RAIN BAN: The Next Generation Windshield Wiper

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Purpose of the experiment ? The overall aim of our project was to find an alternative to a car's windshield wipers. Our system is powered by high-speed air and is based on the following principles: 1) High-velocity dry air exits through a thin slot of an air chamber spanning over the entire width of the windshield. 2) The velocity and flow direction of the exit air deflects the wind flow and prevents raindrops from hitting the windshield. 3) To allow the system to work both on stationary and moving cars, the thin slot can be rotated in a vertical plane. Procedure We analyzed and measured the behavior of individual waterdrops under a variety of conditions, that is; (i) dropping them from different heights; (ii) changing the exit air's angle, and; (iii) changing the distance between the slot of the air chamber and the waterdrops' trajectory. The air source was mounted within a measuring device that allowed its rotation in three directions and to determine the optimum angle between the exit air slot and the deflected waterdrops. Subsequently, we studied the wind flow's impact on the deflected waterdrops in a homemade wind tunnel. Data By rotating the air source at an angle of 45 degrees towards the wind flow, our concept proved successful. This configuration was deployed in a 1:18 scale car. Conclusion We could confirm through testing that our setup keeps a windshield clean from raindrops (to wind speeds of at least 50 km/h, or 31 mph, the maximum speed our wind tunnel was capable generating).

Awards Won: