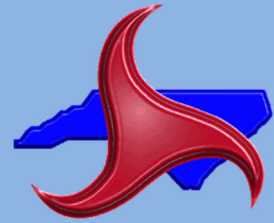


# NCDOT Traffic Safety Unit Programs



## Dynamic All Red Extension

Red Light Running (RLR) crashes pose a serious traffic safety issue but there are limited tools to effectively address them especially for rural, isolated intersections. NCDOT tested and evaluated an innovative safety countermeasure for signalized intersections, called a Dynamic All Red Extension (DARE). DARE, also known as red clearance extension or dilemma zone protection, is designed to reduce crash risk by protecting vehicles on the cross street from a set of potential RLR on the mainline.

## Background

DARE works by detecting a vehicle is likely to violate the red signal indication of an approach during the red clearance timing interval of that approach; stopping the signal controller timing in the all-red clearance interval before switching right of way; and allowing the offending vehicle time to clear the intersection before the cross street receives a green indication. Because the system is dynamic, only the detected vehicles deemed as potential RLR receive the red extension.



Red light running crash captured at a pilot project site prior to implementation

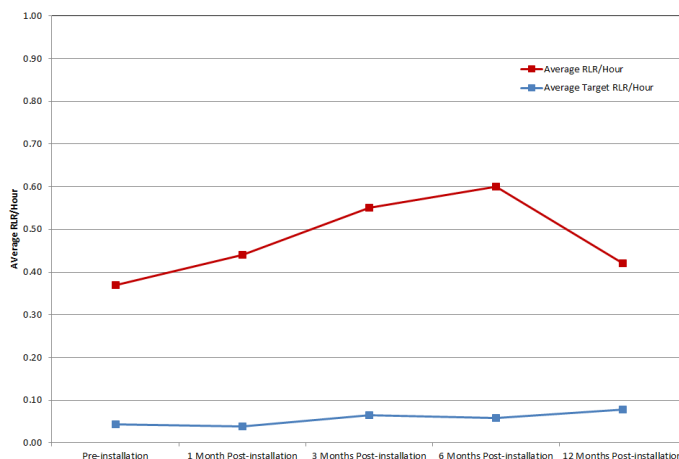
## Results

DARE was initially installed in NC at eight signalized intersections at rural, isolated, high-speed locations in 2013. Since that time additional treatments have been implemented through the NCDOT safety program. A two-pronged project evaluation was conducted. We conducted a driver compliance evaluation, which involved the collection and analysis of over 1,000 hours of observational video data to determine whether significant driver adaptation occurred after installation. We also conduct a before and after evaluation of crash data.

As shown below, the driver compliance study results do not indicate a statistically significant change in average RLR from before to 1-year post installation, indicating minimal change in driver behavior.

The initial crash analysis results indicate a **25% Reduction in Target Crashes**, which include Angle Crashes involving a RLR on a treated approach. A **Benefit/Cost of 143:1** was calculated for 11 sites where DARE was the sole treatment.

Average Red Light Runner/Hour



Example DARE set-up using inductive loops. It is "dynamic" as the amount of time the red clearance is increased can vary from one cycle to the next. In this scenario the total All Red for the cycle is 3 seconds.

