

# CASE STUDY IN MODEL RR DESIGN: KCS 3<sup>RD</sup> SUB

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# What I started with

- ▣ Small bedroom "around the walls"
- ▣ Bi-level "No-Lix" (continual grade)
- ▣ Computer control, CTC

# Finding a home for the RR (and me!)

- ▣ Searched for property with a shop/outbuilding
- ▣ Located 4.5 acres in Coweta w/ a 40' x 60' shop
- ▣ Had an office, lounge, bathroom, HVAC -- a bonus!
- ▣ Also need some storage (so can't use entire 40' x 60' building for model RR).

# Selecting a prototype to model

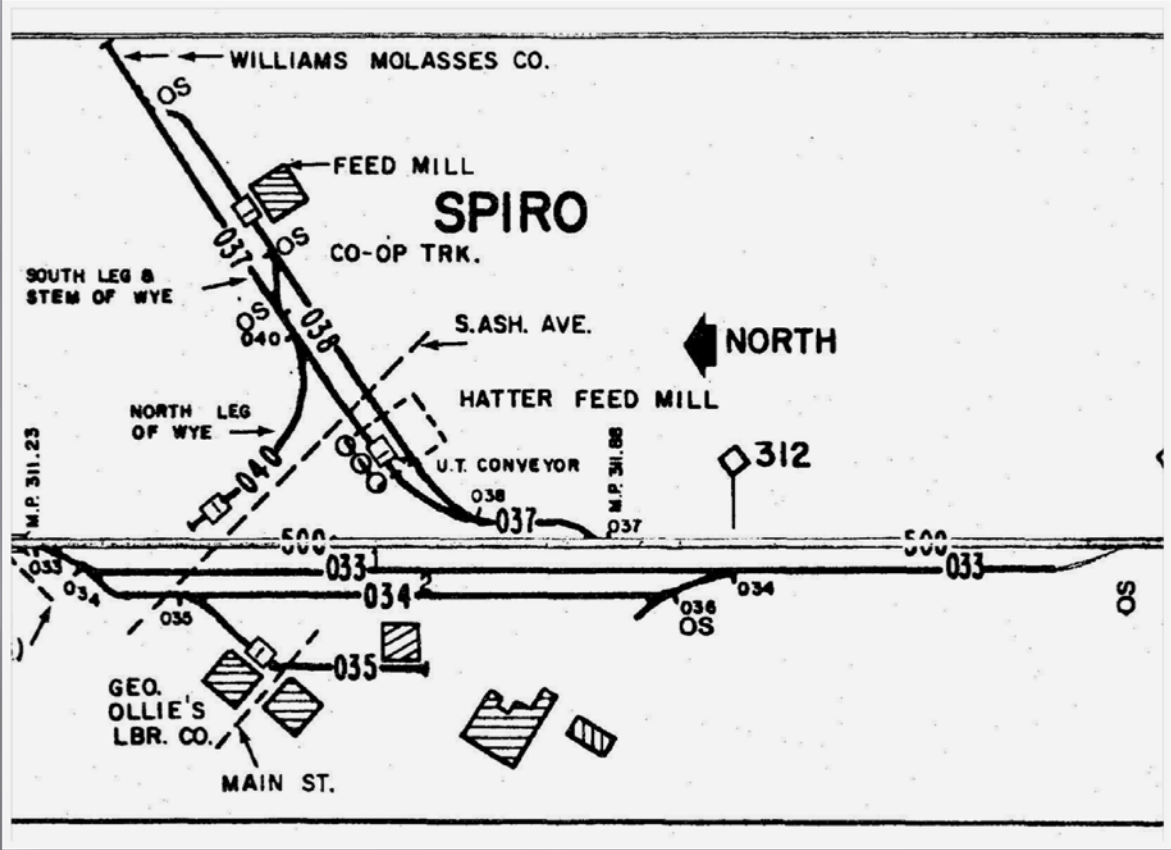
- ▣ Wanted something I was familiar with
- ▣ Something I could research or see first hand
- ▣ Something less commonplace
- ▣ Wanted on line industries, switching and interchange work
- ▣ Decided on the KCS 3rd Sub in 1979-1980.  
Why?
  - Frank Bryan had SLIC charts of the trackage.
  - Fairly convenient to scout/photograph.

# Selecting a prototype to model

- Had data on actual trains run during the chosen era from Frank and others.
  - KCS used to read the line-up over the dispatcher frequency at the beginning of each day, we had notes/recordings of that.
  - Mark Montray and the KCSHS are a great resource (see <http://www.kcshs.org/>)
- Interesting topography and considerable industries and interchange

# Sample SLIC Chart

Courtesy of Frank W. Bryan



# Givens

- ▣ Available layout space is ~30' x 45'
- ▣ HO Scale
- ▣ Digitrax DCC
- ▣ Minimum mainline turnout #8
- ▣ Minimum mainline radius 33"
- ▣ Track separation 2.25" minimum
- ▣ Maximum grade 2% (prototype approached 2% at points)

# Givens

- ▣ No deeper than 3', prefer 18" to 2' to reach industries to switch ("shelf" style)
- ▣ CTC (means block detection and motorized mainline switches are required)
  - Diagram courtesy Frank W. Bryan. This is a working simulation which runs under Signal Computer Consulting's Train Dispatcher 3 software, see [www.signalcc.com](http://www.signalcc.com) for more information.



# Givens

- ▣ At least half the sidings must accommodate max length train
  - 100' for 2 locomotives
  - 40' for caboose
  - Average car length 50'
  - $33 \times 50 = 1650'$
  - Total length  $1650+100+40=1790'$
  - HO scale is 1:87 so 50% of sidings must be at least 20.5' actual length ( $1790/87$ )
- ▣ Staging yard so trains could come from/go to areas "off layout".

# Druthers

- ▣ Wanted a workaround design where trains could be followed
- ▣ Prefer to model a whole subdivision
- ▣ Computer control capable
- ▣ Be able to operate solo with computer running other trains
- ▣ Maximize mainline run

# Druthers

- ▣ Train length at least 30 cars
- ▣ Wanted a functional yard modeled after the prototype
- ▣ Wanted to run the trains the prototype ran in the era
- ▣ Direction of turnouts, location of sidings and industries, s/b as per prototype
- ▣ No duckunders

# Druthers

- ▣ Crew lounge
- ▣ Bathroom
- ▣ Refrigerator for refreshments
- ▣ Coffee!

# Operational Considerations

- ▣ Designed for operation (car forwarding, interchange plan, scheduled trains)
- ▣ Be able to handle around 8 operators
- ▣ Reasonably realistic car forwarding system
- ▣ Easy as possible restaging/setup
  - This drove me to a “through staging” design and a full circle, since that way loaded coal trains would always be headed southbound for example.
- ▣ Schema that is easy to adjust while learning from ops sessions

# Choosing the basic design type

- ▣ Center "island" was first choice, but allowing for walkaround on all sides wasted some potential layout space, so started with an "around the walls" design with peninsulas.
  - This left a side wall and back wall that could only be reached on one side.
  - Another negative was a long hidden run back to staging, but this will be handled by computer not the operators.

# Fitting in the benchwork and curves

- ▣ First, created a scale drawing of the space.
- ▣ Next, placed the main yard.
- ▣ Added shelf around the walls, 3' max depth.
- ▣ Added peninsulas, allowing for 4' aisles between operating areas
- ▣ Draw a curve at minimum radius, use to determine ends of "lolipops"

# First single level design

- ▣ Design
  - Fill in main sidings
  - Add towns and staging
  - Flesh out with industries
- ▣ Pros
  - Simplest to construct
  - Good scenery potential
  - Lowest cost



# First single level design

- Layout height can be optimized
- ▣ Cons
  - Only 250' mainline run
  - Even skipping some towns, space between sidings is just over 1 train length.
  - Hard to reach/follow trains on the top level of the short bi-level portion along the left and top walls

# Double deck design

- ▣ Design
  - [KCS dbl deck v9-3 level1.pdf](#)
  - [KCS dbl deck v9-3 level2.pdf](#)
- ▣ Pros
  - Doubles mainline run
  - More spacing between towns for better dispatching experience
- ▣ Cons
  - More difficult/expensive to build
  - Bottom layer may be too low, top layer too high, need stools etc.

# Double deck design

- Scenic "vistas" harder to accomplish
- Needs a dreaded helix, some hidden track, a duckunder
- Reequires a duckunder (albeit 65" high)

# Final Design

- ▣ Compromise: mostly single deck w/ mushroom for partial double-deck.
- ▣ Helix at end of run only, not used by operators (computer runs trains in/out of staging up/down helix, operators only run the prototype route between Heavener and Watts).