

# Street and Highway Safety Lighting

A. G. OTTENHEIMER

District Lighting Specialist, General Electric Company  
Chicago, Illinois

The need for programs for modernizing the lighting of our arterial streets is daily becoming more apparent. We speak of the cost of street lighting, but in effect such expenditures are investments that pay for themselves several times over, year after year.

Now you know as well as I do that the most difficult condition to correct is one that is just average—one that just gets by. On the other hand, if we have an outstanding defect in a machine or method of doing business, we usually see to it that this condition receives immediate attention.

Here's what I'm getting at. The *average* lighting on many arterial streets within our city limits consists of a 2,500-lumen, or at best a 4,000-lumen, lamp at each intersection. We're attempting to light a complete city street, 300 feet long and 40 feet wide, an area of 12,000 square feet, with a light source you wouldn't consider adequate for the floor lamp in your living room!

In the last pre-war year 14,000 people were killed and half a million more injured on streets within city limits. If so many people died each year as the result of a disease, our health authorities would immediately go into action. As for traffic accidents, several of our large insurance companies, the National Safety Council, and other organizations have investigated this condition.

Thirty years ago only a million motor vehicles were registered. Today there are over twenty million cars and trucks on our streets and highways. Automobile registrations have increased over 2,000 percent, and traffic has grown more than 5,000 percent.

One encouraging fact is that daytime deaths and accidents are slowly decreasing. However, night deaths and injuries are climbing at an alarming rate. In spite of the fact that only 25 percent of our traffic is on the streets at night, the hours of darkness account for 50 percent of our accidents and 60 percent of our fatalities.

This relationship between death and darkness led the Street and Highway Lighting Safety Bureau to conduct a special survey in a number of representative cities.

Where were the danger spots? One of the most significant facts discovered was that *main arterial thoroughfares*, representing only 10 percent of the mileage surveyed, were the scenes of half the night fatalities. Seventy-three percent—almost three-quarters of these fatalities—occurred at night. In other words, on the basis of traffic exposure, main thoroughfares were found to be ten times more dangerous at night than during the day.

This survey showed that seven of every ten killed were pedestrians, and that 69 percent of the pedestrians were killed at night, when traffic is much lighter. In driving at night one cannot always see a pedestrian in time to avoid him. One of the conclusions of this report was that the difference between day and night rates of injuries and fatalities narrows down to visibility, or the amount of light available for seeing.

But surely these cities had street lights. Yes, they did—but on the main arterial thoroughfares covered, the street lighting averaged less than one-half the minimum recommended by the Illuminating Engineering Society. Although we have a remedy—street lighting—that can prevent a number of our urban traffic accidents, the saddest part of it is that the remedy has not been applied in the correct doses.

Records in Detroit, Michigan, showed that the night accidents were highest on 31 miles of main thoroughfares. These streets did have street lighting, but there were 146 night fatalities and 21 day fatalities in 1934-1935 and up to the time improved street lighting went into service in 1936. Then the lighting was improved and modernized, and during the next 12- to 16-month period records showed 18 night fatalities against 11 for daytime hours.

In other words, the ratio of seven night fatalities to one day fatality was changed after the installation of modern lighting to 1.6 night fatalities to one day fatality. Detroit city officials point out that had the 1.6- to-one ratio been maintained during the 2½-year period before the improved street lighting, the lives of 100 people could have been saved on these 31 miles of heavily traveled city streets.

You and the members of your community pay for good street lighting whether you have it or not. Without it, you pay for increased insurance, loss of time and wages, hospitalization, and property damage. Of course, the prevention of traffic accidents is but one of the services that good street lighting can perform. Correct and adequate lighting is a guardian of both persons and property. Light increases the efficiency of the police force many times. Available figures credit a 40-

percent decrease in crime to adequate street lighting. Good lighting on traffic arteries leading into and through your city, besides preventing accidents, is a striking advertisement, saying to visitors, "Here is a progressive city."

To give your city adequate lighting you must begin with a plan, and the first step is zoning. In this plan, the streets should be charted according to the following subdivisions: (1) business streets; (2) traffic arteries; (3) residential streets; (4) highways.

The next step is to apportion the light according to conditions in these various groups of streets. Fortunately, definite standards have been established in the recommended practice of the Illuminating Engineering Society, a group composed of the outstanding lighting engineers of the country. They have made available tables and charts showing the minimum amount of light necessary for good visibility on the various types of streets. It is entirely probable that the lighting plan recommended would involve too great a change to be accomplished in one or two years. In that case arrangements should be made for an improvement covering a longer period, perhaps five years. Lighting the main thoroughfares is the first big step.

You have all probably viewed with interest magazine ads of the type showing the helicopter landing in the back yard; so it's only natural that you ask what the future holds in the way of new light sources. At the present time the most commonly used light sources are incandescent, sodium, mercury, and fluorescent. The incandescent lamp has an approximate efficiency of 20 lumens per watt as compared to 55 lumens per watt for the sodium, and 40 lumens per watt for the mercury and fluorescent.

Present thinking on the part of research engineers leads us to believe that in the immediate post-war period, the bulk of street and highway illumination will continue to be done with incandescent lamps, but that the sodium and mercury light sources will become increasingly popular.

Considerable experimental work has been done in connection with the fluorescent light source for street illumination. In spite of its relatively high efficiency, one of the main drawbacks has been the low output in illumination per foot of tube. This means that a fluorescent lamp 4 feet long does not have the light output of a comparatively small filament lamp. However, research will continue, and it's quite possible that developments now unforeseen may open new possibilities. If that occurs, we must remember that it may be some years before any radical development is ready for widespread application. Such is the history of lighting progress.