MEASURING CHARGE

Prof. Robin Beach (left) makes measurements of the static charge on an automobile as it is driven at speeds equivalent to as much as 70 miles per hour on the proving stand.

prove serious. Strong, hefty mechanics have been known to be thrown to the ground by shocks received from touching the bodies of electrified automotive vehicles."

In order to test these conclusions, Prof. Beach turned his own automobile into a mobile laboratory. He connected wires around it, and installed a meter that measured up to 30,000 volts. He took his instruments to the toll booths of the Holland Tunnel and the Marine Parkway Bridge in the New York area, measuring the voltage between vehicle bodies and the ground as they stopped. Then he made tests on a "proving stand." This permits a car to be operated up to "speeds" of 70 miles per hour, while standing still, running on rollers.

Speed Increases Charge

The faster the automobile is going, and the greater the "pull'" that it has to exert, the more charge it accumulates. This, of course, follows from the basic principle "that the more intimately the contacting substances are pressed together the greater the generation of static electricity."

One might suppose that when a tire is soft, there would be more contact with the road, and more electrification, but this is not the case. At low speeds there is little difference, but Prof. Beach's tests showed that, at 40 miles per hour, a charge of nearly 10,000 volts was obtained with 40 pounds pressure in the tires. Using similar conditions, but with 80 pounds tire pressure, it was more than 13,000 volts with the same speed. The reason is that, with more inflation, there is greater loading on the tire, and it is pressed into more intimate contact with the road, though over a smaller area.

Chain Doesn't Help

Dragging a chain after the vehicle, a common practice with oil trucks, made no measurable difference in aiding the decrease of voltage on the car, he found. "Since the pavement was not grounded but comprised a most excellent insulator, the drag chains, obviously, could not be expected to discharge the car," he points out. Measurements of the insulating properties of dry road surfaces were made with an instrument called a "megger" and showed the resistance to be extremely high, even between two metal strips a quarter of an inch apart. In some cases, the readings went beyond the scale of the indicator. When the road is wet, its conductivity is increased.

Even grounding the car, by connnecting it to a wire or grid, the practice used in various filling stations, is not entirely effective. While the free charge on the body can be removed in this way, the charge on the tires, and on the metal parts of the car near them, remains.

"If a wrench or screwdriver, for example, was inadvertently brushed against one of these parts, a spark might result of sufficient intensity to ignite lurking inflammable vapors," says Prof. Beach.

It has been suggested that the tires should be made conductive, by painting their walls, or even making them of a special kind of rubber which conducts electricity, but this is also ineffective. Even with metal tires, highly conductive, the situation would be fundamentally unchanged, he finds, for although the charges would then be distributed somewhat differently, there would still be the same voltage between the car and ground.

Probably the most effective remedy would be to make the surface of the roadways of some material which would carry away electricity. Then, with conducting tires, the charge would be dissipated. But it might be very difficult to change the character of the nation's roads so radically and there may be other solutions of the problem. Prof. Beach suggests that perhaps some method may be found of reducing the generation of the charge at the tire treads.

"This," he says, "would strike at the very heart of the problem."

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AERONAUTICS

"Lop-Sided" Airplane Convinced British Editor

A "LOPSIDED" airplane, with two engines, one in the nose, the other in one wing, and not balanced by a similar engine in the other wing, may not be as foolish as it seems at first glance, suggests C. M. Poulsen, editor of the British aviation weekly, *Flight* (July 3).

Writing in an editorial, he says that a letter from a reader of his magazine, who is serving in the R. A. F., suggesting such an arrangement, quickly landed in his waste basket. But then he retrieved it, and when he added to the rough sketch certain parts that had been omitted by its author, it "began to look less crazy."

"The advantages of the arrangement are obvious," he declares. "Instead of two engine nacelles and one fuselage, one has but one engine nacelle and one fuselage. Thus not only weight, but quite appreciable drag should be saved.

"Against the scheme," he admits, "is the fact that the machine might have to fly slightly 'crabber,' due to the fact that the drag of one engine installation would be greater than that of the other."

He asks for the views of designers and pilots on the matter.

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