Notes for use of "S&C CATTLE DOCK <n> pens"

1. A cattle dock in the real world could not be considered an industry:
it does not employ a process to transform inputs into outputs.
Rather, it is a modal exchange where the mode of transport of a commodity changes from road to rail and vice versa.
However, to make this Trainz cattle dock interactive with rail vehicles,
it conforms with the Trainz requirements to be recognised as an industry.
The industry makes no logical sense: multiple queues of cattle inputs produce multiple queues of cattle outputs.
From the game player's perspective, the industry process can be interpreted differently. Process-input unload queues represent cattle to unload from rail wagons to the dock for collection by road.
Process-output load queues represent cattle to deliver by road to the dock for loading into rail wagons.
Every 10 minutes (600 seconds process DURATION value set in config.txt)
a collection and/or delivery by road will occur. The size of each road collection/delivery is set by the process RATE values alterable in Surveyor.

2. Cattle unloaded from rail wagons are unavailable for loading into rail wagons.
Only cattle 'produced' by the docks as an industry output (i.e. brought to the docks by road for loading) can be loaded.

3. Cattle dock mesh attachment points for the cattle in the docks are the same for unloading and loading. The sequence for filling these attachment points for loading cattle is reversed with respect to unloading.
Conflicts will occur if the total number of cattle for loading and unloading for a pen exceeds the number of attachment points in that pen. End pens have 6 attachment points and other pens have 8.
A dock may be configured in Surveyor for loading and/or unloading.
A configuration that enables both loading and unloading is not recommended, but is allowed. For loading only, set the load queues' process rates and initial counts to non-zero and those of the unload queues to zero. For unloading only, set the unload queues' process rates non-zero and initial counts to zero. Set all parameters of the load queues to zero.

4. The spacing between pen gates on the rail side of the docks has been set to allow simultaneous alignment with the doors on adjacent 4-wheel cattle wagons.
Typical of this wagon type is BR 8T Cattle Wagon <kuid:44090:15070>.
Longer cattle wagons - for example, those with bogeys - will have to be loaded/unloaded one at a time.

5. Cattle docks are commonly located on sidings rather than on loops or main lines.
This ordinarily presents a problem for the operation of AI LOAD and UNLOAD commands which require the consist to drive through the industry onto track beyond it equal in length to at least the length of the consist plus 10-20 metres.
The script for the cattle docks has been crafted to allow the operation of these commands when the dock is on a short siding.
There are 2 user-controlled parameters associated with short-siding operations that you must become familiar with. In Surveyor's 'Edit Properties' browser for the dock, scroll to the bottom.
There you will see the 2 added parameters:

PARAMETER 1: NUMBER OF VEHICLES ALLOWED BEYOND DOCK END

Note: (a) this parameter is only relevant for shunting movements to the cattle dock under AI control when the LOAD or UNLOAD commands are active. (b) the parameter calculation made below assumes the siding is terminated in a buffer stop with: (a) for TC3, an invisible signal, such as <kuid2:45324:24010:1>, immediately in front of it, or (b) for TS2009 and TS2010, invisible track that extends behind the buffer stop so that the total length of visible and invisible track beyond the dock end is 80ft and an invisible signal at the end of the invisible track.

By LHclicking on the underlined number in the browser, you will see the parameter value increment from 1 to 10, then rollover back to 1. The value should be set to the maximum number of vehicles (rounded down to nearest integer) that can be accommodated on the visible siding track beyond the remote end of the cattle dock. If less than one vehicle length is available beyond the dock end, the asset may still work with the parameter left at 1, but whenever AI is used to load and unload make sure the leading vehicle of the shunted consist can be serviced by the dock and that this service exhausts the capacity of the remote-end pen.

A typical length for a 4-wheel wagon is 7.5m, so the parameter value could be estimated by: length of siding beyond dock end in metres, divided by 7.5, remainder discarded. This assumes that any vehicle moving beyond the dock end is 7.5m or less.

If longer vehicles - locomotives or bogey wagons, for example - are expected to be shunted beyond the dock end using the LOAD or UNLOAD commands, then the parameter can be reduced accordingly. The parameter is used to abort the AI LOAD or UNLOAD command if its value is exceeded while one of these commands is active. This prevents the shunted consist being unable to proceed with its schedule and a "Waiting for track clearance" message being issued by the game.

To assess whether vehicles will move beyond the dock end during loading or unloading, it is necessary to know a little about how the cattle dock script works.

The script focuses on the trigger for the remote-end pen of the dock (the pen nearest to the end of the siding). Other pens are serviced by co-incidental or 'passive' triggering that occurs with positioning vehicles at the remote-end pen. As a vehicle is moved over this trigger, it is assessed. If a vehicle cannot be serviced by the dock it is allowed to pass beyond the end of the dock, and a counter is incremented. Once the counter equals or exceeds the NUMBER OF VEHICLES ALLOWED BEYOND DOCK END the LOAD or UNLOAD command is aborted. There are, however, other criteria that may terminate the commands prior to this:

(a) the dock is not configured for loading when the LOAD command is active or unloading when the UNLOAD command is active ('configured for loading' means the process output rates, set in the 'Edit Properties' browser, are non-zero for all the pens)

(b) the remote-end pen reaches a capacity limit (no longer able to load or unload);

(c) the number of co-incidentally-serviced vehicles added to those already beyond the dock end equals or exceeds NUMBER OF VEHICLES ALLOWED BEYOND DOCK END.

(d) the last vehicle in the consist is detected by any trigger.

Two examples may help to clarify. The first is where the consist for shunting is n 4-wheel cattle wagons propelled under the LOAD command by a locomotive and tender into a cattle dock with n pens. The cattle dock is configured for loading (all its process output rates are set non-zero) and each pen holds 5 cattle, equal to the capacity of each wagon. The leading cattle wagon is stopped at the remote-end pen, and due to co-incidental triggering by the prior 3 wagons, all 4 wagons are loaded simultaneously. The remote-end pen is now has zero cattle to load and so the LOAD command is aborted by criterion (b) listed above. No vehicle proceeds beyond the dock end.

For the second example, the first is repeated but with the number of cattle in the remote-end pen increased to 6. On completion of the first load, 1 cow is left in the remote-end pen, so it can still

load. The script will attempt to bring the next unprocessed vehicle (the locomotive) to the remote-end pen for assessment. To do this would require the 4 cattle wagons to be propelled beyond the end of the dock. However, when about 2 cattle wagons exceed the dock end, the locomotive tender (the last vehicle in the consist) will encounter the trigger for the near-end pen, and the LOAD command will be aborted by criterion (d). Then again, the abort would occur earlier still if the NUMBER OF VEHICLES ALLOWED BEYOND DOCK was set to 4 or less - only the leading cattle wagon would exceed the dock end before the vehicle counter would jump to 4 and the command would abort by criterion (c). The consist would stop. Any subsequent command could then become active.

PARAMETER 2: PASSIVE LOAD/UNLOAD
Passive loading or unloading is that which takes place without active vehicle positioning by the LOAD or UNLOAD commands. It can occur to lagging vehicles that are co-incidentally positioned in the dock by the action of a LOAD or UNLOAD command on the lead vehicle, and also when vehicles are positioned at the dock under user control in DCC or CAB mode.
The default parameter value is 'disabled' and by clicking on this value in the 'Edit Properties' browser, you can toggle it to 'enabled'. This parameter is also editable is DRIVER by CTRL RH clicking on a cattle dock and choosing 'View Details'. The 'View Details' browser also informs the game player about the dock configuration - whether it is configured to LOAD and/or UNLOAD. When the consist driven to a cattle dock is under AI control, activation of a LOAD or UNLOAD command causes PASSIVE LOAD/UNLOAD to be enabled. The parameter is disabled when the command expires. The automatic enabling and disabling of the parameter just for the duration of these commands is used to prevent unwanted triggering of attempts to load and unload when consist movements occur through the cattle docks under other AI commands.
On short sidings, cattle wagons are often left inside the triggering area of the cattle dock subsequent to loading or unloading. Later movement of these wagons - coupling up to retrieve them from the siding, for example - would cause attempts to load/unload if the parameter were not disabled.
The normal procedure for servicing a cattle dock when a consist is under user control in DCC or CAB is for the user, when his consist approaches the dock, to open the dock's 'View Details' browser and toggle the parameter to 'enabled'. Then the user stops the consist when the position of the vehicle doors are adjacent to the pen gates. The dock's script will assess whether the user's intention is to load or unload based on the relative sizes of the input and output queues (see item 3 above for suggested configurations). When dock servicing is complete, the user toggles PASSIVE LOAD/UNLOAD IS to 'disabled'.

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Railsim