ENGINEERING

Difference in Brightness Is Biggest Auto Light Problem

WHEN AUTOS pass in the night, there is often blinding glare in one driver's eyes. This is a major safety problem of our automotive age and the U. S. Bureau of Standards over a period of years has conducted research on headlights to discover the facts.

Dr. H. C. Dickinson, Bureau of Standards scientist who will be honored with the next presidency of the Society of Automotive Engineers, concludes that the most serious problem involved in safe headlighting is the great disparity in brightness between beams from different lamps. One headlight beam may be ten times as intense as another under even fairly normal conditions. The result is that the driver with the dim lights experiences almost complete lack of visibility when his auto plunges into the bright light of the approaching car. This is true no matter what measures are taken to reduce glare. Dr. Dickinson suggests that most of the glare problem would be solved if the brightness of lights could be kept so that no light was more than two or three times brighter than another.

Plenty of light on the side of the road is needed for a safe meeting with another car that brings with it unavoidable glare. Drivers learn to rely on what they can see of the curb or shoulder and guide by the edge of the road rather than by the oncoming car. To give this roadside illumination, the light for a hundred feet in front of the car should be increased and the beam should be wide spread horizontally and depressed somewhat below the horizontal. This is the function of switching over headlights to "dim" when another car approaches. Such a light is best also for slow speed travel on rough and very curving roads.

Few autoists realize that it is more dangerous to pass a car that is standing still than one that is running at a fair speed. No practical sort of regular headlighting will enable both approaching drivers to distinguish objects to the rear of approaching lights for more than about a hundred feet. A driver in judging whether the road is clear therefore relies on what he has seen during the past few seconds by the light of the oncoming car. But the road immediately back of a car at rest is not illuminated in this way and danger may lurk there unseen.

For open-road driving at good speeds and no passing cars the head-lamps should be aimed horizontally with a concentrated beam spread only about 25 degrees horizontally.

Lights along streets, roads and highways at times increase the hazards of night driving and Dr. Dickinson feels that this problem should be studied. Lights scattered along the road may in some cases illuminate an obstacle so that it has no contrast with its background and is thus practically invisible. Exposed lights along the road may actually make less visible objects that would be seen easily with headlights alone.

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METALLURGY

Metallic Powders Pressed Into Light, Useful Objects

METALLIC powders have served in various capacities from the gold dust of the forty-niners to the aluminum powder paint that covers oil tanks to protect them and reflect the heat rays.

Now powdered metal is entering industry as the rival of molten metal in making small objects. The process is similar to that used in making some clay and porcelain products. The powder is molded into shape under intense pressure. This forms objects that have the appearance of ordinary metal, but only the squeezing of the particles and their interlocking makes the pressed powder present a solid appearance. These molded metallic sponges are then heated to a temperature not quite sufficient to melt the metal. The particles weld together and the material emerges with the advantage of light weight, from a third to four-fifths that of cast metal. After this heat treatment, the powdered metal objects can be handled as though their metamorphoses had been molten instead of powdered.

The devices that mold the powdered metal are really giant pill-making machines. The problem of supplying the correct amount of powder and applying the proper pressure had been solved on a small scale in the pill presses that roll out millions of medicine pellets daily.

The powdered metal process makes possible the use of alloys that can not be produced by casting molten metal. Like oil and water, some molten metals will not mix. Or their temperatures of melting are too divergent. An alloy of such metals can be made by mixing their powders in proper proportion.

Powder metallurgy arose out of the process of making tungsten wire for electric light filaments. The high melting point of tungsten forced the invention of the powder process.

The method also allows the production of metallic articles that have within them non-metallic material. This advantage is utilized in the making of the synthetic abrasive, known as carboloy, a dense, hard tool material that is about 90 per cent. tungsten carbide and the remainder cobalt. Tungsten carbide is nearly as hard as diamond. When pressed and then sintered, the powder mixture can be tooled into proper shape. Heat treatment in hydrogen turns it into the finished carboloy that forms superior tools and dies.

One of the most important applications of powdered metal is in the making of the so-called "oilless bearings." When soaked in oil the bearings made by the powdered metal process take up enough lubricant in their many fine pores to last the lifetime of the machine they serve.

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PHYSIOLOGY

Breathing of Living Tissue Is Disturbed by X-rays

X-RAYING living tissue apparently disturbs its respiration in such a way as to drive out hydrogen, and the loss of this hydrogen is probably largely responsible for the death of the tissue.

This discovery was made by V. Everett Kinsey of the Westinghouse Research Laboratories at East Pittsburgh. He X-rayed pieces of normal human muscle and of cancerous tissue removed in surgical operations, keeping his specimens in a specially built glass vessel to collect the gases given off for analysis. He found that hydrogen, not normally a by-product of respiration, is given off when either healthy or diseased tissue is X-rayed.

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