

Principles of safe design and Human Factors in transportation

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Abstract

Safety is a major concern for all designers of transportation systems. It is therefore remarkable that a systematic application of safety principles in design is often missing. This may be due to a lack of knowledge of these principles with designers. This paper tries to fill the gap. It presents two of the basic models of Safety Science, the Hazard-Barrier-Target (HBT) model and the deviation model. The HBT model is an energy model that describes how a source of hazard may be prevented from harming a vulnerable target by the application of barriers of different types between the hazard and the target. The deviation model describes an accident process in terms of deviations of a normal process and indicates types of controls in different stages of the process. This paper uses these models to illustrate good and bad Human Factors Design from a systematic safety perspective.

Systematic application of the models presented in this paper in design lead to a change in design philosophy for transport systems that will improve transport safety. This design is based on a scenario approach, taking into account the different phases of an accident and designing solutions for each of those phases.

Introduction

Safety has been an important issue in all modes of transportation since the early days. Especially in maritime traffic, for a long time the only massive form of transportation, traffic rules beacons warning sailors are ages old. The Lighthouse of Alexandria for instance was built by Ptolemy Soter around 290 BC. Since those days we have witnessed an enormous increase of transportation of goods and people and with this increase we have introduced huge problems with the safety of transportation. Modern traffic is a dangerous activity. According to the *International Road Traffic and Accident Database*, in the year 2000 alone 40.749 people got killed on the roads in the European Union (IRTAD, 2003).

Although attention for safety has been present throughout the ages, there has not been an integrated systematic approach towards transportation safety, taking into account all elements of the transportation system. The attention for safety has always