eSCai

First, we thought about this idea, because the accident that happens in the roadway, and also, we thought about saving life time of led chip and power consumption.

From this research paper Analysis of System Response, Energy Savings, and Fault Detection in a Weather and Traffic-Adaptive Smart Lighting System, we found that in foggy conditions, a CCT of 3000K LED light can enhance visibility over the street surface, resulting in faster traffic movement and reduced accident proneness.

Operating LED chips at 50% power versus 100% power provides several benefits related to performance, energy efficiency, thermal management, and lifespan:

* Lower Heat Generation: Running LEDs at 50% reduces the heat produced by the chip compared to full power. This improves heat dissipation and decreases thermal stress on the LED components, which is a main factor in LED degradation over time.
* Extended Lifespan: Because LEDs run cooler and experience less thermal and electrical stress at lower power levels, their light output decays more slowly. This means dimmed or half-powered LEDs generally have a longer operational life.
* Energy Savings: Operating LEDs at partial power saves energy proportionally compared to running at full brightness, leading to lower electricity costs.
* Reduced Light Decay: The reduced operating temperature at 50% power lowers the rate of luminous flux decay (light output decline), helping maintain brightness longer.
* Maintained Efficiency: Up to a point, many LEDs maintain good luminous efficacy when dimmed or powered below maximum, providing efficient lighting for the energy consumed.
* Improved Reliability: Lower power operation reduces the chance of failure associated with overheating or electrical overstress, lowering maintenance needs.