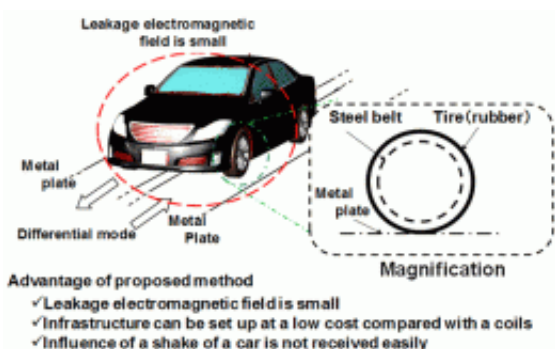


Japanese scientists explore electric roads for EVs

September 20 2011, by Nancy Owano



A schematic of the proposed power transfer system. This system transmits electric power thorough a capacitor composed of a steel belt and a metal plate attached to the road, and the power feed in differential mode.

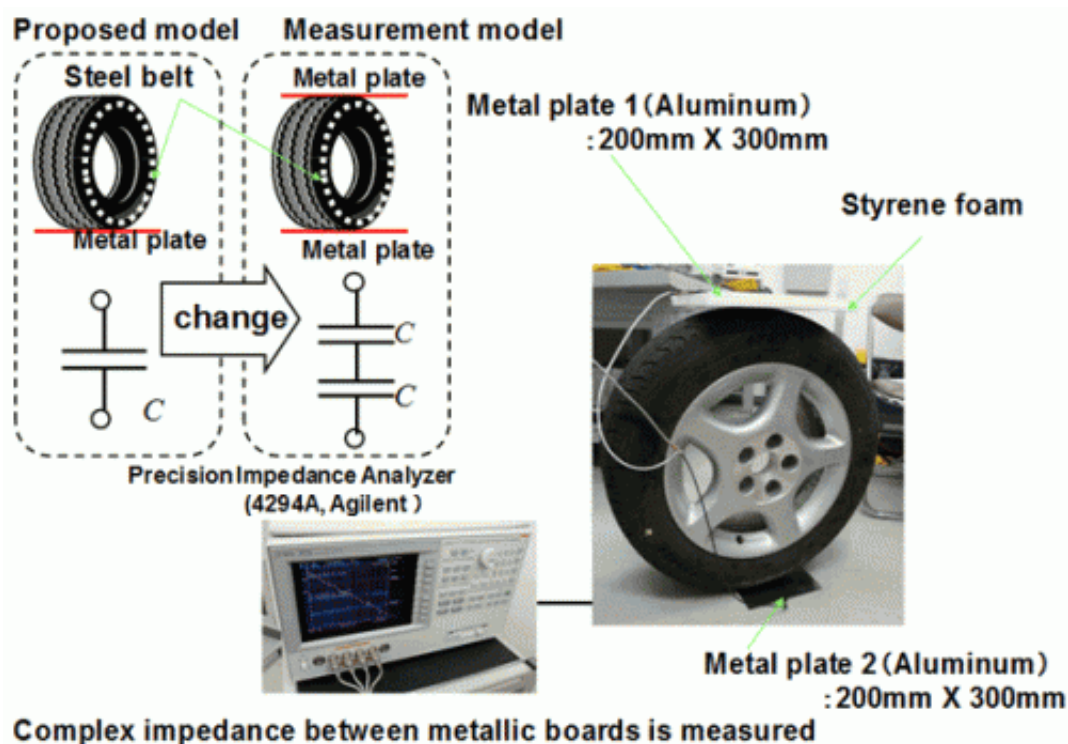
(PhysOrg.com) -- Masahiro Hanazawa of Toyota Central R&D Labs and Takashi Ohira from Toyohashi University are working on a solution for avoiding battery recharge headaches in powering electric cars. They are working on a prototype of electric cars that are powered by the road itself--electric roads for electric cars. While the idea of cars powered from the ground is not new, the system that they propose is an interesting way to power electric cars as the cars travel along the road through steel belts placed inside tires and a metal plate in the road.

This is how the Toyohashi University newsletter report describes their system:

"The source of energy from power lines is up-converted into radio frequency (RF) by high-speed inverters implanted along tracks in the road. The RF voltage is applied to a balanced metal track embedded under the surface of the road. The EV picks up the RF voltage via electrical capacitance between the metal and a steel belt installed inside of the tires of the EV."

In their experiments, the researchers put small metal plates on the floor and inside a tire, and positioned another metal plate above the tire. They measured the electrical impedance between the two plates. The team presented their work in May at the International Microwave Workshop Series on Innovative Wireless Power Transmission in Kyoto, Japan. While their tests involved low voltages, the researchers believe energy transfer from the [road](#) to a running automobile is feasible. With enough power the system could run typical passenger cars, says Ohira.

Their system would require smaller battery packs, rather than heavier packs, to get back and forth from electrified highways, which is viewed as a benefit as well.



The proposed model and measurement model. As a the measurement model a metallic board were arranged above and below the tire, and the complex impedance was measured. Pieces of styrene foam of different thickness were placed between the upper surface of the tire and metallic plate. The measurement frequency was from 10 kHz to 10 MHz.

Still, outsider reactions to their news have been peppered with concerns. One concern is how much danger to the public might their system impose, for example, in someone stepping on an electrified metal strip. Another question being voiced is cost and infrastructure, considering the expanses of roads that would be dug up to accommodate the system.

An effort to explore the powering of EVs from the ground up was also reported earlier this year in [Business Spectator](#) Researchers at the Energy Dynamics Laboratory at Utah State University, said the report, were working on a solution where EVs could pick up small amounts of

electricity as they drive over charging pads buried under the asphalt that are connected to the electrical grid.

More information: [www.tut.ac.jp/english/newslett ...
overtures/index.html](http://www.tut.ac.jp/english/newslett...overtures/index.html)

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