Modular Design of Bus Chassis

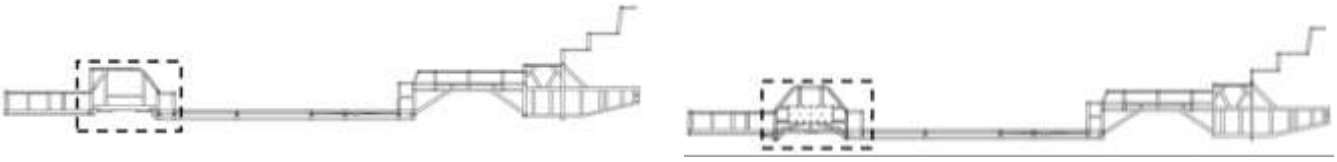
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二.成果简介：

Modular design for a bus chassis is a practical solution to address different bus types and their differing powertrains. Physics interfaces are used to connect interacting subsystems in bus chassis modules. There are few studies focusing on the criteria for assessing interface connectivity, with significantly non-standard characteristics, between bus chassis modules. This featured application can be implemented in the field of bus chassis design and manufacture to meet the customization of bus products, due to the diverse demands of bus operators.

三. 主要研究内容及创新点：

Main content: This study proposes criteria for assessing the interface connectivity in bus chassis modules in accordance with the digital expression of the module interface. Criteria for judging the compatibility of the connection between bus chassis modules are proposed and modular reconfiguration methods are provided, based on the criteria. Reconfiguration of the process matrix is constructed to indicate changes in position, shape, and size after the component is modified, based on the connectivity between modules. Finally, the proposed method is applied to the reconfiguration and replacement of the front suspension frame module of a bus chassis. The results demonstrated and proved the effectiveness of this method.



(**a**) (**b**)

Figure 1. (**a**) Bus chassis without a replaced front suspension frame module; (**b**) Bus chassis with a replaced front suspension frame module.

Innovations: First, the digital expression of the chassis module interface provides criteria for assessing the connectivity between modules. Second, a reconfiguration method for modules, based on the digital expression of the module interface, was proposed and implemented for a real-world case bus chassis. Third, the borrowing or reconfiguration of original modules greatly reduces the development cost of new modules and products and plays an important role in helping enterprises to implement platform and diversified products.

四. 主要研究成果及应用情况

1. Reconfiguration of a Bus Chassis Module Using the Digital Expression for Connectivity between Module Interfaces. Appl. Sci. 2022, 12, 3274. （SCI 见刊）

2. Adaptive Design of Bus Chassis Using a Design Structure Matrix to Facilitate Integration of New Power Sources. （SCI 在投）

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