## 2017 NASG Convention

## American Flyer Trains Track and Switches

HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK

PRESENTED BY: DAVID AVEDESIAN PHOTOS BY: DAVID AVEDESIAN & KYLE RUSSELL BALTIMORE AMERICAN FLYER CLUB

> TIMONIUM, MARYLAND AUGUST 2017





#### Baltimore & Milwaukee Beer Express Golden Spike Built By: Baltimore Area American Flyer Club 2011

**Fundamentals of Flawless Track Work** 

- A curve is a curve
- Do not try to bend the radius of the curve.
- A straight line is a straight line
- A tangent point is where a curve meets a straight line at a right angle or 90 degrees.





What is the radius of the curve of American Flyer Track?

• The Radius is 19-1/8", centerline-to-centerline.

#### What is Centerline-to-Centerline?

 Centerline-to-Centerline is from the center point between the track to the centerline between the adjacent track.

#### Why is this important?

- It is easier to draw your layout design on paper or on the computer using centerlines.
- It is easier to transfer the layout design from paper to train layout board using centerline dimensions.

#### What tools do you use?

- Anything that will make a circle and a straight line.
- Bow Compass/Rule Compass/String Compass plus a Straight Edge Ruler

#### What is an arc of a curve?

- Arc of a curve is different than radius of curve.
- The arc of a circle is 360 degrees.
- For American Flyer, each 10" curve track equals a 30-degree arc.
- Therefore 3 pieces of AF curve track equals 90 degree of arc.
- This concept will become important as we draw flawless layout track design.
- We will learn how to break from traditional sectional track configurations to any Arc of a curve.
- This tip will set you free to imagine your railroad empire as never before.

#### Let's get started

- Locate all the curves on the train board first.
- Once the centerline of the curves are transferred to the train board, then lay down a straight edge to connect each curve from tangent point to tangent point.
- We will NOT worry about partial lengths of curves and partial lengths of straight track.
- That is why they made a Drexel cut off wheel tool.

How do you locate the curves on the train board?

- Sample Problem:
  - Locate track work 2-1/2" from the wall and edge of train board
  - Radius of curve is 19-1/8"

# Instructions for locating the center point (CP) of the curve.

- Measure 2-1/2" from one wall and draw a straight line. From a technical point of view, we will refer to this line as a 2-1/2" offset line (Line A).
- 2. Measure 2-1/2" from the edge of the layout and draw a straight line. Again from a technical point of view, we will refer to this line as a 2-1/2" offset line (Line B).
- 3. Find the intersection of the these two offset lines and make a mark.

## Instructions for locating the center point (CP) of the curve (continued).

- 4. From this mark, measure 19-1/8" along each offset line and again make a mark. This will give you a mark that will measure 21-5/8" from the wall and the edge of the train board (2-1/2" + 19-1/8" = 21-5/5")
- 5. From these two marks, take your 19-1/8" bow compass and "swing" a curve in the general location of the curve's center point (CP). Where the two swing curves cross is the precise center point of your curve.
- 6. Take your 19-1/8" bow compass and swing a curve from the curve's CP. You will find that your curve will lay down precisely at the tangent point (TP) of each offset line or centerline (CL).

For example, let's draw a basic track layout on paper. The next slide will illustrate how we will transfer the track design to the layout.

How do you precisely locate the center point (CP) of a curve?

 Please follow along and let's draw a 90 degree arc of a curve at the tangent points.

What is the Geometry of American Flyer Switches?

- Q1: When two AF Switches are placed back-to-back, what is the straight track offset?
- A1: The offset is 5-1/8" However, we also have the dreaded S-Curve.
- Q2: How can we achieve flawless track work performance?
- A2: First we can't be afraid of "kit bashing" AF switches.
- Q3: What is the advantage of reducing the offset to 2-9/16"?
- A3: More track work in a smaller footprint.

Let's review the existing AF Switches configurations

- Dreaded S-Curve
- What is it?
- How can we avoid it?
- Normal Flyer track work geometry
- Back-to-Back curve off-set is 5-1/8" centerline to centerline
- Cut a ½ curve or 15 degree of arc
- Place one half on the centerline and place the other half on the other centerline
- Using a 12" ruler as a straight edge, measure the distance between the ends of each curve.

- Q1: How to avoid the dreaded S-Curve?
- A1: Place a short piece of straight track between the frog of the two AF switches.
  - Remove the curve section beyond the frog by cutting the track with a fiber cut-off wheel.
  - Remove the curve section of track that mates up to the insulating frog.
  - Lay each section of the AF switch on the centerline of the straight track.
  - With a 12" ruler as a straight edge, slide AF switch along the straight track centerline until the straight edge lines up with each AF switch.
  - Measure the distance, cut a short piece of straight track, insert one pair of fiber pins and secure the track and switches to the layout top
  - Results: Flawless, high speed, never a derailment, trackwork that works in forward or reverse.









#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK LADDER DESIGN MODIFICATIONS



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch # 9 Design Modifications

- I took a manual switch and completely cut off the motor housing and the wide area next to the motor housing where the terminals are located.
- I was able to locate another switch back-to-back without having to use a small section of straight track.
- This saved me a lot of space.
- I then mounted Tortoise Switch machines under the layout and drove them with a dedicated DC power pack.
- For Switch #9, I placed the Tortoise Switch machine under the center hole of the AF switch.
- Please see next slide for Switch #9.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #9 DESIGN MODIFICATIONS



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #10 DESIGN MODIFICATIONS

- In an earlier configuration, I left the slide arm in place and mounted the Tortoise Switch machine under the layout, off to the side.
- I like the clean look of Switch #9 better.
- Please see the next slide for Switch #10.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #10 DESIGN MODIFICATIONS



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #11 and #13A Design Modifications

- Switch #11 again is similar to Switch #9.
- Switch #13A shows how a crossover can be made by cutting the crossover section as tight as you need it to be.
- In this photo, the centerlines are about 3.0" apart.
- I have used two under-the-table switch machines and they were wired together; with one throw, they both switch.
- Please see the next slide for switch #11 and 13A.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #11 Design Modifications



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #11 Design Modifications



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #13A DESIGN MODIFICATIONS



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #14A Design Modifications

- In this application, I have taken a completely different approach for the switch modifications of that of an American Flyer switch.
- For the crossover section of track, I have used one piece of straight track rails.
- The crossover track is soldered and the switch bases are glued together to form one ridge switch track element.
- Please see the next slide for switch #14A.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #14A Design Modifications



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #16 & #17 DESIGN MODIFICATIONS

- By using a cut-off wheel, I was able to place two switches within the 5-1/8" centerline-to-centerline dimension.
- For Switch #17, I reduced the centerline dimension to 2.5".
- Please see the next slide for Switches #16 & #17.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #16 & #17 DESIGN MODIFICATIONS



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK SWITCH #18 DESIGN MODIFICATIONS

- Switch #18 has the standard 30-degree arc for the curve, but I cut the motor housing off.
- Between the Switches #16, #17 and #18, there is a lot of track and switch work going on in a very tight space.
- All three switches are powered by using an under the table Tortoise Switch machine.
- Please see the next slide for Switch #18.

#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK Switch #18 Design Modifications



#### HOW TO DESIGN & INSTALL FLAWLESS TRACK WORK FLAWLESS CURVE OVER A CURVE CROSSING WITH NO POWER INTERRUPTION



















The Dreaded S Curve



**Flawless Track Modifcation** 



**Modified American Flyer Switch** No Change to the Switch Motor Note Green Section of Track Offset Reduced from 5-1/8" to 2-9/16"





2017 NASG Convention Flawless Track Work Clinic Presented By: David Avedesian









#### Summary

- Eliminate the Dreaded S-Curve.
- Let your imagination dream up wonderful trackwork layouts.
- See the Boston & Maryland Railroad Layout Tour and the above modifications, Friday, August 11, 5p-7p.
- If you would like more information, contact me at, 301 938 1811 (cell) or <u>david.avedesian@newportassociates.net</u>.