**Introduction**: This is a document introducing about road markings and street lighting which is a very important term for traffic engineers to control traffic system. These terms comes from traffic engineering.

Traffic engineering is a branch of civil engineering that uses engineering techniques to achieve the safe and efficient movement of people and goods on roadways. It focuses mainly on research for safe and efficient traffic flow, such as road geometry, sidewalks and crosswalks, segregated cycle facilities, shared lane marking, traffic signs, road surface markings and traffic lights. Traffic engineering deals with the functional part of transportation system, except the infrastructures provided.

**Road Marking**: Road marking (surface) is any kind of device or material that is used on a road surface in order to indicate official information or rules.

Center lines are the most common forms of road surface markings, providing separation between traffic moving in opposite directions. This example of a center line section shows typical wear and tear, with the material strip frayed at the edges and smudged by tire rubber.

**Street Lighting**: A Street light, lamppost, street lamp, light standard, or lamp standard is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certain time every night.

This is Sodium Vapor light which is most common in Bangladesh.

We will briefly elaborate road markings and street lighting about its usefulness, how it works, how it make roads unsafe and safe etc. Road marking and Street lighting is a very important factor for roads to make it safe and also traffic jam, congestion etc depends on those terms.

**ROAD MARKING**: As we have learned about the definition of road marking , now we will discuss it elaborately .

Road surface markings are used on paved roadways to provide guidance and information to drivers and pedestrians. Uniformity of the markings is an important factor in minimizing confusion and uncertainty about their meaning, and efforts exist to standardize such markings across borders.

However, countries and areas categorize and specify road surface markings in different ways. Road surface markings are either mechanical, non-mechanical, or temporary.

They can be used to mark traffic lanes, inform motorists and pedestrians or serve as noise generators when run across a road, or attempt to wake a sleeping driver when installed in the shoulders of a road. Road surface marking can also indicate regulation for parking and stopping.

Road marking was first adopted at Michigan in USA in 1911. Adopting history is interesting. It was adopted by Edward N. Hines who was watching a wagon carrying milk which was leaking and was leaving a trail of white line. He was honored for this tremendous idea in 1972 and 2011 by Michigan Transportation Hall and by Paul Mijksenaar Design for Function Award.

Road marking was used in highways when it was first adopted. There did arise a question of which color to use for highway center lines. A vote was inducted and 47 states chosen white and one was with yellow .

## Types of Markers:

**Mechanical Marker**: Mechanical devices may be raised or recessed into the road surface, and either reflective or non-reflective. Most are permanent; some are movable.

- Cat’s Eye
- Botts’ Dots
- Rumble Strips
- Reflective Markers

**Cat's Eye**: invented by Percy Shaw in the 1930s, Cat's eyes equip most major routes in the British Isles. They consist of four reflective lenses mounted in a durable white rubber housing, two facing fore and two facing aft. The housing is mounted within a cast iron shoe, which the rubber housing sinks in to when driven over. This provides protection from snow and allows the lenses to be self-cleaning—they pass a rubber blade when depressed. The lenses are available in a variety of different colors, mainly white, yellow/orange, green, red, and blue.

**Botts' Dots**: Botts' dots (low rounded white dots), named for the California Caltrans engineer Elbert Botts, who invented the epoxy that keeps them glued down, are one type of a mechanical non-reflective raised marker. Generally they are used to mark the edges of traffic lanes, frequently in conjunction with raised reflective markers. Botts' dots are also used across a travel lane to draw the drivers attention to the road. They are frequently used in this way to alert drivers to toll booths, school zones or other significant reduction of speed limit. They are normally only used in warm climates since snow plows usually remove them along with the snow.

**Rumble Strps**: Rumble strips are commonly used for the same purpose. A rumble strip can be a series of simple troughs (typically 1 cm deep and 10 cm wide) that is ground out of the asphalt. Other alternatives, similar to the Botts' dots, use raised strips, painted or glued to the surface. Uses can be across the travel direction (to warn of hazards ahead) or along the travel direction (to warn of hazards of not staying within a specific lane).Their main way of function is creating a strong vibration when driven over that will alert a driver to various upcoming hazards both by sound and the physical vibration of the vehicle.

**Reflective Markers**: Reflective markers are used as travel lane dividers, to mark the central reservation (median) or to mark exit slip-roads. Incorporating a raised retro-reflective element, they are typically more visible at night and in inclement weather than standard road marking lines. The color of markers varies depending on the country of use; freeways in the United States often use reflectors manufactured to appear white to drivers proceeding in the proper direction of travel, and appear red on the reverse to warn drivers that they are proceeding against the proper direction of travel, creating a danger of a head-on collision.

Reflective markers are also referred to as raised pavement markers, road studs, and sometimes (generically) in the UK and Ireland as cat's eye, although this name refers to one particular brand of product. These markers can be used for other purposes such as marking the locations of fire hydrants (blue) or at gates of gated communities to indicate that emergency service vehicles have a code or device that allows them to open the gate. In the United Kingdom and elsewhere, raised markers are used to mark crosswalks (crossings) to assist the blind in crossing streets. In colder climates, reflective markers may be installed below ground using an elongated narrow triangle, cut into the road surface that allows the device to be installed below the road surface. Newer technology allows these to be placed above ground with snowplough-able rails that attempt to protect the reflective components from the snowplough blade.

## Non-Mechanical Markers: There are some non-mechanical markers which is used most in the world.

- Paint
- Thermoplastic
- Plastic
- Eproxy

**Paint**: Paint, sometimes with additives such as retro reflective glass beads, is generally used to mark travel lanes. It is also used to mark spaces in parking lots or special purpose spaces for disabled parking, loading zones, or time-restricted parking areas. Colors for these applications vary by locality. Paint is a low-cost marking and has been in widespread use since approximately the early 1950s. Paint is usually applied right after the road has been paved.

The road is marked commonly by a truck called a "Striper." These trucks contain hundreds of gallons of paint stored in huge drums which sit on the bed. The markings are controlled manually or automatically by the controller who sits on the bed. Paint is run through a series of hoses under air pressure and applied to the roadway surface along with the application of glass beads for retro reflectivity. After application, the paint dries fairly quickly. Painted symbols, such as turn-lane arrows or HOV lane markers, are applied manually using stencils.

Above picture was taken in Kenya where a Road Marking Machine was used.

**Thermoplastic**: One of the most common types of road marking based on its balance between cost and performance longevity, thermoplastic binder systems are generally based on one of three core chemistries: hydrocarbons, rosin esters or maleic modified rosin esters (MMRE). Thermoplastic coatings are generally homogeneous dry mixes of binder resins, plasticizers, glass beads (or other optics), pigments, and fillers. Their use has increased over paints mainly due to the performance benefits of increased durability, retro-reflectivity, and a lack of VOC solvents. Thermoplastic markings are applied using specially designed vehicles.

Usually thermoplastic marking mode should apply the professional equipment called road marking machine to coating traffic lines, and the road paint need preheating by a device commonly called preheater. The thermoplastic mix is heated in trucks to about 200 °C (400 °F) before being fed to the application apparatus. This is often a screed box or ribbon gun.

Immediately after the thermoplastic has been applied, glass beads are laid onto the hot material so that they embed before the plastic hardens. These beads provide initial retro reflection. As the marking wears during use and the initial beads are lost, the beads mixed with the binder are uncovered, providing long term retro reflectivity. Most thermoplastic is produced in white and yellow colors, but other colors such as red may also be produced.

**Plastic**: Commonly referred to as tape or cold plastic, this product is heavy-grade material with reflective beads embedded in the plastic. It is commonly used to mark crosswalks, stop bars, and traffic guidance such as turn lanes, HOV lanes, train crossings, pedestrian crossings, taxi lanes, bus lanes, and bike lanes. There are three ways to apply tape:

Overlay: The application being laid over the surface of the pavement. Using industrial-grade rubber cement, once the tape is combined with the pavement, it should last three years. Major obstacles to estimated life are snow-plows, salt, and mis-application.

Inlay: The tape physically becomes part of the asphalt. Using the heat generated in the paving process, road workers lay special tape on the asphalt in the hardening process, and rollers compress the two together.

Preformed Thermoplastic: Preformed thermoplastic pavement markings are applied using a propane heat torch and are used primarily because of their durability and cost-effective service life. Cut and ready to position onto an asphalt or concrete pavement surface, the most common applications of preformed thermoplastic pavement markings are found at intersections as transverse markings such as stop lines, legends, crosswalks, arrows, bike lane symbols, and accessibility symbols .

Hot-tape markings ready to be applied to the road surface with a blow torch in Brussels, Belgium.

**Eproxy**: Epoxy has been in use since the late 1970s and has gained popularity over the 1990s as the technology has become more affordable and reliable. This material competes directly with plastic with respect to usage and cost. Epoxy is both the basic component and the cured end product of epoxy resins, as well as a colloquial name for the epoxide functional group. Epoxy resins, also known as polyepoxides are a class of reactive prepolymers and polymers which contain epoxide groups.

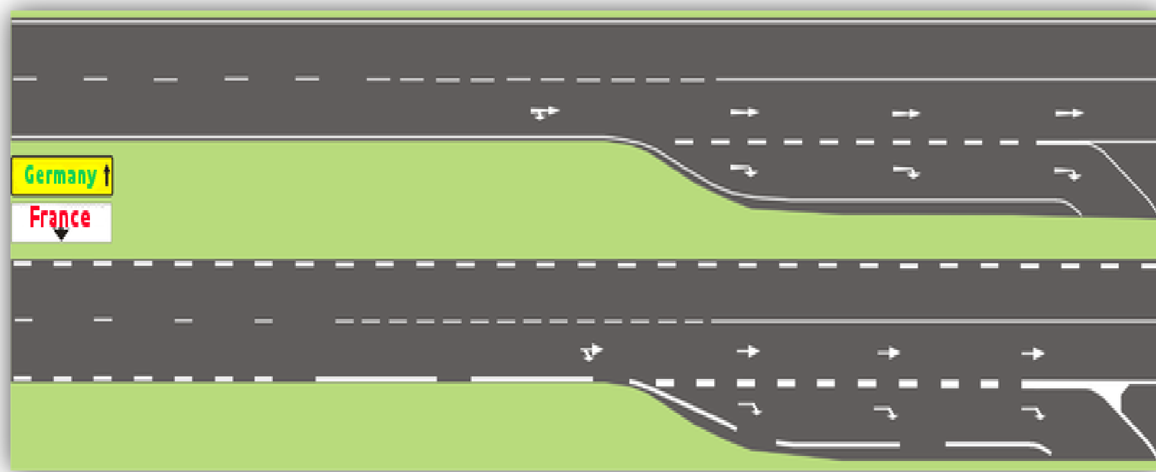
**Temporary Markers**: There are also some temporary markers. Pylons are used to separate HOV lanes from regular traffic lanes. They are also used in areas where lanes are used at different times for travel in both directions. These pylons have shafts that drop into holes in the road surface. A good example of this type of use is the Golden Gate Bridge in San Francisco.

Traffic cones are usually used to divert traffic. The reflective sleeves are for nighttime visibility; the bosses at the top ease handling and can be used for attaching caution tape.


The Traffic cone on the right is used in the United Kingdom to indicate that no parking is allowed.

Giant traffic cone in Seattle, Washington.

**Information about Road Markings**: Road markings are different in location wise. Every country has own design for road markings.




Germany and France road markings are shown in above picture. Germany has continuous line in both side of road and France has non-continuous lines. Also approach road marking is also different.

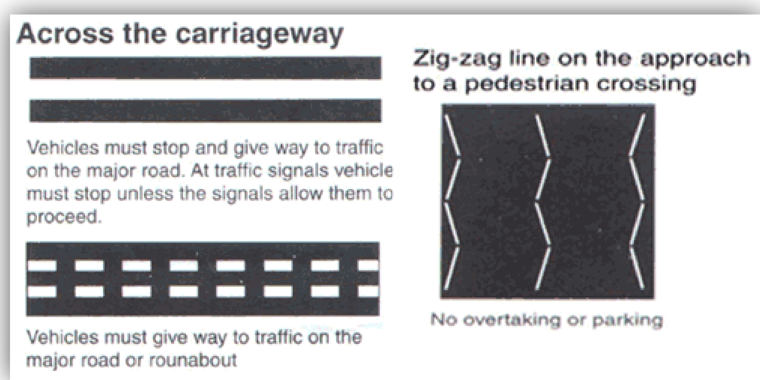
**Specifics of road markings on carriageways**

| | between carriageway lanes (lane lines) | | | edge of carriageway lanes (side lines) | | | |
|---|---|---|---|---|---|---|---|
| | colour | line (length in m) | distance (length in m) | colour | line (length in m) | distance (length in m) | |
| Belgium | white | 2,5 | 10 | white | continous line | | |
| Bulgaria | white | 3 | 9 | white | continous line | | |
| Denmark | white | 6 | 12 | white | continous line | | |
| Germany | white | 6 | 12 | white | continous line | | |
| France | white | 3 | 10 | white | 39 | 13 | *F |
| Greece | white | 6 | 12 | white | continous line | | |
| Britain | white | 2 | 7 | white | continous line | | |
| Israel | white | 3 | 9 | yellow | continous line | | |
| Italy | white | 4,5 | 7,5 | white* | continous line | | |
| Luxembourg | white | 3 | 9 | white | continous line | | |
| Austria | white* | 6 | 12 | white | continous line | | |
| Portugal | white | 4 | 8 | white | continous line | | |
| Sweden | white | 3 | 9 | white | continous line | | |
| Serbia | white | 6 | 12 | yellow | continous line | | |
| Swiss | white | 6 | 12 | white | continous line | | |
| Slowenia | white | 6 | 12 | white* | continous line | | |
| Spain | white | 6 | 12 | white | 21 | 4 | *E |
| Czech Republic | white | 6 | 12 | white | continous line | | |
| Tunisia | white | 3 | 10 | white | 3 | 3,5 | *F |
| Turkey | white | 6 | 9 | white*TR | continous line | | |
| Hungary | white | 6 | 12 | white | continous line | | |
| USA | white | 3,048 | 9,144 | white*US | continous line | | |

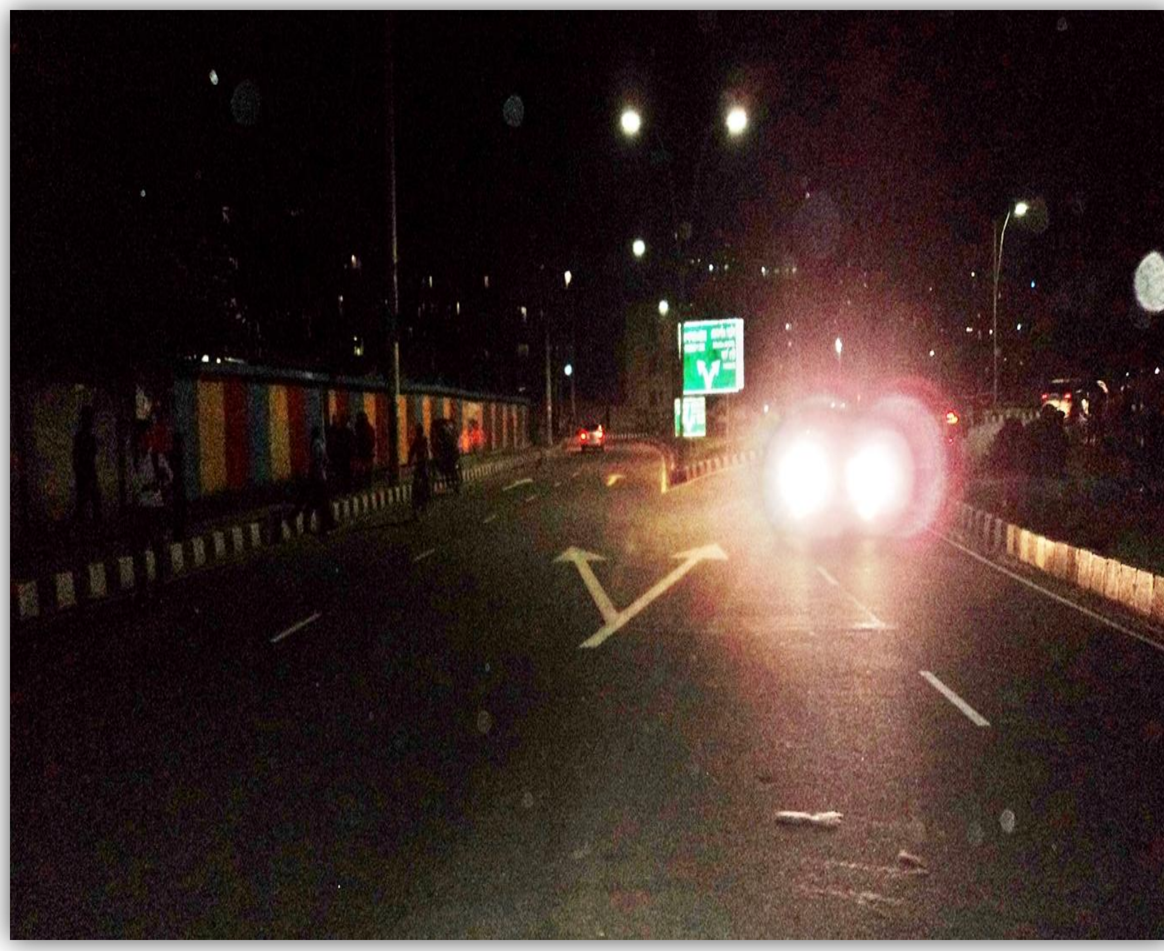
* formerly yellow
*F valid for the right edge line | left edge line : continous line
*E valid for the right edge line | left and often also right edge line : continous lines
*TR almost allways white, but within some sections yellow colour is used
*US valid for the right edge line | for left edge line yellow colour is used

Country specific information on lengths, color and distances of markings on super-highways.

**Marking in Bangladesh**: It is very much important to design road network with sufficient road marking. But Bangladesh is in edge of danger. There are no sufficient road markings and that causes many unwanted accidents.



Both end is a continuous line and the center one is discontinuous.



This is a mark saying you can either go straight or go right from left .

A CNG Auto Rickshaw is going right and that private car is going straight .

We can see that no car can take U-Turn but from road marking any car can take right turn and also go straight.

Parking road marks which is saying it is safe for disabled to be carried out or in the car. Also saying to other cars to drive very slowly and with awareness.

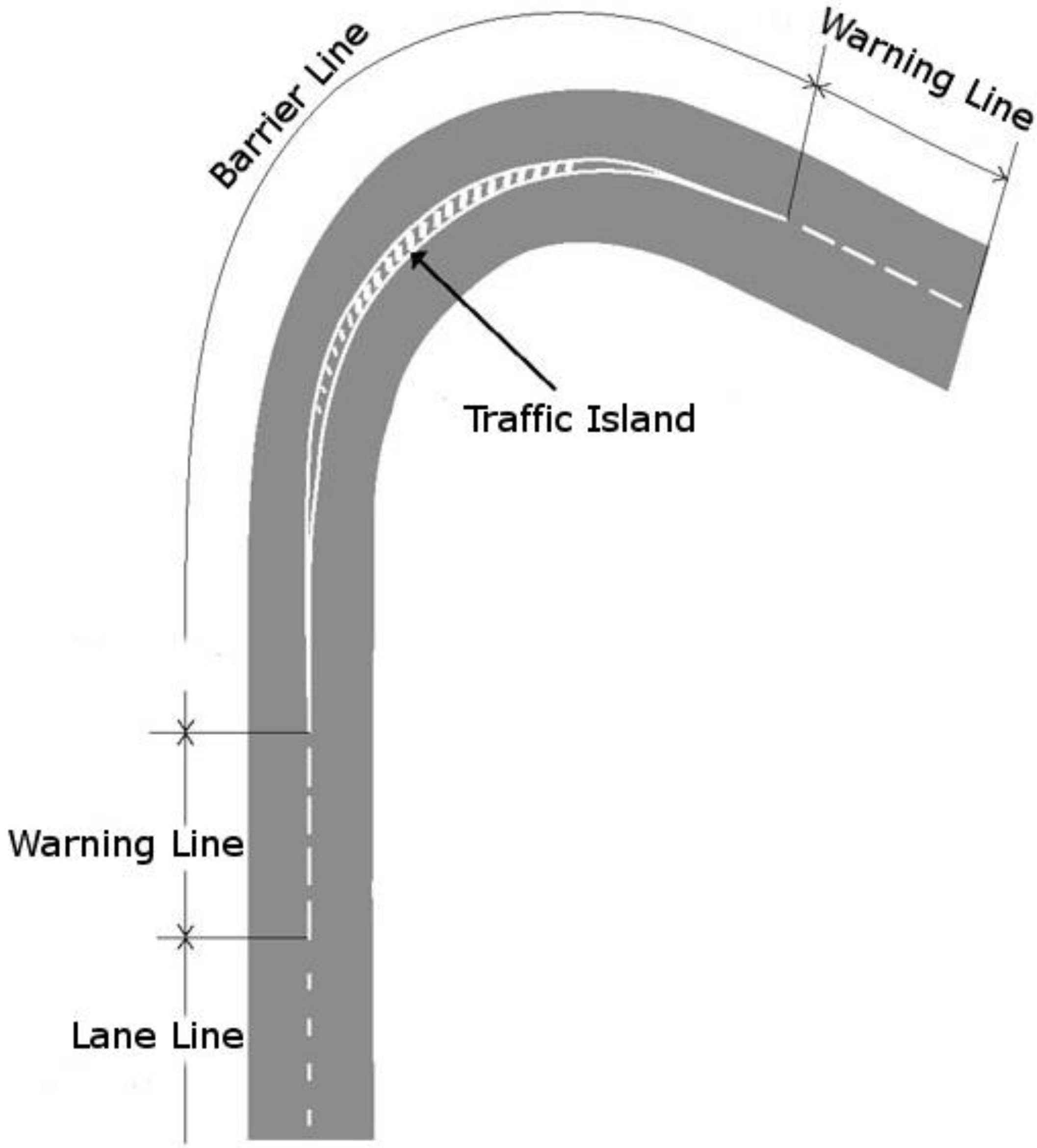
You can see discontinuous line which is saying to drive or pass by normal speed but on the other lane it is marked by temporary marking with traffic cones to not to drive through that lane.

A zebra crossing with ongoing zigzag line which is showing that that area is for pedestrian crossing.

Here you can see three lanes on right side of the road which is showing a right hand drive country road. On those three lanes, two is for running cars to drive through and other one is for slow and also any car can park there.

And on the left side of the road there are three lanes too where two for running cars and other is a Protective L-Turn lane.

Here is a picture with continuous center line. That is used when turn is ahead.




A general road turning markings.

A truck was rollover and is separated by traffic cones.

A traffic circle applied to a four-way intersection as a means of improving its safety. This device, with a proven record of collision reductions and traffic flow improvement, turns the cross-intersection into four virtual three-way intersections.

Black-White Marked Guard rail on road.

A curb extension at a mid-block crosswalk.

Specially painted bicycle-only lanes.

Multiple Lanes with near overpass lane marked.

**STREET LIGHTING**: Street lighting or lamppost is a very important tool for roads and for a city. Major advantages of street lighting include:

Prevention of accidents and increase in safety.

Studies have shown that darkness results in a large number of crashes and fatalities, especially those involving pedestrians; pedestrian fatalities are 3 to 6.75 times more likely in the dark than in daylight. Street lighting has been found to reduce pedestrian crashes by approximately 50%.

Furthermore, lighted intersections and highway interchanges tend to have fewer crashes than unlighted intersections and interchanges. Towns, cities, and villages use the unique locations provided by lampposts to hang decorative or commemorative banners. Many communities in the U.S. use lampposts as a tool for fund raising via lamppost banner sponsorship programs first designed by a U.S. based lamppost banner manufacturer.

**History behind Street Lighting**: The earliest lamps were used by Greek and Roman civilizations, where light primarily served the purpose of security, both to protect the wanderer from tripping over something on the path as well as keeping the potential robbers at bay. At that time oil lamps were used predominantly as they provided a long-lasting and moderate flame. The Romans had a word 'laternarius', which was a term for a slave responsible for lighting up the oil lamps in front of their villas. This task continued to be kept for a special person as far as up to Middle Ages where the so-called 'link boys' escorted people from one place to another through the murky winding streets of medieval towns.

Old Street Light at Brandenbarg.

Before incandescent lamps, candle lighting was employed in cities. The earliest lamps required that a lamplighter tour the town at dusk, lighting each of the lamps, but later designs employed ignition devices that would automatically strike the flame when the gas supply was activated. The earliest of such street lamps were built in the Arab Empire, especially in Córdoba, Spain, Cairo, Egypt, and Baghdad, Iraq ( around 1000 AD ). The first modern street lamps, which used kerosene, were introduced in Lviv in what was then the Austrian Empire in 1853.

The first electric street lighting employed arc lamps, initially the 'Electric candle', 'Jablotchkoff candle' or 'Yablochkov candle' developed by the Russian Pavel Yablochkov in 1875. This was a carbon arc lamp employing alternating current, which ensured that both electrodes were consumed at equal rates. Yablochkov candles were first used to light the Grands Magasins du Louvre, Paris where 80 were deployed—improvement which was one of the reasons why Paris earned its "City of Lights" nickname. Soon after, experimental arrays of arc lamps were used to light Holborn Viaduct and the Thames Embankment in London - the first electric street lighting in Britain. More than 4,000 were in use by 1881, though by then an improved differential arc lamp had been developed by Friedrich von Hefner-Alteneck of Siemens & Halske. The United States was quick in adopting arc lighting, and by 1890 over 130,000 were in operation in the US, commonly installed in exceptionally tall moonlight towers.

The first street in the UK to be lit by electric light was Mosley Street, in Newcastle upon Tyne. The street was lit by Joseph Swan's incandescent lamp on the 3rd February, 1879. The first in the United States, and second overall, was the Public Square road system in Cleveland, Ohio, on April 29, 1879.  Wabash, Indiana holds the title of being the third electrically lit city in the world, which took place on February 2, 1880. Four 3,000 candlepower Brush arc lamps suspended over the courthouse rendered the town square "as light as midday." Kimberley, South Africa, was the first city in the Southern Hemisphere and in Africa to have electric street lights - first lit on 1 September 1882. In Latin America, San Jose, Costa Rica was the first city, the system was launched on August 9, 1884, with 25 lamps powered by a hydroelectric plant. Timişoara, in present-day Romania, was the first city in mainland Europe to have electric public lighting on the 12 of November 1884. 731 lamps were used. On 9 December 1882, Brisbane, Queensland, Australia was introduced to electricity by having a demonstration of using eight arc lights, erected along Queen Street. The power to supply these arc lights was taken from a 10 hp Crompton DC generator driven by a Robey steam engine in a small foundry in Adelaide Street and occupied by J. W. Sutton & Co. The lamps were erected on cast iron standards, 20 ft in height. In 1888 Tamworth, New South Wales, Australia became the first location in Australia to have electric street lighting, giving the city the title of "First City of Light".

Arc lights had two major disadvantages. First, they emit an intense and harsh light which, although useful at industrial sites like dockyards, was discomforting in ordinary city streets. Second, they are maintenance-intensive, as carbon electrodes burn away swiftly. With the development of cheap, reliable and bright incandescent light bulbs at the end of the 19th century, arc lights passed out of use for street lighting, but remained in industrial use longer.

Incandescent lamps were primarily used for street lighting until the advent of high-intensity discharge lamps. They were often operated at high-voltage series circuits. Series circuits were popular since the higher voltage in these circuits produced more light per watt consumed. Furthermore, before the invention of photoelectric controls, a single switch or clock could control all the lights in an entire district.

To avoid having the entire system go dark if a single lamp burned out, each street lamp was equipped with a device that ensured that the circuit would remain intact. Early series street lights were equipped with isolation transformers. that would allow current to pass across the transformer whether the bulb worked or not. Later the film cutout was invented. The film cutout was a small disk of insulating film that separated two contacts connected to the two wires leading to the lamp. If the lamp failed (an open circuit), the current through the string became zero, causing the voltage of the circuit (thousands of volts) to be imposed across the insulating film, penetrating it (see Ohm's law). In this way, the failed lamp was bypassed and power restored to the rest of the district. The street light circuit contained an automatic current regulator, preventing the current from increasing as lamps burned out, preserving the life of the remaining lamps. When the failed lamp was replaced, a new piece of film was installed, once again separating the contacts in the cutout. This system was recognizable by the large porcelain insulator separating the lamp and reflector from the mounting arm. This was necessary because the two contacts in the lamp's base may have operated at several thousand volts above ground/earth.

Today, street lighting commonly uses high-intensity discharge lamps, often HPS high pressure sodium lamps. Such lamps provide the greatest amount of photopic illumination for the least consumption of electricity. However, when scotopic/photopic light calculations are used, it can be seen how inappropriate HPS lamps are for night lighting. White light sources have been shown to double driver peripheral vision and improve driver brake reaction time by at least 25%. When S/P light calculations are used, HPS lamp performance needs to be reduced by a minimum value of 75%. This is now a standard design criteria for Australian roads.

A study comparing metal halide and high-pressure sodium lamps showed that at equal photopic light levels, a street scene illuminated at night by a metal halide lighting system was reliably seen as brighter and safer than the same scene illuminated by a high pressure sodium system.

New street lighting technologies, such as LED or induction lights, emit a white light that provides high levels of scotopic lumens allowing street lights with lower wattages and lower photopic lumens to replace existing street lights. However, there have been no formal specifications written around Photopic/Scotopic adjustments for different types of light sources, causing many municipalities and street departments to hold back on implementation of these new technologies until the standards are updated.

Photovoltaic-powered LED luminaires are gaining wider acceptance. Preliminary field tests show that some LED luminaires are energy-efficient and perform well in testing environments.

In 2007, the Civil Twilight Collective created a variant of the conventional LED streetlight, namely the Lunar-resonant streetlight. These lights increase or decrease the intensity of the streetlight according to the lunar light. This streetlight design thus reduces energy consumption as well as light pollution.

**Street Light Consideration**: There are two optical phenomena that need to be recognized in street light installations.

- ✓ The loss of night vision because of the accommodation reflex of drivers' eyes is the greatest danger. As drivers emerge from an unlighted area into a pool of light from a street light their pupils quickly constrict to adjust to the brighter light, but as they leave the pool of light the dilation of their pupils to adjust to the dimmer light is much slower, so they are driving with impaired vision. As a person gets older the eye's recovery speed gets slower, so driving time and distance under impaired vision increases.

- ✓ Oncoming headlights are more visible against a black background than a grey one. The contrast creates greater awareness of the oncoming vehicle.

- ✓ Stray voltage is also a concern in many cities. Stray voltage can accidentally electrify lampposts and has the potential to injure or kill anyone who comes into contact with the post. Some cities have employed the Electrified Cover Safeguard(TM) technology which sounds an alarm and flashes a light, to warn the public, when a lamppost becomes dangerously electrified.

There are also physical dangers. Street light stanchions (lampposts) pose a collision risk to motorists and pedestrians, particularly those affected by poor eyesight or under the influence of alcohol. This can be reduced by designing them to break away when hit (frangible or collapsible supports), protecting them by guardrails, or marking the lower portions to increase their visibility. High winds or accumulated metal fatigue also occasionally topple street lights.

**Purpose**: There are three distinct main uses of street lights, each requiring different types of lights and placement. Misuse of the different types of lights can make the situation worse by compromising visibility or safety.

**Beacon Light**: A modest steady light at the intersection of two roads is an aid to navigation because it helps a driver see the location of a side road as they come closer to it and they can adjust their braking and know exactly where to turn if they intend to leave the main road or see vehicles or pedestrians. A beacon light's function is to say "here I am" and even a dim light provides enough contrast against the dark night to serve the purpose. To prevent the dangers caused by a car driving through a pool of light, a beacon light must never shine onto the main road, and not brightly onto the side road. In residential areas, this is usually the only appropriate lighting, and it has the bonus side effect of providing spill lighting onto any sidewalk there for the benefit of pedestrians. On Interstate highways this purpose is commonly served by placing reflectors at the sides of the road.

**Roadway Light**: Street lights are not normally intended to illuminate the driving route (headlights are preferred), but to reveal signs and hazards outside of the headlights' beam. Because of the dangers discussed above, roadway lights are properly used sparingly and only when a particular situation justifies increasing the risk. This usually involves an intersection with several turning movements and much signage, situations where drivers must take in much information quickly that is not in the headlights' beam. In these situations (A freeway junction or exit ramp) the intersection may be lit so that drivers can quickly see all hazards, and a well designed plan will have gradually increasing lighting for approximately a quarter of a minute before the intersection and gradually decreasing lighting after it. The main stretches of highways remain unlighted to preserve the driver's night vision and increase the visibility of oncoming headlights. If there is a sharp curve where headlights will not illuminate the road, a light on the outside of the curve is often justified.


This sign is visible by headlight or street lights.

If it is desired to light a roadway (perhaps due to heavy and fast multi-lane traffic), to avoid the dangers of casual placement of street lights it should not be lit intermittently, as this requires repeated eye readjustment which implies eyestrain and temporary blindness when entering and leaving light pools. In this case the system is designed to eliminate the need for headlights. This is usually achieved with bright lights placed on high poles at close regular intervals so that there is consistent light along the route. The lighting goes from curb to curb.

**Measurement**: Two very similar measurement systems were created to bridge the scotopic and photopic luminous efficiency functions, creating a Unified System of Photometry. This new measurement has been well-received because the reliance on V(λ) alone for characterizing night-time light illuminations requires more electric energy. The cost-savings potential of using a new way to measure mesopic lighting scenarios is tremendous. Outdoor Site-Lighting Performance (OSP) is a method for predicting and measuring three different aspects of light pollution: glow, trespass and glare. Using this method, lighting specifiers can quantify the performance of existing and planned lighting designs and applications to minimize excessive or obtrusive light leaving the boundaries of a property.

**Street Light Control System**: A number of street light control systems have been developed to control and reduce energy consumption of a town's public lighting system. These range from controlling a circuit of street lights and/or individual lights with specific ballasts and network operating protocols. These may include sending and receiving instructions via separate data networks, at high frequency over the top of the low voltage supply or wireless.

Image-based street light control: A number of companies are now manufacturing intelligent streetlights that adjust light output based on usage and occupancy, i.e. automating classification of pedestrian versus cyclist, versus automotive, sensing also velocity of movement and illuminating a certain number of streetlights ahead and fewer behind, depending on velocity of movement. Also the lights adjust depending on road conditions, for example, snow produces more reflectance therefore reduced light is required.

**Street Lights Varieties**:

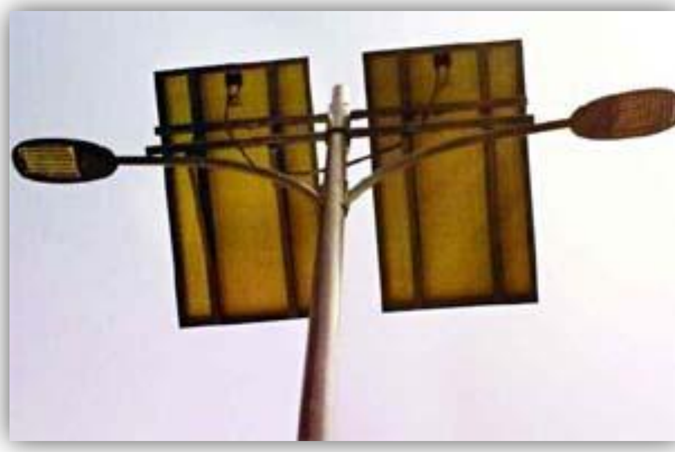
Narrow roads can be lightened up by one side light.

Two lanes and two light on the road divider.

Pedestrian walking way light.

Not adequate lighting system. This may cause collision.

Solar Powered Street Light.



For the first time in Bangladesh, The Dhaka City Corporation (DCC) has announced and build solar street lights will cover the area from the Kakrail Mosque to Notre Dame College at Arambagh.

German Street Light.

Wind Powered Street Light in Iran.

Street Light in Copenhagen.

A Sylvania Roadster high pressure sodium vapor street lamp from Australia. The brown circular object under the light is a photocell.

Historic Street light in Ashgabat, Turkmenistan.

Old style street light with lamps near the hunting lodge Moenchbruch, Germany.

A street Light during snowfall.

A historical Slovak lamppost.

**Maintenance**: Street lighting systems require ongoing maintenance, which can be classified as either reactive or preventative. Reactive maintenance is a direct response to a lighting failure, such as replacing a discharge lamp after it has failed, or replacing an entire lighting unit after it has been hit by a vehicle. Preventative maintenance is scheduled replacement of lighting components, for example replacing all of the discharge lamps in an area of the city when they have reached 85% of their expected life. In the United Kingdom the Roads Liaison Group has issued a Code of Practice recommending specific reactive and preventative maintenance procedures.

**ROAD SAFETY** **(Depending on Street Lighting and Road Markings)**: Roads without centre lines are like roads without signs: without them, drivers lose vital information to guide them safely. The correlation between the quality of the centre lines and the number of deaths and serious injuries is compelling: inadequate and poorly performing road markings equal dangerous roads.

Also safety problems arise from poor lighting facilities. It will cause congestion. Also crime rises in the dark.

**Conclusion**: Bangladesh is a country of third world but a developing country. Bangladesh has one of the most dangerous roads. Lately, we have seen a number of agonizing incidents due to road accidents. In recent times, death in road accident has become a common phenomenon. Some studies revealed high road accident fatality rate in Bangladesh indicating more than 100 deaths per 10,000 vehicles. Every day around eight persons die in road accidents.

According to the Accident Monitoring Cell of Bangladesh Road Transport Authority (BRTA) and Dhaka Metropolitan Police in 2009 recorded 3,381 road accidents across the country that caused 2,958 deaths and 2,223 serious injuries. In 2008, the number of accidents was 4,427 with 3,765 deaths and 2,720 grievous injuries. Although statistics spell out the length and breadth of the problem, they do not adequately reflect the human trauma that results from road traffic injuries. It is a particularly violent way to go, and family and friends have to struggle with shock, disbelief, anguish and even anger.

Road network is poorly designed (maybe without any design) and no plans were followed when buildings roads.

On these circumstances, Government should keep an eye on road markings and street lighting maybe to save some family from unbearable grief.