

# SPEC YOUR LIGHTS

as if someone's life depends on it!

A long standing definition of why you should use warning lights on a roadside vehicle is to give advance warning of a hazard... but, lets clarify it further... the hazard is you and your fellow operators...

➔ in fact your operators are actually safer driving to the scene than they are when they get there.

Why? Because, the moment you step out of your vehicle you are a "pedestrian", and pedestrians are not easily seen.

At a work scene you have to compete for the attention of the motorist and we know from multiple studies that a high percentage of the driving public is speeding and not paying attention. Now you are saying, "tell me something I don't know."

OK. Let's go further. The towing and recovery industry, in our experience, ranks low on a scale of 1-10 on effectiveness in the types of lights used and placement of lights to maximize advanced warning.

That strong statement is based upon our observations of towing and road service vehicles around the country, doing less than an adequate job of:

Getting their work scenes to stand out from their environmental surroundings  
Competing for the driver's attention  
Being seen early enough for driver reaction to be in your favor.

Enough talk about the problem as we see it. Let's focus on what can be done to offset these factors using warning light packages to increase the visibility and distance from which your operators can be seen.



## Factor #1: INTENSITY

**INTENSITY:** is a function of light output (Flash Energy), the amount of energy in a device and how it is focused will determine how much light will reach a specific distance.

The distance from which your operators are "detected" is directly related to intensity & focus (the amount of light reaching a measured distance). The best analogy we could use is... "What will give you the best chance of being seen at a distance? A license plate light or a headlight?" The difference is intensity and focus. The goal for a safety manager or the person choosing vehicle lighting should be to increase the "Envelope of Safety" for the work crew on the side of the road (See Chart #1).

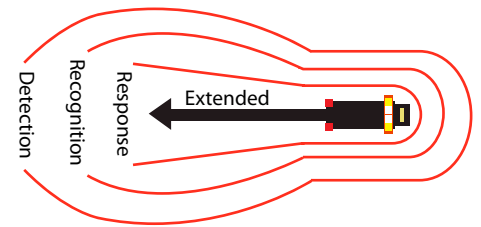
SAE has established "minimum acceptable levels of visual warning" for motor vehicles (See Charts #2 & #3). Because SAE is recognized as an "Authority" in a court of law, you comply to protect yourself in court, but to protect your people you need to exceed these levels, depending on your working environment.

Let's put it into context for towing vehicles (See Chart #4). This chart shows the "effective distances" of a strobe measured in joules (a layman's way of comparing flash energy of one strobe to another). The most common strobe found on towing equipment is 10-12 joule lights (where strobes are used).

Even though the chart shows a class 1 & 2 light might be effective at short distances, when you add environmental factors and the other three factors yet to be discussed, we recommend lights that exceed SAE class one, and in this case we recommend 16-18 Joule lights as a minimum standard for the towing industry.

Chart 1

### ENVELOPE OF SAFETY



The sooner a motorist can detect your truck, the sooner they will recognize it and respond. Greater light intensity will improve motorist detection and improve your safety.

## SAE CLASSIFICATION OF VEHICLES

Chart 2

**CLASS 1** - Authorized Emergency Vehicles, Police, Fire, Ambulance & Incident Response Requests Right of Way

**CLASS 2** - Highway Maintenance, Construction & Service Vehicles... You!  
Warns of Hazard

**CLASS 3** - Non-Highway Vehicles

Chart 3

## SAE HIGHWAY VEHICLE SPECIFICATIONS

Minimum Visual Lighting Requirements

**J595** - Flashing Warning Devices

**J8455** - 360 Degree Roatating Beacons.

**J1318** - Gaseous Discharge Warning Devices (stobes)

**J578** - Color Specifications - Amber.

**J575** - Test Methods.

Should be included in every light bid spec

Chart 4

## INTENSITY V. DISTANCE

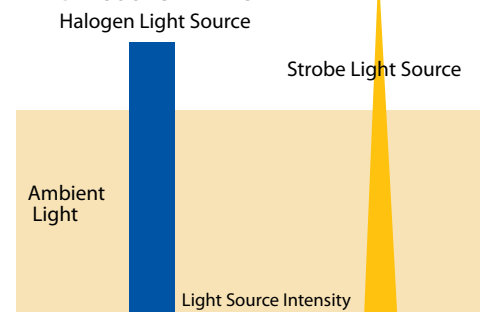
Strobe Beacons

25-50 yds	Class 3	5-8 Joules
50-75 yds	Class 2	10-12 Joules
75-100 yds	Class 1	12-14 Joules
100-150 yds		14-16 Joules
1/8-1/4 mile		18-20 Joules
1/4-1/3 mile		21-22 Joules

\*Additional heads and animation will increase effectiveness but not necessarily distance.

## EFFECT OF AMBIENT LIGHT ON LIGHT SOURCE INTENSITY

Chart 5





## Factor #2: CONTRAST

**CONTRAST:** This relates directly to the issue of standing out from the surrounding environment.

If the intensity is only as great as the brightness of the environment (let's say the sun at noon) then your warning lights will not be seen (called "masking"). In fact, the only light visible will be light greater than the background, in this case bright sunlight (See Chart #5). How you correct this situation is to increase the intensity to greater than that of your environment (viewable intensity). In some situations that means going to a higher class light (Possibly from SAE class 2 lights to Class 1 or higher lights).

Also, contrast is a function of dark time. Dark time is the off-time of a strobe, halogen, or LED light. SAE recommends that warning lighting flash a minimum of 60 FPM, not to exceed 240 FPM. Less than 60 is not enough activity to stand out and 240 is approaching steady on (not enough dark time).

Contrast can be enhanced by such things as adding black out disks to the tops of beacons (keeps the sun out, and enhances dark time) and reduction of glare with sun shields on directional bars etc. More on contrast will be covered in Factor #4.

## Factor #3: ANIMATION

**ANIMATION:** The fifty-dollar word for animation is "Conspicuity Factor" which simply means, "The additional awareness created by the animation of a signal."

An example would be a single signal flashing at less than 60FPM, versus two flashing at 120FPM. Another would be a single flash strobe versus a double or quad flash. Different mounting levels are also an option (See Chart #6).

Peripheral vision plays a huge role in driving and seeing beyond what's in your central vision. Peripheral vision does not pick up stationary visuals well, but is highly sensitive to motion and activity which in lighting is called animation. To be seen by inattentive drivers at speed you have to have intensity greater than ambient lighting and animation.

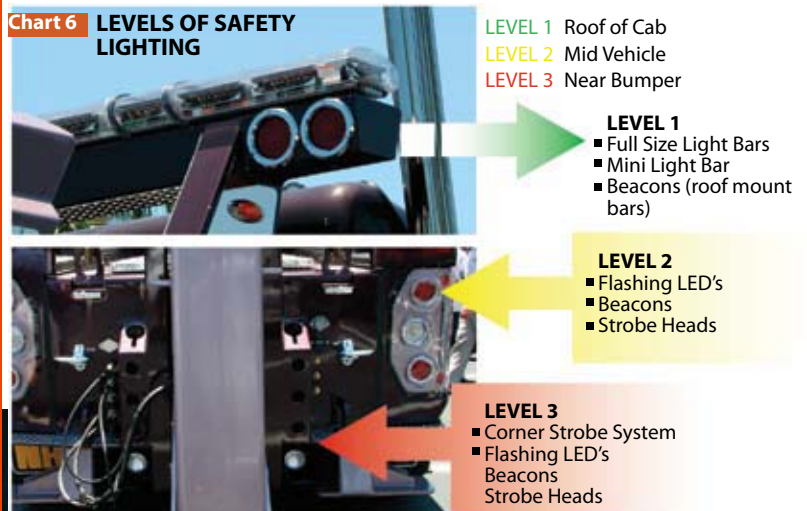
## Factor #4: INSTALL POSITION

**INSTALL POSITION:** of warning lights. Yes it's possible to use the right intensity light, with the right amount of animation and still have a "less effective" lighting system than it could be.

For the towing industry we recommend using the "Tri-Level" mounting concept (See Chart #6). The tri-level concept uses a light or lights mounted high on the vehicle (cab high or higher) called level one, lights mounted at eye level called level two for the towing industry (usually mounted high on the headache rack or in a similar position), and level three mounted even with, or slightly higher than, the stop, turn, and taillights. Level three can be additional lights, or corner strobes where permitted by state code.

**The towing and recovery industry ranks the lowest in effectiveness in the types and placement of lights to maximize advanced warning.**

Chart 6 LEVELS OF SAFETY LIGHTING



These Four Factors can increase the effectiveness of a vehicle's warning light package and are things you as an owner need to consider when evaluating the lighting program for your fleet. Now you are ready to evaluate your own lighting program. **But, choose your lighting packages as if someone's life depends on it!**

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