Breathe Easy: Developing an Automated Ventilation Cycle System to Regulate CO2 Buildup in Vehicles

Torres, Chanum

Breathe Easy explores the relatively unconsidered subject of CO2 build-up in vehicles, basing its rationale on ventilation studies in buildings and the accepted fact that heightened levels of CO2 can negatively impact on health. ASHRAE Standards recommend CO2 levels for indoor spaces should not exceed 1000 ppm. 30 trials measuring CO2 levels were conducted in vehicles over 4 months. Results showed that a vehicle's Air Conditioning (A/C) mode directly influences CO2 build-up. Levels of CO2 between 1000ppm-9500ppm were reached under 'Recirculation' mode within an hour. The more people in the vehicle, the faster the rate of CO2 build-up. Under 'Ventilation' mode, levels fell below 1000ppm in 2-3 minutes. Collected data was presented in individual and complex, conglomerated graphs, clearly showing trends in CO2 build-up. Mathematical processes were used to generate equations, expressing the connection between time, number of passengers and CO2 levels. It was alarming news to find that levels of CO2 contributing to driver fatigue, driver nausea and lack of driver concentration were found to be present. This led to the development of a design solution: AVIAR (Automated Vehicle Interior Air-Quality Regulator). The concept behind AVIAR is an automated ventilation system, able to measure levels of CO2 and thus constantly adjust the cycle between recirculation and ventilation to ensure better airflow. Pre-existing time-regulated ventilation cycles in vehicles were proven to be ineffective. Breathe Easy casts light on a problem that potentially affects millions of unwary drivers and commuters worldwide yet offers a solution with wide applicability.

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