BIAS AND RADIAL BENEFITS

Bias Tire Construction
Bias tires are constructed through a very different manufacturing technique than radial tires. Bias tire manufacturing is an older technology/manufacturing process that offers high load capacities at reduced costs, but sacrifices longevity and uniformity in “roundness” due to the nature of the construction.

The type of rubber used in the compounding process also differs between the bias and radial tires (as a general statement – synthetic rubber is the primary compound for radials – natural rubber for bias). Synthetic rubber is primarily manufactured from crude oil byproducts, whereas natural rubber is produced primarily from latex harvested from para rubber trees. Internally, the construction bias tires have the plies (support) of nylon/polyester cords laid at a 30-45 degree angle which typically alternate direction between plies; hence the name bias. The bias tire “footprint” will flex/distort under load (radial tires are far less affected); this decreases heat dissipation as well as decreasing the life of the tread.

Radial Tire Construction
A radial tire is constructed with rubber coated, reinforced polyester/steel cable belts that are assembled parallel and run from side to side (bead to bead) at an angle of 90 degrees to the circumferential centerline of the tire (hence the name radial). This build makes the tire more flexible and reduces rolling resistance. As a result, the tire is better able to dissipate heat accumulation, this factor increases the longevity of the tire (when compared to an equivalent bias size). Numerous rubber coated steel belts are then constructed into the "crown" of the tire (under the tread) to form a strong two-stage unit/reinforcement; this additionally helps in heat dissipation as well as puncture resistance. The radial construction also decreases the chance for “flat-spots” that can develop when a tire is not in use for long periods of time (this is common on bias tires and is the foundation for many complaints of out-of-round tires during the initial use; ALL bias tires are prone to this situation due to the diagonal construction/mfg of the nylon cords in the green tire).

The Benefits to a Radial design:
1) Softer, smoother, quieter ride
2) Improved fuel economy
3) Flat, wider footprint for better tire wear
4) Runs cooler than a bias ply, minimizing risk of a blowout on the highway (especially under high loads like those found in trailer applications)
5) Longer tire life
6) Better tracking – Improved sway control

Mileage & Performance:
The varying load conditions, weight distributions, maintenance practices and transportation conditions that are found in ST tires create a situation where no manufacturer can reasonably project the "mileage" that should be expected during the life of a bias or radial tire. However, there are several deciding factors that can help to improve the performance and expectations of an ST tire (bias or radial). As mentioned above, bias tires are inferior at dissipating heat under when compared with radial tires; this is especially prevalent under high mileage applications as heat tends to build up over time and exacerbate the construction differences between bias and radial ST tires.

As such, consumers should expect a significant difference in longevity of tread life with radial tires vastly outperforming their bias counterparts. As a recommendation, consumers who intend to utilize their tires in high mileage and/or high frequency applications should be equipped with radial tires. Bias tires are most recommended for those individuals who intend to use a trailer infrequently and/or short distances. With either bias or radial, some of the most important operating factors are tire maintenance and the monitoring of the air pressure. ALL ST tires primarily derive their carrying capacity from the air cavity of the tire and wheel. As air pressure is reduced below the recommended PSI, the load carrying capacities of tires are also decreased proportionately; consumers who are operating close to the carrying capacity of the tires/unit with an under inflated tire are more likely to (unknowing) create an overload situation. Under-inflation will also increase the heat absorption of the tire which will lead to accelerated tread wear (and again, further illustrate the differences between bias and radial). Conversely, over-inflation also changes the engineered footprint of the tire which accelerates tread wear.