GUIDELINES FOR FORMING COMMUNICATION SIGNS IN THE AREA OF SAFETY

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Global age that we live in belongs to signs as organized Information and Communication systems. In spite of the standards of communication, traffic and related signs, there is no unique nomenclature of signs. The term "sign" and its meaning are differently interpreted in the literature. By analyzing the terms "sign", "picture" and "symbol" in the communication process, this essay demonstrates the problems that result in different interpretations of the same term by different authors. That problem can lead to unforeseeable consequences in the area of safety and protection. So as to achieve uniformity of signs for all participants in the communication process, this essay suggests guidelines for designers who form signs. Making a concept of a sign on the grounds of simple structure (code) represents a starting point. Guidelines that refer to perception, information, comprehension and behaviour of people are elaborated with regard to the sign or signs shown, as a whole system, throughout the four phases of message reception.

Key words: communication, guidelines, meaning, safety, sign

Smjernice oblikovanja znakova komunikacije u području sigurnosti

Globalno doba u kojem živimo pripada znakovima kao organiziranom komunikacijsko-informacijskom sustavu. Unatoč standardima komunikacijskih, prometnih i srodnih znakova, ne postoji jedinstvena nomenklatura znakova. Pojam znaka i njegovog značenja, u literaturi se različito interpretira. Analizom termina znaka, slike, simbola u komunikacijskom procesu, u radu je prikazana problematika koja dovodi do različitih tumačenja istog pojma od strane različitih autora. Taj problem može dovesti do nesagledivih posljedica u području znakova sigurnosti i zaštite. Da bi se postigla jednoznačnost znakova za sve sudionike u komunikaciji, u radu se predlažu smjernice oblikovanja znakova dizajnerima. Polazišnu točku predstavlja izrada koncepta znaka sa stanovišta jednostavne strukturiranosti (kôda). Kroz četiri faze prijema poruke razrađene su smjernice koje se odnose na opažanje, informativnost, razumijevanje i postupanje osoba s obzirom na prikazani znak ili znakove kao sustavne cjeline.

Ključne riječi: komunikacija, smjernice, sigurnost, značenje, znak

1
Introduction
Uvod

As we receive 80 % of information visually, we can say that the age of visual communications in which we live belongs to signs.

In this essay we do not observe signs individually, but as a part of organized Information and Communication systems [1]. High mobility of population nowadays more than ever involves the awareness of signs and their meanings, whether they are related to traffic, orientation in space, product declarations or visual identity of products [2]. The purpose of this essay is to analyze and observe the idea and the meaning of signs in achieving a better and faster communication process.

History of communication by graphics starts with picture messages - pictographs. They are still used in modern societies for visual communication at airports, workplaces, in traffic etc. As signs, pictographs represent a concept, an object, an activity, a place or an action, whereas as visual signs they are used as warnings, guides or protection and, more or less, as persuasive information. As such, they go beyond verbal and cultural obstacles and are superior to words as a form of communication. Pictographs are exceptionally useful in situations when it is necessary to recognize concepts quickly, as it is e.g. in traffic or in the state of danger (poison, fire, exit etc.). Although people encounter pictograms every day, the majority of them do not recognize them as such.

The aim of this essay is to present possible starting points in forming signs in the area of security.

2
Problem statements
Pristup problemu

There is no unique nomenclature of signs, not even in semiology, and especially not in other aspects which define and classify proximate or identical references of signs. This applies to general communication systems, and includes systems of signs that require symbolism (in the area of chemistry, mathematics etc.) in elaborating professional systems [3]. However, the topic of this essay refers primarily to communication systems based on safety. Along with all the standards in communication, traffic and related public signs (ISO 7001:2007 standard, regulated by law [4]), it is necessary to show analogue instructions to designers [5] due to possible collision or greater misunderstandings with unforeseeable consequences. This primarily concerns the process of creative forming during the testing of functionality of suggested signs, semantics i.e. practical results. Uniformity of signs is essential for the prevention of possible dilemmas in comprehending signs. Instructions for designers should emphasize the relatively simple structure (code) of elements due to the so-called Zero phase of perception. It is also necessary to test the readability of signs (Zero phase in reception of message) from demanded distance for reading the sign.

3
Concept of sign and its meaning
Pojam znaka i značenja

The concept of sign and its meaning is interpreted differently in the literature [6]. According to Arnheim [7], the terms "sign", "picture" and "symbol" do not represent

different terms but three different functions. Therefore, a triangle can represent a sign of danger in the field of traffic, a picture of a mountain or a symbol of hierarchy.

Figure 1 *Three different functions of a triangle*
Slika 1. *Tri različite funkcije trokuta*

So as to be able to communicate well, it is essential to know how well or how badly a certain visual conception fulfils that function:

- a sign represents a concept of a certain object and it visually does not reflect its content (letters, numbers, words). In semiology, as conventional signs, letters are defined as symbols.
- a picture is a visual perception that displays a certain reduction of the object that it depicts. It exhibits substantial formal features of the object (pictographs). In the area of visual art the closest terms would be "stylization" and "schematization". If this kind of sign were similar to its meaning, it would be considered as figurative.
- a symbol is a visual perception of terms at a higher level of abstraction. In the framework of semiology, a symbol is a conventional, arbitrary sign.

According to Arnheim, every visual perception is always a picture, regardless of whether it is presented as a symbol or a sign. According to the nature of their presentation, symbols and signs represent the same term which is in the case of symbol reduced to the essence of content and form, while in the case of sign the emphasis lies on communication with all that we are surrounded with.

According to Rot [8], a sign is every means of communication. Pieces of information are transferred through signs, and the communication itself represents a transfer of information. The main function of signs is communication, in other words, the transfer of information. As far as the function of communication is concerned, we differ between representative (significant) and expressive function. Signs can consequently be classified as:

- signs of representation (symbols)
- signs of expression (signals).

According to Perasović [9], a sign is a feature, a signal, a carrier of meaning, an object that refers to another object (in the philosophic sense). According to him, precise determination of sign is disputable, but mostly considered as a means of communication at the level of imaginative and intellectual comprehension that is defined by the conception and its meaning (real, mental, functional, logical etc.).

Perasović divided signs into:

- natural – pictures of objects that refer to their meaning by their appearance
- artificial or conventional – that are determined by rule or regulation, reduced in their conventional meaning associative – that refer to the object of their imaginary meaning.

These examples illustrate the absence of a unique

nomenclature of signs and different interpretations of their definitions. These facts lead to misunderstandings in the comprehension of the meaning of individual signs. Although this paper does not aim at introducing unique nomenclature in the area of signs, the intention is to point out to the existence of that problem.

4
Scientific approach to signs
Znanstveni pristup znakovima

Semiology (Gk. semion – sign, logos – word, speech) is a science that studies the behaviour of different signs within society. Semiotics represents a discipline of semiology whose primary interest is the general theory of signs, study of signs and sign systems. Semiotics was a component of philosophy (as a science) until the beginning of the 20th century, and owing to C.S. Peirce [10] and C.W. Morris [11], it developed into the theory of signs.

At the same time Jakobson [12] and De Saussure [13] define semiotics as a lingual semiology that develops in the sixties of the 20th century within the French structuralism. At the beginning of the seventies Foucault notices the limitations of fundamental concepts in the system and his static because it excludes extension on signs. The term "semiology" is thus replaced by the term "semiotics".

Since then, semiotics unites different traditions into theory and defines itself as a "science about sign processes that explores all kinds of communication and trade of information" [14].

5
History of signs
Povijest znakova

We encounter the first signs 4000 years B.C. in the caves in France, Spain and northern Africa in the shape of wall pictures. In the early hieroglyphic writing, every sign, pictogram and pictograph functioned as a concrete representation of what they depicted. Later on, by forming and synthesizing appendices like suffixes, prefixes etc., to the existing signs, new signs developed that had abstract meaning (actions, ideas, phenomenon etc.), called ideograms.

Besides Egypt, pictographs are also found in ancient Rome, where they were put at roadsides to mark the distance to Rome.

In the 12th century, pictographs appeared on emblems of aristocratic families, on their armours and shields, and thus became their "trademarks". Heraldry is a distinctive system which strictly refers to the features of the form. It is related to the colours and vignettes, and also to their arrangement at the area of sign. That kind of pictograph has been especially developed in the time of guilds. In the 15th and 16th century, with the revolution in printing, drawings and their graphic reproductions evolved as vignettes, ornament designed illustrations. Signs which we nowadays call "emblems", represented different medieval workshops like butcher's shop, printing-houses, bakeries etc., and there are places where they maintained their meaning until present time. We consider them to be the first pictogram signs that came close to the present day pictograms regarding their meaning and appearance.

Finally, with the emergence of car in the 19th century signs became essential for traffic safety. Signs became an international language as car sales spread across the world.

Traffic regulations and signs that we are familiar with are not older than a hundred years. First international convention about road and automobile traffic was held in the year 1909 in Paris. Later conventions, held in other cities, suggested that all the states adopt the same traffic signs without orders or other information written in words. As the majority of population of that time was illiterate, insisting on visual appearance was only appropriate and logical.

Forms of traffic signs were defined by the First Paris convention. Warning signs obtained the form of equilateral triangle; prohibitory traffic signs took the shape of a circle and information signs of a rectangle. The last amendments and additions to the Protocol of traffic signalization from 1968 introduced the stop sign in the shape of an octagon instead of a round sign with a triangle drawn inside of it. Furthermore, colours were defined for signs – blue for obligation, red for prohibition, yellow for danger and green for information.

The first and the most important treaty regarding road signs, presenting the base for the European system of traffic signs, was signed in 1949 in Geneva. That protocol is based on symbols without the use of words.

6
Process of sign designing
Proces oblikovanja znakova

Due to practical reasons, i.e., unambiguousness of readability, numerous signs that are used in the area of protection and safety are defined by ISO standards in the analogy of road signs. As there is always place for new situations in work surroundings, means of work of machines, etc., new, adequate and modern signs are designed.
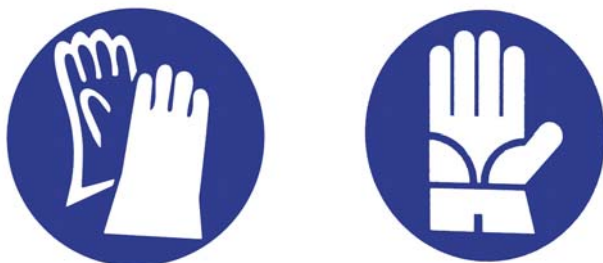

Figure 2 *Signs of different forms and the same meaning*
Slika 2. *Znakovi različitog oblika i istog značenja*

Prior to designing a sign, it is necessary to give meaning to its concept, guidelines that include idea, forms and associations inspired by that sign. The concept consists of ideas that are grouped. For example, if we are talking about some work communication or movement, it is necessary to accurately define the meaning of a sign, whether it relates to direction, request, manifesto, warning or prohibition. If it relates to direction, we need to specify its reference. If it relates to warning, we need to consider the kind of warning, e.g. fire hazard warning, high voltage warning or poison warning. Depending on the request, the sign should point to the certain behaviour of a person. Manifesto has the strongest meaning, which should be taken into consideration in the process of designing. Nowadays most situations are covered with standardized signs, and as such, they should be respected.

In the process of sign designing it is exceptionally important to use colours properly. Thanks to the

standardization of traffic signs, a system was developed which monitors human perception of colours and forms by comparing results with the current system of signs. That way we obtained a general system of colours and forms of signs in traffic communication.

Signs are all around us: they warn of speed limit, prohibit parking, allow passage, etc. Signs gain their real meaning due to their use in practical situations. Numerous signs do not comply with rules, they confuse with their colour, form or their motive, they are inaccurately direct or are being ignored. For example a hand that stands for prohibition on a green surface that means passage, etc.

The key to comprehend the message of a sign is the recipient, who needs to decode the symbol within the sign, provided that the sign is visible. The eyesight of the recipient is influenced by different factors such as dull sight and various psychological conditions like drug or alcohol influence, lack of concentration, distraction and other factors that reduce the level of sign recognition. The concept of a sign has a purpose of upholding the law and regulations, analogue to signs in traffic [15].

The concept is elaborated by the technique of partitioning and grouping itself, the so-called mapping. Mapping consists of ideas and associations that are partitioned and logically combined in a unique integrity. Finding the right motive for a sign is a demanding work, where the grouping of associations helps a designer visualize an acceptable choice before selecting the final solution. After these basic steps, a designer can engage in designing only if the purpose and meaning of a sign is determined [16].

Beside unambiguous symbols in the area of protection and safety, statistical data is primarily used in designing a sign or graphic medium interpreted by a picture. These data direct to reliability of proper understanding of a message while interpreting the guidelines. They speak of accidents; type, size, place and other relevant information which systematically describe actual events (accidents, affliction, damages). Combining these data can result in guidelines of analogue, not only actual events, but of their frequency.

7
Defining the guidelines
Definiranje smjernica

Guidelines for forming signs of communication in the area of safety will be defined throughout the phases of message reception with the purpose of allowing quality communication process.

The first phase of message reception, the so-called Zero phase, refers to the activation of a visual stimulus, perception, in the recipient of message. Space is crucial in the ability of a recipient to perceive the sign. For example, if it is a waiting room that we observe, the ability of perception will be higher than in spaces with higher movement density, like bus or train stations. The colour of walls where a sign is placed also plays an important role. If the walls are white, the perception will be higher, while in the case of coloured surfaces the perception depends on the contrast of colours of surface and sign. With traffic and other signs that are placed outdoors, under the influence of visibility during the change of day and night, adequate illumination of signs is essential for their timely perception. This especially refers to signs of danger and explicit commands. In an environment with a high degree of mobility of people, the size of a sign should be adjusted and, if necessary, repeated, so as to be perceived.

The second phase, syntactic phase, refers to

information through letters as conventional signs. Sign explanation with the supplement of textual information often leads to obscurity if texts are larger. Shortness of textual message that additionally explains the sign increases the informative quality of the sign itself. The choice of typography is also important when applying textual message. The usage of a sans serif font will transfer the message better than a serif font. Readability of smaller amounts of text will be significantly higher with a sans serif font, especially on coloured surfaces. Illumination has a considerable effect on the perception. A decision whether the sign should have its own illumination or reflective light is sufficient is made by testing the environment of that sign.

The third phase, semantic phase of message reception, revolves around the recipient's understanding of signs.

Figure 3 *Application of different forms and colours depending on the purpose of the sign*
Slika 3. *Primjena različitih oblika i boje ovisno o namjeni znaka*

The fourth phase, the pragmatic phase of message or sign reception, speaks of success of the previous three phases. It refers to the reaction of the recipient. As far as protection and safety are concerned, insensibility to this phase of message is often visible in actual situations with catastrophic and deadly consequences. On the other side, the success of the pragmatic phase of message is displayed in finding a way out of often dangerous and delicate situations. The fact that this phase is exceptionally important is highlighted with signs of danger and explicit commands. If the space is filled with advertising messages, it is necessary to put one or more signs together in a place far from advertisements. Messages should be put in a place where they will be perceived quickest and clearest. In the case of combined signs connected with an indicator arrow in the same place, their priority determines their location. By doing so, signs should be positioned in the direction that the arrow points to. To avoid mistakes in designing pictograms, it is necessary to stress the case common in practice. Red round signs represent signs of prohibition even without a sign crossed out. A diagonally placed line which represents a visual method of prohibition marking, does not apply with combination of red and round forms.

8
Conclusion
Zaključak

People communicate by means of visual signs, whether it is a picture or a written word. Signs in visual communica-

tion represent a symbol, a concept, an object, an activity, a place or an action visualized by a picture. As such they belong to the most spread multicultural communication nowadays. This paper describes the meaning and significance of the comprehension of signs, and their proper interpretation in achieving improvements of the communication process. As symbols, signs should be characterized with simplicity and associability to make their perception quicker and easier for recipients, regardless of culture and language. Their explanations should be maximally simplified with the purpose of creating clear and unambiguous message such as information, direction or prohibition. When designing signs, the principal aim should be the simplicity of representation in a short period, which creates difficulties to designers. Due to the situations demonstrated in the paper, that influence the reduction of recognition and comprehension of pictograms, we proposed guidelines that might help the designers in designing pictograms with the purpose of achieving optimal perception, comprehension and entire functionality as signs.

9
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