



GEOMETRICAL MEASUREMENTS OF DIACRITICAL DCROAT SIGN

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Abstract: *By analyzing the Croatian and Vietnamese dcroat sign which represents a unique case of typographic solution, this article contributes to the quantitative and qualitative discussion on the design of modern fonts. The main issue is the problem of designing letters that are composed of a body and a diacritical mark and that are not present in other Latin scripts. The goal of the letter design is recognition, and diacritical marks must assume eigenvalue of the letterform from the font-family concerned. Based on the assumptions of dcroat character design, following measurements were conducted: thickness, vertical and horizontal positioning. In order to enable proper diacritical design and achieve legibility, most common practices were established by measuring geometry in different fonts and font-families.*

Key words: *diacritics, dcroat, character, legibility, geometry*

1. INTRODUCTION

The number of digital fonts has been increasing constantly. Besides 'old fonts' digitalized by the type foundries, new fonts are arising rapidly. Problems that type designers have to deal with derive from a huge number of glyphs which are considered a standard part of fonts. Besides characters and symbols they include characters with diacritical marks from different scripts (i.e. Asia, South America, Greece, Eastern Europe...)

Special characters have a long cultural history generally unknown to type designers. That is why it is important to educate type designers and typographers and raise their consciousness enabling them to produce or repair special characters correctly. That is hard to accomplish for an obscure letter like lowercase dcroat present only in Croatian and Vietnamese.

When designing diacritics, it is necessary to pay attention to their thickness, position, size and eigenvalue of the letterform from the font-face concerned. In order to enable proper diacritical design and achieve legibility the most common practices and mistakes were established by measuring geometry of dcroat diacritical mark in different font faces.

2. DIACRITICAL MARK DESIGN

Fonts are mostly not ready for the general use when they first reach the market, so they should be carefully edited for the purpose of a certain text/script. The way diacritics are made depends on their designers' linguistic diversity. (Bringhurst, 2000) In spite of a large number of fonts available today, there are still many that don't support European languages, let alone African or Asian. In Latin, diacritics are used to add new compound characters to represent sounds. Some of the biggest font foundries still use the basic set of accents when designing fonts. This often results in a bad design and confusion of type designers. Letters with diacritics must offer readability and aesthetic value to the native reader. Lack of stylistic harmony is most visible in serif fonts. The basic letter of serif fonts has a certain style and contrast that is missing in the diacritic design.

The accents shouldn't differ from the design of the given typeface, either by size or thickness. Special concern should be given to small sizes of letters (8-12pt) because of the possibility of overlapping and lack of recognition. Positioning depends on the letter size (display/text) and font-family type (regular/bold). Thickness should be also considered. Diacritics are smaller in size than letters, so their contrast shouldn't be lighter or darker but proportionally smaller. Kerning should be done carefully to avoid overlapping or setting letters too far apart. (Březina, 2009)

With the increasing number of available fonts, mostly 'English' oriented, inadequate and incomplete fonts are the starting point for typographers in need of rare linguistic characters. In order to accomplish linguistic accuracy and create more complete fonts there should be enough available information on rare special characters. Every alphabet depends on the culture evolving for hundreds of years. Type designers and typographers should thoroughly analyze all linguistic specifications and technical appearance of rare characters needed by non-English speaking domain. There will always be the need to create or edit rare characters from existing fonts. Diacritics are mostly misshaped, inadequate in size or position (Bringhurst, 2000).

Microsoft's Character Design Standards is the only official and available resource for diacritic design. Its purpose is to compile general rules for character design in Latin scripts. Descriptions usually concentrate on the diacritic positioning and not the design itself. The biggest sources of information are the fonts themselves, but they have to be considered with caution because they can be misleading.

The most common diacritics are: *acute, grave, circumflex, dieresis and tilde* (present in all major cultures: France, Spain and Germany). The bar in the letter dcroat can be categorized as: through (positioned through the letter, attached to the letter); asymmetrical, non-centered (base dependant). Diacritic design problems in the letter dcroat are: asymmetry, width harmony, and cultural preferences.

Balance issues in asymmetrical letters are based in finding the letter's optical center. If the diacritical mark is misbalanced, the letter will seem to gravitate to a certain side. Letters with counters usually have their optical balance around the center of the counter. When the diacritic is properly positioned, the letter must not collide with the next letter. The width, advance and kerning of the letter must be adjusted to avoid collision. In bold faces and sans-serif fonts there is even less space than usually given by the serif. The most common solution in the example of dcroat is to shorten the diacritic itself. Size and weight of diacritics are crucial for recognition without which the context and meaning can alter. On the other hand, if the bar is too thick it can merge with the serif or bowl. The biggest problem is the lack of standards. Western oriented type designers cannot be expected to be informed of East European cultural and linguistic specifications. With digital capabilities, solving this problem is possible but rarely accurate. The necessary knowledge and information on diacritics design should be available. (J. Victor Gaultney, 2002)

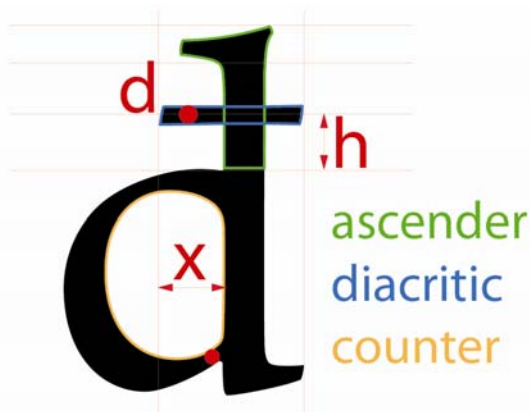


Fig. 1. dicroat construction

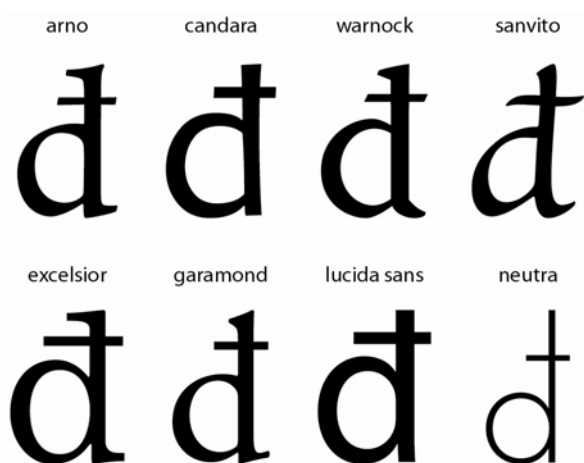


Fig. 2. Top: good solutions; bottom: extremely poor solutions

3. HISTORY AND DESIGN

The lowercase letter d with stroke in Croatian writing was proposed by Đuro Daničić in the late 19th century. The idea was to represent one phoneme with one glyph.

According to Microsoft (<http://www.microsoft.com/typography/developers/fdsspec/lowercase.htm>) lowercase letter d with stroke (also known as dyet or dicroat) is used in Croatian, Vietnamese, Macedonian and Serbian language. Its design is based on the lowercase d with an added bar. The bar should be of the same thickness as other lowercase characters with bars. Vertically the bar should be visually centered between the x-height and the ascender. It should horizontally extend to the right of the stem similarly to the serif in serif designs and enough to be visible at small size but not long enough to cause spacing problems for sans serif designs. To the left, the bar should extend approximately one half the width of the lower bowl of the d. The advance width should be the same as the lowercase d. In sans serif designs it may be necessary for the advance width of this character to be greater than the lowercase d to visually compensate for the bar. Thickness and position of the bar should be determined by the contrast of the letter and x-height. The bar shouldn't be too short, the ideal length starts with the optical center of the letter. The capital letter dicroat (Ð) looks the same as the Icelandic Eth so it won't be discussed in this article.

When the 7-bit ASCII code was used it was not possible to use dicroat due to lack of space, but when the extended 8-bit systems were introduced, dicroat's position in all the major code systems (MS Windows 1250, IBM-1129, ISO-8859 Latin 2, Mac OS Croatian) was 240 (decimal) or F0 (hexadecimal). In 16-bit Unicode standard that supports thousands of glyphs, dicroat has the space U+0111. (Wells, 2000)

4. MEASUREMENTS

By measuring geometry of diacritical mark of the dicroat letter from different fonts and font faces most common practices in designing were established. Different results were expected in serif and sans-serif fonts. Three values were measured:

1. Extension to the left (50% of counter was expected)
2. Vertical position (50% of ascender was expected)
3. Thickness (depending on the contrast)

Font	x%	h%	H%	d%
Serif-regular	61	50	38	136
Sans-serif-regular	55		44	119
Serif-bold	78	51	37	123
Sans-serif bold	67		45	117

Tab. 1. Results

It can be concluded from the measurements that the bar to the left extends more than 50% of counter meaning that the optical middle is a bit further. Serif fonts have smaller contrast so the numbers are more similar to 50, but serif fonts have greater contrast and optical middle. In bold faces these values are even greater due to the bigger bowl and contrast. Bold faces also have more diverse results (from 35 to 102%). Vertically, the bar is lower than 50% of ascender in sans serif fonts, and even lower in serif ones. Optical middle is obviously lower than 50% due to the x-height and serifs. Similar results were obtained in bold faces. Thickness of the bar is greater than the thinnest part of the letter but never thicker than the thickest part of the letter. Serif fonts have thicker bars due to the greater contrast of letters.

5. CONCLUSION

The goal of the font design is recognition and legibility. But, there is insufficient information on the appearance of rare characters not present in the Western cultures, especially East European letters composed of a body and diacritical marks. One instance of this problem is designing the letter dicroat present only in Croatian and Vietnamese scripts and consisting of the small letter d with an added bar. By measuring the geometry of this diacritical mark general rules were established concerning its width, vertical position and thickness. The most common mistakes and problems in diacritics design were discussed and solutions were proposed. Besides geometry, style and culture should be considered. Nowadays, many fonts are available for usage, but a few offer appropriate and legible solutions for each special character needed in each culture and script. Discussion conducted in this article forms encouragement and motivation for new typographical solutions and repairs of other diacritical problems present.

6. REFERENCES

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