A study of rollover strength of electric mini baja roll cage
林憲聰、梁卓中
E-mail: 345828@mail.dyu.edu.tw

ABSTRACT
The increasing environmental pollution, the decreasing oil deposits, the noise emissions, the deteriorating traffic conditions in the big cities have forced the car industries to search for alternative energy sources and new concepts. And the electric vehicle seems to become an important solution to the problem. In this paper the design of SAE Mini Baja-Like, a small electric racing can has been finished, according 2010 Baja SAE Rules. And then three cases are studied: the first case dealing with determination of the critical sliding velocity of Mini Baja rolls over from a tilt table, the second case considers rollover of Mini Baja which sits on a platform traveling at a velocity v which is suddenly stops, and the third one repeats the second problem except that the platform is brought to stop according to a given deceleration profile, thus simulating the FMVSS 208 rollover test procedure. A numerical model is created to validate the rollover environment. And the engineering draw software Solidworks and finite element software Hypermesh are used to draw and mesh for Baja frame. Finally, rollover simulations are performed by using finite element analysis software LS-DYNA. The dynamic response of the center gravity and the structural deformation and damage of Mini Baja Roll Cage frame are studied in details. The results shows that the sliding velocities of FMVSS 208 are so higher and not suitable for Mini Baja Rollover test. And the suitable testing sliding velocities for rules are suggested in this paper.

Keywords : SAE Mini Baja、LS-DYNA、FMVSS 208、lateral rollover