RESEARCH AND DESIGN TO REDUCE LIKELIHOOD OF ACCIDENT*
ROY HAEUSLER,† AND JOHN VERSACE‡
Engineering Division, Chrysler Corporation, Detroit, Michigan
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In its research and design for safety, the automotive industry has given primary emphasis to preventing the accident. Our efforts in this field can be summarized as follows:
(1) Helping the driver to sense the problem of control, as through better visibility.
(2) Helping the driver to inform pedestrians and other drivers of his presence, his actions, and also his intentions, as through more effective directional signals and other signalling devices.
(3) Improving the driver’s ability to transmit his wishes to the vehicle, as by convenient placement of easy-to-operate controls.
(4) Improving the vehicle’s response to the driver’s wishes, as by increasing available deceleration.

Progress in each of these areas has involved a great many improvements in features and functions of the vehicle and its components. No exploration here of these innumerable factors could do justice to the adequacy of treatment given them, or the size of the job remaining to be done. Let us examine one facet—that of measurement.

We can readily agree that scientific progress has to a large degree been dependent upon our ability to obtain objective and representative measurements, measurements that can be verified by other observers, measurements that as nearly as possible reveal the whole picture and thereby distinguish the exception from the typical. We must encourage on all sides a close adherence to this essence of the scientific method, as contrasted with the oft-revealed willingness to draw conclusions from isolated cases or from non-representative data obtained through experiments, demonstrations, or events more spectacular than significant.

In the field of automotive safety reliable measurements can be obtained most readily when we concentrate our attention on those facets involving only the vehicle, and not the highway or the driver. Let us review a few examples of this type of measurement, and at the same time gain an insight into some of the industry’s accomplishments. While the data shown are related to specific makes and models of vehicles, they are offered as being essentially representative of the industry’s progress.

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† Automotive Safety Engineer.
‡ Research Psychologist.
The goal of the first of the four major areas in this field of research and
design has been the provision of maximum help to the driver in his efforts to
sense and interpret the control problem as quickly and as accurately as
possible. Visibility, an obvious factor, involves a number of measurements.
One of the most important has been the freedom from visual obstruction in
a horizontal plane through the driver’s eye, as shown in Fig. 1. The clear

![Fig. 1. Horizontal visibility of driver.](image)

spaces available for vision are shown in Fig. 2, as angles appearing in a plane
view. This comparison calls attention to the fact that substantial progress
has been made in the 11-year period covered. Total visibility rose from $264^\circ$
to $307^\circ$, out of a possible $360^\circ$. Visibility through the windshield rose from
$81^\circ$ to $115^\circ$, and at the same time all disruptions to the continuity of this span
were eliminated.

Nighttime visibility has been heavily dependent on lighting of the road
from headlamps. Fig. 3 provides one measure of the improvement obtained
through the introduction of a new sealed beam headlamp, less than 2 years
ago. Better concentration of light and specifically a reduction in stray light