Special Replacement Blind Service

This piece investigates what I believe has gone wrong with London's bus blinds in recent years and seeks to explain the solutions I put forward when asked by Leon Daniels, TfL Managing Director Surface Transport. Being flattered to then be given the task of designing the more legible displays now appearing on some buses, this article covers some of the thinking.

At the outset Leon asked me to ensure that all displays were clear, unambiguous and aesthetically pleasing — and aesthetics play an important role in legibility. Typography is a huge subject and therefore one that can only be skirted over in this format; I hope however there is sufficient here to make clear the importance of the usability of destination displays and indeed all forms of information provision.

Context is everything in design and all the illustrations on these pages are hopelessly out of context, as are any comparative tests done by parking two buses side-by-side and photographing them from any distance. There are so many variables to consider, some of which are: lighting, weather conditions, vertical viewing angle, horizontal viewing angle, variable viewing distance — and I doubt anyone has typical eyesight anyway, whatever that might mean.

Location, location, location is the immutable maxim of the retail world; in the world of legibility and typography it is: spacing, spacing, spacing. All typefaces work at their best when spaced optimally, and this next point is routinely misunderstood: visually even spaces between adjacent letters is crucial, as is appropriate leading (line spacing).

My personal reason for believing most people don't understand this importance is that humans are amazingly good at reading very poor typesetting, riddled with spelling mistakes and badly spaced. This is because we recognise words by their shapes and the sequence of them making sense to us (this isn't entirely true but will do for now).

Aoccdrnig to rsecearh, it deosnt mttaer waht oredr the ltteers in a wrod are, olny taht the frist and lsat leettr be in the rghit pclae. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe.

The major flaw in this though is that it only works when the reader is familiar with the words in front of them; when we are not familiar with them, perhaps in a scientific work, or signs to places we may not know, this ability collapses. Type on signs is not the same as type on a page, though the latter provides other challenges also routinely not understood.

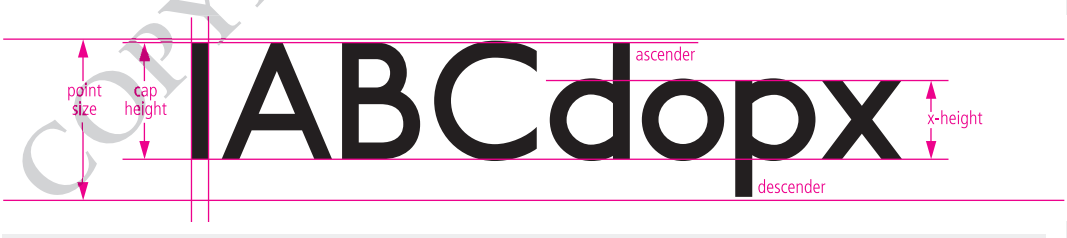
EDWARD JOHNSTON

This will be a name familiar to many people as the designer of the typeface commissioned by the Underground Group (pre London Transport) and introduced for use on posters from 1916 in what today's terminology calls 'medium'.

A bold followed in 1929, but by current thinking this would more appropriately be called 'extra bold' and as such for its intended purpose, only existed in capitals, numerals and punctuation.

He was asked to design a condensed variant for use on buses and the root (no pun intended) of many of today's problems with this were manifest even then. The need for a condensed only existed because the display areas were insufficiently wide.

Johnston's 'medium' characters were founded on the proportions of classical Roman capitals and are deceptively not as simple as they may look. He calculated that the proportion of 7:1 for the basic letter stroke was ideal and, based on this, calculated the optimal diameter of a perfectly circular lower case 'o' to dictate the 'x-height'.



Demonstration of Johnston's application of 7:1 ratio in the capital 'I' and descriptions of some aspects of type measurement. (For interest only, it can be seen that the 'point size' is actually slightly greater than the overall height of the characters and this is true of all typefaces.)

I sometimes amuse myself (and bemuse others) by referring to 'Johnston's Racing Line'. If one watches racing drivers whiz round the track, to keep their speed up they must take the shortest line around curves but at the highest speed — so it is not actually the shortest line, but is the one requiring the least effort and least slowing down. Edward Johnston's letterforms achieve this feat by making the readers' eye/brain combination process each one as quickly and effortlessly as possible. Not only are his letterforms highly uniform collectively, they are paradoxically all highly individual visually. There really are no two characters that can be remotely confused with each other.

III Gill Sans
III Helvetica
III Univers
III Johnston

People sometimes muse at the Johnston 'hockey stick' lower case 'l' but it was designed that way to ensure sufficient letter spacing followed it. In only one of these four sans serif typefaces is it obvious what the word is.

Edward Johnston's work is rightly well respected but I fear often today because of that dreadful word 'heritage'. His types should be revered because of how wonderfully well they fitted the brief and not because he did it a hundred years ago, with resulting age-related 'icon' status now attributed that is I feel disrespectful to their true worth. Current bus blinds still use variants of Johnston.

SO WHY HAS IT ALL GONE WRONG?

I always work to the principle of the four 'Ds': Discover, Define, Design, Deliver. Many design projects start with the enthusiasm of Design, but without having done the analysis (Discover) and establishing the perceived problem (Define) in the first place. Design approaches such as this are fortunate to succeed.

When I was asked to advise a way forward on replacing London's blind displays I have to confess to already having been doing the 'Discover' for 50 years, having had a long-term interest in the subject going back to the trolleybus replacement programme. However, the aspect that I did need to investigate was: what was the cause of the degradation that has happened in recent years.

Well to be blunt I believe the problem stems from two quite independent sources. You'll have to wait a bit longer to find out the second one, but the first is the Disability Discrimination Act (DDA), or more specifically from it, the guidelines on route number and destination displays for buses, where in extracts relevant to us it states:

- Characters of not less than 125mm in height when fitted to the front of a vehicle and not less than 70mm in height when fitted to the side of a vehicle [they mean the cap height but don't say so];

- Lower case lettering in Helvetica, Arial and other sans serif fonts are easiest to read;

- It is important that ascenders and descenders are not squashed since this will make shape recognition more difficult.

The first point has led to the slavish adherence to height whereas width is not even mentioned. I repeat: spacing, spacing, spacing. Point three warns against squashing descenders. This squashing refers to height, however, no mention is made of the huge degradation in legibility caused by squashing width — and this does far more damage as it affects all letters and not just those with descenders. (This particular recommendation probably refers to dot matrix indicators, thankfully not countenanced in London, that often suffer from just that.)

The two suggested sans serif typefaces are in my view appalling for legibility (see: www.dougrose.co.uk/index_helvetica.htm)

The current displays were indeed not squashing the letterforms vertically. However, when a name didn't fit, the inter letter spacing was being reduced, sometimes dramatically so. When this didn't solve the problem the letterforms were then squashed and so compounding the problem. My local 263 bus route looks like it goes to 'Highbury Bam'. The DDA guidelines were being entirely met and thus demonstrating their well meaning shortcomings. So that was 'Define' done now too.

Highbury Barn
Highbury Barn
Highbury Barn

From top to bottom: Medium correctly space; Medium with reduced letter spacing and squashing; Condensed designed for the purpose. The juxtaposition of 'rn' needs especial care to not look like an 'm' — and even more so with this being in a sans serif face.

Condensed or Squashed
Condensed or Squashed
Condensed or Squashed
Condensed or Squashed

There may be some misunderstanding in certain quarters as to what is meant by 'squashed' as opposed to 'condensed'; they are most definitely not the same thing. In the above examples, from top to bottom are: Medium type correctly letter spaced; Medium type with reduced letter spacing; Medium type with reduced letter spacing and letters also squashed (compressed) width; Condensed type correctly spaced.

A well-designed Condensed typeface retains the correct stroke thickness proportions of Medium but the shapes of the letters change and become narrower. When a typeface is squashed, the horizontal strokes retain their thickness but only the vertical ones become narrower. This is bad for legibility with any typeface, albeit more obvious to the untrained eye with sans serif.

In the extreme examples of a capital 'T' to the right, from top to bottom are: Medium; Medium 50% squashed; Condensed. It can be seen that the squashed letter has a vertical stroke half the thickness of the horizontal cross bar, whereas the properly designed Condensed retains the balanced proportions.

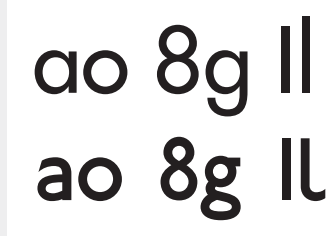
The design of every letterform includes the space before and after it and is not there to be compromised optionally. This is seldom appreciated nowadays as everyone uses a Mac or PC, albeit few with typographic understanding. McKenna's (www.mckennabrothers.co.uk) and their superbly printed blinds were being backed into a corner. I now need to move back in time.

THE START OF 'DESIGN'

In 2009 I visited the Victoria & Albert Museum (well before this present TfL commission) to look at and understand some of Edward Johnston's design sketches that reside there. I was designing a slightly condensed Johnston variant at that time to use on navigation buttons on my website and will refer to this now simply as 'Condensed'.

The successful design of a typeface is the ultimate graphic design contradiction. Each of the individual characters must conform to an overall 'family feel', with each having visually similar stroke thicknesses and general proportions, whilst, paradoxically, each must be instantly recognisably different. Edward Johnston was not a type designer but understood this paradox and this is why every character in his typefaces is so much more successful than in any other sans serif face you may wish to consider in this application.

Comparison of two sans serif typefaces: Futura, designed in 1927 on the top line and Johnston from 1916 below. The similarity of these three pairs of characters are clearly unambiguous in Johnston.



Knowing I had already designed a Condensed variant that adhered as faithfully as possible to Edward Johnston's sound principles, and that I had already started designing further variants, born out of all this came the discussion with Leon and (now Sir) Peter Hendy. In my experience these are two very untypical high-ranking officers who have a sensitivity to typography and the vital role the humble bus blind plays in being the entry point to the system and the starting point of every bus journey in London — all six-and-a-half million a day. (The rest of the UK bus industry should take note of the importance of this.)

I expect some of you are wondering why there was a need to squash Johnston Medium when a condensed was available. Well I believe the answer is that the often so-called 'bus blind condensed' was too condensed for many names.

By 1939, and based on Edward Johnston's bus blind condensed, Harry Carter had designed a more suitable version (a reference from the excellent 'Johnston's Underground Type' by Justin Howes). Even this variant was struggling because it could be unnecessarily too condensed and there was nothing between it and Medium available. Herein lies the second problem alluded to earlier.

It is my professional view that McKenna Brothers of Manchester produce very high-quality printed blinds. However, with the present DDA Guidelines they could only opt for one of three solutions and respect correct letter spacing:

- move away from Johnston (not permitted by LT and now TfL);
- use a wider blind box (not available);
- use a smaller typesize (not permitted by DDA).

This left McKenna's up a blind alley so as to speak. What was needed was a range of Johnston types of varying widths.

DESIGN PROGRESS

So as to create a usable range of Johnston types I had inspected some destination boards from the pre-blind era, and also blinds produced by London Transport themselves from the early post Second World War days. These had hand-cut characters and so there was no standard shape for any; each was truly unique. It quickly became clear that standardization was needed and instead of one 'bus blind condensed' two were needed, in addition to my own Condensed. I have ended up calling these Extra Condensed and Ultra Condensed.

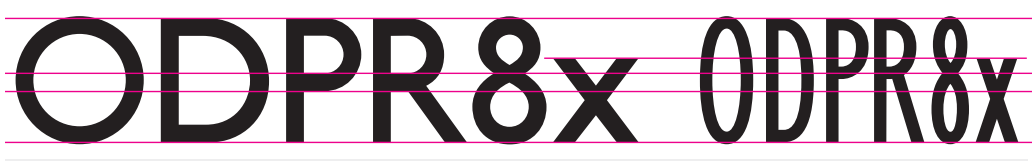
From top to bottom are: Johnston DR Medium, DR Condensed, DR Extra Condensed and DR Ultra Condensed. Note that the space saving of the three condensed variants is different according to the letters occurring in each word.

The effectiveness of Johnston's original designs are in my view unassailable and the only option was to retain his principles but alter the proportions of each character, but maintain those magnificent principles and their ability to be spaced correctly.

Once the skill has been mastered, we don't think about reading — we just do it. When Johnston designed his highly condensed letterforms he was at pains to retain another crucial aspect. This is not easy to explain in words but one of the features of legible type is that each individual character must be as quickly recogniseable as possible.

I refer back to his perfectly circular 'O', both capital and lower case. He strived, and succeeded in making the 'bowls' (sometimes also called 'counters') of his capital 'D', 'P', 'R', lower case 'b' and so on, as uniform and round as possible.

In order to achieve this with a highly condensed typeface, something has to give. Retaining such uniform-looking circles can only work if the proportions top to bottom are changed, and this is because the stroke thickness has to become less. There is a lot more to this than may be thought.



Comparison of Medium and Ultra Condensed, where it can be seen that the x-height is the same. However, in the Ultra Condensed, the optimal uniformity of the 'bowl' of the 'P' and 'R' are still as round as practical and therefore need to be higher up. Note also that in all width variants the figure '8' is not two circles parked one above the other. The eye follows the shape more easily where the top and bottom halves cross as the whole character is formed of sweeping curves with no abrupt changes of direction. Medium is to the ratio of 7:1 whereas Ultra Condensed is 10:1, though still giving the appearance of a medium typeface and not 'light' as might be expected.

Having done this and I hope made it suit the job, I have to say that I don't much like my Condensed as it lacks the purity and elegance of the original — but all design has to embrace compromise and the need dictated the outcome. To my eyes the Extra and Ultra Condensed types are so far removed from Medium they are OK; it is the slight condensing I find inelegant.

DELIVER

One of the other drivers behind this project was to have a library of all destinations in London available to McKenna's whenever any individual display was needed for any garage. Their existing production methodology precluded this.

At the time of writing about 1350 front destinations have been produced and available now 'on tap'. This represents all those needed when the project commenced but is being added to, bit-by-bit, as new destinations occur.

The design of bus fronts is such that the destination has its own blind box, so, for example. 'Aldwych' only needs creating once, even though over 25 bus routes need it on their blinds. The side blind boxes however have the route number combined with the destination and so over 25 different versions of Aldwych are required.

I don't yet know what the total number of individual displays will be but there are about 700 bus routes, averaging about nine turning points per route (one night route has seventeen).

Production is now in full swing with a range of condensed typefaces more suited to the job. About 4500 displays have been delivered to McKenna Brothers with more feeding through every week. The majority of London's buses still have the old displays (so don't complain to me about those as some people have – they are not mine) but the balance is changing gradually.

THE FUTURE?

Having a suitable range of condensed variants is I sincerely hope a step forward in helping people with good or compromised eyesight. Of course what is really needed are blind boxes fit for purpose — the right size for the job of displaying the content clearly, and at an appropriate size — rather than making the type fit the space available. Few people buy a picture frame and then try to find a picture that will fit it.

The habit of just repeating what was done last time means we still have route number boxes little bigger than those on Edwardian motor buses. This 'B-Type' now preserved at the London Transport Museum shows the space devoted to the destination, via points and route number. This vehicle type was introduced in 1910.

Three-figure route numbers are in the vast majority but as illustrated in the '149' examples below, none can be displayed even on the much vaunted 'LT' type unless condensed type is used. There are separate 'smart blind' boxes for destination and route number and at present their construction causes them to be quite far apart.

The restrictiveness of the display area and inefficient use of what's available may be possible to overcome with a design process that is more focused on function. This process may also tackle the substantial issue of reflectivity of the curved glass, a problem made worse in bus design in recent years.

I have also been involved in electronic bus blind displays being trialled from Cricklewood bus garage and have of course used my interpretations of Johnston. These screens use the same technology as a Kindle, designed for a quite different purpose. As such, unfortunately the screens are not big enough and contrast is poor for bus blinds, though superb for a hand-held reading device (not that I endorse this method of reading).

The largest screens presently available are 32-inch (the diagonal, as in the method of measuring televisions) and three of landscape format have been fitted, side-by-side. A further present drawback is the vertical joins, making the destination layout split in two. Some are very difficult to design as such.

The triple screen arrangement can be seen in these photographs. The creation of the destination content is made more difficult by the vertical joins.

The built-in side blind box has been taken out of use and an 'e-ink' Kindle technology screen fitted inside the front lower deck window. The aspect ratio of this 32-inch screen allows a larger route number and, I believe, more elegant layout overall. Though this is a better size screen height-wise, it is still not wide enough for many destinations and is only the size and format it is because that is what is already manufactured. It has not been designed for the purpose, which is fair enough at the very outset of a new design development, but not in the long term.

There are other short-comings (not the least of which is cost) but they will be overcome with the passage of time I am sure and the advantages will be very worthwhile. Every bus in London could have every destination in London loaded and available for use on any route at any time. It will be possible (it already is on the trials) for updates to be transmitted to every bus from a central location using mobile telephone technology. No vehicle would need to be visited to fit or replace anything when routes change or are allocated to a new garage.

Via points are no longer displayed on the front of London buses; the disadvantage of them being that for about half the journey of each bus, the single via point shown in recent years was potentially misleading as the bus had already gone past it. With electronic displays, several via points could be shown and update as the bus progresses, only showing what is still to come, as in my realization above.

One of the fundamental resistances up to now in moving away from printed blinds is that the definition of dot matrix is hopeless and television type screens have not been sufficiently high definition. Even current 'HD' screens are not as sharp as printed blinds and there are issues with moisture and vibration on a bus they are simply not designed to cope with. The Kindle 'e-ink' screens have high enough resolution to remove any doubts in respect of resolution though, at the time of my latest information, longevity of being subjected to continuous vibration in service is an unknown factor.

With TfL's involvement in the research programme EBSF2 (European Bus Systems of the Future 2) perhaps the bus industry ought to lead the way and specify display areas fit for purpose as part of bus design, rather than utilizing blind boxes and existing technologies that happen to be available from suppliers who may have little involvement in reading the contents in the street, day-in day-out, all six-and-a-half million times.

EXAMPLES

It is easy to interpret history through the eyes of the present, but it must be understood that lettering for posters and signs 100 years' ago would have been hand spaced. Johnston designed his types knowing this. Even with his superb letterforms, an unskilled typesetter could make it look awful.

The inevitable restrictions that came with metal and wood type stifled this flexibility (we will put to one side for now 'hair spaces', 'thin spaces' and so on). Paradoxically, computers now allow the equivalent of hand spacing again but almost no-one thinks about this, nor makes use of it, and just types things straight off the keyboard. I don't.

Creating a computer typeface (routinely now called 'fonts') is a time-consuming business. Having drawn every individual character — 26 capitals, 26 lower case letters, ten numerals and at least 30 punctuation marks — they then have to be specified as to how much standard space is optimum either side when assembled to be typed from a keyboard.

You may wish to consider the time (and pain) of then mathematically specifying the letter space for every pair of combinations: AA AB AC AD… Aa Ab Ac Ad… aa ab ac ad… and so on. There are tens of thousands. That's what you have to do when creating a computer typeface and many proprietary ones are done poorly because frankly there's no money in it.

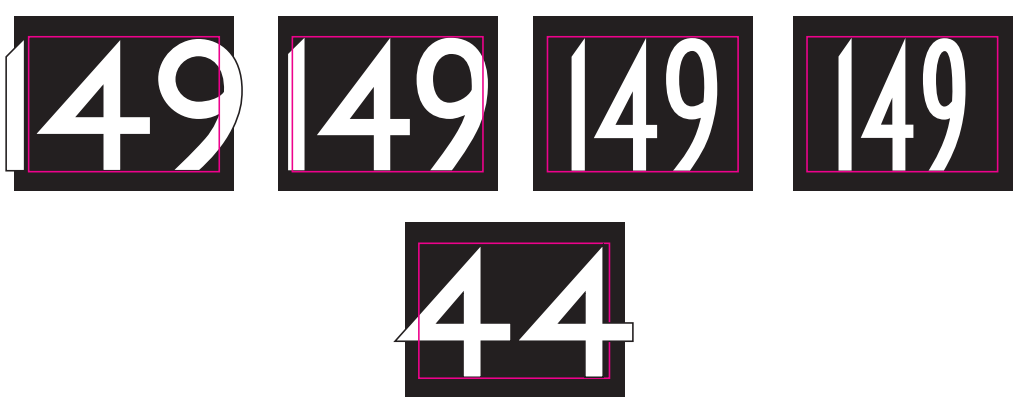
I have just said 'they then have to be specified as to how much standard space is optimum either side'. Deciding on the optimum space either side of every character will be fine if done carefully, but there will always be letter pairs that are so different when juxtaposed that they need their standard spacing customized, sometimes wider than standard and sometimes narrower. The objective is that the space between ***every*** letter pair ***looks*** the same.

I had trouble with the standard word space. Consider a full stop, then a word space, then a capital letter, as in 'St. Paul'; now consider a word space between any two letters in a sentence where 'A W' is very different from 'R A'. Are you getting a feel for this? It's all a compromise and, when setting destination names (signs) I am often overriding my standard spaces and, yes, hand spacing them. In the example here of 'St. Paul', the word space after the full stop is too wide, but that's down to the laziness of the person who created the spacing matrices for this typeface. (It's called Sabon and is otherwise rather fine for reading from a computer screen and somewhat unusually also when printed on paper, which is why I used it.)

All letters are different in shape but the spacing must look visually even for ease of reading and reduction in reading errors. This cannot be done using maths. There is a lot more to all this than meets the eye (no pun intended). It took hundreds of hours on my four types and I still find myself adjusting the spacing matrices when using them. One get past the point where nothing looks right and then reach: everything looks wrong!

The examples below provide a few examples of the processes and outcomes involved in making the displays as clear as possible. As noted above, there are many variables and the backlighting of the blind boxes also has a notable effect. The same display in daylight can look quite different from a brightly lit one at night. It may also not be appreciated but the bus itself and its surroundings can have a distracting effect. The viewer has a lot to contend with and, also as noted above, these examples may illustrate some particular points, but are all hopelessly out of context. Some imagination will be need.

Front and Rear Route Numbers:
In the following examples, the black boxes represent the actual blind area though the red frames show the maximum visual area within which the number must fit.

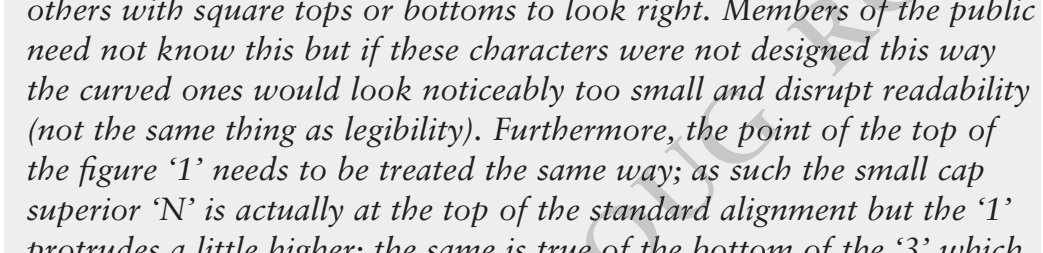


It can be seen that Medium and Condensed don't fit for the '149', which is not a particularly difficult number; most 2-digit numbers fit though '44' will not. The truth is that very few of London's route numbers can be displayed to their full effectiveness.

A device introduced has been 'superior' 'small caps'. A small cap is approximately the same height as a lower case 'x' but crucially has the same visual stroke thickness as the lower case. Simply reducing the point size results in thinner characters. The purpose of this device is that being both smaller and top aligned, it arrests and concentrates reader attention and highlights it is different. The existing 4-character 'N205' is difficult to read unless close up.

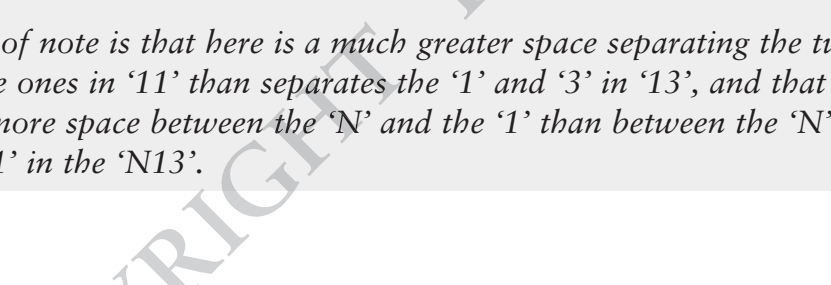
Readers with an understanding of typography will know that characters with curved tops or bottoms need slightly greater height relative to others with square tops or bottoms to look right. Members of the public need not know this but if these characters were not designed this way the curved ones would look noticeably too small and disrupt readability (not the same thing as legibility). Furthermore, the point of the top of the figure '1' needs to be treated the same way; as such the small cap superior 'N' is actually at the top of the standard alignment but the '1' protrudes a little higher; the same is true of the bottom of the '3' which has its lowest extremity just below the baseline.

Also of note is that here is a much greater space separating the two figure ones in '11' than separates the '1' and '3' in '13', and that N11 has more space between the 'N' and the '1' than between the 'N' and the '1' in the 'N13'.

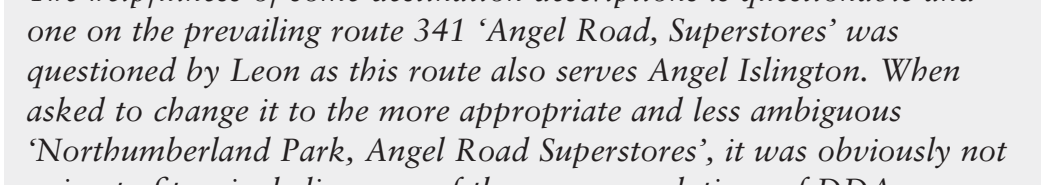


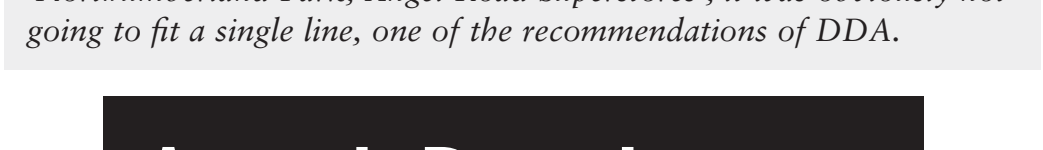
The figure '1' needs much more help than standard spacing can provide (other characters need different help in different contexts). A '1' has far less image area than other characters and so its definition must be maximised. From a distance '11', too closely spaced, is hard to resolve visually. In these two pairs of examples the right-hand one is correct.

Front Destinations:
The helpfulness of some destination descriptions is questionable and one on the prevailing route 341 'Angel Road, Superstores' was questioned by Leon as this route also serves Angel Islington. When asked to change it to the more appropriate and less ambiguous 'Northumberland Park, Angel Road Superstores', it was obviously not going to fit a single line, one of the recommendations of DDA.



In using two lines, not only does it make more efficient use of the visual space available, it also allows the subsidiary name (often called a 'qualifier') to be larger and easier to read from a distance. For this, a sample in capitals was produced to compare with Upper & Lower case. The subsidiary 'Angel Road Superstores' in capitals was in our view clearly better, though both examples use Condensed. Getting the balance of type height was critical, any bigger and it fought for too much attention over the primary 'Northumberland Park'.





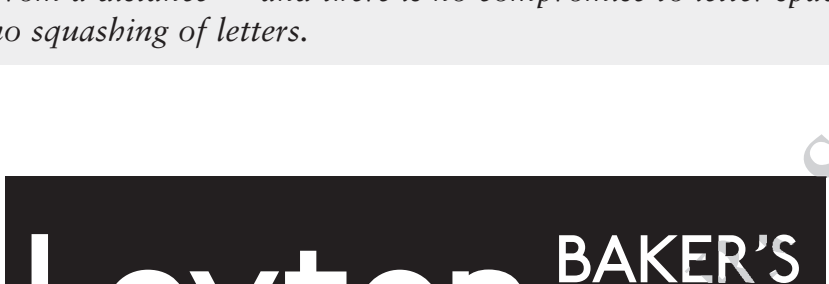
The magenta lines are the same distance apart in both examples. As may be seen, when Upper & Lower case is used to fit the same height, as in the lower example, the typesize inevitably gets smaller. It is undeniable that word shapes are more recognisable in Upper & Lower case than capitals. However, having them on the same line as the primary name meant there was usually not much width and so the subsidiary names were commonly quite small. The advantages of the second line, augmented by the larger visual size of capitals, makes the names easier to read. It should be borne in mind that unless these names have been read a few times in the first place, recognising their shapes when more familiar with them, may not reach that point.

Combined Route Number and Destination Side Blinds:
The layouts for these necessitate many permutations and options, owing to the possibility of one- or two-line place names, offering standard minimum, or optional larger, place name, but standard size larger route number.

An example of a 'superior small cap' applied to a side blind.

The majority of reading errors are made when in a hurry and this is another reason why optimum letter spacing and word spacing matter so much. On this front blind 'Sudbury Town' won't fit in Medium and so Condensed has been used. However, a standard word space would look much too wide, owing to the juxtaposed shapes of the 'y' and 'T', so it has been closed up.

It is often said that 'Upper & lower case is easier to read' — but in what circumstances? This mantra (an epithet which may be giving it too much credibility) is seldom questioned and manifestly not true irrespective of circumstances or context? 'Cranborne Road Industrial Estate' was hugely compromised on existing blinds and this example is far from untypical. The new display is intended to be much easier to read from a distance — and there is no compromise to letter spacing and no squashing of letters.



Short primary names accompanied by short subsidiaries can look better side-by-side on a front blind, again making more efficient use of the space. That said, I have thus far avoided them on side blinds as the subsidiary would be farther from the door than if below the primary. Readers may of course see the side displays from a variety of angles relative to the bus, but when in a hurry it needs to be at its clearest next to the door.

A full stop followed by a word space would look far too wide and so it has been significantly narrowed; less so, but still necessary, a little letter spacing has been removed (this is what 'kerning' actually means and not also the increasing of space) either side of the apostrophe. The intention is that 'fix' goes un-noticed.

Users need not know the typographers' art, but it is their job to make things easier to read on many levels. These two examples are not about legibility but about subliminal ease of reading. Often dismissed as unimportant, but visual balance plays a role on speed of reading. In this 453 side blind the secondary name is mathematically centred below the primary and jars, albeit almost always not realized as such by the reader. In the 168 the subsidiary is visually centred below 'Kent' and not the complete name. This has a better visual rhythm.

None of these visual adjustments should show of course, that's the whole point.

In both examples the primary name has been increased and in doing this it of course also gets wider. In the above example this allowed the lower case 'y' to encroach the vertical space (leading) of the subsidiary name. This would be a complete 'no no' in continuous text but on signs it can work if done carefully. In the upper example the subsidiary name is mathematically centred; in the lower one it is visually centred in the appropriate space.

In this upper example 'Beddington' has been enlarged and the descender crashes into the subsidiary name. It would do this even if the name wasn't enlarged, but in so doing this the subsidiary name can be visually centred in the relevant space.

There is a view in some quarters that abbreviations are a bad thing and I must confess to resisting them myself, but only on the grounds of trying to avoid misunderstanding. That said, it is better to use an obvious abbreviation than to make a name too small and/or poorly space it. Only well-established abbreviations are being used and only when necessary.

The regulations stipulate a minimum cap height of 125mm for front destinations. The new Condensed has made 150mm possible on many names, where previously Medium needed heavy squashing. Side blinds must have a minimum of 70mm cap height. With the range of four Johnston variants created, and the introduction of subsidiaries in caps, many can be made larger, though several need subtle visual adjustment for best effect.

This recently new destination would have caused a lot of problems in the old style layout, a theoretical example of which is illustrated above. The benefit of the second line is obvious with no condensed type needed.

And finally, just to make the most important point again at the end of this piece: spacing spacing spacing. This is a very usual way blinds are seen by readers. In this context, it is better to space the letters a bit loosely and certainly not too close.

POSTSCRIPT

If type design was a matter of pure mathematics then its creation would be a mechanical exercise requiring little understanding of letterforms and reading. Letters alone have little typographic meaning; it is word forms that are the basis of type design.

The human brain's ability to process what it sees plays a major role in type design. Working to micro precision levels of measurement are subordinate to the judgement of the eye — even though readers are usually oblivious of its effects. Type is made to be read and so the type must combine from individual letters into words.

The human eye/brain is however not as precise as we might imagine. Many shapes of truly equal measurement often do not 'look' equal. In type design many letterforms must be made out of alignment and unequal to appear aligned to the eye. As demonstrated in the main body of this piece, a capital 'O' must be larger top to bottom than the standard 'cap height' otherwise it will look to small. The 'O' must be slightly lower than the base line and extend slightly above the top too. This of course applies to many other letters.

A capital 'B' must have its upper section smaller than the lower to give it the correct visual balance. Design an 'E' perfectly mathematically and it will look quite wrong. The central horizontal has to be shorter and a bit above halfway up; in many cases, the lower horizontal must also be longer than the top one — but not always. Why not always? Well if all typefaces were the same, then we would only have one typeface. Introduce the different styles offered by seriffed and sans seriffed designs and further visual imbalances need consideration and understanding by the type designer.

However, as stated at the outset, the most misunderstood aspect of typography is probably letter spacing, word spacing and line spacing. Readers should not have to give any of these a moment's thought; the type designer and typesetter should have done their jobs properly for this to be the case and, sadly, this is more and more commonly not so. Far too many people have the tools (the computer and a folder full of founts, usually mis-spelt 'fonts', but that's another story) but no knowledge of how to set type for it to be easily read. Ignorance, leading to poor typesetting, defeats the whole point of typesetting in the first place.

Frequently not even considered is the fact the reading from typeset words should make reading easier than from handwriting. Poor type design and typesetting takes us backwards in time. For any given typeface at an appropriate typesize (not 'font size' for heaven's sake) getting the spacing wrong simply makes reading harder. There are no exceptions to this.