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Titel des Beitrags:
Simulation of target directed movements within the CAD man model RAMSIS: SAE Technical Paper 1999-01-1919

Abstract:
The ergonomic design of automobiles has changed over in the last years. It is increasingly being transferred from the usage of two-dimensional templates of the human shape to computer-aided manmodels. So far these models were mainly used for static anthropometric investigations on the drivers workplace. Dynamic questions can be answered only very insufficiently. In the context of this work a methodology was developed to precalculate target directed human movements in a motor vehicle environment with the CAD-manmodel RAMSIS. A new two-piece model was developed. In this model dynamic boundary conditions, so called dynamic restrictions, for any movement in a car are determined, concerning outside parameters. In the following, the entire body posture is determined by a statistical posture probability model, considering these dynamic restrictions. A control theory of human movements was derived from the field of neurophysiology. It was adapted to the problems for the application in a manmodel. This theory is used, to generate the necessary dynamic restrictions. For the first time, a statistical angle probability model is used to make the posture prognosis. The model was generated in a preceding work and its suitability to answer dynamic questions was validated within two test series. Altogether 12 different experiments, with in each case 15 test subjects, were carried out within all fields of this work. More than 500 dynamic postures were measured and analysed as well as more than 2500 movements. Within this report the developed strategy, that enables a technical designer to precalculate movements of humans within the manmodel RAMSIS realistically, will be shown. This enables the designer to regard also dynamic questions for the ergonomic design...
of an automobile.

Kongress- / Buchtitel:
Digital Human Modeling for Design and Engineering International Conference and Exposition, SAE

Band / Teilband:
1999-01-1885 ff.

Verlag / Institution:
Pa. Society of Automotive Engineers

Verlagsort:
Warrendale

Jahr:
1999

Serientitel:
SAE Technical Paper Series

Volltext / DOI:
doi:10.4271/1999-01-1919

Occurences:
· Einrichtungen > Fakultäten > Fakultät für Maschinenwesen > Institut für Produktionstechnik > Lehrstuhl für Ergonomie (Prof. Bengler) > 1999

Entries: