TESTING RADIAL PLY TRACTOR TIRES

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Figure 1. Radial ply tractor tire

Auto tire advertisements describe the present as "the Radial Age." The radial ply construction tractor tire (Figure 1) is now becoming available to the American farmer. This study compares the conventional bias ply tractor tires with the newer radial ply tractor tires in fuel consumption and field capacity.

At present the most familiar type of tractor tire is the bias ply tire. The carcass of a bias ply tire consists of layers, or plies, set diagonally to the tread and criss-crossed at an angle called a bias angle. The cords are arranged in two or more plies, depending on the strength needed.

Radial ply tires have plies that run at right angles to the tread and may have one or more layers or plies. A belt around the radial ply tire gives it strength and stability. The result is a tire with flexible sidewalls. European tire companies have had radial ply tractor tires available for some time.

A European radial ply tractor tire was tested in 1961 at the National Tillage Laboratories. The

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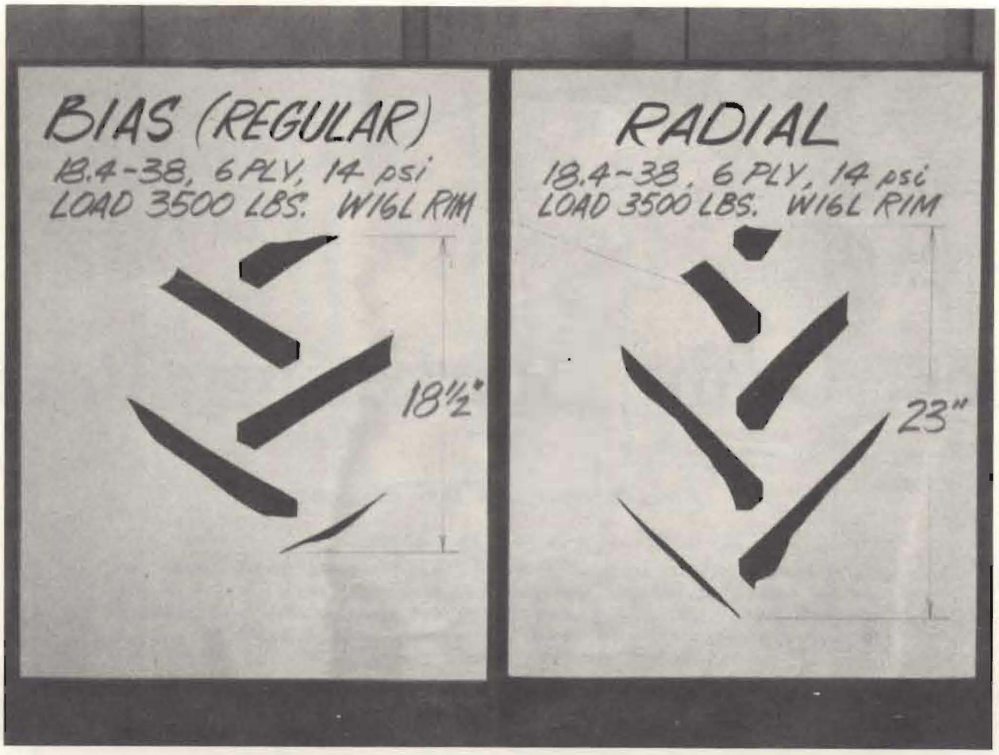

Figure 2. Tire "foot prints" on concrete floor.

tests showed the radial ply tire to be the most efficient tire in converting horsepower into drawbar pull under their test conditions.

Tests

Field tests were conducted at North Dakota State University to compare radial ply tractor tires to first-line conventional tires manufactured by the same company. Tires tested were 18.4-38, 6-ply, inflated to 14 pounds per square inch air pressure. No liquid ballast was used. Both types of tires have an equal number of lugs per tire. The radial ply tire had 40-degree lugs, while the conventional tire had 30-degree lugs.

The tractor used was a 1206 IHC (112 pto hp). The load was an 18-foot IHC vibrashank cultivator with spike teeth. A mechanical jack was used in place of a hydraulic cylinder to assure equal depth and load for all tests.

Tests were conducted on Fargo clay soil in two separate summer fallow fields:

Field Description	Soil Moisture Content At Surface	Soil Moisture Content At 3"-4" Depth	Penetrometer Penetration (Rototiller) Inches
1. Loose fallow	22%	26%	7.5
2. Firm fallow	9%	37%	4.5

Each test consisted of five rounds on one-half mile long fields. Each test was repeated twice.

Results

Field and Tire	Fuel Consumption Gallons Per Acre	Capacity Acres Per Hour	Slippage Per Cent
1. Loose summer fallow:			
conventional (bias) tire	0.62	9.00	14.6
radial ply tire	0.58	9.57	10.3
2. Firm summer fallow:			
conventional (bias) tire	0.62	9.47	11.4
radial ply tire	0.57	9.67	9.2

The results show radial ply tires reduced fuel consumption an average of 7.25 per cent. Slippage was reduced from an average of 13 per cent for the conventional tires to an average of 9.75 per cent for the radial ply tires. Radial ply tires increased the effective field capacity from 9.23 acres per hour to 9.62 acres per hour, an increase of 4.2 per cent.

In these tests, radial ply tires increased field capacity and reduced fuel consumption. Why this occurs is partially explained by the longer "footprint" made by the radial ply tire (Figure 2), which results in more area of tire-soil contact.

The tractor operator noted a smoother ride when the tractor was equipped with radial ply tires. This is due to the greater flexing of the sidewalls.

The retail price for 18.4-38, 6-ply tires in November 1974 at Fargo was approximately $480.00 for a radial ply tire and $280.00 for a bias ply tire.