AGRICULTURAL TIRE CASING CONSTRUCTION MATERIALS INFLUENCE ON TIRE PERFORMANCE CHARACTERISTICS

Rebrova Olena
National Technical University «Kharkiv Polytechnic Institute», Kharkiv

By using different types of materials in the tire casing it is possible to enhance or provide improved performance with the objective to deliver the optimal performance such as improved traction, reduced soil compaction, enhanced service life, dimensional stability, excellent energy absorbing, high carcass flexibility and so on. Now a day the most widely using received nylon, polyester and a steel belt as a material of an agricultural tire casing.

All the tires is provided with the code approved by the Tire and Rim Association for specific types of agricultural tires. This code was created in the interest of simplifying reference to specific types of agricultural tires, regardless of the manufacturer's design name. The most interest represents the materials for specific types of agricultural tires for different farming applications with codes R-1, R-1W, R-2, HF-2, HF-3 and HF-4. A tires carcass requires real attention to detail, as it is responsible for the damping and flexion of the tire. It must be constructed with quality materials and a scientific approach, to be able to address various applications.

Commonly used steel belts and textile materials: nylon and polyester, that allow for high flexibility. Each has its own positive, or negative attributes. Nylon provides mid-range stability and medium shrinking but, is excellent in absorbing energy. Polyester offers better dimensional stability than nylon and low shrinking but, only an average level of energy absorption.

Tire manufacturers use steel belts with a nylon polymer casing for tread stabilization and other tread related matters. This construction method is also used to meet the requirements for hard surface tire applications of construction vehicles. All steel tires are stiffer than steel belted tires as the steel is included in the sidewall. All steel tires improve puncture resistance, dimensional stability and are more durable in applications. Steel belted tires are designed with fabric, like nylon or polyester. Steel belt or multiple steel belts overlaid under the tread area. This provides a flatter footprint by making the casing rigid, has better penetration resistance and reduced rolling resistance.

If take a look at radial tractor agricultural tires, there isn't much need for steel belts. As a rule polyester is known for better ride characteristics, whereas nylon is known for increased durability. The need for one of these over the other can also be determined by how much or little flexibility is needed for this tire to perform at it's potential. Most of VF (Very High Flexion) ultra-flexible tires build with nylon, as it allows to create a more flexible carcass while improving durability over standard radial tires.

So manufacturers for an radial tractor agricultural tires from materials such as nylon, polyester, steel belt, all steel casings choose nylon to receive ultra-flexibility and increase tire performance on a field operations.