The factors of form building in maximally perceived architecture and design

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Abstract. This paper reports the factors of form building in designing composition of any object. The goal of the work is to identify the relationships between the elements and form as the means to express the architecture and design objects, as well as their aesthetic properties. We describe different approaches and exercises for creating architectural forms and design objects.

Creating artworks, let them be pictures and sketches, or voluminous models and architecture forms, it is necessary to set an individual geometric framework into a structure, thus distinguishing the particular project from the others, i.e. COMPOSITION is meant.

Artists, designers and architects at times encounter compositional problems. After completing the work, some mistakes in form building of the designed object may take place, the final version remains a sketch, and the problem is understood at a subconscious level. An observer unaware of specifics in design and composition construction may discover the fault. This is the critical point to be discussed in the article.

Types of composition solutions selected for analysis:

- Frontal composition concerns modeling in the same plane (painting, stained-glass windows, tapestry, graphic art, photo art, posters, Websites and flyers). In the frontal composition itself the depth of space may be depicted by perspective contractions, treatment of light and shade, color spots; however the entire work is observed from one point, i.e. frontally;
- Voluminous composition is 3D modeling (sculpture, minor architecture forms, ornament-applied art, designing common and industrial products). Numerous units of voluminous composition and environment match so that the volume of form itself prevails, and with evident complexity, it looks as one object. The external space surrounds the form without penetrating it;
- Spatial composition is 3D modeling with predominance of space size, e.g. landscape, interior, theatrical performance, exhibition pavilion and stands. In such a composition, each element is significant. The basic components, with which spatial composition is produced represent the volumes forming space and materials forming volumes. All these variants are capable to regulate the designed model [4].

Designing an object begins with project analysis to identify structural features of the object to set upon the further stages of work and to subordinate an object to the uniform geometric and stylistic principle of forms. The lattices are produced with regard to socio-functional requirements to the designed object. Analytical work determines the main spatial lattice, which serves the basis for design compositional netting. This is when we apply the approach of subordinating the netting space with the compositional key. Due to such a thoroughly considered real cause, the compositional solution is added. It corresponds to the aesthetic requirements, and it has all the grounds for building (Fig. 1). With this approach applied, the object structure acquires the regularity of directions, axes, step and
rhythm, which will further subordinate the volumes and forms located in this space. These factors will positively affect the design perception, as everything is subordinated to the same principle of building (Fig. 2). As soon as we have accomplished the design analysis and have subordinated the object structure to the common principle, it is reasonable to switch to the next step of the works, i.e. development of form levels.

Noteworthy, any object consists of the composition and some levels within composition forms: the primary ones are large forms being the basis in the entire designed object; the secondary ones are average forms distinguished or located above primary forms; tertiary ones are minor forms (Fig. 3).

![Figure 1. Composition of recreation zone in Irkutsk city elaborated by V.S. Nikitin.](image1)

![Figure 2. Analytics of subordinating the design geometry to the entire solution exemplified by Basilica Santa-Maria-Novella, Florence, architect Leon Battista Alberti, (1279) and Villa Capra La Rotonda, Vicenza, architect Andrea Palladio (1566) [8, 2].](image2)

In the paper «Primary, secondary, tertiary shapes» author Neil Blevins [7] expounds his observations that any images or objects consist of all three levels of forms being in balance between each other. Primary forms are needed to organize the secondary and tertiary forms – role of framework. Secondary forms bind primary and tertiary forms between each other. Tertiary forms present an accent to attract observer’s attention. In the absence of dominant composition feature, it is
critical to decide which element will be dominant, and then to raise its visual accent using a contrast. It introduces the changes into a normal model of composition arising interest and attracting sight (Fig. 4).

**Figure 3.** Graphic layout of an object into 3 levels of forms by Neil Blevins [7].

Contrast types:
- Contrast of scale. Objects of too small or too large size attract attention right away. For instance, if a large arm-chair is put at one end of the dining table, it immediately becomes the coordination center;
- Contrast of color. Application of colors of varying contrast of brightness or opposite to each other;
- Contrast of form. In the composition with prevailing rectangular or square form a rounded object will attract eye, having become the secondary visual accent;
- Contrast of orientation. Eccentric displacement of composition produces a visual interest. An accent may be created via location of elements around the central point isolating an element from the others (particularly in asymmetric compositions) or placing an element in the end of a linear sequence;
- Contrast of texture. Complex texture adds information load to simple elements;
- Contrast of light. Light visually increases importance of a dominant element [6].

**Figure 4.** Layout of element for «Pictorial relief» by V. Tatlin [1] into 3 levels of forms. Author V.S. Nikitin.

All three levels of forms should be in balance between each other. If we remove, diminish or enlarge one of the levels, the designed object will lose the harmonic ratio of forms, and therefore will reduce its aesthetic properties. There are proportions of applying three levels of forms; however, they are not formulated so far. The suggestion is to employ an optimum range in designing process: the ratio of primary to secondary forms, and secondary to tertiary ones, as 1:5 to 1:10.
To make it clear, this approach is applied ubiquitously, not only in the visual component but also at the level of sounds this law justifies itself: e.g. if you cut high frequencies out of a favorite song, it will sound dull, and having removed the basses, the sound loses volume. The matter is that you favor the song due to optimally balanced sound waves, the same as our balance of forms in the designed object.

The second important point is how to apply the approach to locate objects in the composition. The metric line and rhythm make up the second component to arise interest of an observer. The more dynamic the rhythm is the more interested the person will be to look at it, as the mind tries to understand such inconstancy of a visible picture. Rhythm is the measuring modulus specific for a concrete object of designing. The metric repetition in composition is a multiple repetition of an element at the same interval. In the technique, the repetitions may be diverse depending on the fact, which elements these are, their size and step, whether this is one element or several ones simultaneously repeated at a certain step of alternation. These can be scales, signal lamps, buttons or device toggle switches, carrying construction piers, brackets, scarfs and apertures similarly arranged and located at the same interval. In the composition, the repeated joints of similar elements, cutoff points, even fasteners might be accentuated. For technical structures, the theme of repetition is particularly distinctive. The metric line may be simple, based on the repetition of one element; more complicated, when it is coordinated with the other one; or it is fairly complicated, when the composition includes several lines of metric repetitions.

Any change in the metric line is compositionally justified and accentuated. The rhythm, close to the metric repetition means of composition, excludes the possibility of any digressions. Rhythm failure causes serious violation of integrity, while compositionally expounded change in the metric line is feasible [5]. In some works, the metric line becomes oversaturated with closely located elements or groups of elements. In this case, the background does not serve as the organizing principle; the metric repetition itself stops affecting a spectator, and at sparseness of a line, its trends are lost on the too large and deserted background (Fig. 5).

**Figure 5.** Oversaturation of metric line and its optimum ratio, produced by Neil Blevins [7].

If we infinitely repeat the same tone in a musical composition or build the architecture composition by repeating the same element, no harmonization of the object is the case; on the contrary, the monotony reducing aesthetism is inevitable.

The third factor affecting aesthetism is the buffer space between the three types of forms, i.e. emptiness. The successful designer, artist or architect needs to balance the zones of minuteness and zones of recreation. Empty space helps to create the zones of density, consisting of the secondary and tertiary forms. The form looks monumental and dense, if it is monolith, or the internal space between its elements is minimal. If the apertures or distances between the elements making up the form increase, it becomes more open and dynamic (Fig. 6).
Figure 6. Determination of density zones exemplified by «Head of a robot» created by Gleb Alexandrov [3] from the secondary and tertiary shapes. Author V.S. Nikitin.

Imagine, in the orchestra all instruments play without stopping, simultaneously and at the same volume – this would again destroy a regular ratio of sound waves, and thus information oversaturation occurs.

Therefore, in case of the design with high aesthetic factors it should satisfy the following factors to build a form:

1. Subordination to the uniform compositional structure;
2. The object is divided into the levels of forms;
3. The dynamics of form rhythms is set;
4. The zones of minuteness are in balance with the zones of recreation.

As a result, we receive a group or groups of forms, which unite four conditions for creating the top-quality design.

For a long time, the laws of composition were believed to be something abstract, unrealistic and often farfetched. The debates whether to observe the composition laws in object designing or to ignore them, still go on. Switching back to the issue why an observer unaware of design basics may state that the designed object did not reach integrity and did not acquire completed form. The motive is that practically all composition laws are governed by physiological properties of our sight and further treatment of information by brain. The composition laws exist irrespective of the fact, whether we like it or not. We may apply or infringe them, but in any case, we deal with the laws of nature, against which an ambitious human being is powerless. On the other hand, ideally, at any designed object there should not be too many unnecessary elements, on the contrary, everything should be coordinated, rhythmically arranged. Casual view from the random point is not interesting in essence. We have derived a conclusion that four steps of designing developed for optimum compiling the composition might make an image more comfortable for understanding with human brain, and, consequently, an image will display much higher aestheticism.

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