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To: TREN E3 CONSULTATION
Subject: DRLs

Living in the United States, we are subjected to an inconsistent implementation of the DRL concept.

#1, partial intensity high beam DRLs: Profusely glaring and patently offensive would be the norm with this idea. Some implementations, namely Toyota utilize a series-parallel arrangement in that the DRL function is two, primarily HB3 bulbs, so that if one filament fails, both lights extinguish. Very few cars in the United States use high beam bulbs that have a blacktop coating, some european models use the H7 bulbs that use the coating to reduce point source glare from the filament, but still have directed glare otherwise. These lights mask other more important visual information.

#2, negative turn signals: This concept was used by GM in order to avoid having the pop-up [air brake] headlights of the C5 corvette parked in the up position during the day. This relies on the Sylvania 4157 long life bulb (4000 hour high filament), in order to operate the both high filaments in a prolonged duty cycle. The turn signal here is redefined to be off, off, off signal instead of an on, on, on signal. A different take on this idea is to have both high filament turn off when a turn signal is activated and flash the chosen side, although no OEM implementation has used this. As I understand the EU doesn't allow amber to be illuminated from the front of the car, which is a good thing in that it prevents combination amber parking/ turn signal lamps.

#3, full intensity low beam headlights: This implementation is used by some cars, i.e. Volvo S80 H7 low beam & H7 high beam. The H7 runs high specific output and commensurately has a shorter lifespan than the H11 and HB4. It would be incumbent on the driver up noticing bulb failure either directly or indirectly to replace the failed part, or to field swap the failed low beam bulb with the high beam bulb, or the spare bulb in the car. [if required to carry] The overabundance of light truck vehicles combined with HID low beam DRL has added to the optical nightmare on the roads. The mismatch in heights, aided by adjustable air suspensions, creates an unenviable environment for automobile users either in daytime or nighttime conditions. This can be implemented by the driver in all current vehicles by just turn the vehicles lights on. Some vehicles have instrument panels that have continuous backlighting of gauges, i.e. Lexus, and full intensity low beam DRLs, which can lead to drivers operating their vehicle at night without knowing that they are lacking illumination on the other three sides of their vehicle.

#4, partial intensity fog lights: Some Ford Motor Company vehicles implement DRL functionality by driving the fog lights at 75% voltage. Operation is sufficient to activate the halogen cycle with the chosen bulbs, i.e. Ford Explorer ANSI 899 37.5 watt bulb. The US has very lax restrictions for auxiliary lamps regarding height, aim, and glare, so more precision in the optical standard would show promise with this concept.

#5, partial intensity low beam headlights: This implementation is used by certain makes in order to prevent a reduction in bulb life. By operating at a lower voltage, roughly 90%, the evaporation of filament is reduced and bulb longevity is enhanced, as an ancillary benefit the white point is also lowered. Since the percentage vehicles that utilize HID headlights has been increasing, the inability to run reduced output without lamp degrading cathode fall, works against a large scale implementation.

#6, dedicated DRL lamp: This idea can overcome many of the limitations of other DRL systems. Some exceptions are the Volvo S60R which used an HB3 bulb in a parabolic reflector behind a fresneled

lense. This car had profuse glare and a gross overabundance of light for the DRL function. Audi has used LEDs in an array to function as their DRL. It would be possible for OEM projector manufactures to integrate a ~30 lumen 1 watt LED into the projector assembly and operate with the discharge lamp off and the cutoff shield retracted so the light would be distributed above the traditional cutoff line. BMW has moved from running the H7 high beam bulb at partial intensity, to utilizing the 'angel eyes' to perform the DRL in the 3-series coupe.

DRLs should not be mandated, as there is too much variability in concept, time of year, time of day, and North/South latitude in the EU.

The best method to improve safety is to mandate 'fast' <10ms positive signaling (off state to on state only) brake lights for ALL road vehicles. There is a gain in optically conspicuity/recognition with LED lamps, so there is a greater gain than the 200ms response time advantage over incandescent bulbs, which is especially important when more and more vehicles are equipped with the Brake Assist function. With the proliferation of Brake Assist, the CHMSL should be required to be LED based and adaptive in so forth that a normal brake application would be 1/3 width, and the adaptive brake light function (Brake Assist, Electronic Stability Assist function, multi-wheel ABS activation) illuminating the other 1/3rd width on each side of the already illuminated lamp. This avoids the pitfalls of flashing brake lights and automatically engaging hazard lamps.

Maintain the positive signaling amber turn signals front, rear, and side. That is something that is sorely need in the USA, when most vehicle utilize red partial signaling 'turn signals' at the rear of their vehicle, utter ambiguity as to the driver's intention.

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