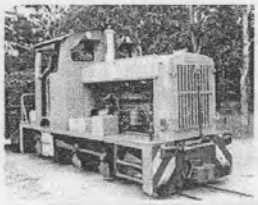
As tramway systems started to modernize there again become a need for more powerful locomotives to haul the ever increasing tonnages. Around this time 3 Australian companies where offering locomotives to the sugar industry. They were the Clyde Engineering Co, Commonwealth Engineering (ComEng) and E.M. Baldwin and Sons (EMB).

Clyde offered 2 models the DHI-71 and the latter HG-3R. The only choices offered to buyers were the engine and transmission, weight and several cab heights. These locomotives proved very popular and nearly every mill has or had one example of a Clyde loco. All Clyde locos are of the 0-6-0 arrangement.



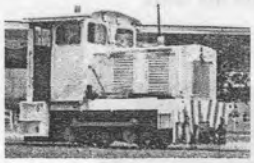
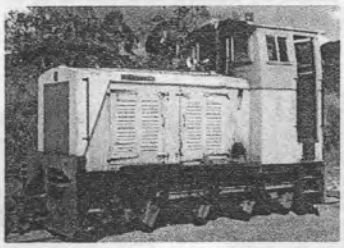
L-R. DHI-71 "Tantitha" of Fairymead mill; HG-3R "Ingham" of Victoria mill.

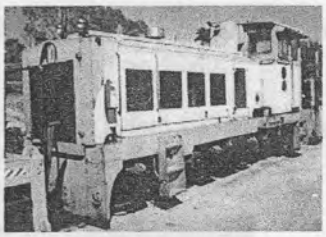
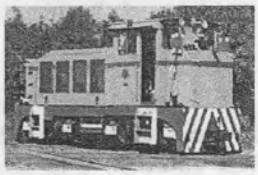
ComEng offered several designs over the years with the overall design of each type looking very similar to each other. Again weight, engine, transmission and some heights where the only real choices offered to buyers. ComEng only made one 0-4-0 and a couple of 4 wheeled locos. The mainstay of locomotives produced where of the 0-6-0 wheel arrangement.



L-R. 4 wheeled GA model, Fairymead mills "72"; 0-4-0 CA model Invicta mills "Invicta"; 0-6-0 AA model Moreton mills "Jamaica".

EMB on the other hand built its locomotives around the buyer's specifications, by offering a variety of engines, transmissions, weights and overall lengths and heights. They also built several locomotives equivalent to Clyde and ComEng lengths and running gear for mills who operated all Clyde or ComEng fleets and who required a loco similar to their designs. Several locos they built where built on the frames of locomotives from other or closed narrow gauge systems, such as the Snowy Mountains Scheme, thus saving money in having to build new frames and running gear. As cane railway systems grew and the standard of track improved to handle the heavier and faster speeds that were been applied to them, so did the need for bigger and powerful locomotives. EMB answered this call in 1972 with a bogie cane loco for Kalamia mill. The unit weighted 26 tonnes and could travel at speeds in excess of 30km/h. Power was transmitted from a diesel engine to a hydraulic transmission which then supplied mechanical power to a reversing box which in turn supplied mechanical power via drive shafts to the bogies. This design of locomotive signaled the end of manufacturing of the ridged frame locomotive for Queenslands cane fields.

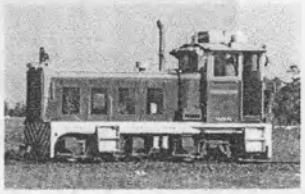



Locomtives built by E.M. Baldwin. (L-R) DH8-PS, "Albany" Victoria mill; DH12 "9" Plane Creek mill; DH20 "70" Fairymead mill; DH26B "Iona" Inkerman mill; DH24B "D10" Isis mill, DH32B "7" Tully mill.

EMB were also involved with the first remotely controlled locomotives to be used in the sugar industry. In 1975 Baldwin's delivered three 26 ton bogie locomotives fitted with locotrol equipment designed by the Sugar Research Institute to Bingera sugar mill. The locomotives operate over the mills Wallaville line with a "master" unit at the front and an unmanned "slave" located midtrain. A couple of Mackay sugar's Baldwins have also been fitted with locotrol equipment.

ComEng was the only other locomotive manufacture to build and offer a bogie cane loco during the Seventies. The unit classed model NA was built for the now closed Cattle Creek mill at Finch Hatton, near Mackay. Unfortunately for ComEng it proved to be a one off, and they received no more orders for their bogie loco.



ComEng's only bogie locomotive. Now based at Racecourse mill carrying the name "Finch Hatton". Photo by T. Badger.

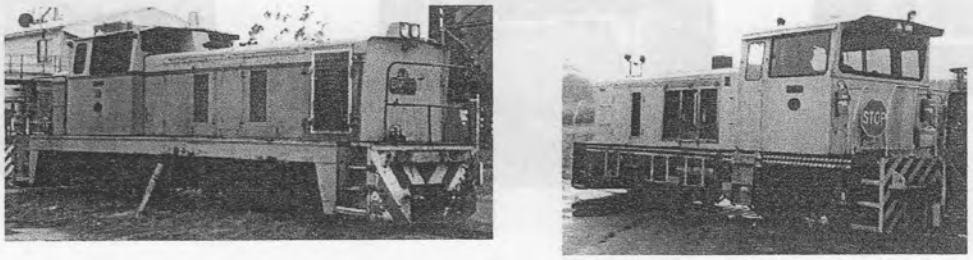
As the price of sugar fell during the late Seventies and early Eighties, sugar mills couldn't afford to buy new locos. This in turn had an effect on the manufacturers who relied on these orders to survive. It wasn't long before manufacturers started shutting up shop. ComEng built its last cane locomotive in 1977 (Cattle creek No 4), Clyde built its last in 1975 (D9 Isis mill) and EMB in 1983 ("No 7" for Tully mill).

As sugar prices and growing areas increased mills started to look once again at replacing their older locomotives with newer units. By this time ComEng no longer existed, Clyde weren't interested and the rollingstock side of EMB had been sold to a company that built underground mining locos.

A Sydney based company by the name of Eimco Australia built 3 bogie locos for Marian mill and 1 for Fairymead mill (which was latter sold to Farleigh sugar) in 1990. A copy of the Eimco locomotive

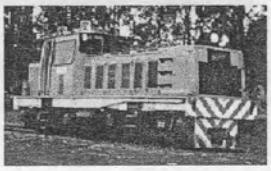
was built under licence by Prof Engineering of Zimbabwe for Sth Johnstone mill. This loco proved to be a real lemon and has been rebuilt several times by Eimco and the mill. It now performs well.

The 3 Marian mill units are fitted for slave operation.



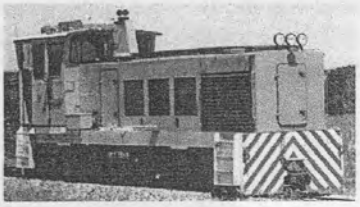
L-R. Eimco loco "19 Narpi" of Marian mill; Prof Engineering (rebuilt) loco "Nyleta" of Sth Johnstone mill.

Bundaberg Foundry Engineers Ltd (BFE), built 2 very similar bogie locomotives under licence from the British firm of Hunslet. One locomotive was built for Fairymead mill and the other for Babinda mill. These are so far the only "new" bogie diesel locomotives built by BFE.



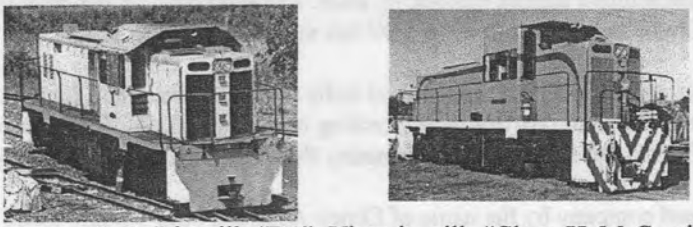
Fairymead mills BFE built locomotive "Booyan".

Westfalia Becorit, under the name Westfalia Baldwin, who obtained the rollingstock side of EMB, built a new bogie locomotive for Invicta sugar mill in 1991. Known as "Strathalbyn" on the mills roster, this loco is a "modernised" and improved version of EMB's earlier bogie locos.



Invicta Mills "Strathalbyn"

Around the early 90's, several mills where looking for a cheap way of obtaining a new loco and it happened that the Queensland and New South Wales Government railway systems were disposing of their Walkers built Bo-Bo shunting locos for a very cheap price. June 1991 saw the first regauged former QR DH loco enter service at Isis sugar mill. Another followed for Victoria mill. These conversions where undertaken by their original builder, Walkers Ltd. It was a simple conversion, with reguaging from 3'6" and lowering the coupler height.



L-R. Isis mills "D1"; Victoria mills "Clem. H. McComiskie".

These conversions proved to be a success and soon other manufactures, like Bundaberg Foundry and Tulk Goninan where offering conversions. These conversions would include new cabs, engines and running gear. Several mills have also converted these locos in their own workshops. Needless to say the first 2 orignal DH conversions were later rebuilt to match later conversions. Some of these conversions have been fitted out for slave and driver only operation.

L-R. Isis mill D3, former QR DH18; Farleigh mill "Ceaders", former NSWSRA 7331; Invicta mill "Scott", former NSWSRA 7310.

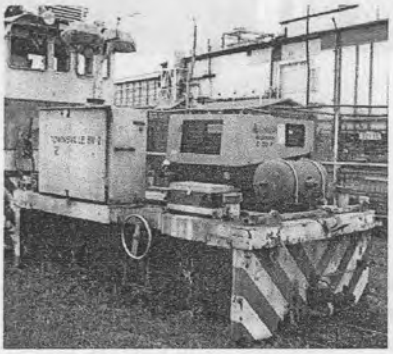
As stated before, no one cane loco is the same as another, as over the years the mills have added bits and pieces to suit local conditions. An example of this was the replacing of Clydes cabs with ones made by EMB and other manufacturers, in order to give crews a better sound proof cab. Several locomotives that have suffered damage in major derailments or crashes, have been returned to their original or another manufacturer for rebuilding.

Brakevans

Mills use brakevans (or brakewagons as some mills refer to them) to provide additional braking to the rakes of cane bins, so mills can operate longer and heavier trains and to provide added braking on lines that have steep grades.

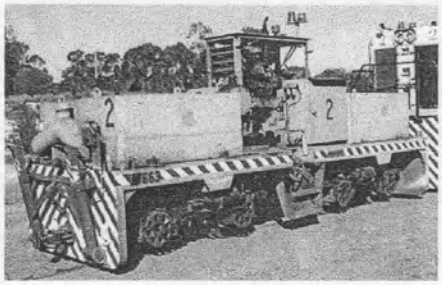
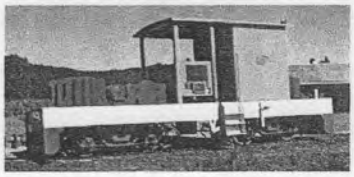
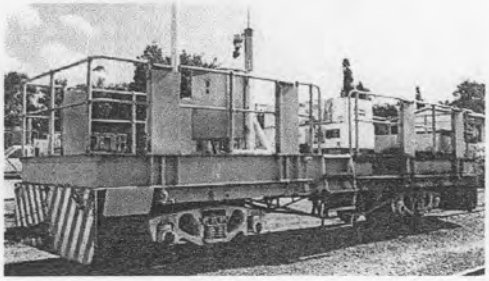
A brakevan is simply a weighted chassis on wheels with a motor driven air compressor on top to supply air for the brakes. Several cabinets are mounted on the vans to contain the control valves for the air, and to house the radio and electrical equipment. The application of the brakes on brakevans, is made from a control panel in the locomotive cab, and transmitted to the van by radio signal. Brakevans vary in weight from 12 tons to 32 tons depending on what the mill requires.

Clyde Engineering constructed the first canefield brake van in 1965 for Hambledon mill. The other 2 major cane equipment manufactures at the time followed soon after with, Commonwealth Engineering (ComEng) building their first in 1967 for Victoria mill, and E.M. Baldwin in 1973 also for Victoria mill. All these brakevans were constructed around a rigid 6 axle chassis.


L-R. Clyde van, Victoria mill; ComEng van, Victoria mill; EMB van, Macknade mill.

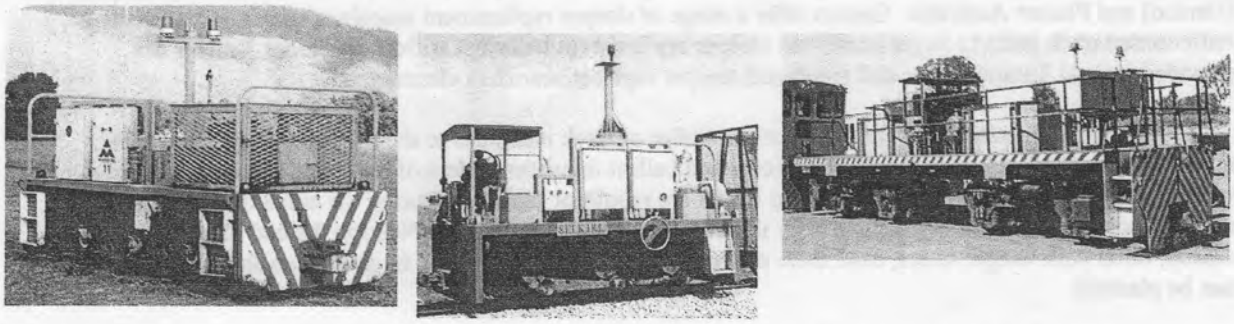
The first bogie van appeared in 1986 and was built for the Isis Central Sugar Mill by Hexham engineering, after they acquiring the rollingstock manufacturing side of E.M. Baldwin. This van was designed around the chassis and bogies of EMB's bogie cane locomotives. With the introduction of the first bogie van in 1986, mills started to construct their own bogie vans using bogies supplied by F & M Baldwin. Several mills and small engineering firms such as Solari of Ingham, made brake vans using old QR bogie goods wagons. The HJS type bogie wagon has been a popular choice for this conversion.

L-R. Hexham-Baldwin van, Isis mill; Tully mill built van; Plane Creek mill built van.

With declining world sugar prices, mills had to look at cheaper ways of obtaining brakevans.

Several mills chose to convert surplus 0-6-0 locomotives to brakevans by removing everything above the frame and adding a compressor. The first conversion took place at Invicta sugar mill in 1982, from a surplus ComEng 0-6-0 locomotive. Isis mill converted a former QR DH locomotive into a brake van.

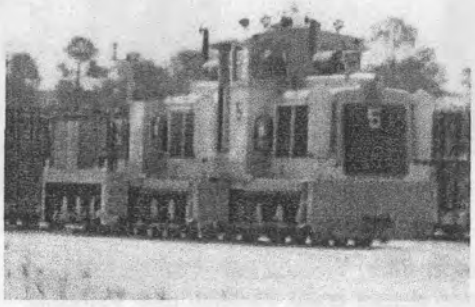


L-R. Former Drewry locomotive, Mulgrave mill; Former ComEng locomotive, Invicta mill; Former QR DH locomotive, Isis mill.

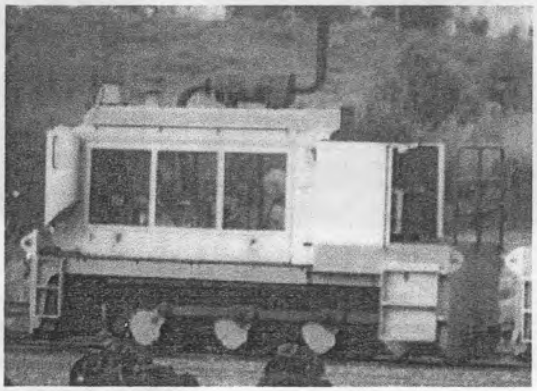
Over the years, brakevans have been modified to allow extra equipment to be fitted or repaired after damage. Just like the locomotives used throughout the canefields, no 2 brakevans are the same in appearance.

SLUGS

Isis Central Mill experimented with slug or calf locomotives in the early 80's. They removed the cabs from 2 of their Clyde DHI-71 locos, added control jumper cables and ran them in Cow and Calf arrangement. Again the conversion was successful, but Isis was the only mill to do it. These 2 calfs, along with all the mill's DHI-71's where sold to sugar mills in Fiji in 1994.



Isis mill loco D5 with former loco D3 and Van No 1 at Maminos siding.



Former Clyde DHI-71 loco D3 as Converted to a "slug" unit.

Photos courtesy of Brian Bouchardt.

Track Maintenance Equipment

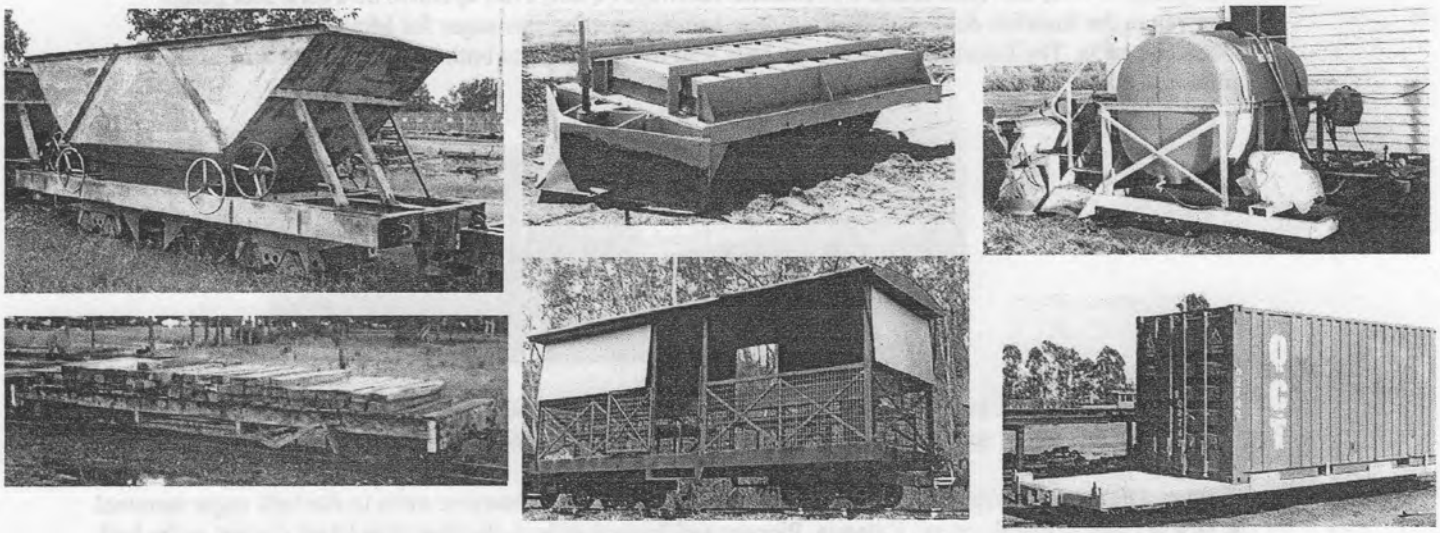
Over the years mills have invested in specialized track machines to keep their track in A1 order. Like their bigger cousins, mills now use machines for tamping track, changing sleepers and ballast regulating. There are 3 major manufactures that offer specialized track machines, Gemco, Fairmont Tamper (Harsco) and Plasser Australia. Gemco offer a range of sleeper replacement machines ranging from small railmounted track jacks to larger combined sleeper replacement/ballast scarifiers. Fairmont Tamper has provided several Tamper liners and combined sleeper replacer/scarifiers cleaners.

Plasser Australia is by far the biggest supplier of track machines to the sugar industry. They offer smaller versions of their mainline tamper liners and ballast regulators. Most of these machines see a lot of work during the slack when new or existing tracks are rebuilt or replaced. During the crush these machines are used when tracks require attention after derailments or weather damage. Nearing the end of the crushing season, mills with tamper liners, send them out to record the condition of the trackwork so slack matinace can be planned.

L-R. Gemco trackjack, Moreton mill; Plasser KMX-12T tamper liner, Victoria mill; Canron ballast regulator, Marian mill; Gemco sleeper renewer, Isis mill; Harsco sleeper crane, Farleigh mill; Fairmont Tamper sleeper replacer, Farleigh mill.

Navvy Wagons

All mills have some type of navvy or work wagons. These can range from ballast hoppers and plows, flat wagon's, shipping containers mounted on bogies to passenger carriages. As most navvy wagons are made by the mill for their own specific use, no one wagon is the same as another. Some navvy wagons were even acquired from former non-sugar tramways, like the Burrinjuck Dam, Mapelton and Innisfail tramways. The following photos show a small selection of navvy wagon's that can be found.



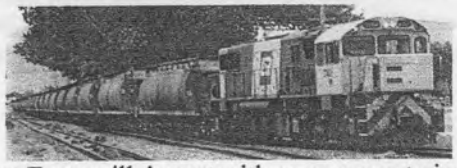
L-R. Bogie ballast hopper, Proserpine mill; 4 wheel ballast plow, Inkerman mill; 4 wheel weed sprayer, Bingera mill; 14 ton bogie cane bin frame fitted with a 20 foot container, Farleigh mill; Bogie passenger wagon, Marian mill; Bogie flat wagon ex Burrinjuck Tramway, Fairymead mill.

Queensland Rail's Involvement

Queensland Rail (QR) have been used for many years to carry cut sugar cane from the fields to the mills, but as the mills increased their tramways into the areas that were covered by QR, that need ended. Plane Creek sugar mill at Sarina was the last mill to receive cane by QR in 1994. QR or as it was known back in the 1900's, the Queensland Government Railways (QGR) even operated its own 2 foot gauge tramway in the Innisfail district, delivering cane and transporting raw sugar for Mourilyan and South Johnstone mills. The Innisfail tramway was later sold in the 1970's to both Mourilyan and Sth Johnstone mills.

Former QGR Innisfail Tramway locomotives DL15 "Nerada" and DL14 "Johnstone" work a raw sugar train to Mourilyan harbour. Photographer Unknown.

QR transports raw sugar from Plane Creek, Marian and Proserpine mills to the bulk sugar terminal at Mackay and from Inkerman, Kalamia, Pioneer and Invicta mills in the Burdekin (Ayr) district to the bulk sugar terminal at Townsville. Other mills who used the Government railway have changed over to road transport. The transport of raw sugar is done during the crushing season.



2182F arrives at Townsville's port with a raw sugar train from the Burdekin.

Molasses is another sugar by-product that is transported by QR. 3 mills in the Burdekin area, Inkerman, Kalamia, and Pioneer ship their molasses to buyers in special purpose molasses wagons. Molasses transport takes place all year round.

3915 passes through Oakwood with empty molasses wagons.

Babinda mill (and Mulgrave mill when required) receives Sugar Syrup from the Tableland mill at Arriga near Mareeba by QR in former molasses wagons. Tableland mill is a "mini mill" in that it only crushes the cane to extract the juice. The final process of turning the juice into raw sugar, been carried out at Babinda mill. 1761D is seen at Deeral with a syrup train bound for Babinda mill.

REFERENCES AND ACKNOWLEDGEMENTS

REFERENCES

Various editions of Continental Modeller
Various issues of the Australian Model Railway Association (AMRA) Journal
Various editions of the Australian Model Railway Magazine (AMRM)
Australian Diesel Scene 4 & 5. Published by Eveligh Press
Queensland Sugarcane Railways Album by R. Gough and B. Webber. Published by the Authors.
One For The Road by A.K. Roberts. Published by the Author.
Wheels In Motion by A.K. Roberts. Published by the Author.
Various editions of Sugar Research Institute (SRI) publications.
Safe Operating Practices For Cane Railways. Published by the Australian Sugar Milling Council
Various editions of Light Railways. Published by the Light Railway Research Society.
Various editions of Bulletin. Published by the Australian Railway Historical Society.
Various editions of Railway Digest. Published by the Australian Railway Historical Society, NSW division.
Locomotives of Australia by L. Oberg.
Motive Power by L. Oberg.
Various editions of Sunshine Express. Published by the Australian Railway Historical Society, QLD division.
E.M. Baldwin locomotive and brakevan operating manuals
Clyde locomotive operating manuals.
Walkers locomotive operating manuals.
Various issues of The Turntable Newsletter. Published by The Turntable (QLD)
Various issues of Motive Power Magazine
Various issues of Australian Loco News
Australian Railway Association (ARA) Inc. Yearbooks. Published by the Australian Railway Association Inc.

ACKNOWLEDGEMENTS

Thanks goes to the following who have over the years have expanded my interest in cane railways.

T.Badger, L.Driver, G.Driver, P.Ford, L.Zelmer, C.Hart, E.Millington, T.Millington, J.Browning, M.Green, P.Henderson, G.Hadley, and the members of the CaneTrains email group.

A special thanks goes to the locomotive and service crews at Isis Central and Tully sugar mills.

For more information about modelling cane railways visit the Cane Railway (Tramline) Modelling Special Interest Group, CaneSIG at **www.zelmoroz.com/canesig**