LAB

LABORATORY DEDICATED TO ACCIDENTOLOGY

The LAB accident analysis, biomechanics and human behaviour laboratory develops the new scientific discipline of accidentology, **in response to a growing determination on road safety.** LAB scientists draw extensively from the realms of physics andhuman sciences in their endeavours to probe the causes and consequences of road accidents with a view to improving prevention and protection.

BASIC FACTS

The LAB accident analysis, biomechanics and human behaviour laboratory, unique in Europe, was set up in 1969 under a joint initiative by Renault and PSA Peugeot Citroën. It fields a multidisciplinary team (including doctors, engineers, biomechanics scientists and statisticians) probing the causes and consequences of road accidents. With this wide-reaching combination of expert skills and know-how, LAB develops the new science of accidentology, which can be broken down into the two broad disciplines of primary and secondary accidentology. Primary accidentology is based on a detailed analysis of real-life accidents, which are reconstructed and modelled working from field data. By developing an understanding of the sequence of events leading up to an accident, scientists can then set about devising strategies capable of preventing it. The outlook here is that prevention is better than cure, and this, indeed, is the reasoning behind systems like ABS, emergency brake assist and ESC (see sheet). Secondary accidentology addresses protection for vehicle occupants if an accident cannot be prevented. Work here includes developing an understanding of injury mechanisms, analysing vehicle structure behaviour, and checking the efficacy of protection systems with a view to improving them further.

IN SHORT

LAB WAS FOUNDED IN 1969 TO PURSUE THE NEW SCIENTIFIC DISCIPLINE OF ACCIDENTOLOGY, WHICH DRAWS FROM FIELDS SUCH AS MEDICINE, BIOMECHANICS AND HUMAN SCIENCES TO MAKE A DIRECT CONTRIBUTION TO THE DEVELOPMENT OF MORE AND MORE EFFECTIVE VEHICLE SAFETY SYSTEMS.

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HOW DOES IT WORK?

Since 1969, LAB has built up a unique data bank with data on over 13,500 vehicles and 26,000 accident victims. This base is being constantly expanded to include the findings from fresh analysis, enabling scientists to assess the efficacy of new safety devices and driver support systems. Teams are regularly dispatched to the scenes of accidents, along with the emergency services, to investigate the factors involved.

One of the general findings from this kind of **primary accidentology** study is that accidents are very often the result of a combination of human failings or inappropriate reactions. Defective driver perception is found in 26% of accidents; diagnosis or forecasting errors in 18%; inappropriate reaction in 17%; and improper execution of an appropriate decision in 20%.

Since, as these findings confirm, the vehicle is rarely the sole cause of an accident, studies into driver-car interaction are clearly crucial. This is the reasoning behind LAB's investigations into human behaviour, and driver psychology in particular. Ergonomists and cognitive scientists work hand in hand on ways to optimize human-machine dialogue and improve the way crucial information is perceived. Simulation and virtual reality are among the key methods used for investigating driver reactions to unexpected and emergency situations.

In secondary accidentology, doctors and biomechanics specialists are constantly expanding our understanding of injury mechanisms, with a view to optimizing the efficacy of protection systems. This kind of work provides valuable input for the development and validation of systems such as airbags, seatbelt load limiters, and the programmed crumple zones that "soak up" impact energy during a collision. To validate such systems, extensive use is of made of dummies designed to faithfully reproduce the physical and biomechanical characteristics of the human body.
With recent progress in digital modelling, these physical dummies have been joined by virtual counterparts, which can be configured even more precisely to match the full range of human morphologies.

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