

The Development of Passenger/Pedestrian Oriented Symbols for Use in Transportation-Related Facilities

The American Institute of Graphic Arts

The American Institute of Graphic Arts in cooperation with the United States Department of Transportation, Office of Facilitation, has created 34 passenger- and pedestrian oriented symbols for use in transportation-related facilities. The intent of the project was to produce a consistent and inter-related group of symbols to bridge the language barrier and simplify basic messages at domestic and international travel facilities. The working process attempted to take full advantage of strong and widely recognized existing symbol concepts and to introduce new symbol forms only where no satisfactory concepts existed. The report includes detailed descriptions of the process employed to create the symbols as well as guidelines for their use.

Over the past several years, numerous international, national, and local organizations have developed sets of symbols for use in facilitating passenger and pedestrian orientation in transportation-related facilities and at the sites of large international events. (Throughout this report the term "symbol" is used to denote both true symbols such as the Red Cross and pictorial devices, pictographs, or pictograms which are illustrative in nature.) Some of these groups have attempted to establish international standards but have been criticized for the overall graphic quality of the drawings, as well as for some of the concepts. Others, especially those associated with temporary events, such as Olympic Games or World's Fairs, have spent considerable effort to achieve graphic excellence. At the same time, they have made a conscious effort to give their symbols a unique graphic character inappropriate for wider functional needs. Out of all this effort have come a number of well-conceived and well-executed individual symbols, but no one complete system that seems immediately adaptable to the needs of transportation-related facilities in the U.S.

To develop such a system and to take full advantage of the work

done to date by others throughout the world, the American Institute of Graphic Arts in cooperation with the U.S. Department of Transportation, Office of Facilitation, has compiled an inventory of symbol systems which have actually been used in transportation-related facilities or large international events. We have not concentrated on theoretical or experimental proposals, although we are aware of them. In addition, we have compiled and analyzed whatever existing research seemed pertinent. Unfortunately most of the reports seem more concerned with the methodology than with the conclusions reached. Nevertheless, all relevant data has been considered when making evaluations.

To undertake the project, the AIGA appointed a committee of five members with considerable experience and interest in the problem. It was determined that the task of the committee would be to review the major symbol systems in use around the world, to analyze the effectiveness of each based on personal experience, and from this analysis to develop a clear concept for each message area. The committee's next task was to determine who should draw the symbols and prepare the guidelines for using them. Finally they were to direct the execution of work by other AIGA members.

The committee was composed of Thomas H. Geismar (chairman), Seymour Chwast, Rudolph deHarak, John Lees, and Massimo Vignelli. The firm Cook and Shanosky was involved in all of the deliberations and eventually designed the new symbols and their graphic system. The firm Page, Arbitrio, and Resen was in charge of the guidelines section.

Each existing symbol was analyzed independently by each committee member. In addition, each group was discussed at some length by the whole committee, and the recommendations were arrived at as a joint decision of the group. Some decisions were easily made; others provoked considerable discussion. These decisions were then submitted to a working panel of the DOT Advisory Committee for review. That committee thoroughly reviewed the recommendations, and made a determination on each, accepting many, revising some, and rejecting a few. The AIGA then reviewed the working panel's response, and revised some of its recommendations. In evaluating the existing material, it was always presumed that all recommended symbol concepts

would require at least some graphic modifications or refinements to be incorporated in a uniform graphic system. Other symbols required new or modified concepts and consequently considerable original drawing.

A set of guidelines for using the symbols and relating them to the verbal messages was developed—not to provide a rigid set of rules but rather to suggest a range of possibilities within which the problems most commonly encountered in facility signage can be resolved without sacrificing the integrity of the symbol system.

Finally, in the course of this project we have found common agreement on a few key points concerning symbols:

We are convinced that the effectiveness of symbols is strictly limited. They are most effective when they represent a service or concession that can be represented by an object, such as a bus or bar glass. They are much less effective when used to represent a process or activity, such as Ticket Purchase, because these are complex interactions that vary considerably from mode to mode and even from carrier to carrier.

We are convinced that symbols are useless at a facility unless incorporated as part of an intelligent total sign system. The use of symbols alone, without consideration for the verbal messages and all other signing, will only add to the confusion.

We are convinced that it is more harmful to oversign than to undersign. To mix messages about relatively insignificant activities and concessions with essential public messages weakens the communication. While there may be some messages beyond this basic group that require symbols, only those messages that are truly essential should be considered.

Having said this, we do feel that, properly used, symbols can play an important role in facilitating communication and orientation in transportation-related facilities. We also believe that a well conceived and well designed set of symbols can win wide acceptance.

Thomas H. Geismar, Chairman.

The American Institute of Graphic Arts Committee on Signs and Symbols, November, 1974.

Initial Message Areas

The first task of the committee was to develop a group of initial message areas:

The first category, Public Services, contains twelve messages which represent services widely used in transportation-related facilities and seven additional messages to represent all common public transportation modes. The second category, Concessions, includes messages that are related to commercial activities. The third category, Processing Activities, was developed for the messages that represent important passenger-related procedures. Finally, a fourth category was created for Regulations. Three prohibitory messages were selected along with two closely related opposites.

We have attempted to describe the message areas with wording that corresponds to conventional terms, without over simplifying. These are not necessarily the words that would appear on actual signs. The guideline section of this report offers recommendations about the suggested wording that should appear with the symbols.

Public Services

Telephone
Mail
Currency Exchange
First Aid
Lost and Found
Baggage Lockers
Elevator
Toilets, Men
Toilets, Women
Toilets
Information
Hotel Information
Taxi
Bus
Ground Transportation
Rail Transportation
Air Transportation
Heliport
Water Transportation

Concessions

Car Rental
Restaurant
Coffee Shop
Bar
Shops

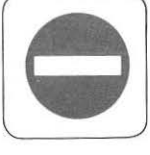
Processing Activities

Ticket Purchase
Baggage Check-in
Baggage Claim
Customs
Immigration

Regulations

No Smoking
Smoking
No Parking
Parking
No Entry

Transportation Related Symbols



Basis of Evaluation

Frequently the words legibility, readability, and clarity enter discussions about symbols. While these words reflect realistic concerns, they are too inaccurate to be useful in evaluating symbols. To produce consistent judgments a more objective basis was needed. Three very fundamental aspects served as the outline for the committee's evaluations. All visual communication, including symbols, have three distinct dimensions: semantic, syntactic, and pragmatic. The strengths and weaknesses of every symbol can be evaluated in relation to these basics of communication.

The semantic dimension refers to the relationship of a visual image to a meaning.

How well does this symbol represent the message?

Do people fail to understand the message that the symbol denotes?

Do people from various cultures misunderstand this symbol?

Do people of various ages fail to understand this symbol?

Is it difficult to learn this symbol?

Has this symbol already been widely accepted?

Does this symbol contain elements that are unrelated to the message?

The syntactic dimension refers to the relationship of one visual image to another.

How does this symbol look?

How well do the parts of this symbol relate to each other?

How well does this symbol relate to other symbols?

Is the construction of this symbol consistent in its use of figure/ground, solid/outline, overlapping, transparency, orientation, format, scale, color, and texture?

Does this symbol use a hierarchy of recognition?

Are the most important elements recognized first?

Does this symbol seriously contradict existing standards or conventions?

Is this symbol, and its elements, capable of systematic application for a variety of interrelated concepts?

The pragmatic dimension refers to the relationship of a visual image to a user.

Can a person see the sign?

Is this symbol seriously affected by poor lighting conditions, oblique viewing angles, and other visual “noise”?

Does this symbol remain visible throughout the range of typical viewing distances?

Is this symbol especially vulnerable to vandalism?

Is this symbol difficult to reproduce?

Can this symbol be enlarged and reduced successfully?

In actuality, these three dimensions are interrelated in complex ways. Nevertheless, recognizing them makes it possible to logically isolate and evaluate specific qualities.

Considerations in Drawing the Symbols

In attempting to establish a unified set of symbols, one of the goals was to draw the symbols so they had a single graphic vocabulary. This was especially difficult in this project because of the extreme variety of images required by the messages. Some of the messages can be represented by bold abstract forms which depend on widespread education to become conventional symbols, such as the red cross or the internationally accepted No Entry symbol. Others depend on a picture of an object that is closely associated with the message to carry the meaning, such as airplane for Air Transportation or coffee cup for Coffee Shop. Finally, there are messages that are actually complex pictures of people engaged in processes such as purchasing a ticket, riding in an elevator, or inspecting luggage. Nevertheless, all the symbols, simple and complex, must function as a group with a recognizable visual vocabulary. Fortunately there are basic visual devices that can help establish a unified graphic vocabulary among the symbols. Many of these devices were employed in the creation of the initial group of symbols.

Simplification of the images is one characteristic that makes the set of symbols a coherent group. The amount of detail used in the drawings has been reduced to a practical minimum. Unimportant features have been eliminated, resulting in a set of symbols that

are consistently bold and direct. This characteristic boldness is also important if the symbols are to function as signs in busy confusing environments where unnecessary details would reduce legibility.

Guidelines for Application

The following guidelines were developed to illustrate desirable applications of the symbols to signage.

From the standpoint of legibility and recognizability, "ideal" guidelines would advocate universal consistency in presentation (including layout, accompanying letter style, arrow, size relationship, color relationship, illumination, and conformity to an established size/distance formula). However, cultural, environmental, and architectural conditions and styles vary greatly. Thus, from an aesthetic point of view an ideal set of guidelines would advocate freedom of application to allow and encourage the integration of graphics into the visual fabric of the environment.

These two ideals appear to be in conflict, but in fact need not be. Experienced designers know that the same visual elements may function entirely differently in different surroundings. For example, a yellow panel will stand out powerfully on a dark grey wall, be less forceful on a white wall, and disappear entirely on a yellow wall; or, a modern sans-serif letter style that may be in harmony with the contemporary architecture of a modern airport may be dissonant in an environment like Colonial Williamsburg.

Legibility Criteria

The following diagram illustrates the results of pragmatic testing of several symbols (Ticket Purchase, Elevator, and Taxi) and represents a rough guide to size/distance relationships. For the purpose of this illustration, legibility was defined as the recognition of the various elements that make the symbol understandable without the aid of wording or preconditioning. Recognition of the symbols after they are learned is another matter, and we feel cannot be meaningfully tested at this time except in the case of those few well known symbols such as First Aid, Men, Women, etc. The testing was done in daylight using symbols with black figures on white symbol fields displayed on a black sign background.

Figure 1 shows the result of the testing on the Ticket Purchase symbol. The distances from which the Taxi symbol was legible were 10% greater; for the Elevator symbol, 30% less.

One of the most important aspects of good signing is siting (Fig. 2). The closer to one's natural line of vision, the better. A useful rule of thumb is to avoid exceeding a 10-degree angle from the natural line of vision. This formula has value, primarily with regard to height, except in the case of a roadway or corridor type of con-

Figure 1.

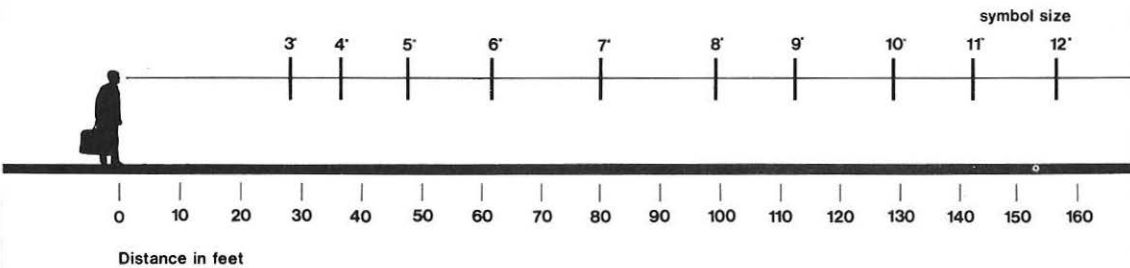
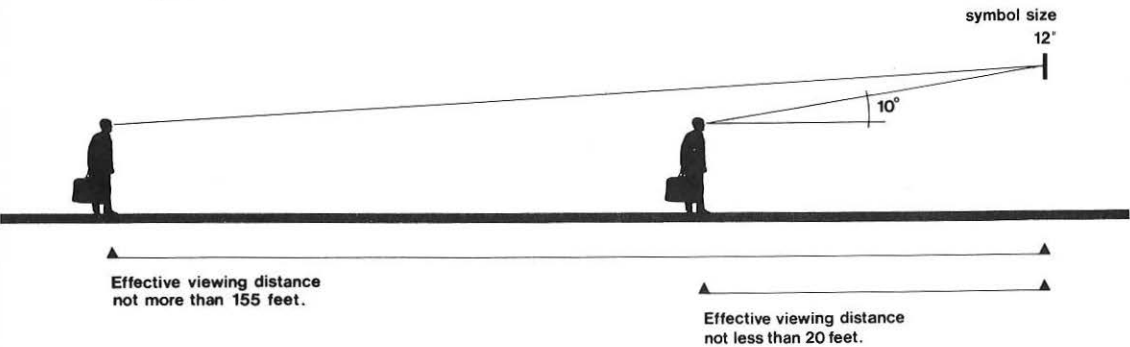


Figure 2.



dition where natural line of vision can be reasonably defined. If conditions require that the viewing angle exceeds 10 degrees, the size/distance relationship may have to be adjusted (for example, a sign at 15 feet above the floor level will probably have to be larger than the same sign at 8 feet to be as effective) or another smaller sign may have to be added for short-distance reading.

It must be pointed out that legibility varies greatly from one symbol to another or from one type style to another, and that color relationships, lighting, spacing, and viewing angle may also affect legibility. We recommend pragmatic testing of symbols and lettering on-site, or in simulated on-site conditions. If an attempt is made to equalize symbols of unequal legibility in a signing system by varying their size, the result would be visually chaotic. We recommend that the legibility characteristics of the least legible symbols determine the size of all the symbols in a given system. This would provide a sense of order and adequate legibility throughout. The intensity of internal lighting of symbols on translucent background material should be minimal to prevent loss of legibility due to halation, the spreading of light.

Use of Grid

We recommend that within a given facility or system only one type style be used, and that a consistent vocabulary of relationships be developed. In order to aid in the development and application of an established vocabulary, we recommend the use of some kind of consistent grid as a basis for the sign layouts. The grid used for the illustrations in these guidelines established certain key relationships; one symbol width between lettering and symbol, one half symbol width between arrow and symbol under most conditions, and one quarter symbol width between symbols.

Lettering

In order to provide the freedom to respond meaningfully to varying architectural and cultural styles, we are not recommending any one lettering or type style for use with the symbols. Choice of a type style should take into account legibility and compatibility with the symbols and the environment. Lettering and word-spacing affect the legibility and appearance of different

lettering styles in varying ways at different distances. Color and lighting also affect spacing needs. Generally, the following rules of thumb are useful:

White lettering on a dark background requires more letter spacing than does black on white.

Internally lighted letters may require greater letter-spacing, depending upon intensity of light.

Open letter-spacing increases legibility from great distances. (Larger letters spaced tighter and occupying the same area may accomplish the same thing.)

Many type styles suffer aesthetically when open letter-spacing is used.

Well executed optical letter-spacing (either open or tight) is better than mechanical letter-spacing.

Helvetica Medium (caps and lower-case) was selected for these illustrations because of its excellent legibility, compatibility with the symbols, and aesthetic quality. Its extremely large x-height (the height of lower case-letters such as the x) also allows the use of both upper- and lower-case with relatively little size loss. The word shapes created by the ascending and descending letters aid in legibility.

The directional arrow style was selected because of its compatibility with the Helvetica Medium letter style used and was positioned in a consistent relationship to the symbols.

Lettering size should be determined by testing, but a reasonably effective guide is to provide 1 inch of letter height for each 50 feet of viewing distance.

Symbol Presentation

In order to ensure legibility and recognizability of the symbols, it is important that certain visual elements be kept consistent. The drawing of the symbols and the proportional relationship of the figure (the drawing or symbolic device) to the symbol field (the square area with radius corners) must always be maintained.

With the exception of the No Smoking, No Parking, and No Entry symbols the figure must always be presented in the symbol field. It is also important that the figure always be black on a white symbol field. (Never use the symbols in reverse: white figure in a black symbol field. Many are difficult to read when presented in this manner.) A very dark color may be used in lieu of black for the figure, or a light color for the symbol field, if desired, but strong dark/light contrast must be maintained in order to ensure good legibility.

Summary

The recommended family of symbols represents the best efforts of the committee and its subcontractors during the time available. Throughout the process of evaluation, selection, and design, decisions have been made subjectively by individuals and groups having wide experience in the problems of signage. Beyond this method, however, it is quite difficult to predetermine objectively the effectiveness of any one symbol. Experience shows that constant repetition has more to do with effectiveness than does a difference in style of drawing or appropriateness of concept. The No Entry symbol is now understood in most Western countries because it has been widely used; it would be meaningless in an area where it had never been seen. For the same reason, the results of survey tests taken at on-site locations have their limitations. Do most people recognize the handset as a symbol for telephone because it is a good symbol or because it has already been widely used? Would a different symbol for telephone, with equal exposure, have been even more effective? Can a symbol with very little exposure be expected to be well recognized?

With an understanding that such tests can provide only limited information, we do feel that use of the symbols in actual conditions can help point up any especially poor symbols or major defects in the overall system. Such testing should be carried out in a wide range of locations, at least some of which serve large numbers of foreign visitors. We further recommend that any survey evaluations to be made at on-site locations be done professionally with the goals and methods clearly predetermined.