Queensland Sugar Industry

Queensland's cane railways (tramlines) annually transport in excess of 24,000,000 tonnes of cut sugar cane over 3,500 plus kms of mostly 2' (610 mm) gauge privately owned track. Raw sugar is one of Australia's largest export crops; road and rail transport is 30-40% of the total milling cost.

Sugar cane, a tropical grass with a fibrous stalk, 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 each cut length of mature cane planted in well-spaced furrows to allow for mechanical cultivation. The cane is grown for 12 to 16 months before being harvested in the second half of the year.

Flood irrigation from a pump/pipe system. Flowing surface water, whether flood, canal, weirs, etc., requires carefully graded fields and surplus water retrieval (perhaps a pond).

Spray irrigation; note wind drift and metal pipe from supply,

The dual cutters on this harvester (above) raise up and down to cut the leafy tops off the cane. The roller mechanism guides the cane into the billet cutters. Leaves and other trash are blown out the back while the billets are dumped into a bin or in-field transporter moving along beside the harvester.

Single bin trailer with metal 'pan'. The trailer is backed into the ramp; the hinged rail ramp lifts so the bin can be transferred to/from the rails. Note the large metal springs near the hinge and the tire which prevents the ramp dropping too close to the ground for the guide pan.

Green cutting of cane removes the leafy tops as the stalks are cut near the ground and chopped into 25

cm long billets. In some areas the cane is still burnt prior to cutting to remove leaves and weeds. In either case, the billets must be transported to the mill within 24 hours to obtain the best quality sugar. Rail provides the most economical means to do this.

Cane billets are often directly loaded in the field into 4-6 ton rail bins carried on trucks or trailers, then hauled the short distance to the farm siding for transfer onto the tramline. Recent developments include self-propelled dumpsters carrying the cut cane from the field to waiting rail bins as well as much larger rail and truck bins.

Single bin trailer with loading ramp so that a special rail transfer facilities are not required. This trailer's ramp drops over the rails and the bin is rolled directly onto the rails.

Winching bins onto a 2 bin trailer at a farm transfer point. Note the large timber bumper on the tractor (next column), which is used to move the bins while on the rails. Hitting the bins too hard is a frequent cause of bin damage.

Although recent mill consolidation has led to more uniformity, each line's equipment has been somewhat unique as the tram lines are owned by the individual mills. For many years the tram lines were lightly built and poorly maintained with temporary track laid right into the fields. Today they rank among the world's heavy haul railways; track-work standards often equal or exceed those of traditional railways, and train lengths/tonnage and locomotive power have increased significantly.

Cane railways in Fiji operated much the same as their Queensland counterparts, notably those owned in common by CSR (Commonwealth Sugar Refineries). Other overseas lines (Cuba, Indonesia, etc.) may still use steam locomotives and/or wholestick handling.

Locomotives and Bins

Given the nature of the industry it is not surprising to find that while some locomotives have been purpose built, others are standard industrial locomotives. Steam was phased out in the 1960s, recent acquisitions have often been rebuilt (and regauged) mainline locomotives from NSW or Queensland.

Morton Mill's 0-6-0T Eudlo on display at the Mill's park.

Diesel locomotives are generally brightly painted for safety reasons and, until recent mill consolidations, had individual mill colour schemes. The locomotives will be hung about with brooms, chains and rerailers, end-of-rake markers, chocks, and other equipment. As well, they will have at least one flashing roof light and a radio antenna.

First generation Malcolm Moore locomotive, similar to those at the Australian Narrow Gauge Railway Museum (Woodford) and most recently used for maintenance work. Note the yellow flashing safety light on the roof.

St Helens (Farleigh Mill, Mackay), an 0-6-0. Note the end-of-rake markers and wooden wheel chocks on the side of the loco, plus the air conditioner and flashing lights on the roof.

A newly delivered (early 1990s) EIMCO locomotive, the last of the purpose-built locomotives.

Cane bins do not have brakes, thus the locomotive(s), and perhaps a radio-controlled brake van at the rear of the rake, provide the necessary braking power. Some lines double-head their locomotives, others use radio-controlled slave locomotives in the centre of a long rake.

Mackay Sugar brake vans with flashing lights for visibility. Brake vans are essentially heavy weights with a small engine for powering the radio-controlled air brakes.

Bins were typically designed to transport either 4 or 6 tons of cut cane billets (the use of whole stalk cane ended in the 1960s). Each mill had its own construction design, although the use of different materials and periodic maintenance resulted in quite distinctive bins over time. Sides and ends are normally constructed to be folded down or replaced in a single piece; bin floors are commonly corrugated metal sheets.

CSR-type wholestick cane truck (at ILLRS museum)

Three different four ton bins: now operating together they originally came from different mills. The boards on the top of the middle bin extend its capacity. Some bins had one solid side to make dumping easier.

A older style 4 ton bin in rather sad repair. Note the extended top, welded corner braces and tubular frame.

A 6 ton bin is the same height and width as a 4 ton bin, just longer, so that three 4 ton bins will fit into a mill's rotary dumper in the same space as two 6 ton bins. Bins normally have safety reflectors or reflective paint on each side to make them more visible to motor vehicle drivers. The mills are now experimenting with 10 ton or larger bins which will never leave the track, thus will not sustain the same damage as the smaller bins trucked into the fields.

Pleystowe Mill's new extended bins, roughly ~15 ton load, on a well-graded main line leading to the mill. Note the concrete culvert under the upper bin.

The cane lines both transport the sugar (cane billets, juice, refined sugar, molasses, mill mud, etc.) and provide a storage system for cut cane and empty bins during the crushing system.

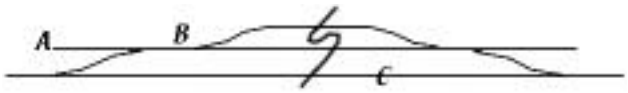
Harvesting contractors (or growers, if they cut their own cane) cut only enough cane to fill the daily quota of bins delivered by the mill. Cane ages very quickly after cutting, thus full bins should be moved to the mill within 6-12 hours, providing a smooth flow of cane for the milling process.

South Johnstone Mill canetainers (above) being transferred from road to rail for a short trip into the mill.

Cane deliveries are controlled with a system of bin tickets (consignment notes) identifying the source of the cane. This ticket accompanies the bin to the weigh scale and follows the cane into the mill where sugar content and other quality control tests are performed before crushing.

Sugar juice train at Gordonvale, Oct 1999.

Smaller mills may crush only, shipping the resulting juice to a central mill for further processing. Refined sugar, molasses, cane mud (milling residue used as fertiliser) and the cane fibre may also be transported by rail from the mill.



Simple farm siding (above), ~500 m long, in level country. Loaded bin delivery ramp A is roughly 450 mm above the through road C; B is roughly 300 mm above C, with the elevation falling off to the empty pick-up ramp at right.

The hinged rail units at the delivery points are ~2 m long, with a welded cross piece to maintain the gauge ~1 m from the hinge, and are propped on old rubber tires.

The through road is lightly ballasted with gravel. The others are grass and trash covered, with standing water in the wet season. A shire-maintained gravel road parallels the siding, separated from C by a shallow drainage ditch.

More sophisticated farm sidings and pickup points are described in the next section.