National College of Art and Design
Department of Visual Communication

Airport Signage: Graphic Design Issues

by

Heidi Ruby Vambeck

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Introduction

"There's no such thing as a problem, only an opportunity" (Weber, 1991, p.182). I am writing this thesis on the problems that the designer must consider and resolve in relation to designing airport signing systems. I chose this subject as I found the area of visually communicating to such a diverse audience fascinating. I did not only want to investigate the basic design decisions that faced the designer, but also the more complex considerations relating to what needs to be communicated, who gets involved in visually communicating the message, guidelines for successful communication, typestyle and colour considerations that should be made, whether using pictograms is a solution, problems relating to pictograms, technological advancements and what the future holds for airport signage.

I will be discussing different airports and I will compare and contrast a lot of my practical application of design theory with Dublin airport. In order to do this I had to pretend to become the designer and see what obstacles and options faced me. I found it extremely difficult to get relevant information dealing specifically with airport signage.

I went about obtaining a lot of my information through interviewing many designers such as Peter Simlinger, the designer responsible for the new Viennese airport signing system; designer Libby Carton of Carton le Vert, Germany; designer Michael Hardt, ex president of ICOGRAD; Stephen Durkan, design consultant for Dublin Airport's new signing system, John Murphy, Chief Engineer at Aer Rianta. I spent a lot of time

at Dublin Airport taking photographs and analysing individual signs. To help my investigation I undertook my own survey which involved over 200 people over the duration of two days.

I also received some useful information through e-mail from other design students in different countries. I found information on websites relating to specific airports, environmental graphics and general signage information to be useful, but badly referenced.

After analysing the above information, I attempted to present my interpretation of the options and considerations that the designer incurs, when challenged with designing a successful airport signage scheme.

Chapter 1.

The Airport Signage System

Designing environmental graphics for airports involves a complicated mix of corporate, government and architectural issues. An effective airport signing system should easily guide the travelling public through a web of roadways and corridors by using a terse and comprehensible system of directional, informational and regulatory messages. Not only is the study of graphic design important in understanding the needs of the travelling public and how they will respond to an airport signage system, it is as much a study of human behaviour.

What contributes to a successful airport signage scheme?

For an airport signage system to be successful, a logical way of thinking must be used by the airport management, the graphic consultants and the design engineers. These three groups must discuss ideas with each other. Sometimes airport management may forget that their audience, unlike themselves, are alien to their surroundings. Also, graphic designers may design a unique colour system that is unsuccessful, may use symbols that are not universally recognisable or choose a fancy typeface that reduces legibility. Sadly, systems that use the above methods only add to the public's confusion and so lead to the travellers not having trust and, adversely, disregarding the signs. So it is important for a logical method of thinking among the above parties to be employed. This is the method that Dublin Airport employed when designing their new signage system. I spoke with the airport engineer in Aer Rianta, Mr. John Murphy, who explained to me that redesigning the signage system at Dublin Airport

was a big programme and unique to Dublin Airport. As they did not have the expertise or software relating to this sort of project, they approached an outside consultant, Stephen Durkan from Oranmore, was the designer that was chosen. I spoke with Mr. Durkan and he explained that along with airport management, finance people, a team of engineers from Aer Rianta and himself, the new signage system was devised. (Durkan, Jan 1998, Interview).

When designing a signage system it is important to stick to ground rules regarding copystyles and sizes, consistent terminology, easily recognisable and universally acceptable symbols and uniform colours for standard duties. The information to be communicated must be understandable by both the sophisticated and unsophisticated traveller. One must remember, however, that no signage system will satisfy everyone's questions and needs. However, when planning the system one must try to design a brief and informative selection of non-verbal instructions that will hopefully help most travellers.

Categories of information to be communicated:

It is important for the following categories to be successfully communicated through signage and graphics:

1. Directional
2. Informational
3. Regulatory, advertising and identification graphics.

1. Directional:

   The foremost type of signing in an airport is directional signing. All other signs are of less importance. Successful directional signing is important because of the need for fast movement of pedestrians, cars and especially the travellers. These signs are important for the absolute success of fluid movement in the airport. At the changeover point between ground and air transport, the failure or success of the signage system is mainly measured by the speed, ease and comfort of access to and from the airport terminal. Directional signage is not only important to the normal passenger but is extremely important to passengers arriving late for a flight, foreign visitors as well as those people subjected to normal airport frenzy.

2. Informational Signing:

   These signs convey specific information regarding the airport's services and functions, such as the toilets, telephones, snackbars, restaurant, postal facilities, "*you are here*" maps, police, etc. The functions of these signs are to help the traveller's requirements not directly associated with aeroplane boarding, baggage claim or airport existing process.

3. Regulatory, advertising and identification signage:

   Regulatory signs relate to local, state and government requirements and recommendations providing travellers with travel advice. Advertising signs reflect promotional needs of the tenants and other airport business, as well as providing a source of financial injection for the airport from advertising displays. Identification

Fig.1

signs provide the tenants with proper exposure in rented spaces and other areas established by the airport authority.

Terminology Guidelines for a uniform national programme.

To make airport signage simple and clear it is important that consistent terminology be used for national use. This does not only apply to the use of the English language but also to multilingual communication when required for the international travellers.

To overcome some of the problems facing the designer trying to achieve a uniform national programme, I have composed the following terminology guidelines. I put together the following points by researching and extracting what I found to be successful in airports. I achieved this by studying general design books, I examined airport signs mainly Manchester and Dublin. I spoke with designers and made my own analysis with what I have learned over the last four years - I choose some of the more obvious airport signs to use for my guidelines and I use Dublin airport to compare and contrast my design theory guidelines.

Firstly, for the airport trailblazer and airport entrance the single word **Airport** is recommended. Unless there is another airport in the vicinity the name of the airport is not necessary. If display space permits, the aviation symbol for airport should be included. In relation to Dublin airport a symbol of an aeroplane along with an arrow is used, black on white, to direct people to the airport. I find this works quite well in Ireland as the function is, to direct people to the airport and there is no confusion by adding Irish and English lettering. Figure 1.

Fig.2

Fig.3

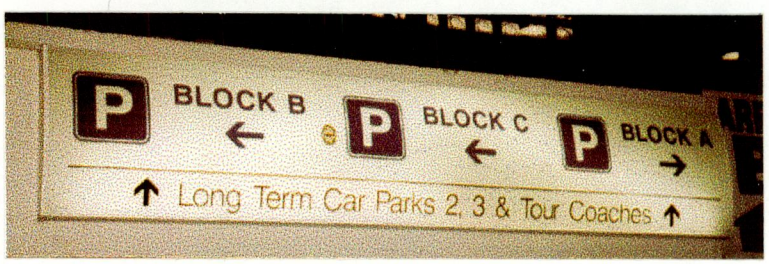


Fig.4

Secondly, for terminal area roadways, the word **Terminal** should be used for all structures in use for aircraft arrivals and departures. When there is more than one terminal, it will be conveyed as Terminal 1, Terminal 2, etc. in the order that the passenger meets them on the roadway system. It is not recommended to use names of individuals or airlines to identify terminals. This only leads to a mix up when a listing of airlines operating from a given terminal building is required. Dublin airport uses the term Passenger Terminal and Paisinéirí. Figure 2.

In relation to airport parking facilities the letter **P** should be used. A white upper case **P** on a blue background with a white border is used in Dublin Airport. Figure 3. In addition to this in order to identify specific parking lots the following terms should be used.

Hourly - for short periods of time, less than 24 hours.
Daily - 24 hours or more.
Remote - Park and ride.
Valet - Assisted parking.
Method - Coin operated spaces.

When parking is being related to multi-terminal complexes use the term **Parking/Terminal 1**, etc. In Dublin different areas inside the short term parking area are denoted by Block A, Block B, etc. and in relation to long term car parking it is numerically denoted. Figure 4.

In relation to all areas where rented cars are to be returned the words **Rental Car Return** should be used. If its signage system requires the names of the rental car

Fig.5

Fig.6

Fig.7

Figs.8

companies, the standard airport typeface should be used and not the individual corporate identity. In relation to Dublin Airport the words Car Rental Returns are used Figure 5, but one result of my survey, resulted in passengers commenting on not being able to find the Car Rental Returns area easily. Discovering that they had driven past it before they had even realised.

In relation to all types of air couriers, air freight, air express, etc. that are normally found at freight/cargo facilities the term **Air Cargo** should be used. At Dublin Airport the word **Cargo** is used along with the Irish word Lastas.

When you have arrived at the terminal, it should be made clear where departure and arrivals are. At Dublin Airport a successful method of conveying this is achieved by using the international symbol for an arriving aircraft. The symbol is used both inside and outside the airport building. The international symbol for departing aircraft is also used. Figure 6.

Once inside the terminal specific areas will be recognised by the following terms:

Baggage claim - where passengers claim their luggage from their arriving flight. The words Baggage Reclaim are used along with a symbol in Dublin Airport. Figure 7.

Toilets & Symbol - for the location of both men and women - toilet/washroom facilities. In Dublin airport, the word Toilets and Leithris and a symbol are used. Sometimes black on yellow, sometimes white on green and the symbol usage is not similar in all of the signs. I have three examples of signs for toilets in Dublin Airport. In Figure 8 the three signs are all different from each other, either the colour coding,

Fig.9a

Fig.9b

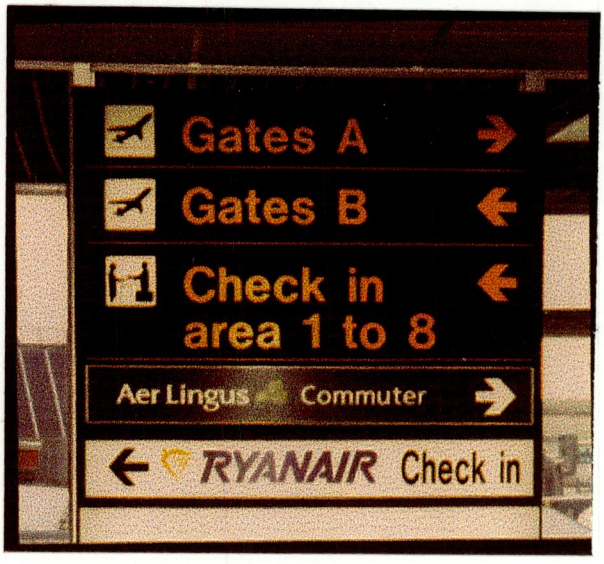


Fig.10

the symbols, capital/lower case lettering or the letter weight differ. One design should be kept constant throughout the entire airport.

Information - use this term for general airport information along with the **i** symbol. Again in Dublin airport there is no continuity with Information. Figure 9a shows a different colour scheme and lettering layout than in Figure 9 b.

Telephone - for telephone services in the terminal and where appropriate use the symbol. Again in Dublin airport there is no continuity in their signs for telephones.

Gates - the area assigned for the passenger in the terminal building or concourse to denote where to board a departing flight. Each airport handles the terms Terminal, Concourse, and Gate quite differently. Successful airport signage systems have used the following. Firstly, for airports with no concourse, i.e. single terminal airports, the gates should be identified by continuous numbers. For airports with one terminal but more than one concourse, identify each concourse by Alpha indicators starting with "A" the gates shall be identified by Alpha/Numeric indicators, for example A1, A2 or B1, B2 etc. It is not necessary to use the term gate at each gate location. When dealing with an airport with more than one terminal, with a combination of concourses and separate terminals, identify the terminals by numbers, the concourse, by Alpha/Numeric indicators.

For departing directional information on the terminal sign system to gates, show the gate indicators as for examples Gates 1-20 for single terminal with no concourses and for multiple concourses use Gates A-1 to A-20 it is better to use the word "to" instead of a hyphen between the specific gates. In Figure 10 the words Gates A, a symbol and an arrow is used. When one comes through the departure gates you are then

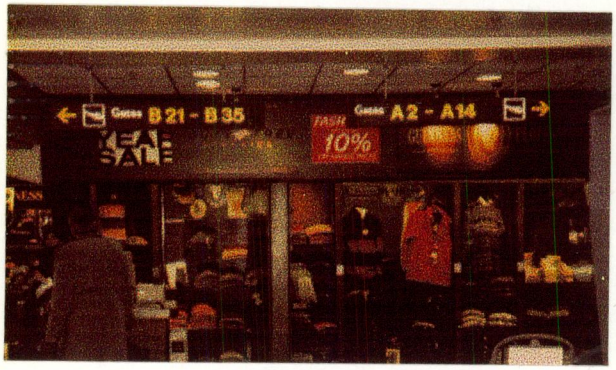


Fig.11

Fig.12b

Fig.12a

Fig.13

redirected to either choices as in Figure 11. This methods seems to work quite well in Dublin Airport. This was another section of my survey that I investigated - whether passengers had any problem finding their way to their respective gate. The majority had no problem.

Enter with or without an arrow.
Exit with or without an arrow.

In Dublin Airport there seems to be again no continuity as regards these signs. For example, figure 12a and figure 12b, in 12a the wording 'Exit' and an arrow and a symbol is used and in Figure 12b the words 'Way Out', and an arrow is used.

Emergency Exit - use where appropriate.

The following words -

Restaurant & Symbol,
Coffee Shop & Symbol,
Snack Bar & Symbol,
Bar & Symbol

are considered basic primary concession terms. These terms should be used on the corridor signage system rather than any specific corporate or custom names. In Figure 13 it is possible to easily understand where the bar and snacks area are, but, again the Irish translation is difficult to read due to the light type weight.

The above are some guidelines that if used continually throughout the airport will result in a successful signage system. If the same terms and use of signage are experienced from one airport to the next, it will help the public in their use of each facility. Having discussed the above point of view with Libby Carton, she disagrees with the point to a certain extent. She believes that an airport can have its own identity

and need not necessarily have to conform with every other airport signage system. What we did come to agree on, was, that it is important to set up a hierarchy of messages and information throughout the airport. (Carton, Dec 1997, Interview). Having discussed the standard terminology earlier it is easy to put the messages into three levels namely, primary, secondary and tertiary. Both pedestrian and vehicular passenger flow within the airport is much more efficient, when clear concise information is presented either by primary or secondary signing systems.

Typestyle Considerations

Once the above has been established the next consideration that the designer has to deal with is the letterstyle and all that goes with it. When choosing the letterstyle to be used for an airport signage system the importance of an effective style cannot be over emphasised. In my research on airport signage I became aware of a rather obvious fact, that signs in airports can be boiled down to two camps. Namely these camps are signs for pedestrians and signs for people in vehicles. These two camps differ formally in size and proportion. The typestyle used is therefore of primary importance, and all the other elements of the signs, materials, location, symbols are embodied in the actual message itself and the typeface which is used.

The designer is faced with many problems regarding typefaces. There are over 5,000 modern typefaces in use today. It is important to realise that to a large degree that successful communication is determined by the typeface involved. It would be advisable that airport signing systems use a consistent, similar type letter style. The

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger light

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger bold

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Frutiger italic

Fig.14

consistent use of a good airport typeface can communicate the voice of the airport to the passenger and gain trust and promote efficient traffic flows.

Issues to be considered by the designer.

When selecting a specific effective airport typeface many important issues must be considered by the designer. I will again be comparing and contrasting these issues with airports, putting emphasis on Dublin Airport.

1. Character of the Airport.

   In contrast to a small regional airport a large high traffic international airport may require a somewhat more sophisticated typeface, as is used in Schiphol. The typeface used in the Schiphol signage is Frutiger, named after its French-Swiss designer. Figure 14. In some airports designers have convinced the sponsor to approve a custom typeface style that gave the airport the so-called regional flavour, which has proved to be a significantly more expensive system. This meant that certain suppliers were able to get 'locked' into the project because of confined designs which usually drives the maintenance costs of the projects to an uncompetitive level, even if it was competitively bid in the beginning.

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Times 20 point

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Andrew Script 25 point

Fig.15

Fig.16

2. Availability of the typeface

A well researched plan during and after the initial contract relating to the chosen typeface is important. A problem that has to be answered is whether or not it is possible for the airport to reorder the typeface in all sizes required. There are several typefaces e.g. Univers, that are not restrictive or exclusive and that satisfy the guideline's design intent.

3. Vehicular or Pedestrian Usage

The problem here is that some typefaces do not read well when viewed quickly. When the designer is considering the word spacing and letter spacing care should be taken, that both pedestrians and vehicles will be using the particular typeface in question. Many typefaces suitable for text are simply not legible in roadway sign use. For example Figure 15 Times or any Script fonts are unsuitable.

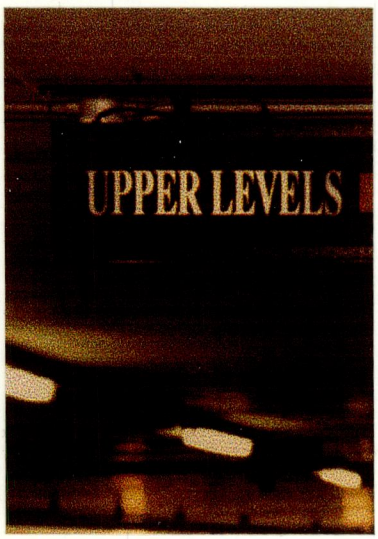
4. Capital Letter Height versus Lower Case Height

Often described as the Y and X height this relationship should be about 1:67 or 1:75 to allow the lowercase to be large enough to be read when the smaller heights are used. Upper and lower case letters with medium stroke width have better legibility since words composed of all capitals are much harder to read. In Figure 16 it is clear that the light stroke weight in all capitals is more difficult to read than the English type which is set in upper and lower case.

This is the number 38 in Univers 20 point.

This is the number 38 in Times 20 point.

Fig.17



Figs.18

5. Stroke widths.

Extremes in either direction are inappropriate. Very thin or very thick lines tend to read oddly from a distance. To overcome this problem medium stroke widths rather than 'bold' should be used. Some allowance should be made for the 'halation effect' associated with trans-illuminated signs where letters tend to look larger in stroke due to the blurring effect of very high contrast.

6. Typeface

It is important to choose a recognisable typeface which is clear and open in its shape and which use traditional letter forms as their basis. Typefaces that are decorative, ornamental, heavily condensed or extended or in any undue manner stylised should be avoided. Suitable typefaces are Fruteger and Univers. These typefaces are suitable due to their marvellous readability and because they have open forms so figures like three and eight will not be confused. It is clear to see in Figure 17 that Univers reads clearer than Times especially in relation to numbers.

In contrast to Schiphol Airport in Holland which uses Fruteger throughout the airport, Dublin uses many different typefaces throughout the grounds and terminal building which leads to inconsistency. Figure 18.

7. Legibility

The problem facing the designer is deciding what is a practical viewing distance for a one inch capital letter. Standards range from 16 ft to 50 ft. A conservative number to use as a minimum would be 30 ft of viewing distance for each one inch

of capital letter height. Thus a 6" capital letter and its associated lower case, as a word, would be recognised easily by most passengers at a distance of 180 ft. Concerning legibility, the typefaces that people consider the most legible are the ones that they are most familiar with. It can also be said that legibility depends on typeface and typesize, while readability is based on the total design.

8. Spacing

Once the designer has chosen an appropriate typeface he must overcome other problems relating to the sign. Some sort of spacing guide should be devised so that a repeatable method of letter-to-letter spacing is obtained. The amount of letter spacing will depend very much on the typeface. Condensed typefaces can be set tighter than regular or extended typefaces; display sizes can be set proportionately tighter than the very small text sizes which require more space for maximum legibility. A problem with a lot of airport signs is that the type is generally large, so any inconsistency in letterspacing will be obvious and therefore distracting. This is seldom a problem for the designer regarding lowercase letters as they are designed to fit together well. Capitals, however are another matter.

9. Word Spacing

The designer must carefully consider the wordspacing being used on the airport signs. Wordspacing is measured in units, and it is important, that even spaces are maintained to ensure consistent fabrication results. When discussing wordspacing one must also take into account line length and how lines are set in the sign. There are four basic ways to set type: justify, unjustify, centre and asymmetrical or


Baggage Reclaim
Transfer Lounge
Gates B
Way Out

Fig.19


Imeacht
DEPARTURES
(Set Down Only)
Slí Amach
WAY OUT
Ceantar Srianta
RESTRICTED ACCESS

Fig.20

random. Justified type is when all lines are set the same length and align on both the left and the right. Typeset with lines of varying lengths, and even wordspacing is referred to as unjustified type. Centred type, like unjustified type, has even word spacing. Asymmetrical has no predictable pattern in length or placement yet most airport signs incorporate a symbol into their design which is going to affect how the type is set. It is possible to see if you look at Figure 19 that most type is aligned left, yet in Figure 20 the type is centred from the pictograms. Wordspacing can prove a difficult problem for the designer to overcome, as too much or too little can affect the success of the sign. Wordspacing is also affected by the typeface, typesize and type arrangement that the designer chooses. It is important that the word spacing is consistent with the letter. Not only should the designer consider wordspacing but also the linespacing or leading.

10. Line spacing

Line spacing is specified in points and sometimes half points. The designer has various issues to remember when considering line spacing. Ultimately his goal is to improve legibility. He must consider the appearance of the sign, the typesize he is using, the x-height etc. Large x-height typefaces such as Helvetica require more linespacing to achieve the same effect as those with small x-heights such as Futura and Garamond. Line length and the message must all be considered. The designer must remember that line spacing and word spacing should all be compatible. This can be quite difficult for the designer, as different messages of equal importance can all be on the same airport sign and the designer has to ensure that the overall image of the sign is successful in portraying its intended messages. In Figure 21 I

Fig.21

Fig.22

Fig.23

feel that the line spacing could be improved. I feel that the word 'Pedestrian' is too close to the top of the sign and that there is too much space between the words Pedestrian and crossing. In Figure 22 the line spacing seems to be more successful.

11. Viewing distance/Sizing Graph.

The choice of typesize that the designer chooses involves many functions and aesthetic factors, visual character, architectural scale, the available area, the amount of information the designer is trying to communicate, the viewing distance and letterspacing requirements. Letter height is determined by the height of the straight capital letterforms such as the letters H or F. There have been guidelines developed for deciding upon the minimum letter heights at particular viewing distances and for the average number of characters to be accommodated within the airport sign message line. These standards should be applicable to most airports but sometimes the designer may be faced with problems whereby he should be able to modify the job and he should be able to determine what is appropriate to the given job. It is important for the designer of airport signage systems to consider whether the sign is going to be read from a moving vehicle, which in turn would indicate speed and will result in larger type size. Also, one area that I found throughout my research is that the information regarding Check-In is set in too small a type size. Figure 23. In relation to the viewing distance, I feel that the type size is far too small if one takes into account the importance of this sign.

Chapter 2.

Colour.

Another consideration that the designer has to take into account is the issue of colour. Colour schemes vary from Airport to Airport and their reasons for their specific choice differs, of course what is chosen and what is successful are two different matters.

Colour choice in different airport designs.

In a manual for colour guiding which I received from a student through e-mail from the States, suggests that the standard colour for the related roadway system should not be used to represent the Airport signing system. This is because if similar colour coding is used, people will not be able to identify the separation of roadway systems from a specific and clearly defined system for the Airport complex. Yet in contrast to this in Schiphol Airport, Holland, the new signing system is yellow, white and blue, the same colours found on the signs on Dutch roads. The intention they have in mind is to present travellers with the old system; the airport spokesman explained: *"There was a big difference between all types of media. Every medium had its own visual image. So we made one system for the whole."* This uniform approach offers *"the same colour scheme and even the same typeface from home to gate. So when you leave home, you will already have a kind of colour scheme in your head."* (O'Connor, 1997, p.2)

It is possible to compare this with the new signage system in Dublin Airport. I spoke with John Murphy chief engineer with Air Rianta and Stephen Durkan the design consultant who worked on the project. They, also like Schiphol, replaced their old signage system which was black on yellow to a colour scheme that would relate to the roadway system in Ireland. That is, the directional signs in Dublin Airport directing traffic entering and exiting the Airport, by anyone of three main routes is based on a green background with white type. Yet I feel that having spoken with Mr Murphy that this choice of colour in fact was not intentionally decided upon, for this reason. Mr


P 3
Príomhoifig
PASSENGER
TERMINAL
Páirc an
Chorrbhaile
CORBALLIS PARK
Lastas
CARGO
Slí Amach
Way OUT
Oth Cloth
DUBLIN
P 3

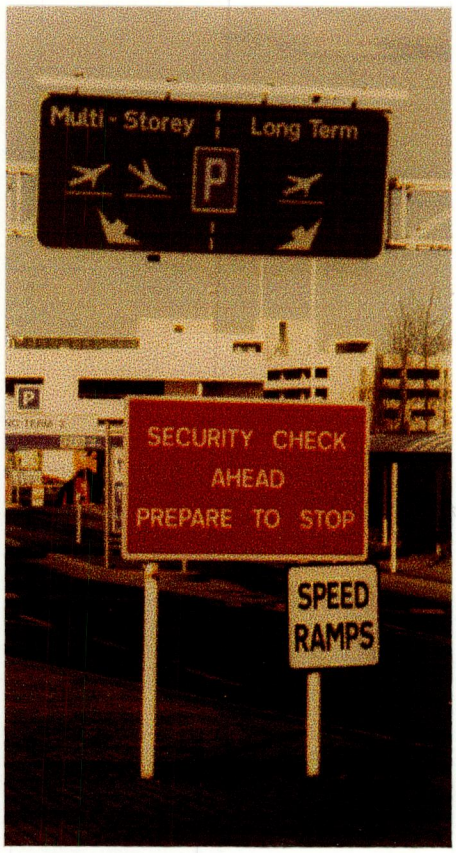

Multi - Storey
Long Term
P
SECURITY CHECK
AHEAD
PREPARE TO STOP
SPEED
RAMPS

Fig.24

Murphy commented that *"We had black and yellow signs everywhere and I suppose they were a bit gaudy...the green was more aesthetic."* Mr Murphy explained that the green was not a standard green but one that they choose between their design team. He also went on to confirm my doubt that *"green is actually the background colour used for National Primary and National Secondary routes"* and *"that neither of the above apply to Dublin Airport."* If they were in accordance with the regional routes a lot of their signs, strictly speaking, should be on a white background. He also went on to comment that *"some County Council and Department of the Environment management may have been a little upset with their choice of colour." (Murphy, John. 1998, Interview).*

In fact the reason that this colour scheme was chosen was not only to overcome the way finding system but also the multilingual problem. These colours were chosen as a colour code.

1. Green background with white writing - to carry directions for traffic entering and exiting the Airport by anyone of three main routes. Figure 24.

2. Red background with white writing - denoting Police or security notices. Figure 24.

3. Blue background with white writing - for the industrial areas. Figure 24.

4. Brown background with white writing - for tourist areas, for example the cycle trails. Figure 24.

In contrast to Dublin Airport's choice of green background, McCarran Airport, Las Vegas, has replaced its standard green with white lettering overhead roadway signs with blue, which are considered to be more effective and brighter.

Does colour coding effect the wayfinding system?

In Manchester Airport purple, pink and white are on the signs informing passengers of flight arrivals and departures, gift shops and bathroom facilities. Manchester's idea for using this new colour scheme instead of their traditional black lettering on a yellow background common in other areas of the Airport goes beyond merely displaying a new colour scheme for a new terminal, according to signs manager John Rowan. Manchester wants its signs to have "a higher impact level". For instance, priority information: necessary to get people to flights - will be in white. Secondary information: denoting toilets, news stands etc. will be in pink. *"If this is found to be successful,"* Rowan explained *"in time, we will change the existing terminal over."* (O'Connor, 1997, p.3).

Schiphol can also be compared with Manchester where in 1960 it installed a colour scheme that has since been widely imitated: yellow for primary destinations within the Airport, and green for secondary points. *"We use colour in a systematic way"*, the Airport spokesman said. *"We don't use colour to make it lively. It is combined with the other information."* For example, gate announcements will be done in black lettering on a yellow background. (O'Connor, 1997, p.3).

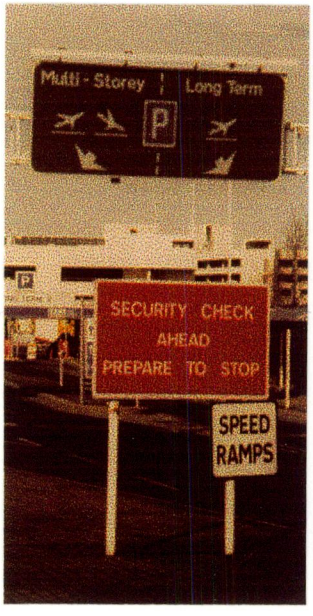
Colour and the multilingual issue.

The old signage system at Schiphol carried Dutch messages in black on yellow and English in white on yellow. *"It was difficult to read" the spokesman said. It makes it complicated when you see the different signs and different colours just for one message."* Now, signs for both languages will be in the same colour, with the Dutch message in bold face and the English translation in lighter type. (O'Connor, 1997, p.3).

If this is compared to how Dublin Airport overcomes the multilingual issue with colour in Figure 25 the background colour is the same for both languages and the type weight

Fig.25

Fig.26



Figs.27

varies as does the upper and lower case lettering. Yet there seems to be no continuity in their method of colour coding if we compare Figure 25 and Figure 26, the two methods of over coming the Irish/English design is handled completely differently. In one instance the Irish is dealt with totally in uppercase with a light weight, and in the other Figure it is a bolder type in upper and lower case.

Colour in relation to continuity.

For a successful Airport system to be credible, continuity is a major factor. I discussed the matter with Uwe Rutenberg a transportation consultant who commented on the fact that one big problem that they have come across in their work, "*is that of inconsistency*" she believes that it is the application that presents a problem, for example the background colour, letter colour, letter type and size" there is no consistency. (Rutenberg, Dec 1997, Interview).

This leads me onto the issue of continuity in colour coding. Often different consultants and design teams are over different areas of the Airport and grounds. This in turn leads to varying opinions and no continuity in the colour scheme. This is very apparent in Dublin Airport. The colour system changes greatly from when you first arrive at the Airport to when you reach your parking destination and when you enter the terminal building it changes again.

In Figure 27 it is clear to see that there is no consistency in Dublin Airport's colour scheme. This is because the signage system was done by different consultants with varying opinions at different times. It is difficult for the colour system in an Airport to be extremely successful without huge costs as new advancements are always being made which need to be signed such as roads, parking facilities, terminals etc.... Buildings that are already there, probably have out dated signs. The old colour scheme sometimes, should not, for the sake of consistency be put in the new area, terminal, roadway etc. Often what is there already may have to be worked around or sometimes a totally new design team will come in and import new colour schemes that will affect the old ones. In turn this may add to colour coding confusion.

It is also important for the designer to consider the geographic location of the Airport, in relation to what suitable colours are chosen. In full, the word is caution with colour.

Chapter 3.

Pictograms

When a designer is faced with designing signage for airports, he must try and over come the multilingual issue. His aim is to convey clear concise information to both the sophisticated and unsophisticated traveller regardless of their origin, but why are pictograms the answer or are pictograms the answer?

Why use pictograms?

I discussed this topic with many designers such as Libby Carton of Carton Le Vert of Berlin; Peter Simlinger, the designer of the pictograms in the newly designed airport in Vienna; Michael Hardt, ex-president of ICOGRAD; to name but a few. The overall reaction seems to be that "pictograms are the answer" (Carton, Libby.), but what I wanted to find out was why?

1. The number one reason for symbols being used in relation to airport signage is the capacity for the symbols to be understood by all travellers including those who do not read the vernacular. For example, Cairney and Sless (1982) showed that symbols which were effective with native born Australians, were equally effective with recent arrivals from Vietnam. (Edworthy and Adams, 1996, p.77).

2. When comparing signs of the same size, one with text and one with pictogram, the pictogram version can be recognised from a greater distance. Jacobs, et al. (1975)

underwent a test with sixteen pairs of signs of the same overall size. The symbolic version was, on average, recognised at twice the distance that is needed for recognition of the equivalent verbal sign. This would suggest that late passengers would be able to recognise their required destination faster from a symbol rather than a written sign at a given distance. Also Kleine et al. (1990) investigated the visibility of equivalent symbol and worded signs through the eyes of older viewers. The results showed that the visibility of symbol signs is better than verbal signs, not just for older viewers but for viewers of all ages. Which in turn would greatly encourage designers to use symbols in their design for airport signage. (Edworthy and Adams, 1996, p.78).

3. Symbols can be recognised faster and more accurately than the equivalent worded signs as investigated by King (1971), he used viewing times of 1/3 to1/18 seconds to assess the legibility of eighteen symbols and nine worded signs under brief viewing conditions. The result measure was the percentage of correct matches between each briefly presented symbol or word stimulus and an answer chosen from a selection of symbols and words. Overall the percentage of correct matches was greater for symbols than for word signs. It also found that for word signs the percentage of correct matches decreased as the exposure time decreased, and that for symbol signs there was no such decrease. Furthermore, 65% of the participants stated that they found the symbol signs easier to match than the word signs. (Edworthy and Adams, 1996, p.79).

John Murphy, chief engineer of Dublin airport, explained to me that a reason for an increase of symbol usage at Dublin airports new external signing system was due *"to*

their being faster to interpret than text, this could prevent accidents due to drivers not having to slow down to read the text." (Murphy, Jan 1998, Interview).

4. Another point in favour of using symbols in airport signage is that a symbol sign can cope with more degradation and still be recognisable. King (1975) in another investigation introduced delays of five to ten seconds before responding was permitted. This happened with and without an interfering task that was inserted in order to stimulate the effects of the delay usually involved between seeing a highway sign and reacting. The methodology was more or less the same as for his earlier investigation. In the interference conditions there were more errors for worded signs than for symbol signs, thus suggesting that symbol signs are more resistant to interference than worded signs. Ells and Dewar (1979) investigated signs both worded and symbol signs in degraded conditions by having a glare source in the visual field. Under these conditions the verbal signs suffered more than did the symbol signs. (Edworthy and Adams, 1996, p.79).

5. A symbol used in conjunction with text may be more effective than text just used alone. Investigations have proved that a symbol used with a worded warning can provide greater compliance than either used alone.

In contrast to this, Simlinger explains that in the airport in Vienna, words are only used as needed, *"not as a principle"*. For example the airport uses a recognised symbol for departures, but since there is no equivalent for 'international', words are added. (O'Connor, 1997, p.3).

Jaynes and Boles (1990) carried out an investigation asking participants to perform a chemistry laboratory task by using instructions containing warnings that were verbal only, pictograph only or a combination of both. A control condition involved no warning. The verbal warning was 'WARNING, WEAR GOGGLES, MASK AND GLOVES WHILE PERFORMING THE TASK TO AVOID IRRITATING FUMES AND POSSIBLE IRRITATION OF SKIN.' The pictograph conditions involved depicted of all three pieces of equipment. The safety equipment described or depicted was available next to the materials required for the task to be performed. Results showed greater compliance when a pictograph was presented together with the verbal warning (81% compliance), but pictographs alone produced less compliance (34.5%) than the verbal warning alone (63%). (Edworth and Adams, 1996, p.80). I also found that the above result was similar to the result of my survey in Dublin Airport regarding greater compliance when there was a pictograph - worded sign. The results were: combination 71%; pictogram alone 13%; words alone 16%.

Problems associated with using pictograms.

Pictograms may seem like the obvious solution to the designer's problem, but they too carry difficulties with them, namely:

1. A simple depiction of a relevant object does not necessarily ensure clear communication, the designer must take into account the context in which the symbol will appear. Take for example a symbol for lifts showing two people standing in a box. This symbol, when used on a sign board with an arrow pointing somewhere, is often

taken as a symbol for toilets. This may seem like not a very important confusion but, if there is a confusion about an exit symbol, this is more serious. Lerner and Collins (1983) investigated eighteen alternative 'Exit' symbols mixed with 108 building-related foil symbols that included some 'No Exit' signs. The symbols were seen for four seconds in conditions that simulated the degradation that would be produced by smoke. Participants had to identify which of the symbols gave exit information. The study found that some of the 'No Exit' foil symbols were interpreted as being exit symbols up to twenty per cent of the time. Thus it would be important to choose clearly distinct 'Exit' and 'No Exit' symbols for use in a given context. In large buildings such as airports, a confusion of this sort in an event of a fire would be disastrous. (Edworth and Adams, 1996, p.83).

2. Sometimes designers may try to design a single symbol to signify something far too complex without appropriate learning. An example is 'In case of fire do not use elevator', which has proved to be a difficult symbol to successfully design. Modley (1966) who, along with Dreyfuss (1972), has done much to bring the need for carefully-designed symbols to our attention, has suggested that our present world needs a set of internationally acceptable symbols that can form a system of universally understood visual signs. (Edworth and Adams, 1996, p.83).

Standardising Pictograms.

A spokesperson for Schiphol airport in Holland commented recently on an airport web site that *"The problem with pictograms is that they are not always standardised*

internationally. You have to learn them, as you have to learn any other language. We tried to find pictograms that had a visual meaning in themselves, so that you could guess more or less what the meaning was."

Schiphol, uses about 100 pictogram symbols to back up its written messages for the benefit of travellers who do not know either Dutch or English. Schiphol not only uses the standard internationally approved symbols, which are not mandatory, but also use those that have been endorsed by the International Air Transport Association for use at airports. These two set of symbols differ from each other and are not mandatory. Schiphol also reserves the right to make changes for the sake of clarity if they are faced with any design problems.

I discussed the issues of the standardisation of pictograms with Peter Simlinger, a Vienna-based designer who worked on the signage in the airport in Vienna. Simlinger believes that it would be possible to standardise a maximum of 160-200 public information symbols. Most of these would be accessible only to people who live in a technical world, a category Simlinger believes is getting bigger all the time. *"More and more symbols that relate to technical features can be standardised because they are reduced pictures of what you really experience in everyday life".* Some symbols are recognised for their universality, for example, the symbol for an airport or an escalator. Simlinger says that those pictures are used so often that it would be *"stupid to go on developing alternatives and testing them."* Other symbols work because of their ingenuity. Simlinger cites the pictogram symbol for a lost and found office: an umbrella frequently lost, a tag and question mark in case there may be confusion over

it being an umbrella shop. Simlinger comments on the difficulty of coming up with a single accepted symbol for 'animal' or 'rescue equipment', for example. He believes that symbols for abstract references are only understandable if they have been learned. *"The standardisation people are not to bring off such a learning process. They are only able to find out what a human being associates in its head with a given reference. If it is concrete you can depict it, render it and show it. Then it can be tested."* (Simlinger, Dec 1997, Interview).

Simlinger also points out the problem that even the most widely understood symbols may require some level of sophistication to be understood. For example, a picture of a knife and fork may say 'restaurant' to most airport travellers but it would have very little meaning in rural China.

John Murphy, chief engineer at Dublin airport believes that in relation to standardisation that there will be a standard in the future 'Europe will be one federation, one union in terms of airport signage' but that will not be the case for a number of years. (Murphy, Jan 1998, Interview).

Considerations to be made when designing pictograms for airports.

Legibility

If the designer is designing a symbol from scratch, he will have to give special thought to legibility but often symbols will be taken from already published sources that include only symbols of relatively good graphic design, such as ISO (1990) Dreyfuss (1972) and the International Air Transport Association to name a few. Sometimes the designer may alter an already designed symbol with permission by the governing authority, but, careful consideration will have to be given so that a legible successful symbol will be achieved. Modley (1966) and Dreyfuss (1972) give much useful guidance on theoretical approaches on achieving a successful symbol. It is also important for the designer to remember not to include small details, that will be lost if the symbol is small, far away or if the lights are poor. One way to help the designer to overcome the legibility issue is to design the symbol on a 20 by 20 grid and for the designer not to make any detail smaller than one square unit. (Edworth and Adams, 1996, p.94).

Recent works by Kline and Fuch (1993) resulted in their belief that there is a more scientific way of ensuring the greatest possible legibility distance. They believe that reducing the spatial frequencies involved mean that pictograms can be more visible. They were able to increase legibility simply by removing high frequency spatial changes in detail. To simplify, the method involves making the size of the figure and background details within the symbol as equal as possible. . (Edworth and Adams, 1996, p.95).

If the designer is including text either within the pictogram sign or even in the surrounding text, the designer must consider type size, text and background colours, typeface, leading, white space and detail regarding layout, as these issues will greatly contribute to the success or failure of the symbol or symbols being legible. It is advisable for the designer to consider the symbols being tested.

Conspicuity

Another issue the designer must consider is conspicuity. As I discussed earlier using symbols in conjunction with associated wording, indicates that one way in which the symbol-plus-words combination produces it's enhanced result is through the attention getting effect of the symbol. Therefore an important property of a symbol is its conspicuity.

Conspicuity can apply in two situations, as pointed out by Cole and Hughes (1990). One is where the observer is not expecting anything in particular and the second, the point which I am more concerned with, is search conspicuity. Search conspicuity is measured under conditions where the subject knows what he or she is looking for and has to report if it is present. A test was done by Boersema et al. (1989) where eye movements were used. The study was to prove that nearby advertisements can distract attention from a symbol sign. This would greatly concern the designer with regard to designing for Airports as there are many distractions for the traveller. The study that was carried out used slides of railway station scenes that included a routing sign, the advertisements that were visible near the routing sign was artificially manipulated. An eye movement camera enabled a continuous record of when and where participants directed their gaze. The people involved in the investigation were told before each slide what routing sign to look for. The result was that it took longer to find the routing sign when there were more distracting advertisements. . (Edworth and Adams, 1996, p.96).

Discriminability

Having discussed both the conspicuity and legibility considerations I would like to discuss another consideration. This is that a symbol may stand out, but, because the observer may have in his head two or more symbols that look similar and appear in the same context, it will take longer, or he/she will have to come closer in order to be sure that the correct symbol has been identified. Therefore the designer must remember to

design a symbol which is highly identifiable and that stands out clearly from all other alternatives in order to ensure fluidity through out the Airport.

There is a chance when the designer is inventing or availing of pictograms in his signage scheme, that he may fall under the false notion that his problems are solved by the addition of this new dimension, which he believes will amazingly improve compliance when this is actually not the case. He must remember that the context of use and the needs to be considered in determining the effectiveness of the symbol-in-context.

Chapter 4.

The future and Airport Signage.

Technological advancements and their implications.

A current problem which is facing the designer regarding airport signage is the future and its implications. Designers today are faced with the problem of keeping up to date with technological advancements, such as computer generated graphics, highly sophisticated software, new hardware and the Internet. These are all ingredients, for the recipe, for modern airport way finding systems. In other words, designers need to deal with signs that deliver up-to-date information in rapidly changing environments. For example, since airports today are equipped with constantly changing weather forecasts which effect traffic control, information to passengers needs to be continually updated. Other relevant messages such as flight information must also be delivered as required and altered.

Wayfinding seems to be a more apt word rather than signage when discussing orientation in Airports. It would seem that the idea of a sign is going out the window. The old fashioned sign would seem to be converting into a multimedia object and airports are panicking to adapt this new technology to their particular needs. Today's society is everyday becoming more and more familiar with technology and computers. What would have baffled the average 35 year old ten years ago would be simple as pie today. This is all due to the gross usage in homes and offices of PC's etc. and as a result variable message signs using LED technology (light emitting diode) which works in a windows menu driven environment is on the increase.

Since airports have become much busier over recent years, some gate and ticket counter facilities are used by more than one carrier on a shared basis, rather than leaving certain facilities sitting idle. Using electronic variable message signs means the gate can be changed instantly for other airline flights. All this information can be programmed hours in advance and the changes can therefore take place automatically because a clock can be tied into the system and trigger the messages. If anything changes in the agenda the system can be manually adjusted. Over the past few years more colours have been allowed and this has enhanced the brightness of the signs.

In America, the Americans with Disabilities Act (ADA) has had a huge impact regarding updating old signage systems. One result is the introduction of the visual paging system for those with hearing impairment, which works similar to a teleprompter to display, in order, the announcements that are being broadcasted through the public address system. Kansas City International have been one of the first to employ this visual paging system and the signs have been installed in every hold room and baggage claim area (Worley, 1995, p.47).

Kansas City International replaced its twenty-five year old audio public address system with the visual paging system as part of an integrated communications package. The computer pieces together pre-recorded audio and visual boarding announcements to assemble a message and then automatically plays it. When the system is not displaying flight information it is programmed to display public service announcements, regarding smoking or parking or to greet conventions that are gathering nearby. As yet they do

not use it as an advertising mechanism but, purely for airport information only. The American with Disability Act has made designers really think, as the law requires every sign in a public facility to be understood by the visually impaired.

Designers and management beliefs on signing in the future.

A designer called Brian Gatzke is overcoming the multilingual barrier by designing visual paging signs that display foreign languages as well as English. His company underwent a pilot programme for the Olympic Games in Atlanta and believes that a lot of airports will want signs with that capability. Some airports stipulate that their display media be able to handle languages such as Chinese and Japanese which use characters rather than letters.

Gatzke expects that airports will use variable message, and computer programmable technology to provide signs that redirect traffic and show the amount of parking spaces available in car parks, and on what level they are available. LED signs can also be used to divert traffic in the event of an accident and offer alternative directions for drivers.

Dick Kuykendall, manager for 3M's Traffic Control materials division, believes that space in an airport has value and you want to use it. He means that using horizontal signs on the roads leading to the terminals compliment vertical signs. Also the floor markings inside the terminals should be used to their limit, and new types of film that enable more dramatic use of graphics in passengers areas should be used. Kuykendall believed that all this technology is not a problem for the designer as these technologies are starting to win acceptance within the airport community.

Adam Mayberry, Public Information Co-ordinator at Las Vegas McCurran International, had to last year overcome the problem of directing passengers from the new parking building which significantly changed the way finding system being used regarding entering and existing the airport. Mayberry overcame this obstacle by solving the potential problem of lost travellers by using 3M lane markings that relied on blue, yellow, red and green triangles that were affixed to the roadway to direct visitors. It's only through driving and walking around the airport himself that he discovered 'new signs' that were needed for better traffic fluidity. This was the same thinking that Libby Carton talked about in her interview with me when she discussed 'putting yourself into the position' to help overcome any problem regarding airport wayfinding (Carton, Dec 1997, Interview).

Mayberry also changed the standard green background with white lettering in overhead signs to blue background as he considered that colour better to overcome the problem of the signs neither being reflective or bright enough. Las Vegas is one of the first US airports to use this colour scheme. Inside the airport, casinos and hotels take advantage of the electronic advertising signs. To overcome the multilingual problem of visiting international travellers, the addition of international symbols have become mandatory on all signs. Mayberry admits that signs are a never ending project and just when one thinks everything is perfect there is a weakness in certain areas that has to be resolved.

Fiber optic signs and signals seem to be the modern way to deal with all lighting conditions and they overcame the problem at a high cost. Lou Trovato of C.J. Hood & Co. of Stamford, Conneticut notes that fiber optic technology produces brilliant, readable messages under any lighting conditions and uses very low power. Fiber optic signs also overcome the problem of varying weather conditions, for example, in 1989 when Hurricane Hugo swept through Charlotte, North Carolina. The Hood signs withstood the test and were fully able to operate when power was restored to the area. These signs are also in use in airports such as Tampa International and San Diego International.

Robert Norvell, President of Dayton, Ohio based Com-Net Software specialists, suggests that while signage traditionally was a vertical product, it is now becoming a subset of the total airport system which includes gate management, departure control, FAA operations and even accounting. Flight information display systems take advantage of computer programmes and technology and allow the integration of various sources of airport data, in contrast with the old-fashioned sign. Not only does an FID display public information via a sign, it also allows information collected at the gate such as type of aircraft used for the flight and number of passengers to be transferred to accounts. FID's also form a unified database that feeds many related airport functions without duplicative collecting and transmittal activity.

Public interest in the NET will also spill over into airport signage. Airports with large LED signs that are suitable for advertising usage could link into Internet web pages and display their contents. Several airports in the US are installing information centre

booths that incorporate the sponsorship of a stock brokerage firm. The broker adds an electronic stock ticker tape that encircles the booth which both attracts public interest to the booth and also covers some of the airport's maintenance costs.

To overcome the problem of traffic jamming up at drop off points, electronic signs that display information at the pickup and drop off points will let the traveller know what is happening inside the terminal regarding flight times, etc., and if a flight is late the driver can go ahead and park and so prevent the traffic from jamming up. The designer must remember that signage is more than just information and should integrate the signs with the style of the building and identify the airport with its birthright. This is seen in Columbia Metropolitan Airport where the airport identifies itself with its southern history. This resulted in a picturesque blend of cityscape street lights with fabric wayfinding banners to highlight the terminal's 'town square' theme along with LED identifiers in the baggage claim areas.

To look further into the future regarding signage, the future indicates that full motion video and high definition TV will be in greater use which will add to the designer's problems and add a new dimension to signs. Their systems may be used as predicted by manufacturers to promote destinations with a holiday appeal. Liquid crystal display technology is growing in use in Europe and the US are taking a look at greater use of LCD technology which already has a highly readable format. Airports are also buying signs that have maximum flexibility for international operations with specs now being issued for signs that can handle up to five languages.

A new method of wayfinding in the US that came about through a minor automobile accident is the Pole Max. This is a durable padded material placed on and secured to outdoor and indoor safety poles. This product is also a wayfinder and an advertiser. At the moment it is being used in St. Maartens Airport, which will receive 20% of the gross advertisement revenues from the signs.

Conclusion

Based on the evidence from the body of my thesis it is clear that my aim was not to resolve a specific issue. It was, in fact, to tease out the major issues which have to be considered by today's designer in relation to designing a successful airport wayfinding system.

I wanted to investigate the problems that present themselves to the designer due to the varying audience arriving and departing at airports. In order to cover the major considerations, I had to confront myself with the question of why an airport wayfinding system is a success or a failure. I answered this by researching different airports, visiting and analysing them. I also carried out many interviews with designers and engineers, and spent a lot of time in Dublin Airport taking photographs and analysing them. I researched design theory books, airport magazines and searched the Internet for relevant information. I also undertook my own survey which involved over 200 people over the duration of two days.

Having discovered the more obvious issues that the designer is faced with, such as what information should be communicated, what guidelines should be used, what decisions should be considered regarding type and typestyle. I then wanted to research the different uses and alternatives that colour offers to the designer. For example, how colour can effect the wayfinding system, the multilingual issue and the issue of continuity. The next issue I investigated was pictograms, and the considerations and questions that they held such as, why should the designer use pictograms, what

problems are associated with using pictograms, the standardisation of pictograms and exactly what considerations the designer should make when designing pictograms for an airport. The final area that I investigated was, how technological advancements and the future in airport signage are effecting the decisions that the designer makes.

This is not a thesis full of answers but rather the purpose is to provide a specific set of issues that face the designer today. It is a personal interpretation of which designer's belief you hold greater trust with. Maybe like Peter Simlinger you believe that there should be one standard set of pictograms or on the other hand does Libby Carton have a valid point, of each airport keeping its own identity. It was not my aim to resolve all the considerations I have mentioned, but, instead to make one aware of the difficulties involved with designing for airport signage. I do have strong thoughts on many of the issues that I discussed and have throughout my thesis contributed some of these such as the guidelines for a uniform national programme. I also found Peter Simlinger's ideas on pictograms very valid.

I also believe, that in order to overcome a lot of problems associated with wayfinding within airports, if there was more continuity and consistency a lot of obstacles would be overcome. I believe that a good colour coding system is a major issue that the designer should consider in order to conquer this problem. I feel that Dublin Airport lacks a successful colour coding system. I believe that it is an issue that should be reviewed in order for the fluidity within the airport to increase.

I believe that it is possible to have a standard, mandatory set of international symbols. Maybe the problem is that there has not been a set designed, that deserves this title. I also believe that Libby Carton has a valid point about individual airports keeping their own identity, but having a standard set of symbols need not be a regimental factor in the overall design. As I mentioned earlier with Columbia Metropolitan Airport, they have subtly kept their southern identity, by combining special lighting with fabric wayfinding banners, to echo their identity. I believe that standardisation can be combined with individuality.

In conclusion, having widely investigated the many issues involved in designing a successful wayfinding system, I have arrived at one certainty, I believe that the day will never come when the designer is not faced with solving a visual issue. Afterall, the job of the designer today, and in the future, is that of a visual problem solver.

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