A Global Review of Current Instrumented Probe Bicycle Technology and Research

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ABSTRACT

Bicycling has been known to provide various benefits including environmental, social, health-related, economic and transport-related. It produces minimum fossil fuel emission, is affordable to almost 80% of the world's population, is a source of exercise, reduces cost of travel and uses much less road space as compared to other modes of transport. However, the transport environment in most North American cities is still car-centric. Portland has one of the highest rates of bicycle commuters in North America, around 6.3%, which can be considered very low when compared to cities such as Copenhagen (Denmark) where it is over 30%. The main challenges to wider acceptability of bicycle transport are comfort and safety. Several indices have been developed to model perceived comfort and safety of bicycle riders. Researchers have also tried to quantify the effects of dedicated bicycle infrastructure [1], bicycle-vehicle interactions [2] and bicycle velocity, acceleration or angular velocity [3] on perceived comfort and safety. The most recent development in this area is research through an Instrumented Probe Bicycle (IPB) to monitor the bicycling environment. In this paper, previous research in this field is summarized for Europe and Asia. Next, through a survey of Canadian and U.S. researchers, the current state of bicycle comfort and safety research in North America is analysed with emphasis on IPB research. Finally, a strategic IPB research plan for North America is proposed with an aim to improve the attractiveness of bicycle transport.

Keywords: Level-of-Service, Instrument Probe Bicycle (IPB).

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