

## **The Michelin Group commissions the first comparative ground compaction study from IRSTEA to gauge the merits of caterpillar tread against IF (Improved Flexion) tires on a machine harvester**

**An independent scientific body has demonstrated that IF-class tires remain a more suitable and effective ground compaction solution for a machine harvester on loose soil. This conclusion was drawn from tests carried out on a 3.5 hectare plot of farmland.**

The French National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA), an independent public body, carried out a comparative study using a combine harvester with a loaded hopper, fitted with three different solutions: 800mm width IF and 900mm width IF sets of tires, and three 760mm roller caterpillar tread tracks.

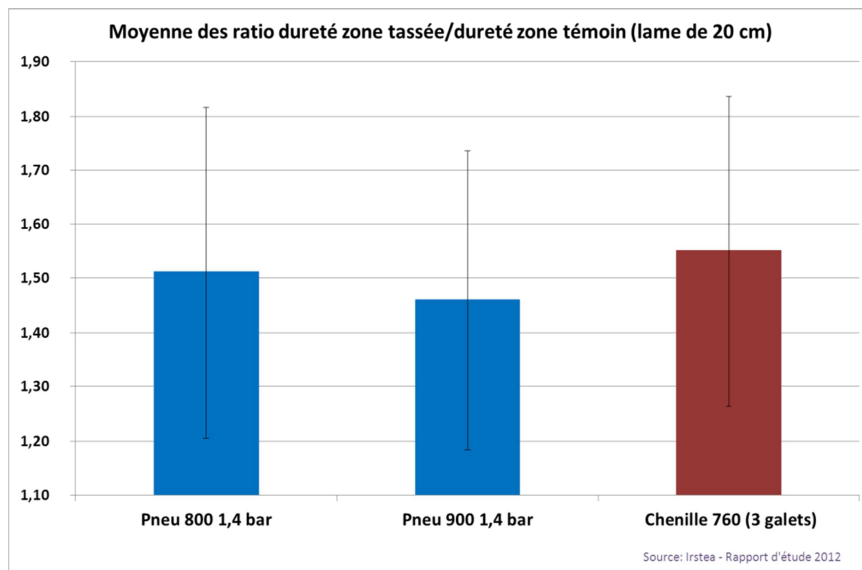
Michelin, in agreement with IRSTEA, released the findings at the SIMA trade show (Paris, Villepinte, February 24-28, 2013), in response to questions from the agricultural sector, which is increasingly interested in the advantages and disadvantages of this technology that helps farmers to increase productivity while protecting their soil capital.

The study was carried out in June 2012, in accordance with IRSTEA research and testing protocols, on a 3.5 hectare plot at the research facility at the Institute's Montoldre site in France's Allier department. The objective was to measure the difference in compaction between the two technologies.

In addition to its scientific value, the study serves as a decision-making tool for the agricultural sector, which is coming under pressure to increase crop yields year after year.

A first study compared the average hardness levels in a control area and a tightly packed area. The loaded combine harvester then passed over the plot with the two sets of tires and the caterpillar tread. IRSTEA measured the soil compaction in the area with the OCDS logistics tool for mapping soil hardness: resistance measurements are taken by inserting several rods at different depths.

With a 20cm rod, the combine harvester fitted with caterpillar tread impacted the ground with a 1.55 ratio compared to the control area, while ground hardness dropped to a ratio of 1.46 when the combine harvester fitted with IF 900mm tires inflated to 1.4 bar passed over it.



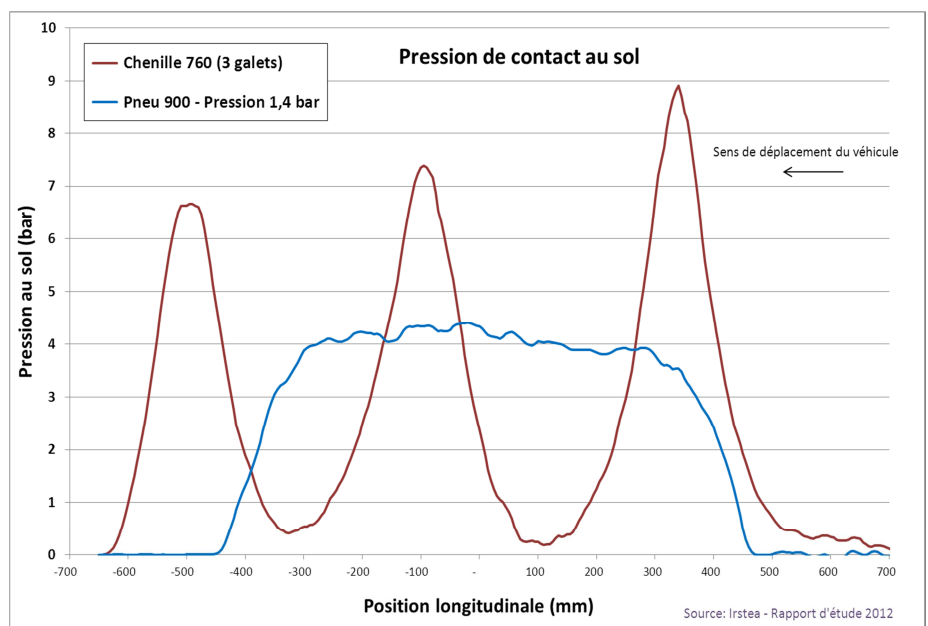
**On soft ground**, with a 20 cm rod, the combine harvester fitted with caterpillar tread increased the hardness of the ground by 55% compared to the control area.

When fitted with IF 900mm tires inflated to 1.4 bar, the harvester increased ground hardness only by 46%, or 9% less than the caterpillar tread (see opposite).

**On hard ground**, tests showed that the caterpillar tracks exerted uneven pressure on the ground, with peaks reaching levels up to two times higher than those obtained with IF tires, which distributed the load evenly over its entire tread.

The combine harvester fitted with 900mm IF tires, inflated to 1.4 bar, evenly spread the pressure exerted on the ground, calculated at slightly over 4 bar.

With caterpillar tread tracks, the combine harvester exerted uneven pressure on the ground, with peaks (corresponding to the impact of the rollers) of up to nearly 9 bar, or twice the pressure exerted by the tires.



The study concludes that the caterpillar tread's uneven load distribution and the extra pressure on the ground, compared to IF tires, did not give it an advantage in terms of soil compaction.

*Backed by an annual budget of €115 million, IRSTEA has 1,750 employees, including 700 engineers and researchers and 250 doctoral students, who work in 19 research units spread across nine sites. The Institute's goal is to be a European leader in environmental research, as well as an important scientific center to support public policy making.*

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