

NMRA RECOMMENDED PRACTICES	
ELECTRIC TRACTION CURVATURE & DRAWBARS	
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**NMRA RECOMMENDED PRACTICES
RP-5.2 Electric Traction, Curvature & Drawbars**

A. INTRODUCTION:

It will be recognized by traction modelers that electric traction cars, particularly the city-interurban category, embraced a great variety of physical characteristics i.e. length, width, overhang, length of drawbars, radial freedom of couplers, and other factors, most of which affect the subjects discussed herein. Accordingly, the recommendations made cannot be as concise as would be desired. They are made, hopefully, as an aid to the modeler in appreciating one of the more obscure aspects of traction modeling.

B. TURNING RADIUS:

1. Curves as sharp as 35' radius were commonly used in street railway practice, and they did not usually have easements. Almost all of the interurban cars operating in the great middle western (Ohio, Indiana, Michigan) interurban network, some of them as long as 62', were able to negotiate 35'R, as were many nationwide. Accordingly it is recommended in **RP-5** that street railway and interurban car models intended for full range of street railway operations should be capable of meeting the 35'R requirement.

2. The second column of Figure 1 shows the radius through which the truck must turn, each way from center-line of car, in order to negotiate the 35'R curve. A few degrees tolerance has been included in each of the degree references to allow for normal variation in car dimensions mentioned in paragraph A. and to allow for minor discrepancies in car or track construction.

3. It is generally practical to meet this requirement in O-scale and the larger scales. Commercially available HO-scale RTR models and drive systems have not, however, in the past had sufficient freedom of truck angle to permit use of 35'R trackage, except for the smaller cars, such as the well known 40' die-cast Brill models. However recent developments in systems using vertically-mounted can motors, and experiments in under-floor units, indicate promise that HO-scalers can now meet this requirement.

Approx Car Length Feet	Max Truck Angle to Car Degrees	Coupler Swing (Each Side) Degrees
40	20	55
50	30	65
60	40	75

Figure 1

C. COUPLED CARS - DRAWBARS:

1. Many interurban and some city cars were equipped with couplers for the purpose of pulling trailers and/or training motor cars with multiple-unit control. In many cases these trains were required to operate on city trackage involving curves as sharp as 35'R; in accordance with paragraph E.2.b. of **RP-5**.

2. To meet this requirement coupler heads are mounted on fully radial drawbars of such length that the pulling face of the coupler is approximately 5' from the drawbar pivot. Although this length varies slightly under special conditions in the prototype the 5' length is specifically recommended for use in freelance models.

3. The swing, in degrees each side of center, that the drawbar must be permitted in order to allow coupled cars to enter and traverse a 35'R curve or turnout without easements is shown in the third column of Figure 1. The extreme drawbar angle is required when one car of a pair is fully into the curve and the other is on tangent track. Figure 2 illustrates the extremely awkward relative position of two 60' cars entering a 35'R curve.

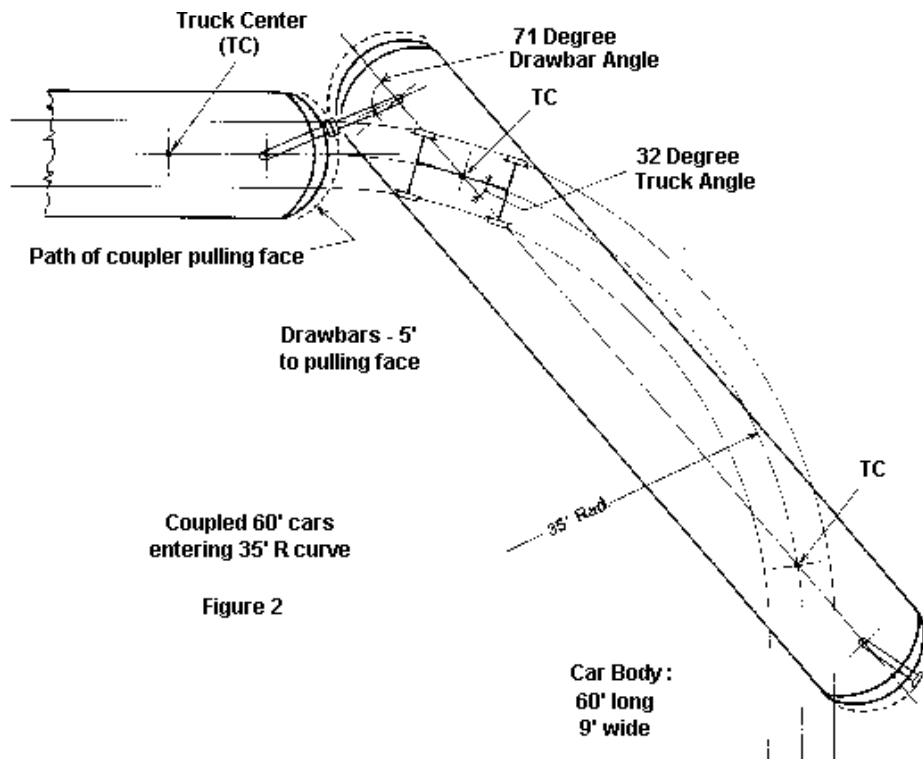


Figure 2

4. It is recommended that, if operation described in the preceding paragraphs is required, there be no "S" curves; i.e. two curves, particularly short radius ones, should be separated by a tangent section at least equal to the length of the longest car to be operated in a coupled pair or train. If an "S" curve cannot be avoided, as in a crossover, curvatures must be limited and tested in advance.

5. It was difficult for the prototype car builder to achieve a swing of 75 degrees each side of center, although some well known prototypes went out to 80 degrees. It is even more difficult for the modeler, particularly in the small scales. Stepwell castings are likely to be over scale and to have walls much thicker than the prototype, calling for judicious filing. Pilots must be mounted on structures which do not limit the coupler swing, but the ingenious modeler will find it practical to overcome these problems.

6. The coupler swing requirements shown in Figure 1 are based on the usual overhang of city and interurban passenger cars. Freight and non-revenue cars frequently have a shorter overhang beyond the truck centers; this eases the requirement for extreme drawbar swing, and thus provides a greater degree of tolerance in the Column 3 figures. In addition the problem of providing wide coupler swing is usually less difficult in non-passenger cars because of the absence of passenger boarding steps and other interferences.

7. Special requirements for the coupler heads used in traction applications are stated in **RP-5** paragraphs F.2.b. through F.2.e. See also Data Sheet D9p.04 with reference to special knuckle coupler heads used by some interurbans. Cast bronze knuckle couplers having 16"H knuckles and drawbars designed for traction use, in HO-scale, are available commercially.