

**Chapter 1 : Sequencing and Flashing Light Bars and Arrows On North American Signal Co.**

*Directional Warning Lights Grote's line of Directional Warning Lights provide outstanding visibility in compact, ultra-low profile lamps. These rugged lights will fit anywhere and provide for unlimited mounting possibilities.*

The lamps of a selected group are sequentially energized. Caldwell Assistant Examiner-Kenneth N. Method and apparatus for directing traffic from a distance in which a plurality of lamps are arranged in two interleaved groups with each group defining at least three arrowheads aligned one behind the other and arrowheads of separate groups being opposed. The lamps of a selected group are sequentially energized. Particularly with the advent of high-speed freeways and throughways, it has become increasingly necessary to provide improved signs, warnings and the like to appraise motorists of decisions they must make in vehicle speed, direction and the like. Extensive advances have been made in this respect, particularly in the field of large illuminated signs advising of on-ramps and off-ramps, intersections and the like. These types of signs are normally physically mounted in fixed position above or beside roadways, and usually at some considerable distance from a point at which a decision must be made as to turning of a vehicle or changing of speed. With regard to construction and repair work on or adjacent highways and the like, it is often necessary to temporarily close one or more lanes of a freeway, for example, so that traffic must be diverted from these lanes. Such diversion is commonly accomplished by the use of movable conical markers which may be placed along the roadway, as, for example, in a line slanting across a lane to be closed, and, usually, one, or more, flagman with brightly colored flags is located in the area to attract the attention of motorists and to wave them in the desired direction of vehicle traverse. In conjunction with the foregoing, it is not common to employ some type of blinking lights, as, for example, along the side of an open ditch, or the like, to warn motorists of possible danger. Serious danger exists for flagmen and road crews located on high-speed freeways, for only slight miscalculation or confusion by oncoming motorists can produce drastic results. Even a flashing light atop an emergency, or repair, vehicle will be seen by the operator of a vehicle approaching a 60 miles per hour for less than 30 seconds, and often only seconds. This provides the motorist with very little time to decide what action is required and to take such action in a safe manner. Oftentimes accidents result from hasty decisions acted upon under these conditions. The present invention is particularly directed to the provision of early or distant warning of oncoming vehicular traffic by the provision of a system having high-intensity lamps or lights visible to great distances and sequentially energized in predetermined order to provide directional information to approaching motorists. This then provides a marked improvement in protection for road crews and maximized safety for motorists consonant with minimized disruption of traffic flow. The system hereof is described with respect to mobile units inasmuch as the invention is particularly advantageous in this application, but, of course, no limitation is intended thereby. Further, the invention is referenced herein to usage in warning and directing following motorists; however, it is, of course, possible for a mobile unit hereof to be designed to direct warning and directional indicating lamps toward oncoming motorists. The invention is highly advantageous in connection with temporary lane closure on freeways and the like, for the warning and direction system hereof is constituted so as to be applicable for operation at normal vehicle speed. This is particularly important in the original closure of a lane, so that traffic may be slowed and redirected as required while the lane is being closed, as well as being properly directed after closure. The invention includes both truck-mounted and trailer-mounted warning system in the form of panels or signs normally carried in a retracted, or stored, position so that the carrying vehicle may be moved at high velocity along highways and the like and yet capable of movement to actuated position for full observance by following vehicles and energization to provide only warning but also direction indication to such vehicles. With the truck-mounted system of the present invention, the truck operator from the cab thereof raises the warning panel to operative position while traveling down a freeway, or the like, and energizes the high-intensity lamps of the panel in predetermined order to indicate to following motorists the direction in which they should pass the truck and then slows down the truck with little or no disruption of following traffic until the truck is stopped in the lane to be closed. Physical markers may then be safely placed on the freeway, or the like, to show lane closure and

the flow of traffic thereat, with the truck then proceeding on down the closed lane to a point of road repair. The invention also provides for towing of the trailer unit, so that it may be physically located at the original point of truck stoppage and energized to provide the early or distant warning and direction required for this operation. With the trailer in such position, the truck may then proceed on down the closed lane to locations at which work is to be performed. Of particular importance in the present invention is the type of warning and direction-indicating means employed. High-intensity amber lights are utilized herein with means for varying the intensity of light emitted. It is also provided in accordance with the present invention that the warning and directional sign, or panel, shall normally have at least some lights energized with others being sequentially energized to maximize direction indication. It has been found that visual depth perception is adversely affected by intermittently energized, or blinking, lights. Consequently, the present invention does provide for the maintenance of steady light emanation from some portion of the sign, or panel, hereof in most embodiments. I is a perspective view of a truck-mounted warning and directional indicating device in accordance with the present invention; FIG. I, and, also, schematically illustrating electric and hydraulic control lines extending therefrom; FIG. I there is illustrated an embodiment of the present invention, including a warning and directional sign 11 mounted atop the cab of a self-powered vehicle 12, such as a small truck or pickup. The sign 11 is shown in FIG. The sign 11 is carried by a sign-supporting frame 13 affixed to the top of the truck cab and extending upwardly therefrom. Provision is made for movably mounting the sign on the frame 13 by actuating means 14, such as a hydraulic system described in greater detail below. The sign is movable between a horizontal stored position generally parallel to the top of the truck cab in closely spaced relation thereto, and the illustrated actuated position of substantially vertical orientation in extension upwardly from the top of the cab. Mechanism for sign movement energization and control thereover is described and illustrated below in connection with FIGS. Before proceeding with a further description of the embodiment of the present invention illustrated in FIG. As will be seen by reference to this FIGURE, the unit thereof incorporates a warning and directional sign 2] carried upon a wheeled trailer 22, as by means of a sign-supporting frame. Similarly to the embodiment of FIG. Considering now the sign, or signs, of the present invention, it is noted that in FIGS. Warning and directional indication is provided in accordance with the present invention by the provision of a plurality of lights mounted on the rear surface of the sign and arranged and energized in particular order. As will be seen from reference to FIG. These two arrowheads of lights are aligned with each other across the sign, and a common arrow shank is provided by a pair of lights, 1k and 1m, spaced substantially equidistant apart and equidistantly between lights 1o and 1n. On this particular sign face there is also provided an alphabetic instruction illustrated in the form of the word "pass" located above the lights and formed, for example, of prismatic reflecting surfaces. Suitable lamps for the sign 11, as well as other signs in accordance with the present invention, are sealed beam amber lamps of the type often termed "automotive fog lamps" having a very substantial light output, such as a maximum beam candlepower of 8, These lamps, preferably, have a substantial lateral spread but very limited vertical spread. It is desired for the warning of the sign and the message thereof to be beamed at very substantial distances, so as to be seen by oncoming motorists. A horizontal beam spread of 40°, for example, provides for easy visibility at laterally displaced positions such as on curves of freeways. Limitations upon the vertical divergence, or beam spread, is employed to maximize the amount of available candlepower in the desired direction. It is additionally noted with respect to the lamps of the sign that each lamp is provided with a hood 36, somewhat in the manner of traffic lights, for the purpose of minimizing the entry of sunlight into the lamps. The sign 11 is noted above to be comprised of lamps arranged as two oppositely directed arrowheads with a number of intermediate horizontally aligned lamps in the manner of an arrow shank. Before proceeding with a detailed description of sign-mounting and movement means, attention is invited to the manner of lamp energization, not only for warning but also for direction indication in accordance with the present invention. Considering first the sequence of operations "pass to left," it is provided that lamps 1a to 12 shall burn steadily to form a visual arrowhead pointing to the left. Lamps 1h, 1m and 1k are sequentially lit in the stated order to provide a visually moving light path into the arrowhead. This then provides to an oncoming motorist a steady light source for early or distant warning with such light source itself comprising an arrowhead pointing in the direction the

motorist is to pass the sign, and, also, provides a sequencing of light forming a path to the arrowhead. With regard to the sequencing, the lamp lh may first be turned on and after a delay of milliseconds, for example, the lamp lm turned on and after a subsequent delay of milliseconds the third lamp lk turned on, with the three lamps lh, lm and lk then burning for a further milliseconds, for example, so that the complete arrowhead and shank are lit for this period, and then the three lamps lh, lm and lk are turned off and the cycle repeated. For the indication "pass to right" the lamps lf to lj are continuously lit, and the lamps lc, lk and lm are sequenced in that order, such as described above. For directing vehicles to pass to either or both sides of the truck carrying the sign, the lamps la, lb, ld, le, lf, lg, ll and lj are lit to burn continuously and the centrally aligned lamps lc, lk, lm and lh are flashed on and off. One advantageous mode of operation provides 25 to 35 cycles per minute of lamp operation under any of the above-described modes, and it is noted that in each situation certain lamps remain burning. This has been found to be quite important in providing depth perception to oncoming motorists. Although blinking lights attract attention, they, unfortunately, fail to provide a reference for proper depth perception under many circumstances. It is, of course, necessary for vehicle operators to be able to locate the distance at which warning and direction are being provided. Alternative lamp arrangements upon the sign are also provided in accordance with this invention. It is to be appreciated that for highway application there are certain maximum sign dimensions for convenience of use thereof. A convenient sign size is of the order of 6-feet long by 3-feet high. It has been found that while certain advantage lies in providing written directions such as the word "pass" on the sign ll, greater spacing of the lamps between each other is advantageous in providing direction at even greater distance. As the sign of the present invention is approached from a great distance, the individual lamps of any cluster appear as a single light source, and, within reason, the greater the separation between lamps the greater the distance at which the orientation of the lamps may be determined by oncoming motorists. Thus the sign 2l is provided with the same lamp arrangement as sign ll but with the lamps spaced further apart. Actuation of the lamps of the sign 2l. An additional and preferred embodiment of the present invention comprises an even more powerful sign, shown in FIG. As shown, this embodiment of the invention is provided with some 22 lamps on the rear, or operative, face of the sign. In this embodiment of the sign of the present invention groups of lamps are lit to form arrowheads, and the groups are lit in sequence to move the arrowheads in the direction desired to indicate the side on which vehicles should pass. The sequence of operation for "pass to left" is first the lighting of lamps 2a to 2e which forms an arrowhead pointed to the left and located at the right of the sign. These lamps continue to burn through the illumination portion of the cycle, and, after say milliseconds, the lamp 3a to 3e are lit to form a second arrowhead at the center of the sign and pointed to the left. These lamps, then, continue to burn and, after say milliseconds, lamps 4a to 4e are lit to form a final arrowhead pointed to the left and located at the left of the sign. The entire array of three arrowheads then remains lit for some short period of time, such as an additional milliseconds, at which time the lights are extinguished for a short period as, for example, milliseconds and the cycle repeated. It will be seen that to an oncoming motorist there is visually displayed first, second and third illuminated arrowheads pointed to the left and moving to the left, as successive arrowheads are lit during each cycle of operation. It has been found that this particular arrangement is visible at a distance of 2 to 3 miles, not only as to the presence of warning lights but, also, the direction information conveyed thereby. It will be appreciated that this sign 3l is also adapted for illuminating three successive arrowheads pointed to the right, with the sequence of operation being the same as that described above but reversed with respect to direction. In order to provide instructions to pass on either side of the sign, the four lamps of the two opposed arrowheads at opposite sides of the sign are continuously lit, and the four central lamps across the sign are flashed simultaneously. It is, of course, to be appreciated that some variation in which lamps are continuously lit and which are flashed, sequentially lit, is possible with respect to each of the signs described above. Thus, for example, in sign 1l it is possible for the lamps la, lb, ld and le to be continuously lit for pass to left instructions and the lamps lh, lm, lk and is sequentially lit, rather than having the lamps la to le continuously lit. It is also possible under certain circumstances to provide alternative lamp locations upon the operative face of the sign of the present invention. It is, however, provided hereby that one operative face of the sign shall carry a plurality of high-intensity lamps adapted for predetermined and

sequential energization. Furthermore, the invention provides particularly that the sign thereof shall be mobile, so as to be readily movable along a freeway, or the like, and, in addition, shall be movably mounted between a carrying and operative position upon the wheeled vehicle carrying same. Further with regard to the embodiment of the invention illustrated in FIG. I, for example, it is noted that sign movement and energization are adapted to be accomplished from the cab of the truck. A schematic illustration of control means for the invention is shown in FIG. Referring to this portion of the drawing, it is noted that there is shown a control panel, or console, 41 which is adapted to be mounted within the cab of a truck, as, for example, under the dashboard thereof. This control panel is adapted. Insofar as the electrical system is concerned, the control panel is illustrated to include an on-off" switch 43 for connecting the battery 42 to light-control circuitry 44 for energization of same. This light-control circuitry 44 is connected by a cable 46 to the lights of the sign, or panel, as described above. Certain control functions are operated from the control panel. Indicator lamps 48 are provided on the control panel to show which mode of operation is being carried out by the illuminated sign of the present invention under the control of the operator by means of switch. Actual light energization and sequencing are controlled by circuitry 44 with its control-panel setting choosing the mode of operation. Various types of circuits may be employed for this purpose; thus no further description thereof is included herein. A further portion of the present invention which has not previously been discussed is the control over intensity of illumination of the lamps of the sign.

### Chapter 2 : LED Directional Warning Lights -- Warning & hazard - Grote Industries

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*When it comes to your Directional Warning Lights needs, Federal Signal can help you find the right fit for your Fire Apparatus to your Command Vehicles and everything else in between.*

China[ edit ] Tactile ground surface indicators are installed broadly in major cities such as Beijing, Shanghai, Dalian and Guangzhou. They can also be found winding through suburban areas surrounding major cities; the volume of blocks installed is second only to Japan. Both warning and directional blocks are used, and installed in a manner roughly the same as in Japan. Some areas have their own rules, however, such as in parts of Guangzhou where no blocks are installed where directional blocks intersect, a location where warning blocks would normally be installed. Block colors include yellow, grey, green, brown and beige. As in Korea, because installation methods are adopted whole cloth from Japan, many of the same errors are found. Maintenance is also inconsistent; here and there one sees broken blocks that have been left unrepaired. Blocks are yellow, silver, black, grey, green and brown. Installation methods are roughly the same as in Japan. Blocks of this type are installed at nearly every parking lot entrance, making for a great many installations. Warning blocks are also installed before some crosswalks in the Jalan Thamrin area. No blocks are installed outside this area, however. Blocks are yellow in color. Directional tactile pavers are installed on sidewalk and pedestrian crossings frequently used by visually impaired people such as a route between transit facilities and buildings such as hospitals, school for visually impaired, community centre, major shopping centres, government buildings and so on. The original law was replaced by another law in with wider scope including outdoor areas. All stairs, escalators and ramps must be marked with blister tactile pavers. Boarding areas for passenger ferries are also exempt if the area is exposed to waves and tactile pavers create trip hazard. Low profile directional tactile markings are installed on busy pedestrian crossings in Japan. JIS compliment tactile paver. Older non-JIS compliment tactile paver. Tactile pavings installed on a platform at a Japanese train station. Tactile pavings combined with platform screen doors. Portable tactile mat being used to block off an escalator under maintenance Installation of tactile pavings on sidewalk. Tactile pavings with LED for people with limited vision. In some locations warning and directional blocks are installed as in Japan while in other locations directional indicators are carved into the pavement and warning blocks are installed where directional markers intersect and where pedestrians are to stop. The latter practice is often followed at railway and LRT stations but the two types were found to coexist at one location. Blocks are yellow, silver and grey. Singapore[ edit ] Every MRT subway station in Singapore has tactile pavings to help the visually handicapped navigate In Singapore, warning and directional blocks are installed primarily around subway stations and in some housing estates. Many crosswalks are also equipped with warning blocks. Installation rules are roughly the same as in Japan. Blocks are silver, yellow and grey. The configuration of the blocks, with the exception of some subway stations in Seoul, is the same. Blocks are yellow, silver, brown, white and grey. Because installation methods are adopted whole cloth from Japan, many of the same errors are found. Most blocks are yellow, with grey blocks also in use. Tactile ground surface indicators are frequently installed across the entire sloped area leading to a crosswalk, creating an obstacle for wheelchair users and others. In addition, although there are many stepped areas on sidewalks in city centers, very few are marked with warning blocks. This is dangerous for people with impaired vision and fails to accommodate their needs. Warning blocks are also installed at the top and bottom of stairways at subway and monorail stations. Blocks are not, however, installed at rail stations or rail platforms. Blocks are yellow or grey. Many damaged blocks seem to be left unrepaired. Bangkok is a city with many vendors who set up shop on sidewalks; these frequently end up covering the blocks. Delhi Metro is the most accessible public transport infrastructure in the country. Such tiles can also be located on pavements near shopping plazas, and particularly around the Delhi University campus. These tiles come in yellow. Although, the tiles within the metro stations are continually cared-for, the maintenance of those set over the sidewalks is generally neglected. The Jawaharlal Nehru University, Delhi also has tactile paving on its walkways. Still the development of pedestrian walkways with tactile paving is at infancy in the country. The upcoming Kochi Metro rail project in state of Kerala will also have entry to exit tactile paving, in

the lines of Delhi Metro. The standard specifies the use of truncated cones, rather than domes as used in the USA. HREOC describe the use of the standard. Warning blocks and directional blocks are similar to those used in Japan, and installed in the same way, including at the Opera House and other well-known tourist spots. Unlike many other countries, however, blocks are not installed before crosswalks. As some rail, mono-rail and light rail stations, directional blocks lead from at or near the ticket gates to the platform. Blocks are yellow, silver, blue, green and grey. Blue blocks are frequently used at rail stations while yellow is often used at monorail and light rail stations. Note the line of paving along the edges of the station platform, connecting to the push-button intercom bollard in the centre, and then past the stairs to the rear of the station where the elevator is located out of sight. Generally, the Standard AS

In general, tactile indicators in New Zealand are required to: Warning tactile indicators in New Zealand are mandatory at pedestrian cross-walks also called pram ramps or kerb crossings in New Zealand , at the approaches to stairways, ramps, escalators and moving walkways, the approach to railway level crossings, bus hoarding areas, median cut-throughs, along the entire length of railway platform edges and before any abrupt changes in grade to the walking surface 1: In any event, the warning tactile indicator pad should be no less than mm wide, except where it is physically impossible. Directional tactile indicators are required to be installed at cross-walks, public transport access points and significant public facilities to provide directional guidance for vision-impaired people who have to deviate from the continuous accessible path of travel in order to gain access to the aforementioned. Directional tactile indicators should always point in the directional of travel to achieve this. Belgium[ edit ] In Brussels , blocks are installed before crosswalks, at bus stops and at subway and rail stations and platforms. Most blocks are grey, with yellow, silver and black blocks also used. Brussels has a mix of locations where the blocks warning and directional and installation methods are similar to those in Japan and locations where block configuration and installation methods are unique to Belgium. One of the Belgium-specific blocks uses metal disks of roughly 85mm in diameter and 8mm in height. Given the large size, height and slipperiness of the metal disks used in the Belgian blocks, one suspects that they present a significant obstacle for wheelchair users, children and the elderly. In one part of the city, metal bars are embedded in the road surface where one would expect to find warning blocks at the top of stairs and escalators, for example. Being only 3mm in height, these protrusions create no obstacle for wheelchair users or elderly pedestrians but also seem likely to go unnoticed by the visually impaired. In some places, similar metal bars are embedded in the road surface and serve a directional function. Rubber warning blocks are also sometimes installed at bus stops where directional blocks intersect. Brussels, therefore, presents a mix of block types and installation styles that may create confusion for people with impaired vision. In some areas, blocks serving a directional function are installed within crosswalks. Most blocks are white but black, grey and pale yellow are also used. To protect the scenery, subway station signs and other prominent manmade objects are not installed near historical sites such as the Arc de Triomphe, the Paris National Opera, the Louvre or the Place de la Concorde but Tactile ground surface indicators, in colors that stand out white and yellow , are an exception Paris has recently been emphasizing barrier-free accessibility, including such experimental efforts as the uniquely configured blocks installed at the Montparnasse rail station. Tactile paving at those locations is usually in white or yellow. Some larger cities, such as Leipzig have installed tactile paving throughout their city centers, including normal signs requesting that the paving be kept free of obstacles. It is capable to greater autonomy and security for people with visual acuity difficulties in their movements as shown by numerous tests of verification and testing conducted made by Italian Union of the Blind and Visually Impaired and the associations linked to it. The modular elements that make up the path, with channels specially designed in shape, spacing, height and radius of the relief, allow the blind and partially sighted to achieve a destination through the tactile sense and soles and manual white stick , hearing, and the contrast of brightness. Inspired by a few, clear design principles universality of signs, safety, durability , this product allows endless applications in both exterior and interior. To visually impaired, also provides a further aid studied through color contrasts between guide way and the surrounding ordinary flooring. Netherlands[ edit ] In Amsterdam, blocks are installed before crosswalks, at medians and on tram and subway platforms. Both warning blocks and directional blocks are installed according to the same rules as in Japan. Netherlands-specific blocks are used in addition to blocks configured

like those in Japan. Most directional blocks are white or grey while warning blocks are yellow or grey. Where directional and warning blocks are used together the color of the blocks is often not uniform. Netherlands-specific blocks include some with thin recessed lines. With very little surface irregularity, such blocks are extremely difficult to detect with the feet or a white cane. Grooves carved into the pavement at subway station platforms are also difficult for people with impaired vision to recognize. They are prevalent in the Karsiyaka, Alsancak and Konak districts on sidewalks running along the Gulf of Izmir. They are also located around ferry buildings and metro stations. In Istanbul, the train stations have ongoing works for cautionary, tactile yellow lines. Within this framework, they are also currently working on the installation of tactile pavings which guide the visually impaired people from entering the station entrance area until boarding the trains. Blocks with dots and blocks with bars are used, but both types are intended as warning blocks; neither serves a directional function. Blocks are mainly installed before crosswalks, at medians, at station platforms and at the top and bottom of stairways. Blocks with dots are for installations at crosswalks, medians and station platforms while blocks with bars are for installations at stairways. The color of blocks installed before crosswalks is also supposed to vary with crosswalk type:

### Chapter 4 : [racedaydvl.com](http://racedaydvl.com): Grote Red LED Directional Warning Light: Automotive

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### Chapter 5 : Tactile paving - Wikipedia

*Amber/White LEDs Light Stick Versatile Mounting LED Lightbar Long Distance 40° Light Spread Optics Rugged Waterproof Interior / Exterior Mount Design Details: Ultra-Slim Design.*

### Chapter 6 : Direction Warning Lights - Grote Industries

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