A computer-aided material selection for design of automotive safety critical components with novel materials

ABSTRACT

An expert system for material selection for design of automotive component with fibre reinforced plastic materials has been developed. The expert-system shell KEE (Knowledge Engineering Environment) provides a tool to store and process expert knowledge. The system concentrates on selecting suitable materials for automotive components, in particular for major elements of pedal box system namely the mounting bracket, the accelerator, the clutch and the brake pedals. Data about the materials and their properties are stored in the frame-based system. The expert system enables material data to be accessed through user interface. Selection of the most suitable material is carried out through experience and expert knowledge (for instance, about manufacturing method for polymeric based composite materials) written in rule system. Factors like mechanical, physical and chemical properties, economic and manufacturing considerations were used in the material selection process. The material must satisfy all the above requirements in order to become a suitable candidate for a particular component.