

• 計畫中文名稱	自行車安全帽對騎乘者頭部防護功能之研究(I)		
• 計畫英文名稱	Protective Function of the Bicycle Helmet against Head Injuries(I)		
• 系統編號	PB9808-2294	• 研究性質	基礎研究
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• 研究領域	工業工程類		
• 研究人員	陳祥和,吳志富		
• 中文關鍵字	--		
• 英文關鍵字	--		
• 中文摘要	<p>自行車既是代步又是娛樂工具，在交通壅塞、地鐵為交通主幹的都會區，自行車是方便又節能的代步工具，在風景秀麗、人文豐富的鄉村山野，自行車是深度旅遊的休閒良伴，尤其日前油價暴漲環保日重的情況，騎自行車目前已成為超熱門的健身活動。但任何活動均有意外風險，騎乘自行車發生事故時，嚴重的頭部外傷是常見的死因之一，每年在美國造成約 800 人死亡及 17000 人住院，在台灣則平均每年有 304 件頭部外傷案例，足見頭部防護對騎乘自行車之重要。目前配戴安全帽之自行車騎士比率仍低，為提升騎乘者配戴之意願，本研究擬運用人偶碰撞實驗及數值模型動態分析著手，從事故模擬了解自行車意外過程中頭部承受之損傷風險。繼而進行安全帽衝擊能量測試的改良，運用有限元素法探討頭模材料及剛鉗形狀等變數改變之影響，了解現行安全帽安全性測試有否真實反應自行車騎乘者安全性需求。最後考量騎乘者不戴安全帽之主要原因，改善現有安全帽之設計，配合適當修改之安全性測試可讓安全帽符合人因工程要求。本研究其能提升國人騎乘自行車之安全防護，也可提供未來強制配戴立法之參考，真正達到騎乘自行車便利、節能又健身的目的。</p>		
• 英文摘要	<p>The bicycle is an alternative and a recreational tool in a traffic-infested and subway-based metro area. Its advantages of convenience and energy-saving, and environmentally friendly make it a worthy bid for a better future. In a scenic setting and lush countryside, a bicycle proves to be an excellent companion during traveling and leisure, especially during today's explosion of the oil price. Bicycles have become a popular pastime and</p>		

recreation. However, every activity has its own risk of injury. The biggest threat fatally is the head injury for bicycle riding. Annually, a shocking 800 deaths and 17, 000 hospitalizations are caused by this in the US. In Taiwan, there are averagely 304 bicycle accidents related to head injuries every year. As you can see, the danger of head injuries for bicycle riding is extremely important and therefore a solution is should be sought urgently. This study will start from the impact test of dummy with a bicycle and the dynamic mathematical simulation of cycling accidents using the MADYMO computer program. The risky conditions of rider's head during accidents can be revealed by experiments and simulation. The second part of this study tries to understand the necessity to modify the safety test of the bicycle helmet for the impact resorption. It involves a finite element simulation and real tests for helmets. Effects of material choosing for the head form and shapes of the impacting base will be investigated by this study. It will propose a better tester to reveal the real tolerance of human head during cycling accidents. The third part of this study will investigate the barrier for wearing the helmet to bicyclers in Taiwan. A new design of the bicycle helmet will be generated to fit rider's needs by considering the ability of easy carrying, comfort and ventilation. Following the guidelines of Ergonomics will improve the protective function of helmets for bicycle riders against the head injuries. The results of this study can provide a good reference for legislation of the helmet use law to protect the cyclers from head injuries.