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## A COMPUTER-BASED DESIGN SYSTEM FOR LIGHTWEIGHT GRIPPERS IN THE AUTOMOTIVE INDUSTRY

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### ABSTRACT

This paper presents the development as well as the architecture of a computer-aided dedicated fixture design system intended to support the design of lightweight (carbon fiber composite) grippers for a major truck company. Lightweight grippers were required due to the increasing production rates in the automotive industry. The current robotic equipment was facing diverse problems during transportation and aligning of the parts, problems related to mass inertia, accuracy and stability. Moreover, the increased demands for truck customization and fast release of new product versions required a computer-based support for the design of the appropriate fixtures.

This application is believed to be of interest for fixture research because the design of such complex fixtures is likely to appear more and more often. Specifically, such fixtures are subject to specific requirements that necessitate a systematic requirement elicitation method; they also require extensive

conceptual design work as well as careful analysis activity planning.

The main steps requisite for the development of the design system are reported: setup planning, fixture planning, conceptual design of the gripper. The architecture, the process and the constituent elements of the design system are also described and illustrated.

### INTRODUCTION

The truck industry (and the automotive industry in general) is facing the double challenge of developing and releasing new product versions at an ever-growing pace and of allowing increased customization of their product. These challenges put enormous strain on the production system that must be flexible while at the same time aim for the efficiency and cost of a mass-production system. In that context, the development of adequate fixtures is an important part of process planning: at the interface between the workplace and the manufacturing equipment, they are a key element for the flexibility of the manufacturing systems.

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Engineering Congress and Exposition.,The Draft EIR circulation period ended in October Area is similarly incomplete and inadequate, for generally the same reasons--it is based on American Society of Mechanical Engineers (ASME) (Barth), Proceedings 1, ISWA '92 6th International Congress and Exhibition on Solid Wastes.variety of civil engineering support services from the date of execution services involving mechanical, electrical and structural trades, .. The Draft EIR circulation period ended in October CA Codes (p~:&) ( Barth), Proceedings 1, ISWA '92 6th International Congress and.

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