

Conspicuity and Readability

Speech is a two-way interaction, in which one person conveys a message to another, and it is only complete when the recipient of the message understands it. If someone whispers in a crowded room, you cannot understand them. If their back is turned to you so that their words are muffled and you cannot read their lips, and others are attempting to talk to you at the same time, you cannot understand them. If someone covers their mouth while they are trying to speak, you cannot understand them. If they speak in a language you do not know, you cannot understand them. If they do not express themselves well enough, or speak too quickly, you cannot understand them.

Like any other form of speech, the purpose of any sign is to convey a message. But if that message is to be understood it must first be noticed and then read – that is, it must be conspicuous and readable. While this may appear to be obvious, the factors that result in a conspicuous and readable sign are numerous and complex. For the sign industry, “conspicuity and readability” have become synonymous with sufficiency in size, height, placement, and illumination to allow the message to be seen, read and comprehended.

Planners who regulate signage can benefit from understanding the numerous and complex factors that result in conspicuous and readable signage that can serve as a planning tool to facilitate efficient resource allocation, enhance traffic safety, beautify retail/commercial districts, and stimulate the local economy.

Definition of Terms

Before going further, four terms need to be defined: conspicuity, visibility, legibility and readability.

Conspicuity: The capacity of a sign to stand out or be distinguishable from its surroundings and thus be readily discovered by the eye. It is the noticeable contrast between a sign and its background, attributed to an exogenous (unplanned) or endogenous (planned) mindset, with the display having features that attract attention to the sign. Conspicuity is considered a subjective outcome.

Visibility: The physical attributes of a sign and its contents that allow for detection at a given distance, although legibility may be uncertain. Visibility is considered an objective stimulus.

Legibility: The physical attributes of a sign that allow for differentiation of its letters, words, numbers, or graphics and that directly relate to an observer’s visual acuity. Legibility is considered an objective stimulus.

Readability: That which enables the observer to correctly perceive the information content of letters, numbers or symbols grouped together in words, sentences, or other meaningful relationships on the sign. Readability is the character of a sign that leads to comprehension of its intended message, and depends on legibility and other considerations of contents and time restraints. It is considered a subjective outcome.

The on-premise signs used by businesses to communicate with passing traffic are functioning in a complex environment. Those on the receiving end of the message signs convey are typically viewing the signs through the windshield of their vehicle. In order to mentally process and respond safely to the information on the sign, they must within seconds be capable of noticing it, reading it, comprehending it, and making a decision as to whether to maneuver through traffic and stop at the business. When a passing motorist sees a business that is interesting and either stops at the business or remembers it for future use, the benefit is shared by the business, its potential customer, and the municipality in which the business is located.

As a matter of good public policy and smart planning, sign regulations should be written to allow local businesses to communicate effectively with passing motorists. That means signs should be allowed sufficient size, height, placement, and illumination to be certain the sign will be noticed and its message understood. This brings numerous benefits to the local community, not the least of which is enhancement of public safety through effective wayfinding.

Time, Place and Manner

In the regulation of speech under the First Amendment, governments are constitutionally restrained from stepping outside the bounds of content-neutral regulation of “time, place and manner” of expression. In the case of signs, this refers to the “time” when a message may be displayed on a sign, the “place” at which the sign may be located, and the “manner” in which the message may be displayed. Translated into sign code language,

this means the government may regulate the size, height, placement, and illumination of a sign.

But the Court has placed limits on how far the government may go in regulating these factors. In *Virginia State Board of Pharmacy v. Virginia Citizen Consumer Council, Inc.*,¹ a First Amendment case, the Court laid out the test for determining whether a speech-restricting ordinance is constitutional:

Time, place and manner restrictions on commercial speech are permissible only if the restrictions:

- (1) are justified without reference to the content of the speech,
- (2) serve a significant government interest, and
- (3) leave open ample alternative channels for effective communication of the information.

These guidelines were enhanced in *Central Hudson Gas & Elec. Corp v. Public Service Comm.*² Today, if a sign ordinance is to withstand a constitutional challenge, the government must show all of the following:

- (1) a substantial government interest that justifies the regulation;
- (2) the regulation directly advances that interest;
- (3) the regulation is narrowly tailored to achieve that interest; and
- (4) the regulation leaves open ample alternative avenues of communication for those it affects.

This was clarified in *Cleveland Area Board of Realtors v. City of Euclid*,³ in which Euclid, Ohio passed an ordinance allowing real estate signs to be displayed only in windows, and barring them from their normal placement on front lawns. Euclid's ordinance was struck down largely because it did not allow for adequate alternative communication. The selling of real estate could only reasonably be facilitated through the placement of signs on front lawns. Placing the signs in windows rendered them virtually invisible to passing motorists. The Court found that it was not enough that the homeowners be able to "speak" by putting their for sale signs in their windows, their message also had to be capable of being "heard." In other words, the Court affirmed that for speech to be protected, the intended recipient had to be capable of receiving and understanding the message, and government could not arbitrarily interfere with the reception of that message.

As applied to sign regulations, this would indicate that signs must be allowed sufficient size, height, placement, and illumination to be capable of being seen, read and understood by the passing motorist. Most states require a minimum of 20/40 vision to obtain a driver's license; therefore, signs should minimally be capable of communicating effectively with drivers having 20/40 vision.

While we will not address at great length the variety of factors that affect individuals' abilities to read and comprehend the message on a sign, it is worthwhile for communities to consider whether they might need to accommodate the visual needs of particular members of society, at least where they relate to particular businesses. For instance, as people age, they are less able to distinguish between certain colors, have longer reaction times, their field of view narrows, and their vision declines. These individuals need to be able to see and read signs from a greater distance than others in order to safely read and react to them. Other issues that can interfere with a person's ability to see or read a sign include color blindness, cultural differences, and visual impairment. The special visual needs of the community should be considered as part of the zoning in areas where appropriate, such as in retirement communities and/or campuses.

Let's look a little more closely at visibility, conspicuity, legibility, and readability, both at what they mean and how they are achieved.

Visibility

The very first step in assuring a sign can communicate effectively is ensuring that sign can be seen – that it is visible. This is primarily a matter of placement, but other factors also affect visibility. For instance, in order to be visible at night a sign must be illuminated. If the sign does not sufficiently contrast with its environment, is poorly maintained, or is parallel to the roadway it can become essentially



The average person takes approximately 0.33 seconds to recognize a familiar single word or symbol.



Research has shown that parallel signs are missed significantly more times than perpendicular signs.

invisible. If it is too small, too high, or too low to be seen through a windshield, it has no visibility. Blockage by trees, other vehicles, buildings, inclement weather, or other signs can also impair a sign's visibility.

Imagine you are the owner of an independent bookstore and your business is located in the downtown area of a mid-sized town. Street trees have been added all along the street in front of your business, and your sign, though large enough to be seen from the road, is blocked from view by a lush, leafy tree. Your long-time customers know where you are, but because 16% of Americans relocate each year,⁴ and almost as many change their work location each year,⁵ they are slowly dwindling away and newcomers to your town do not know your business exists. Sure, word-of-mouth will replace some of your lost customers, but, at least according to one comprehensive survey,⁶ half of an independent small business's first-time customers will stop at the business because they saw its sign. What all of this means is that unless you can find some other way to make your store more visible to passing motorists, your business will steadily decline or, at a minimum, fail to grow as it should.

Some businesses attempt to overcome visibility problems through the use of temporary signage, such as banners, sandwich board signs, balloons, flashing lights, etc. Many communities, however, view these alternative forms of signage as "clutter" and bar their use. The problem here is that by first infringing upon the right of the business to "speak" to passing motorists, and then refusing to allow alternate forms of communication, regulators are quite possibly engaging in unconstitutional censorship of speech.

Imagine you are looking to buy a book and would like to buy from an independent bookstore, rather than one of the very visible and well-known chain stores. You have never seen the independent book store downtown, but you have heard one is located there. As you try to safely maneuver through traffic, watching for pedestrians and cars entering and exiting the roadway, you are also looking for the bookstore's sign. Unfortunately, all you can see are trees. You become very frustrated, perhaps even risking further distraction by picking up your cell phone and dialing information in hopes of finding out the store's location. You may or may not eventually locate the store, but in the mean time you have taken safety risks and perhaps even driven around the block several times, wasting gas and time.

When signs are not visible, nobody is better off. For reasons of safety, economics, and even aesthetics, it is incumbent upon cities to ensure local businesses' signs can be seen by motorists.

Conspicuity

Whereas visibility addresses issues of physical conditions that allow a sign to be seen, conspicuity addresses issues related to the viewer noticing and being aware of the sign. For a sign to be conspicuous, the viewer must be able to differentiate it from the surrounding background.

Visibility can be objectively and consistently determined. For instance, a photograph will readily reveal whether a sign

Variables Affecting Conspicuity

Measurements and construction of the sign

Placement of the sign

- a. Height
- b. Setback (distance to the first edge of the sign)
- c. Obliquity of viewing angle

Size of the sign

- a. Letter height
- b. Number and length of words
- c. Dimensions of logos or other graphics
- d. "White" space
- e. Square footage

Illumination (day or night) on the sign

- a. Luminance (candelas per square foot or square meter)
- b. Luminance contrast (positive or negative)
- c. Color contrast

Type of sign (roof, pole, projecting, monument, V, wall)

Considerations external to the sign

- a. Speed of traffic (affecting seeing, reading, and reacting times)
- b. Number of traffic lanes
- c. Artistic and attractive qualities of the sign
- d. Obstructions or distractions affecting conspicuity

Community Aesthetics

likely to notice a business with a red sign than someone who has no feeling about the color one way or the other.

Most businesses need to be noticed and remembered by those who pass them on the street, but often their signs are placed among many other visual stimuli. Nonetheless, if a sign is properly designed and placed it will be noticed even by those who are not specifically seeking it at that moment. The conspicuity of a sign is enhanced by virtue of its placement within the cone of vision (see below), its angle in relationship to the viewer (signs facing the roadway are far more difficult to read than signs facing the oncoming motorist), the ease with which it can be read, the design elements (colors, shapes, contrast, illumination, motion, and borders) that differentiate it from its surroundings, the speed at which traffic is passing, and the familiarity of the sign's graphic elements, such as logos.

A sign's shape and color are usually noticed and recognized from a much greater distance than its legend. Corporations, chains and franchises know this, which is why they make the most of trademark colors, logos and shapes. Public roadway signage is designed based on the same principle. You don't need to read a stop sign to know what it is; its shape and color are only used for one purpose. When you see a green sign with white lettering along the highway, you know it will contain information about places ahead and how many miles away they are located.

Cone of Vision

is visible. Conspicuity, on the other hand, is subjective and cannot be consistently measured. One motorist might readily notice it, while another will drive right past it and never know it is there.

One of the reasons a sign will be conspicuous to one person and not another has to do with whether or not the person is looking for a particular business or type of business. If someone is hungry, that person is much more likely to notice a restaurant than someone who is simply on the way to work. Someone who has a special preference for the color red will be more

The human eye is designed to focus in one direction, with peripheral vision extending out to either side, creating a fan-shaped zone of visual awareness. A sub-portion of that zone



Color contrasts and familiar symbols or logos are likely to enhance conspicuity.

TABLE 1

The Standard Relationship Between Vehicle Speed and Legibility Distance In Feet and Meters

Vehicle Speed		MRLD
55 mph (88 kph)	81' /sec (25 m/sec)	440' (134 m)
50 mph (90 kph)	73' /sec (22.25 m/sec)	400' (122 m)
45 mph (72 kph)	66' /sec (20 m/sec)	360' (110 m)
40 mph (64 kph)	59' /sec (18 m/sec)	320' (98 m)
35 mph (56 kph)	51' /sec (15.5 m/sec)	280' (85 m)
30 mph (48 kph)	44' /sec (13.4 m/sec)	240' (73 m)
25 mph (40 kph)	37' /sec (11.3 m/sec)	200' (61 m)

Source: Schwab, Richard N.;⁷ also, Garvey, P.M., et al, 1996.⁸

is the “cone of vision,” which is variously reported to be limited to 18 to 24 degrees. Location within a range of 20 degrees from the motorist (the half-angle being 10 degrees) is recommended for on-premise signage, and outside of that visual cone, a sign’s conspicuity is dramatically diminished. Once the sign is noticed with peripheral vision, the motorist will have to make accurate eye movements to look directly at the sign with central vision for legibility and readability.

At night, the cone of vision is greatly reduced, often to only the area illuminated by the vehicle’s headlights. Unless a sign otherwise optimally visible is either internally illuminated or lighted by exterior flood lamps, it is essentially invisible at night. Even signs containing retroreflective materials cannot be seen unless they can be illuminated by vehicle headlights. For this to occur, a sign must be located near the right shoulder of the roadway.

Legibility

Legibility occurs when a sign’s letters, symbols and graphics are capable of being deciphered sufficiently that it’s meaning may then be understood. How easily a sign can be read by oncoming drivers of 20/40 visual acuity is first dependent on the sign’s legibility, which in turn is dependent upon such characteristics as letter size, font, spacing of letters and words, extent of negative space (blank area of sign), whether the sign contains a dark legend on a light background or a light legend on a dark background, the color combinations between legend and background, and (in the case of obliquely oriented signs) foreshortening effects, among other factors.

Before judging the legibility of a sign, it is essential to first determine the distance from the sign at which it must be legible. This, of course, is because the intended viewer of the sign’s message will not be standing in a sign shop or at a permit hearing looking at a drawing. They will be seated behind the windshield of a moving vehicle, focusing their attention on the driving task in an environment full of items vying for their attention. Moreover, they must be able to

notice and read the sign in sufficient time to make a decision to stop at the business and then safely stop at the business. The key, therefore, is the speed at which they are traveling and the duration of time they will need to read and react to the sign.

In most research minimum sight distance is referenced as the MRLD, or the Minimum Required Legibility Distance at which a sign should be detectable and readable. The distance will vary according to the speed of approaching vehicles, the sign’s placement in relation to the roadway, its conspicuity and readability, and the complexity of the message. For simplicity’s sake, Table 1 offers the minimum distance at which a sign must be legible to the average driver of 20/40 visual acuity (the minimum required for a driver’s license). It assumes the sign being viewed is within 5 to 10 feet of the edge of the right-of-way, that it is of optimal height, that it is optimally conspicuous and readable, and that it is not subject to any environmental degradation, distractions or visual obstructions.

The next step is to determine how large the letters must be at that distance to be legible to the average driver of 20/40 visual acuity. Forbes and Holmes developed a Legibility Index (LI)⁹ to describe the relative legibility of different letter sizes used on highway signs. They found that for every 50 feet of distance, lettering needed one inch in height to be read by a person with 20/23 visual acuity. Although the Forbes-Holmes standard was used for many years, the needs of drivers with lower visual acuity have been taken into consideration by the Federal Highway Administration, and the standard has been reduced to one inch of letter height for every 35 feet of distance. For a person of 20/40 visual acuity, however, one inch of letter height is needed for every 28.6 feet of distance.

Because the previous MRLD studies had been conducted primarily on test tracks where no driving tasks were involved, in 2001 a study by Chrysler, et al¹⁰ was undertaken that included driving tasks. The test group, which included

TABLE 2

Standard Letter Height Guidelines for On-Premise Signs

Speed Limit (mph)	Speed Limit (kph)	MRLD (Feet)	MRLD (meters)	Letter Height (Inches)	Letter Height (Centimeters)
25	40	200	61	7	18
35	55	280	85	9	23
45	70	360	110	12	30
55	90	445	136	15	38

older drivers, was asked to find and read street name signs throughout Minneapolis, MN. The subjects were instructed to observe all traffic rules and engage in safe-driver behaviors. The test signs were located on both sides of the roadway in varying degrees of visual-field complexity, and consisted of several types of retroreflective materials.

The researchers found a mean legibility distance of 153 feet for 6-inch letters, or an LI of 25 feet/inch. For left-mounted signs using low reflectance materials, the LI dropped to 16 feet/inch, and if said signs were placed in high complexity locations, the LI dropped to 5.5 feet/inch. Clearly, when driving tasks are taken into account, drivers need larger lettering than has long been thought to be able to decipher roadway signs.

The reality of on-premise signs is that unlike highway signs, they are extremely varied in font, color, size, and design. This fact prompted Garvey, et al¹¹ to further study the detectability and legibility of a variety of on-premise signs under real life environmental conditions. The results of their study disclosed that even under the best conditions (daytime and low complexity), the LI was approximately 30 feet/inch. In high complexity circumstances, the LI dropped as low as 7 feet/inch (consistent with Chrysler, et al), with the mean LI determined at 25 feet/inch.

Clearly, then, an increase in letter height will increase legibility distance, although the ultimate size of lettering needed depends heavily on the selected font. Often the most aesthetically pleasing fonts are more difficult to read, while plain block fonts are most legible. Table 2 sets out recommended minimum letter heights based on standard highway-style fonts for 20/40 visual acuity and various speeds of traffic.

Speed, setback, distance, and letter size are not the only considerations. Of equal importance is the length of time needed to recognize and comprehend the message on the sign. Griffin and Bailey¹² have found that when test subjects are asked to read words that are flashed at them, a level of 75% accuracy in 0.7 seconds can be expected. Accuracy approaches 100% when the subject has 1 to 2 seconds to read the word. Table 3 can be used as a guideline when 0.7 time

factor is applied. For example, a sign with three words would take 2.1 seconds ($3 \times 0.7 = 2.1$). Note that individuals with literacy problems, such as those associated with dyslexia or in those who are not fluent in English, can be expected to have difficulty with word recognition with estimated more time being necessary.

Wall signs are particularly troublesome as communication devices in terms of legibility. This is so for two reasons. First, the effect of foreshortening is so intense that the words on the sign simply cannot be deciphered from any reasonable distance, no matter how large they are. Second, because the signs are parallel to the roadway, unless the driver is approaching from a direction directly or nearly-directly opposite, the sign is outside the cone of vision. To those driving past, it can only be discerned by a 90 degree sideways turn of the head. In many cases, neither action provides the driver enough time to safely slow down, brake, or change lanes should the sign prompt a responsive reaction or contain information the driver is looking for. According to Schwab,¹³ a general assumption is that at angles greater than 2-3 degrees, the sign's legend or copy is foreshortened, thereby decreasing legibility and readability. One way to correct this problem is to install a building-mounted, double-faced projecting sign that is either "V" shaped or perpendicular to the roadway.

Although the "V" sign is a compromise between a perpendicular sign and a parallel wall sign, Griffin and Bailey¹⁴ concluded that such a sign angled approximately 30 degrees from the wall of a building that is parallel to the roadway is highly readable (criterion of 75% accuracy under normal viewing conditions). They found, however, that readability at increasingly oblique angles is greatly reduced when a sign utilizes crowded letters (small spaces between letters); although, larger letters may be used to help offset crowding if wider spacing is not an option.

Readability

Readability is the ultimate goal of any sign, and it speaks to the ability of the message to be comprehended. Johnston and Cole (1976)¹⁵ pointed out what researchers have consistently found about signs – that even when a driver is exposed to several signs within a short distance, the signs do not cause

TABLE 3

Readability Time per Number of Words

Number of Words	Normal Reader	Nonfluent or Dyslexic
1	0.7 seconds	3 to 13 seconds
2	1.4 seconds	6 to 16 seconds
3	2.1 seconds	9 to 19 seconds
4	2.8 seconds	12 to 22 seconds
5	3.5 seconds	15 to 25 seconds
6	4.2 seconds	18 to 28 seconds
7	4.9 seconds	21 to 31 seconds
8	5.6 seconds	24 to 34 seconds
9	6.3 seconds	27 to 37 seconds

traffic accidents. This is so because the normal human brain has a remarkable ability to process visual input, recognizing even highly complex items, such as the movement of vehicles and pedestrians on a crowded road, buildings, landscaping, signs, and more as single inputs, make rapid decisions and selectively choose items of importance requiring more attention, while rejecting others.

Engel (1977)¹⁶ found that recognition relied not only on sensory and visual prominence, but also on cognitive recognition. In other words, the driver's psychological state, motivations, and familiarity with a sign and its contents greatly affect the ability of that driver to recognize and comprehend its message. The more familiar an object or figure on a sign is to the driver, the fewer glances he or she will require to recognize it, thereby reducing recognition time. In situations where a driver may become distracted by too much information in the visual field, the average driver will be quickly concentrate attention on the information he or she needs to attend to the driving task and ignore everything else.

Aesthetics play an important role in the readability of a sign. People who may only glance at a sign will within milliseconds comprehend a message about the business based on the fonts, colors, shapes and graphics used in the sign and use that information to decide whether to take a second look an attempt to read the words on the sign. For example, a person seeking a fast food restaurant will not bother to read a lavender colored sign with a lovely script font. Thus, all aspects of a sign contribute to the successful conveyance of its unique message.

A properly designed sign will meet the marketing needs of the business and conform to appropriate standards of safety, quality and functionality. If the community desires a thriving business district, then the sign that

allows a business to flourish will be a sign that is compatible with the desired character of the community. The purpose of the sign code should be to facilitate the city's objectives without regulating the content or restricting creativity. Establishing minimum standards for conspicuity and readability of signs based on sound science will ensure that each sign serves the communication purpose for which it was intended, bringing benefit to the business, the consumer, and the community as a whole.

A sign code must resist content-interference, including interfering with the aesthetic features that flavor the textual content, as well as the imposition of physical constraints that result in design interference, and instead allow local businesses sufficient leeway to engage in creative expression within a framework of thoughtful design, structural safety, and community values. Undue restrictions on time, place and manner – or size, height, placement and illumination – simply



When a script font is used, the size of the lettering - and, thus, the size of the sign itself - must be increased to ensure readability.

work to undermine the attractiveness and effectiveness of the sign's communication ability. When forced to reduce a sign's message to fit into a smaller space, a business will have no choice but to abandon aesthetic elements and fonts and instead use the most basic, readable fonts and colors available to maximize visibility and legibility. The business's unique message is lost. Differentiation between the small, locally-owned business and major corporations begins to disappear, and the locally-owned small business is usually the one that suffers.

Constitutional application of content-neutral regulation of time, place and manner – or size, height, placement and illumination – will ensure that the sign's message, as designed by the speaker, is capable of being seen and comprehended by its intended recipient. It will ensure that signs are allowed to be readable and conspicuous, thereby functioning as effectively as possible in our highly mobile society.

Endnotes:

1. Virginia State Board of Pharmacy v. Virginia Citizen Consumer Council, Inc., 425 U.S. 748, 761-773 (1976).
2. Central Hudson Gas & Elec. Corp v. Public Service Comm., 447 U.S. 557 (1980).
3. Cleveland Area Bd. of Realtors v. City of Euclid, 88 F.3d 382, (6th Cir., 1996).
4. The rate for some groups is particularly high. More than one in three people aged 20 to 24 move each year, and nearly 31% of those between 25 and 29 move annually. Additionally, a full third of renters moves each year. Schimmel, Bruce, "Moving Facts", Philadelphia citypaper.net, April 10-17, 1997. <<http://www.citypaper.net/articles/041097/article019.shtml>>
5. Nolte, Carl, "Driving Force for Many – Parking: Survey finds 67% are alone at the wheel" San Francisco Chronicle, p. A13, September 4, 2000.
6. Based on a 1997-99 survey, in conjunction with Signtronix, of nearly 2500 first-time customers who were visiting 165 independent small businesses within 30 to 45 days after those businesses installed a new sign. The Signage Sourcebook. (Sherwood, OR: The Signage Foundation for Communication Excellence and the U.S. Small Business Administration, 2003), p. 183.
7. Richard N. Schwab, Ret., Safety and Human Factors: Design Considerations for On-Premise Commercial Signs. (Washington DC: International Sign Association, 1998).
8. P.M. Garvey, et al., Sign Visibility: Research and Traffic Safety Overview. (Bristol, PA: The United States Sign Council, 1996).
9. T.W. Forbes and R.S. Holmes, "Legibility Distance of Highway Destination Signs in Relation to Letter Height, Letter Width, and Reflectorization," Proceedings: Highway Research Board, Vol. 19, pp. 321-326, 1939.
10. S. Chrysler, et al., "Improving Street Name Sign Legibility for Older Drivers," Proceedings of the Human Factors and Ergonomics Society 45th Annual Meeting, pp. 1597-1601. (2001).
11. P.M. Garvey, et al., Real World On-Premise Sign Visibility: The Impact of the Driving Task on Sign Detection and Legibility. (Bristol, PA: The United States Sign Council, 2002).
12. J.R. Griffin and J.E. Bailey, Visual Science and Signage: Signtronix Report. (Torrance, CA: Signtronix, 2001).
13. Richard N. Schwab. Safety and Human Factors: Design Considerations for On-Premise Commercial Signs. (Washington DC: International Sign Association, 1998).
14. John Griffin and James Bailey, Horizontal Obliquity: Word Readability and Logo Identification. (Torrance, CA: Signtronix, 2002).
15. A.W. Johnston, B.L. Cole, Investigations of Distraction by Irrelevant Information. (Australian Road Research, 1976; 6:3-23).
16. F.L. Engle, Visual Conspicuity, Visual Search and Fixation Tendencies of the Eye. (Vision Research, 1977; 17:95-108).

Several legal issues are discussed throughout ISA's Signline series. Signline is offered for educational and informational purposes only and not to be construed as given legal advice to any user. Competent legal advice/advisors should be sought after and obtained by the user.



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