

## **THE SAFETY COMMENT: WHEEL WEAR – A SAFETY ISSUE**

by Bob Knight, Chairman, NARCOA Safety Committee and  
Guest Author, Tom Norman, NARCOA Insurance Administrator

While surfing the Speeder Net a few months ago I found a great wheel wear commentary by Tom Norman (see reprint on page 12). After a few e-mails back and forth Tom has revised his comments concerning the Safety Issue of wheel wear for this issue's "Safety Comment." Trust you will find it of interest!

### **WHEEL WEAR . . . A SAFETY ISSUE**

When I first started in this hobby in 1986, I started a logbook that recorded each excursion run, starting and ending points, and the miles ran per day. I also recorded when I installed new wheels, brake shoes, etc. It has been helpful to me for identifying when I should expect things to wear out. Here is what I have for my history. The only one of my motorcars that I put significant miles on (i.e. more than 3,000 miles) is my MT19-B. Basically I can get about 9,000 to 10,000 miles on a set of brake shoes and 10,000 to 11,000 on a set of wheels.

I originally started operating the MT19-B in 1990. I put a new set of wheels on in 1996 and ran them until 4/20/01 for a total of 11,110 miles. At that time flange and tread wear were visible using a wheel caliper and the NARCOA wheel profile gauge. I replaced them with new Fairmont wheels. I had purchased a dozen new wheels from Fairmont in October 2000, for \$108.22 each, plus freight from Fairmont, MN. Those wheels were batch stamped, 0A0. I ran them until 10/31/05 for a total of 11,082 miles. I just ordered another dozen wheels from Fairmont in September, for the same price of \$108.22, but they were shipped from West Columbia, SC (no longer stocked in Fairmont, MN). This batch is stamped, 0F5. None of my wheel shows any foreign country origin.

Both sets of wheels were replaced when I started noticing hunting occurring. It started to appear around 9500 miles. Hunting is most noticeable on good tangent track at speeds above 25 MPH. The last set was fine when I began Southwest Railcar's Takla Sub excursion in August 2005, which was 950 miles on CN (formerly BC Rail) track. By the end I was noticing hunting on well-maintained tangent track.

This last set of wheels that I ran, I monitored wheel wear about every 2,500 to 3,000 miles. I actually rotated the wheels to try and maintain even wear on each wheel. When working on the MT19, I always adjusted the thrust collars to have equal wheel spacing from the frame side members and used a straight edge to check front axle to real axle alignment; also double checked axle spacing. It seems that even with the best alignment, the car would have a certain wheel that would wear more than the others. I would rotate the wheel with the most wear to the wheel with the least wear. When referring to wear, I'm talking about wheel thickness at the flange and tread. The difference in wear between the good and bad wheels was no more than 1/32" or 2/32".

When I replaced this last set of wheels, I had the following measurements. Using a wheel caliper, all wheel thickness was down to 1/4" from 5/16". Flange thickness on front wheels was slightly over 3/16". I like to use the NARCOA wheel profile gauge to check the profile. Using the wheel profile gauge, measure the gap between the worn thread and the profile. Mine measures 2/32" on all four wheels. The gap between the profile and the flange measures 6/32" on the right front, 5/32" left front, 4/32" on both right and left rear. Note that the wheel profile and caliper agree on the tread. Both indicate 1/16" wear. However on the flange wear, the caliper indicates about 2/32" less wear. It appears that the supposedly 5/16" wheel is thicker in the area of the flange (about 11/32" or so) as the wheel is formed. I'm not sure this happens as the wheel is made, but the new wheels callipered at this thickness. The caliper will show less wear, but the profile gauge will show more accurately the

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true wear on the profile. So my suggestion is to replace wheels around 10,000 to 11,000 miles, when you start to experience hunting. Wear, using the NARCOA wheel profile will show 1/16" tread wear and 1/8" or more flange wear.

NARCOA wheel profiles are advertised in *The SETOFF* (see page 3) and can be ordered from Hank Brown. The wheel profile also has the gauge line scribed on it. By using two wheel profiles and a tape measure, you can measure your car's actual gauge. Fairmont currently recommends a tolerance of 1/8" to 1/4" under track gauge. I personally like to be closer to 1/4" under gauge.

The March/April 2001 issue of *The SETOFF* has a simplified wheel profile drawing of the Fairmont M11404K1 16"x5/16"x4 1/2" wheel. The main tread slope is 1 in 47, while the very edge of the wheel has a 1 in 20 slope. It also has photos of actual wheel sections showing new and worn wheels. When giving wheel wear measurements above, when I say the tread is worn 1/16" that means there is a concave wear area on the 1 in 47 slope portion of the tread. A straight edge on the slope area will show this dished shape. When it gets to 1/16" wear, then hunting is noticeable. Even if one drive wheel is worn 1/32" more than the other the wheels will still find a stable point on the tread that gives equal circumference on tangent track. Once wear gets around 1/16" each wheel will have two locations on the tread that are the same circumference and the car hunts between the two locations. It's easier to see when you look at the Fairmont drawing of the wheel profile on the next page. Also when I say that I swap worn wheel to good wheel, I have found that tread wear is usually uniform between all four. It's the flange wear that is different. One front wheel usually wears more than the other by the 1/32". I just try to balance the wear by rotating the wheels.

So in summary, when the tread and flange wear are worn as listed, or about 10,000 miles I replace. If an operator doesn't know the mileage of their wheels, but notices that the tread is dished in 1/16" or more on the drive wheels, that will be the reason for the hunting and should be replaced. Don't just check the tread for wear. Remember to replace wheels for flange wear too. Basically, I replace all four at one time. Also be very cautious while accelerating and braking until you have worn the paint off the new wheels. The motorcar will be very slippery and squirrely until the paint is worn off at about 100 miles or so.

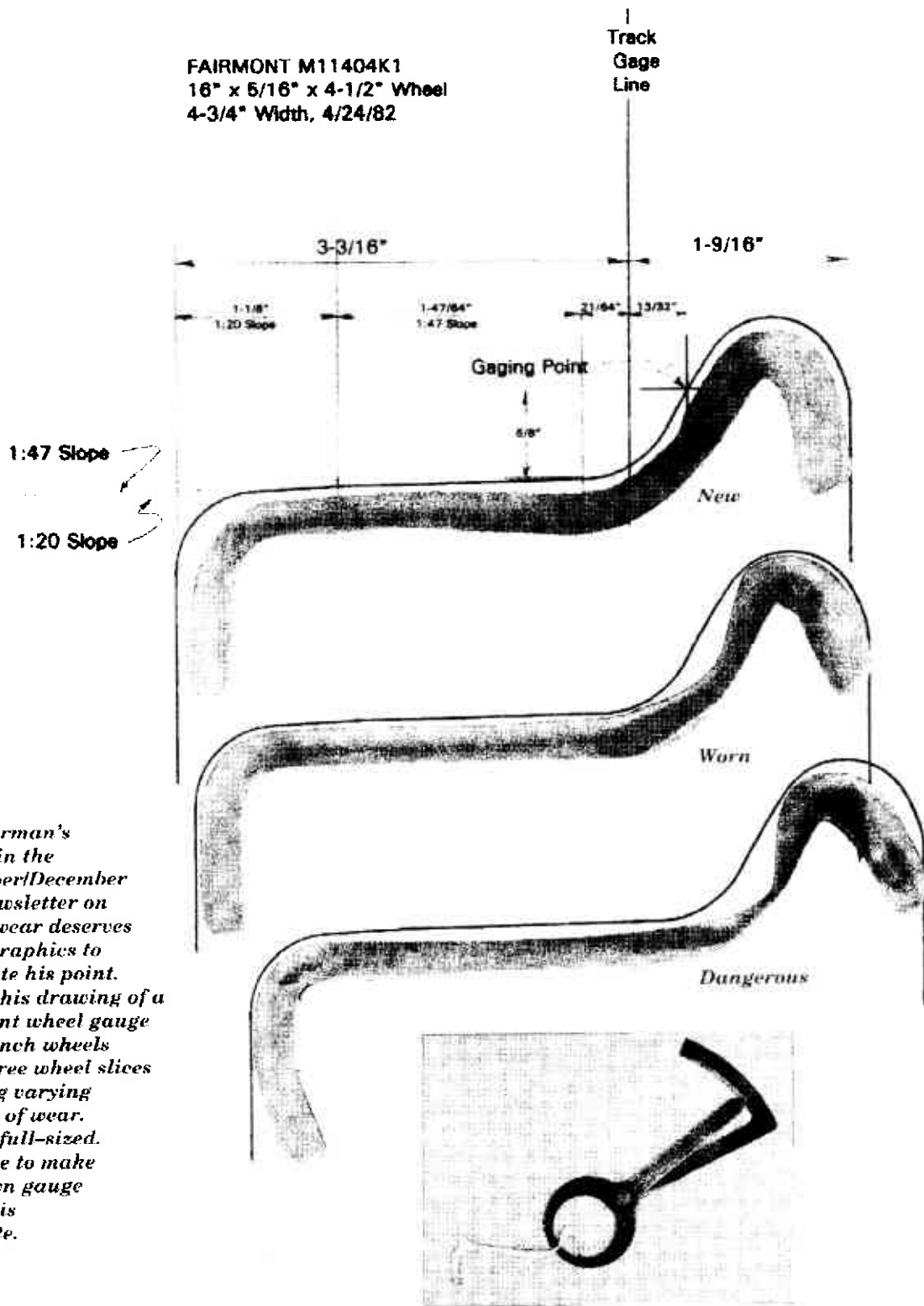
Hope this helps and keep it safe on the rails.

Tom Norman, NARCOA Insurance Administrator

P.S. You veterans have now mentored 57 new and returning members this year.

Many thanks from your Safety Committee!!

## Let's Do It Again



Tom Norman's article in the November/December 2000 newsletter on flange wear deserves better graphics to illustrate his point. Here is his drawing of a Fairmont wheel gauge for 16-inch wheels with three wheel slices showing varying degrees of wear. All are full-sized. Feel free to make your own gauge from this template.

