

Integrated Multifunctional Optical Displays In Trucks

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1. INTRODUCTION

The optimisation of driving speed, engine speed depending on the form of the terrain, the performance of the motor, the load, and the gradation of the gearing driving a heavy truck is essentially more difficult to handle than in a car. An important reason is the unfavourable relationship of engine performance to mass in comparison to that in cars. In addition, the mass of a truck varies with the load in an extreme way. To be able to reach a satisfactory acceleration, modern trucks are supplied with super-charged motors and gearings with many (up to 20) gears. The choice of the right gear under varying driving conditions is no trivial problem. It clearly makes more claims on the sensory abilities of the drivers than car driving.

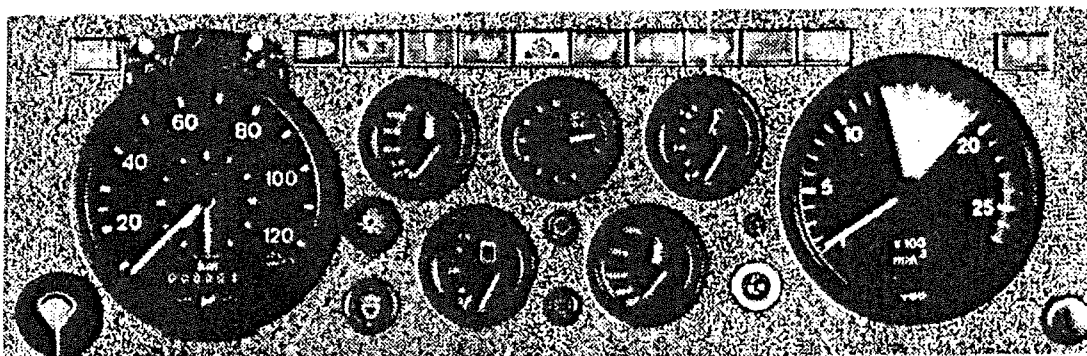


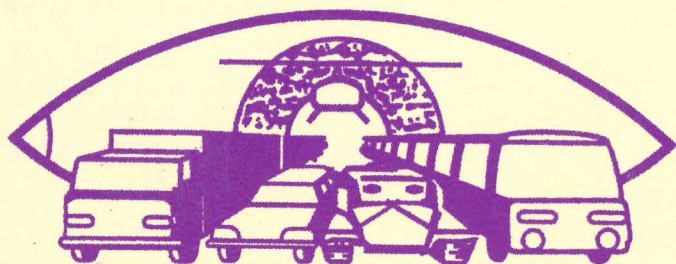
Figure 1. Conventional dashboard in trucks.

For the handling of this task the truck driver has a series of displays; optical, acoustic, haptic-kinaesthetic and proprioceptive at his disposal. He combines these using experience and an acquired in the course of time, internal 'machine model' (Kluwe & Haider, 1993). This model mediates him a dynamic picture of the familiar vehicle, his behavioural options in the traffic flow including the future development in choice of an option. He has acquired this ability after longer training and it remains at the most drivers locked on a certain truck type, usual load, and road conditions.

It is now possible to install optic displays of new fashion because of new display technologies (i.e. active matrix TFTs). New sensor systems, data processing devices and algorithms make it possible to transmit more than the usual information to the driver (see also:

Popp & Färber, 1991; Popp & Färber, 1993). The question is: what kind of information in which form should be transmitted to a truck driver? Any new contents of the optical displays in trucks is meaningful, however, only if through them an improvement can be achieved in an ergonomic way. The following strategies and/or questions for investigations are conceivable:

Is it possible, to relieve drivers, through one optimal designed *optic display*, of a part of the mental effort to integrate and process the conventional displayed information? This could itself be expressed in a reduction of the demand on the driver, also in shorter or rarer glances to the display and rarer faults in changing gears. Or: Is it possible to relieve drivers, through an optimal designed *optic display*, of a part of the training that must be overcome to give newcomers an expert's knowledge? This could express itself in a shortening of the duration of adaption and training to a new truck or new conditions driving the usual truck.



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