

Modelling Cane Railways

A C Lynn Zelmer, CaneSIG coordinator

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Modelling
a Sugar Mill
Interior

CaneSIG: <http://www.zelmeroz.com/canesig>

Modelling a Sugar Mill Interior by Luis Dominguez

Introduction

This article looks at another work in progress. It's in HO by an American modeller who suggests that he's not an experienced modeller and does not consider himself more than average, lacking the experience and manual dexterity of people who have been modelling all their lives. I don't think he needs to apologise for his modelling abilities, but he says...

Seeing the work done by Australian modellers, my work is not of that quality. That's the reality. But, sometimes the best person is not the one who gets the job; it's the one who is available.

Luis starts by describing the scope of his model and the sources of inspiration, followed by some notes on how he accomplished specific parts of the model. Photos of his model follow from page 3, with more to come as his sugar factory progresses.

The Project and Sources

The model is in HO scale. I am modelling only the sugar factory. The floor plan is 13-1/4" (33.65 cm.) x 36" long (91.44 cm.) long. Everything is made from styrene, plus a lot of brass rod and tubing, mostly 1/16" (.16cm.) outside diameter.

The first and main source for the project has been Manuel Diaz-Ceballos, a Cuban national who is probably Cuba's best railroad historian and an incredible modeller.

It's too bad that Manuel and I could not build the mill together; it would have been far better and more prototypical. He has scratchbuilt HO and O scale models of contemporary Minaz and FCC diesels that are unbelievably prototypical and has done so with minimal equipment.

Other sources include a book by Oliver Deerr (not a misspelling!), the so-called Gilmore Manual of the Cuban Sugar Industry (I used a mid-1950s edition), the ASME Catalog and various books on boilers, stationary steam engines, etc.

There will be a conveyor coming from the floor of the centrifugals to a warehouse, to represent that some of the sugar was stored bulk and to open the possibility of using airslide hoppers that Manuel (see below) says started to be used in the mid-50s.

The mill omits some of the recirculation processes (no data on them), all masseculte and first molasses storage tanks inside the factory, and some of the

crystaliser devices. The crushers are significantly smaller than true to scale because (a) the model would get much bigger and (b) I was unaware until recently that Plastruct made plastic geared wheels that might have been suitable approximations. I would say that all machinery is about 20-25% reduced but that is not a precise number.

Since Cuban mills do not seem to be standardized, the model being free lanced did not seem to be too much of an issue. The boilers are heavily based on those that existed in two large mills, Central Tinguaro and Central Moron (In Spanish the word means knobby hill as well as the derogatory term for mental retardation). However, those mills had as many as nine enormous boilers.

The centrifugal comes from a good illustration in an ad appearing in the Gilmore Sugar Manual. The clarifier, filters, evaporators and condenser are based on diagrams and description in the Deerr book. For the evaporators and condenser, I picked the versions in the Deerr book that were most suitable to modelling with shampoo flasks; not very scientific but workable. So, the model is quite a mutt, but in many ways that is what Cuban mills became as they gradually modernized.

Manuel sent me many images from a book by Hulot and images from one of the western mills that has been turned into a Cuban sugar museum. The problem with the museum is that it is not a working museum and the all important connections between machinery, regulators, gauges, etc seem to be missing.

The UK based International Steam Society has some videos of mills in Java but I have found it very difficult to use them as the basis for modelling. They do not explain much about the machinery and seem to be more concerned with showing pictures and pointing out names of manufacturers -- I guess they assume a high level of knowledge about machinery.

The videos and photos in the Industrial Steam web site helped a lot in visualizing equipment. So have Manuel's pictures. For technical detail, my sources have been Oliver Deerr, Cane Sugar (an early 20th century book), the ASME catalog, a Loyd's book on Cuba dating to 1913, at the apogee of foreign direct investment, and a book called "Libro de Cuba" (Cuba Book), a sort of pictorial of the island pub-

lished twice, once in the 1920s and again in the 1950s.

Modelling the Mill

As of now, I have built all the major equipment that seemed to me had to be included in a credible model. It is a very compressed model, as you will see from the small number of tandems, evaporators, boilers, etc. Even then, it is a rather massive structure of approx 12-1/4" (31 cm.) x 36" (91 cm.). The front half will be taller than the rear portion.

By 1950s Cuban standards this would have been a small mill. It attempts to represent a mostly steam powered mill that uses its bagasse for fuel. I am pondering the addition of a large diesel (basically a readily available model of a GMD engine) generator. The tandems are fewer and smaller than typically found; otherwise the model would take a lot of space.

A lot of the machinery is powered by electric motors, thus representing a mill that has done partial modernization (e.g., of the clarifier and the centrifugals).

The model is not only compressed (probably around 20-25%) but also simplified; for instance, many of the recirculation lines and the first molasses tank(s) were left out; I also did not represent bagasse stokers.

The boilers were made from parts from SS Ltd kits, plus a number of scratchbuilt styrene parts. The steam and hot water lines are 1/16" (0.16cm.) diameter rod. Most of the elbows and connectors are made from brass tubing that telescopes onto the 1/16" rods, and from 0-80 stainless steel washers. In some areas I used connectors made by SS Ltd or by Western Scale Models (who unfortunately are no longer making HO pieces).

The tandems were a nightmare to make; I spent months on the project and am still not happy with the THIRD (!) version. The gears came from the people at Crow River, who, like SS Ltd, have been very patient with me. The tandems are based on an actual prototypical diagram of an early 20th Century steam powered tandem; however, the gears are about 75% of what their actual size should have been. I still have to add roller bearing details to some of the tandem axles.

The Corliss engines are from Rio Grande Models, the larger Allis Chalmers twin cylinder model is from Western Scale Models, and the steam power for the vacuum pump is from an AMB kit.

The evaporators and the one condenser were made from hotel shampoo bottles - not very creative but they seem to be OK. That is the part of the model that I am least pleased with; I may revisit it. The tandems took a long time to create, maybe a month to a month and a half; it is based on an actual prototype in the Cuban Sugar Manual 1957.

Besides not having accurate measures of anything, the biggest challenge has been the lack of information on control and recording devices; the Oliver Deerr book, for example, has excruciatingly detailed information on filters, clarifiers, crystalisers, evaporators, but next to nothing on the attachments. Looking carefully at some photos, I have put some "credible" gauge panels by some of the machinery.

The Dorr-Oliver filter is, needless to say, scratch built, as are the evaporators, condenser, centrifugals, etc.

At this point I have connected the steam lines going to the steam power plants. The boilers also have hot water lines; those are still to be connected to equipment.

My next tasks

- glue the model to foam board - check each piece of machinery for blemishes, missing paint, etc.
- connect to the steam and/or water pipes as required - install the bagasse conveyor (designed to fit around the building columns)
- install gauges on the boilers - finish all the plumbing for the evaporators and condenser - weather the floors and machinery
- install columns and roof supports - hang 1.5 volt lights from supports
- build water and molasses tanks (sugar warehouses already done)
- build the roof and walls. The walls will have many industrial tilt-out windows (Tichy) that can be modelled as open; this represents the tropics, not Illinois. Windows have to be open
- weather the structure

(I've just realized that it's going to take through most of the rest of the year to do all this!).

Manuel made several standard gauge cars, absolute jewels, for me years ago and I am planning to build six of three different types based on photos from ACF and Magor.

What seems to be an impossible challenge is to model the cane. I am probably going to use imitation cut sugar cane made from a cut up reed broom. A couple of years ago one of your colleagues in CaneSIG graciously sent me links to some modellers who were attempting to model the cane. It seemed like terrific modelling, but very difficult.

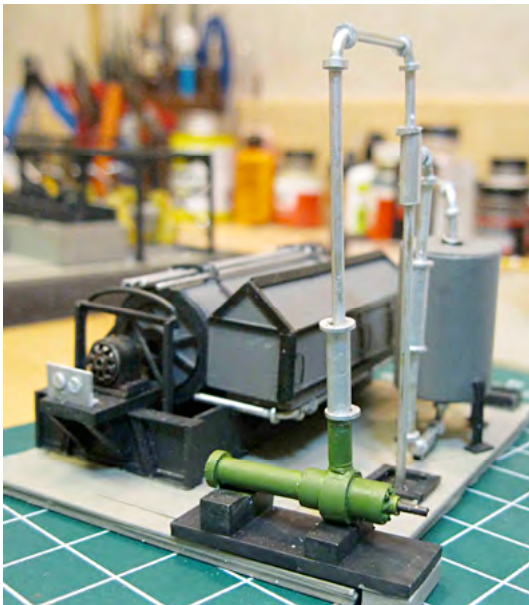
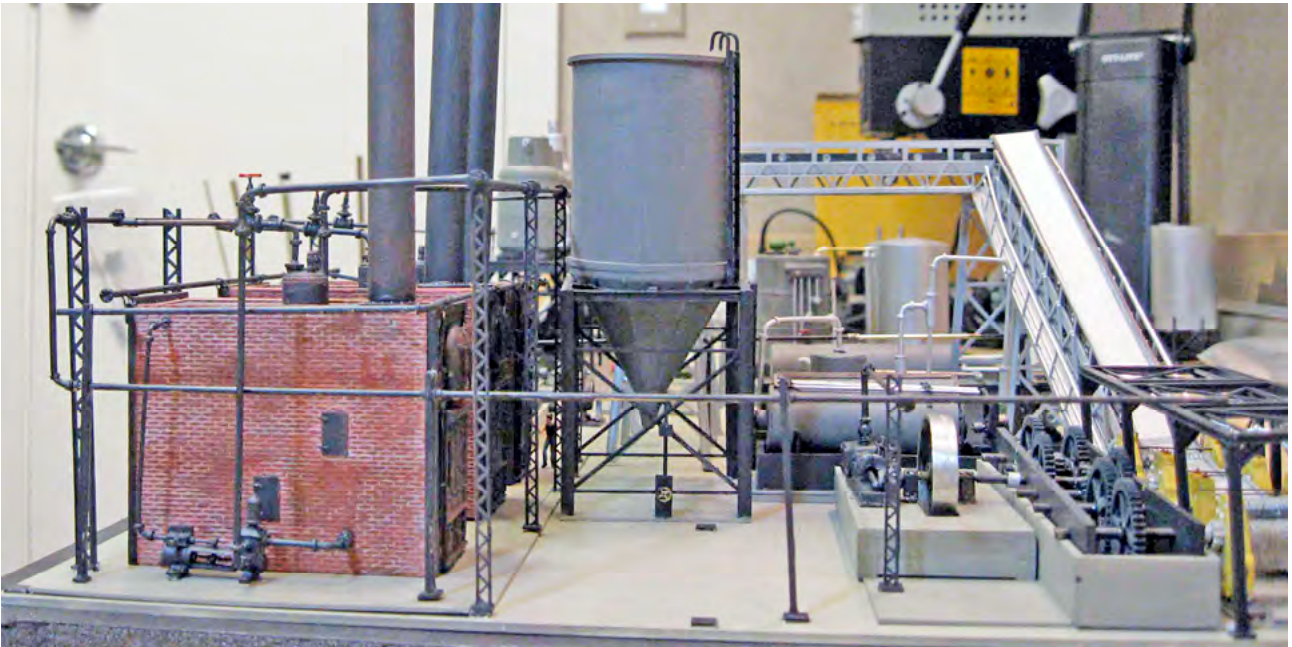
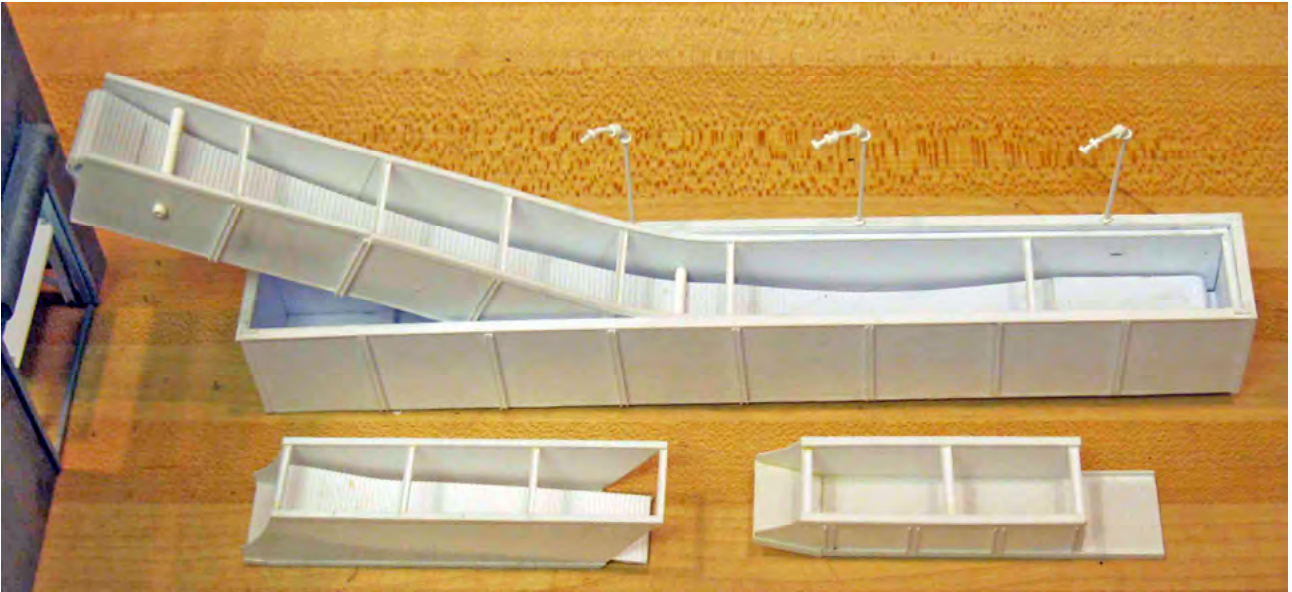
To be continued...

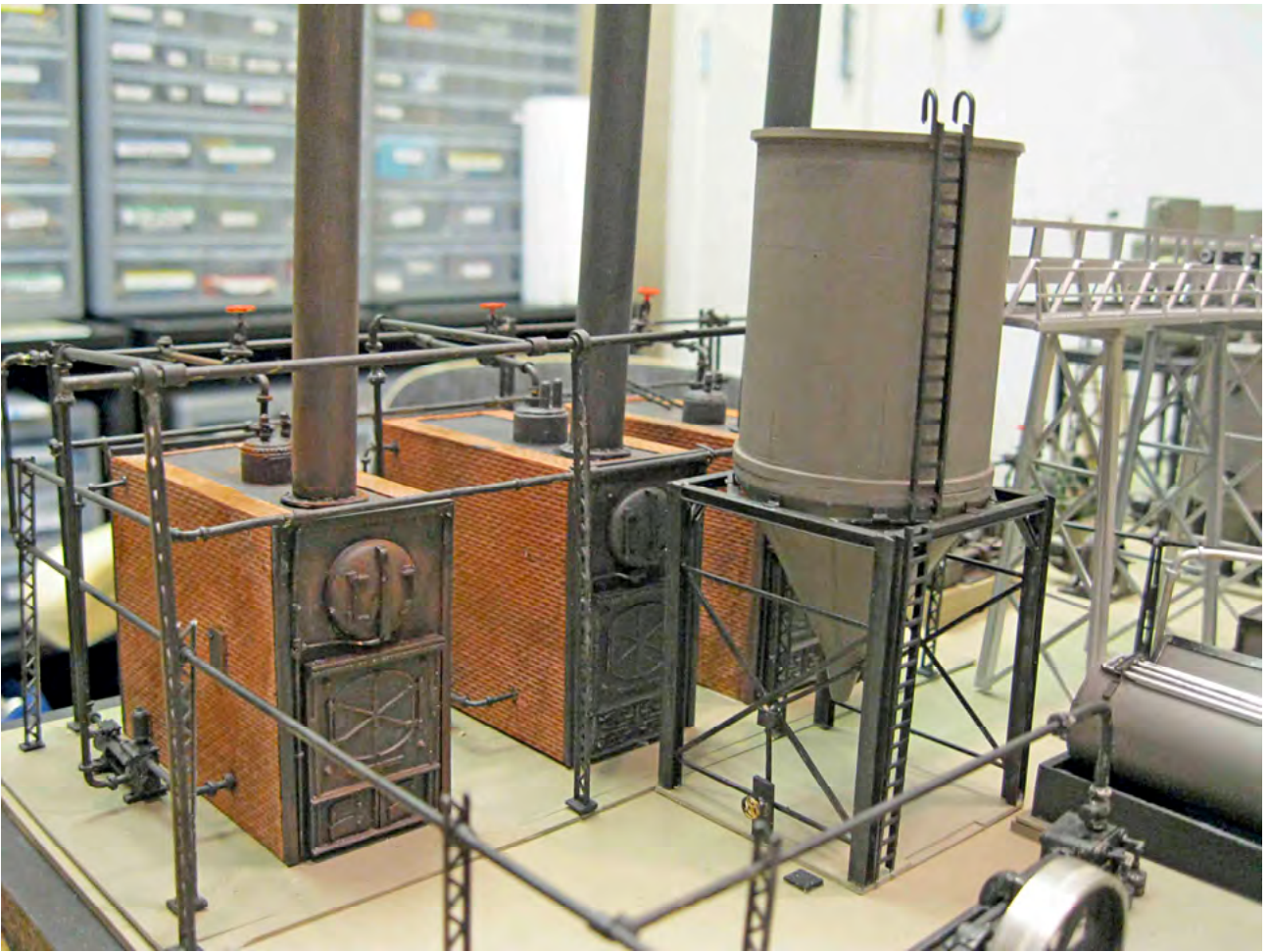
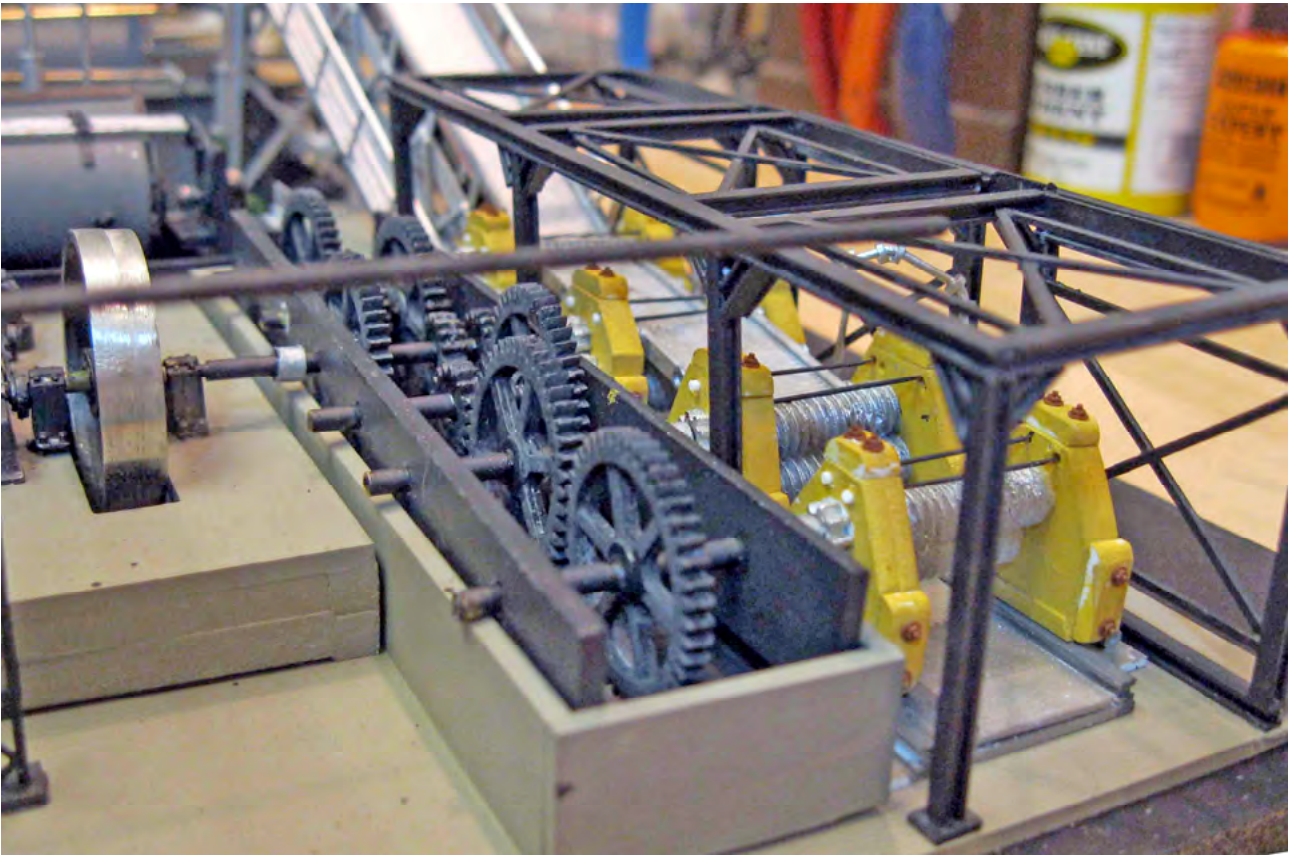
Further Information

The CaneSIG Image Collection contains very few images of mill interiors. Using *mill interior* as a search term will retrieve photos of a Queensland sugar mill during the 1970s. *RefOp* as a search term will retrieve more modern images of a US refinery.

http://www.zelmeroz.com/album_query/_search.php

Boilers and Tandem

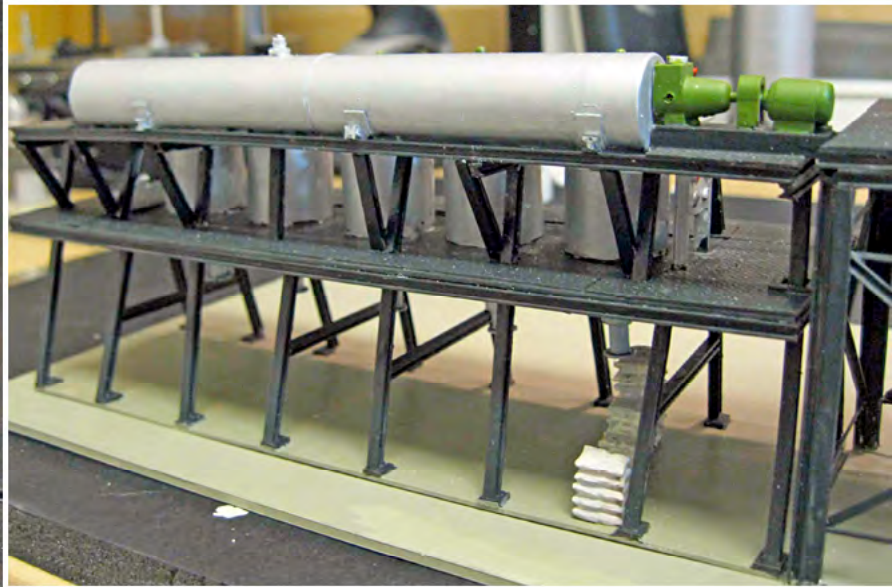
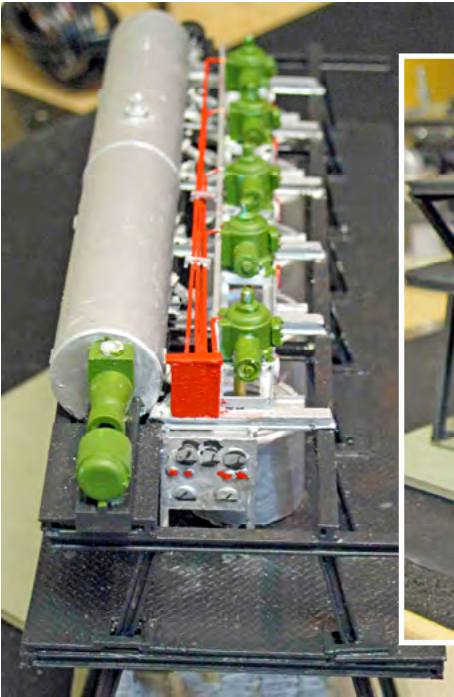
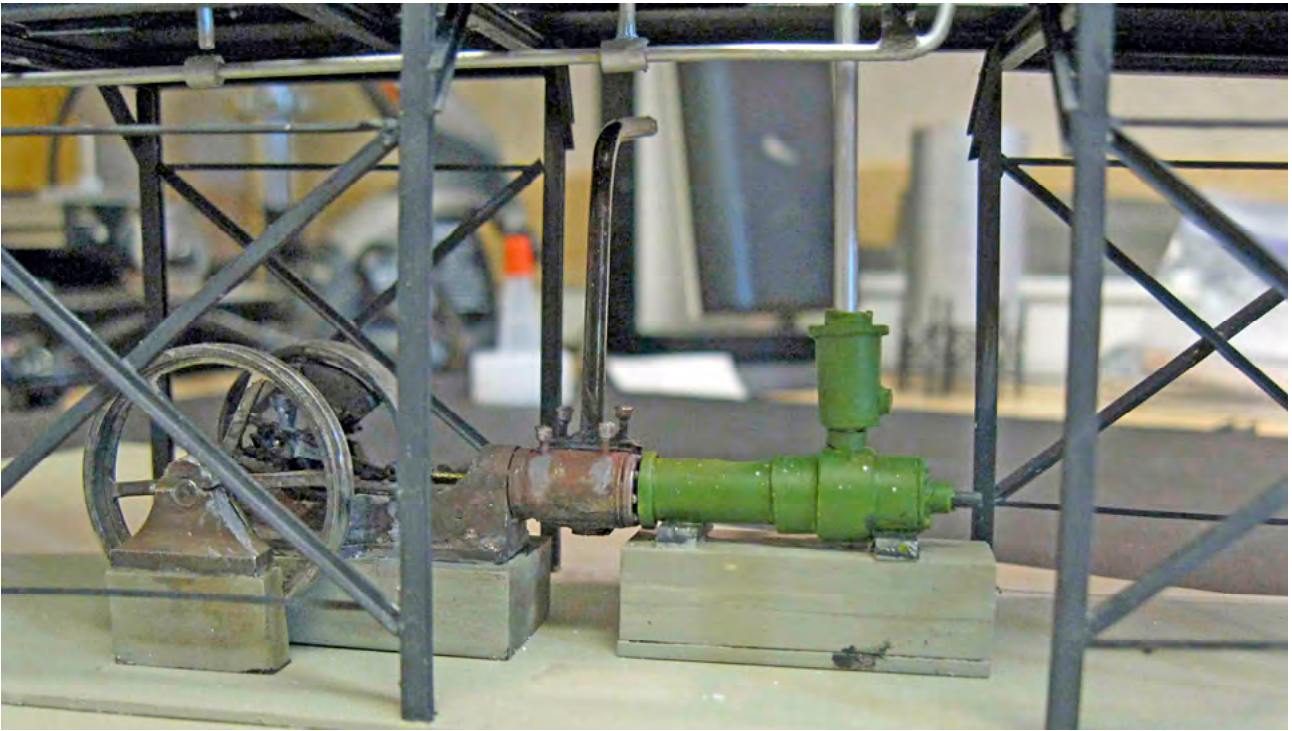






Evaporators, Condenser and Centrifugals





Filters, Clarifier and Crystalliser

