Passenger Car Trucks ... An Introduction

By Martin McDonough

This is the first of a number of highly informative articles by veteran Boston Amtrak car inspector Martin McDonough, a man who goes all the way back to New Haven heavyweight days.

As you will see, his knowledge is extensive and he takes both pleasure and great pride in sharing with all of us.

Mr. McDonough’s articles will continue in the next five or six issues. Coming installments will deal with passenger car truck components. disc brakes. air brakes. spicer drive equipment and passenger car wheels.

All of the photos in this article, unless otherwise noted, were taken by John Kuehl, Private Varnish Editor.

The passenger car swiveling truck may well be called the foundation of the American passenger car.

Simply defined, a passenger car truck is a swiveling carriage consisting of a frame, two or more pairs of wheels and springs that carry and guide one end of a railway passenger car on straight and curved tracks.

The very earliest passenger cars with swiveling trucks were unstable at best because it is not possible to adequately balance a passenger car on just two points, the centerplates. It wasn’t long before side bearings were added.

Side bearings are widely spaced on both the truck bolster and carbody. Installed with initial clearances, side bearings are intended to make contact with each other as the car rolls, limiting the amount of side sway. The more recently developed contact variety of side bearing eliminates side sway even more while still allowing the truck to swivel freely.

There are two kinds of passenger car trucks in use today, four wheel and six wheel. For those interested in taking a good look at passenger car truck types of the lightweight era, I recommend the excellent two parter that appeared in MAINLINE MODELER, volume 3, numbers 1 and 2 (available for $5.50 from 5115 Monticello Dr., Edmonds, Washington 98020).

We’ll take a look at the four-wheel truck first. The side equalizing bar or compensating beam truck is almost universally used on today’s conventional type of passenger car.

Here’s how a four-wheeler goes together:

1. Wheelsets with journal boxes attached are placed on the track. The journal boxes house either solid or roller bearings. The top of each journal box is recessed. Into this recess goes a piece of composition material. A metal block, known as an adapter, is placed on top of the material.

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   2. Now the truck frame is lowered onto the wheelsets. That portion of the truck which encloses each truck journal is called the pedestal. Clearances between journal boxes and pedestals are extremely close.

   The truck frame also sits on top of the coil equalizer springs. Hanging down from the truck frame are four long links, two on each side of the truck frame. These are attached to the frame by case-hardened pins inserted through the transom of the truck frame (a truck transom is formed by two transverse beams extending from one side of

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the truck to the other and are a part of the truck casting).

The links are connected at the bottom by a hanger bar. A large metal flat bar known as a spring plank is placed on the hanger bars. Springs (elliptical, coil or a combination of both) are placed on the spring plank and the truck bolster is then placed atop the springs. Finally, the truck centerplate is bolted to the bolster, if it is not cast integral. The centerplate will fit in the mating casting on the carbody.

The truck frame, springs, swing hangers, spring plank and truck bolster together are called the secondary suspension.

The spring plank along with the swing hangers should be looked on as a cradle. The swing hangers are slightly inclined, most easily seen on trucks equipped with outside swing hangers. As a car tracks around a curve, the entire cradle swings to one side. As the car comes out of the curve, the swing hangers bring the spring plank back to center. Thus the lifting of the carbody by lateral forces also ensures that the carbody will return to the proper alignment when that lateral force is removed. On a curve, the inclination of the swing hangers also serves to tilt the carbody inward, partially offsetting the outward deflection of the carbody, giving the passenger that superelevated feeling of comfort. Side bearings help here too by preventing excessive car rocking.

Passenger car trucks not equipped with disc brakes are also equipped with foundation brake riggings, brake cylinders and safety hangers at varying locations.

**And now for a quick look at the six-wheel truck:**

Six-wheel trucks serve the same functions as four-wheelers. Again, the equalizers rest on the tops of the journal boxes. But six-wheel trucks have four equalizers instead of two. And the truck frame rides on the same four sets of coil springs.

But there is one real big difference. Since the center axle on the six-wheel truck occupies the space taken up by the bolster on the four-wheel truck, it is necessary to duplicate the bolster spring groups by placing one bolster between each pair of adjacent wheelsets.

The centerplate on six-wheel trucks bridges the center axle on a center casting and the ends of the bridge are anchored to the two bolsters. Now three bolsters are involved, one each over each spring plank group of springs with the third resting on the other two.

One other easily noted difference on six-wheel trucks is that the swing hangers are of single-piece construction as opposed to three-piece construction on four-wheel trucks.

In the next issue, we’ll study passenger car truck components, review problems, maintenance procedures and offer some suggestions for consideration.
A thorough walk-around inspection is the very first thing done by Bill Jenkins of Luxury Rails before every trip. Bill, center, takes time out during his truck inspection to confer with Amtrak yard foremen.

This complete modernized six-wheel heavyweight truck’s secondary suspension was totally rebuilt by Milwaukee Rail Car Corp. prior to being installed under Carl Michaelson’s Susan Marie in the background. Note the infrequently seen spring planks in this view of the inverted truck.
Closeup detail view of an inside swing hanger truck equipped with foundation brake rigging.

Shock absorbing composition material (arrow) placed between the top of the bearing journal box and the adapter is easily seen in this photo.
A bolted pedestal six-wheel truck, upgraded with the addition of bolster anchors.

Six-wheel heavyweight truck with straight equalizers and contact side bearings.

Pre-World War II truck with truck extension-mounted brake cylinders.

At one time, the most common of all post-World War II trucks, the 41-N.
Outside swing hanger truck with drop-forged Canton I-beam drop equalizers.

These two Milwaukee Road truck frames are just about identical. Beyond that, however, any similarity between the tread braked version (top) and the disc braked version (bottom) ends.
Perhaps the most popular truck with a large number of PV owners today is the streamlined version of the six-wheel outside swing hanger truck.

This six-wheel truck rode beneath the heaviest conventional streamlined cars ever built, the Milwaukee Road’s Super Domes. This same truck with different bolsters, bearings, vertical snubbers, roll stabilizers, and hanger bars also appeared under the Great Northern's Great Domes, and the Santa Fe’s hi-level dining cars.