

CQC as an Element of Aesthetic Control in Research of Architectural Space

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Abstract

Contemporary architecture is characterised by immense diversity of technical and technological solutions, in particular as regards aesthetics and composition. The moment we mastered the methods of safe erection of edifices, the problem of useable and aesthetic quality emerged. The composition quality control (CQC) is an original method of organising the issues related to deformation of architectural space by an analytical tool and it aims at analysing the space in the context of its designing and transformation. One may prove that space should be composed in a certain way for certain purposes and following certain pre-determined goals so that its form is not random. Composition is an extremely significant stage of creation – success of any project depends on the knowledge of its rules (on observing them or consciously violating them). Despite its vital role, composition is frequently marginalized and seen as a set of rigid, dead rules. This paper will argue that this is a misconception and the knowledge of theory is the key to conscious application of various elements of spatial composition and it helps in a truly creative process.

Keywords: Research; Composition; Architectural space; Theory of architecture; Rules and principles

Introduction

Each attempt at introducing a new architectural object to an existing environment (natural, artificial or a mixed one) is an interference with the environment's visual character and composition; the interference which balances between identicalness and complete dissimilarity taking also a series of in-between forms. Defining the development of such an environment as a process of changes, one may theoretically distinguish the following situations or types of the most common alterations:

1. Addition of new elements to the existing entirety,
2. Replacement of the existing components of the entirety with new ones,
3. Removal of the existing elements,
4. Transformation of the existing elements,
5. Relocation of the existing elements,
6. Combinations and variants of the above-mentioned solutions.

From a statistical point of view, the most common cases which occur in the development of built environment (i.e. buildings and complexes of buildings) are the above-mentioned items no. 1, 2 and 4, i.e. addition of a new element, replacement of the existing element with a new one, or transformation of the existing element by providing it with new features. One of the major issues referring to the examination of visual quality of the environment is the assessment of the impact that individual components have on this environment. It regards first of all new objects which were introduced to the already built environment - both natural artificial one. However, it may also concern the already existing buildings whose visual impact must be defined and evaluated, and in some negative cases, must be toned and smoothed away. Both the former and the latter are directly connected with visual quality issues. Architectural activity is such a form of reasoning in which perception and thinking are inextricably intertwined with each other. 'My earlier research taught me that artistic activity is a form of reasoning, in which perception and thinking are inextricably intertwined. I have acknowledged that somebody who paints, writes, composes or dances – thinks in terms of the senses. This unity of perception and thought turned out to characterize not only art itself' – claims Rudolf Arnheim (Figure 1) [1].

Composition Quality Control is the author's original method

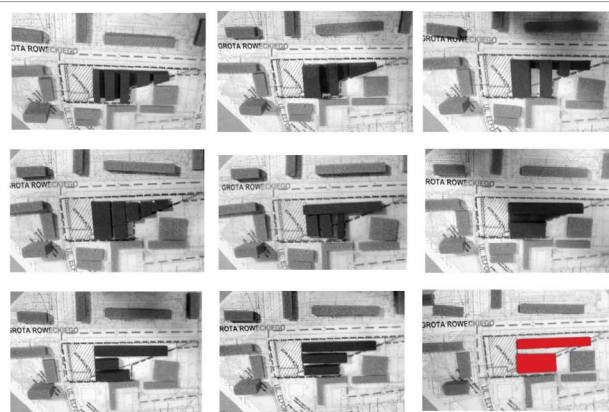


Figure 1: Sample control drawings for the plan field of the buildings planes along with modifications made and the final solution. Phase of architectural concept development.

of ordering issues related to the deformations of architectural environment. It is achieved by means of an analytical tool and aims at the examination of the composition of layouts in the phase of their designing and transformation. As far as designing is concerned – the survey or examination starts with the analysis of a design and search for problematic issues. In the already existing area to be subjected to transformations, the survey is preceded by inventory-making activities. The process involves observers – designers who on the grounds of their knowledge and computer-aided techniques make control drawings. This allows the evaluation of solutions at a very early stage of the designing project. It enables the designers to analyze the solutions with attention

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paid to various compositions as well as to introduce modifications when the designing process is still not very advanced. The developed research program aims to assist a truly creative process. It offers a database of knowledge enabling designers to objectively assess their designs thanks to the use of diagrams, site plans as well as comparative drawings and sample solutions. The assumption is that the desirable effect may be achieved by skilful selection of similar components, or in some cases by juxtaposing components by way of contrast using constructions known from geometry. When a given design fails to meet expectations, some alterations and modifications are introduced. They are then documented and added to the program.

Key Notions

This elaboration refers to architectural environment and urbanized space, which finally becomes a place for various human activities. The terms used in the field of composition of such spaces are not clearly defined. It is thus necessary to determine the scope and scale of spatial systems which will be subject to analysis.

Building object, surroundings and observer

It is essential to realize that each object is somehow composed and introduced into the environment and has a visual impact on its surroundings. How should the notion of 'surroundings' and 'impact' be understood in this context? Generally speaking, a building object, a part of the space of the physical environment (i.e. the surroundings) as well as an observer constitute three main elements of the system in which visual perception process takes place. Both the object and its surroundings have a series of physical features which can be visually perceived, such as: shape, size, color, texture, proportions, space clarity, articulation of decoration, etc. From the point of view of composition, the above-mentioned features take the form of points, lines, and planes being the elements of the composition of plans. This group of features is called 'a visual character'. The observer is a designer, a creator, and in this meaning, the user of the space. The observer is able to perceive the whole of space almost at one glance. Looking at a building with its surroundings, it is possible to clearly see and evaluate the structure of arrangement of other objects and circulation systems around them [2]. The observer's attention is drawn to architectural elements. All kinds of space limitations create a sort of 'interior' around the observer who stops in a given point. It happens irrespective of the absolute dimensions of the perceived section of the environment. There are various 'space interiors' – they can be organized or coincidental, vast or tiny, natural or created by man. The dimensions of each 'space interior' may be defined on 2D plan, which enables a precise analysis of their forms. Situations connected with human activities that may occur in a space, especially urbanized space, happen repeatedly due to the occurrence of similar limitations. For instance, the situation raises no doubts in the case of the space around the city of Bytom market square and Agora Shopping Mall. The space is limited from all sides as in a traditional square: from the sides, from the sides and the front, from the sides and even from above. It is done in a totally clear and defined way.

Plan composition

What is a plan composition? The simplest answer is that it is a system of forms on the plane creating a closed entirety. Right away, a question arises concerning the rules of such a system. The answer is as follows: it is a system of forms which are mutually balanced. Everybody understands what 'a system of forms' means; everyone has some kind of sense of order which allows them to 'esthetically' arrange, for instance, furniture in a room or objects on a table. In the case of the so-called plan plane, it is not just about usual order of objects in a daily life. The

plan plane refers to the arrangement of forms on the plane according to some rules – rules of abstraction which reign on this plane. A 2D plan may anticipate spatial qualities or may prevent the realization of such qualities. While looking at a 2D plan which shows a disposition of some terrain and determines its general division, it can be predicted what kind of impact it will have on the possibility of creating the third dimension. The third dimension which will in the observer's eyes be transformed into buildings' walls, streets or, in this case, elements of the square development. However, the plan is merely a basis. On the grounds of similar plans one may build various architectural complexes. On the architectural scale, on the scale of the 'interior' between the buildings, even if it is complex and permeates or overlaps other 'interiors' – all urban development forms on the plan make up the basic elements of the composition.

Plan fields

The basis for considerations on composition was provided by W. Kandinsky in his book 'Point and Line to Plane'. 'Its content may be more or less precisely transposed to means of expression of other artistic disciplines' states the theoretician [3]. The author believes that Kandinsky's theory should be a starting point for all considerations on the plane structure. Having become familiar with this theory, it is practically impossible not to agree with the above-mentioned opinion. That is the reason why the fundamentals of Kandinsky's theory will be discussed here. First of all, Kandinsky says that each artist feels a 'fresh breath' of the canvas surface before they start their work and that a false disturbance of its surface can be compared to a crime. Painting's plane is understood here as a material surface being the background for the painting's content. 'Everything that is not necessary to express the painting's content and would interfere with experiencing the content – the artist must remove from within the frames. Matched elements of the composition must be laid in such a way as to make the composition fill the whole field of the painting and fit within its frames which confine the painting.' For the purpose of architectural considerations, the notion of plan field (PF) has been adopted (in analogy to the painting's surface – PS acc. to W. Kandinsky) as both material and abstract background to its content [4]. A completely objective juxtaposition of elements on the plan, a completely objective PF cannot be understood in absolute terms. Absolute objectivity is impossible to achieve. What should be emphasized is that the nature of the plan field, the shape of its field and its borderlines are independent of the designer's capabilities. In practice, the designer has no influence on them. A schematic PS must be distinguished from the variety of PF dimension which occurs in reality. This fact is the source of great possibilities in composition.

Plan field borderlines

The plan field PF is limited by 'frames' on the outside, called Plan Borderlines PB. PB constitute a closed system made up, for example, of two horizontal lines and two vertical lines, lines forming polygons, polylines or curves, etc. which define this particular area as something independent of the surroundings.

A polyline being a germ of the plane boundary consists of two segments and an angle. The right angle is invariable as far as its size is concerned; it only changes its direction. In the case of the most regular structure, it forms a square. The simplest polyline may become complicated if several other lines are added to two existing lines. As a result, polygonal polylines making the boundaries, from the easiest to the most complex, may be formed by means of various combinations. They may be a sum of obtuse angles having the same arms of the angle; they may consist of obtuse angles and acute angles having the same or different length of arms; or obtuse, acute and right angles, etc.

The bigger the difference in length of individual segments of the polyline, the more complicated borderlines are created. Infinite variety of shapes of borderlines originates from curves and never loses some kind of similarity to the circle, even though a distant one, as they possess characteristic features and tensions of the circle. However, frames are not only lines providing outline of the field plan. The 'frames' of the field are first of all the boundaries of the surface on which the designer must place everything they need to express the content of the design (Figure 2).

Internal plane vs. functional plan field

A plane can be illustrated as a sheet of paper, a table surface or a flat field imagined as if extending "infinitely". In the architectural approach the building plan field is usually referred to as a building projection, defining the shape of a ground floor projection or that of individual floors, thus defining its outline form on each floor. In the urban development approach the outer outline is associated with the area cohesion of a plot geometrically separated from the neighborhood by means of borderlines determined by border bend points.

In both cases the planes can be measured and illustrated quantitatively, e.g. by means of a scale or an area. The planes have their own form and can be an object in a composition among other forms in the neighborhood or can be the field of a plan and become the object of composition. It can be assumed that in architectural objects the areas which constitute separate functional systems can be confined by means of internal lines. In turn, the lines constitute the borders of a functional plan (FP).

Planes plotted by the lines, i.e. forms are the plan field (PF) composition elements of an architectural complex. The functional plan (FP) is defined by the lines of internal division of the planes (forms). The lines are obliquely positioned in relation to one another. In a particular case, the formula of the planes contact may take a special form. Complying with the rules, parallelism and proper scale, the shape and position of the plan field (PF) may correspond to the form of the internal plane (Figure 3).

Equilibrium

The notion of Equilibrium is crucial for the achievement of a good

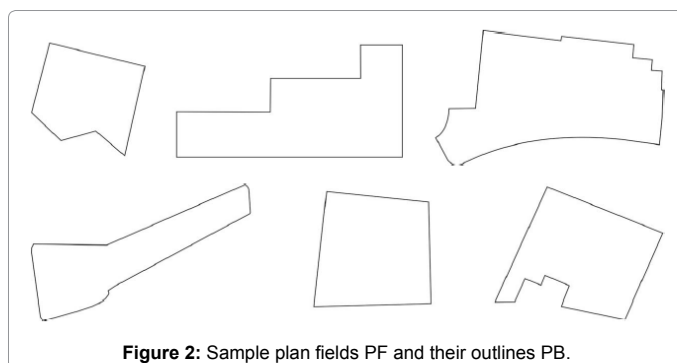


Figure 2: Sample plan fields PF and their outlines PB.

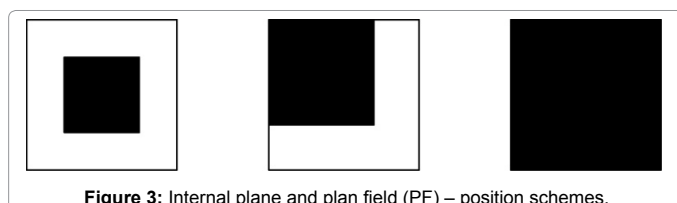


Figure 3: Internal plane and plan field (PF) – position schemes.

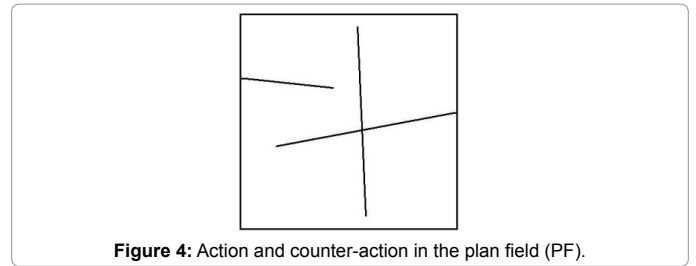


Figure 4: Action and counter-action in the plan field (PF).

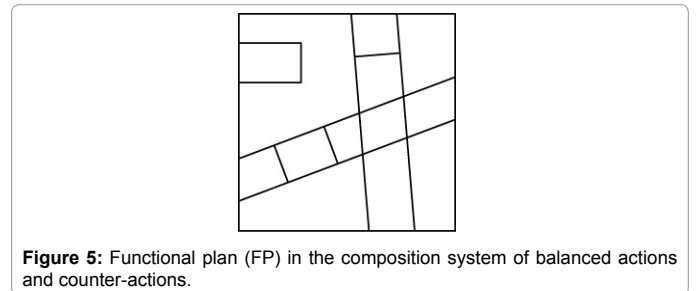


Figure 5: Functional plan (FP) in the composition system of balanced actions and counter-actions.

and harmonious composition. Equilibrium (Latin "balance") is almost equivalent to the notion of a good composition. In the process of assessment of any work of art, the existence of equilibrium or its lack is the same criterion as the criterion of colors matched in an interesting and purposeful way, or skillfully drawn shapes in a painting, or an interestingly designed space in architecture. Equilibrium is a state of 'reconciliation' between various clashing forces in the composition. R Arnheim writes: 'In a balanced composition all factors, such as a shape, direction and position, determine one another so much that no change seems possible and the whole work assumes the character of necessity in all its parts'[1]. When a composition fails to show the features based on the mutually-balanced forces, it becomes 'unintelligible' and seems to be random or accidental. As a result the work is unsatisfactory.

Oblique lines and asymmetrical balance

According to W Kandinsky, the best medium for considerations on the plan composition is a square being the plan field (PF). It is said that the square is the most objective form.

The structural framework of the square consists of its outline, diagonals, the line marking the centre of the square's height and the line marking the centre of the square's width.

There is yet another definition of the composition which is equally important. It was formulated by R. Arnheim who claimed that composition was a system of actively working forces and of other forces which he called "balancing forces". The application of the first ones can be named 'action' and the other ones – 'counter-action' [1].

Let's imagine a vertical line just placed on the square plane which runs very closely to the centre (action). An effort to balance this perpendicular would consist in contrasting it with the level positioned a little bit on the skew so that a slightly 'eccentric' expression of the latter could be achieved.

If additionally a horizontal line leans with its one arm against the right frame of the square, then we instinctively search for some kind of point on the left side to balance the former one (counter-action).

As a result, this simple dynamic composition assumes an entirely satisfactory shape (Figure 4).

Asymmetrical balance of functional plan (FP): Thus created is slightly more abstract and generally more interesting from a visual point of view than a symmetrical balance of the plan. Instead of placing mirroring FPs on both sides of the composition, the asymmetrical balance deals with objects of different sizes, shapes, shades or positions. The objects are located in such a way that in spite of their differences they balance one another on the plan. If there is a big object on one side, it must be balanced with several smaller elements on the other side. As a result, the whole composition makes an impression of a balanced one. In contrast with symmetrical balance, the asymmetrical balance based on oblique lines is most universal and can be applied much more often. In addition to that, the point of intersection of FP lines becomes an important element (Figure 5).

Focal point: A **focal point** is thus created and, whatever it may be, it catches the observer's eye. The focal point is a part of the plan as a whole and melts into its background. While composing FP, the necessity often arises to make a certain PF (plan field) element more distinctive than the others. It may be for instance a point of support of FP (functional plan) on the plan outline.

Instead of making the observer focus on matching different FP elements together, the method of **distinguishing** a certain element draws the observer's attention to a particular place. This is a message which should be 'read' and understood by the designer and noticed by the observer.

Sample Presentation of the Spaces Analyzed

Construction of agora shopping mall – regeneration of kosciuszko square

In 2006 the area located at Kosciuszko Square (Plac T. Kościuszki)

in the city of Bytom, Poland, was sold for 15 million Polish Zlotys to a Scandinavian company Braaten+Pedersen plus Partners. They built an exclusive shopping and entertainment centre there. This modern shopping gallery, called 'Agora Bytom', was constructed right in the city centre, on the site of the quarter of town houses demolished in 1979, between the following streets: Jainty, Dzieci Lwowskich, Piekarska and Kosciuszko Square. The shopping mall is situated at the exit of Dworcowa Street which is the main shopping street in Bytom. The body of the gallery was divided into 3 blocks interconnected by means of internal passages which meet under the canopies of glass-walled atriums. Four storeys of the gallery of the total usable surface of 55 000 m² house 120 shops and service points, big screen movies, numerous cafes and restaurants, office areas as well as a medium-size entertainment hall. The extended internal public space was also planned carefully: the visitors will be able to use the space of the central square and in front of the mall there will be a green square with benches and a fountain.

In search of medium of agora plan

In accordance with the research method adopted, the basis for the plan assessment is defining and reading (interpreting) the structural framework mesh? Vertical straight lines show power and grandeur. Horizontal lines express the sense of peace and stability. Oblique lines, in turn, are dynamic and bring tension onto the plan as well as make an impression of movement (Figure 6). It is known that the FP (functional plan) systems based on lines oblique in relation to each other and to the plan outline (PO) can be deemed a balanced composition if they meet certain criteria of action and counter-action in composition. According to Kandinsky, in the systems using oblique lines the intersections of

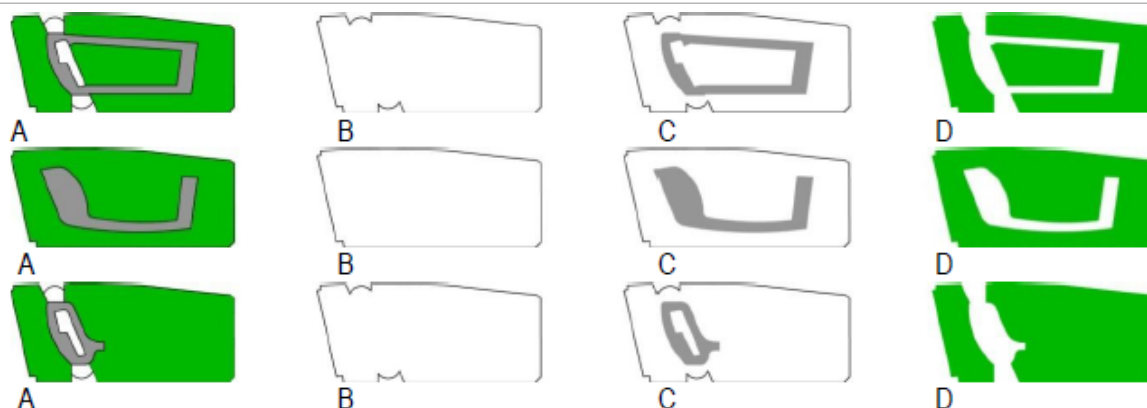


Figure 6: Sample control drawings for the plan field of planes in the constructed building. FP (Functional Plan) Sequence for selected overground storeys of Agora Shopping Mall. (A) composition, (B) plan field PF, (C) circulation system, (D) functional fields.



(a) Bytom Agora Shopping Mall



(b) Bird's-eye-view satellite photograph and functional system of Agora Shopping Mall

Figure 7: Shopping mall.

individual FP lines determine the so-called strong points of the plan field. These are the places where major elements of the composition should be located – significant elements of functional systems. The support points of oblique lines on the field frame constitute another vital aspect. The lines guiding the functional plan (FP) are the next important element of the plan composition. They 'guide' first the designer's eyes on the plan and then the observer's eyes throughout the object. Moreover, particular types of lines may emphasize a certain atmosphere of the interior. Additional emotions can be brought by curved lines, especially S-shaped, which reflect gracefulness and tranquility.

Figure 6 presents sequences of creation of such a plan on the basis of the plan field (PF) of individual stores of the building. While looking as if 'from the inside', it is noticeable that with the preservation of the plan outline (PO) all elements of the plan field on individual stores become subject to the system modification. Each of the elements of the functional plan (FP) is subject to modification, both in the area of fundamental fields (defining functional groups) and in the areas determining features (forms) of the most basic elements of the plan (the above-mentioned is especially visible in the presented spatial axonometry of the system (Figure 7). New distinguished areas come into being, focal points move or disappear. During the composition process the structural framework mesh is subject to deformation and the number of its variables increases.

Conclusions from CQC Method-based Assessment

An urban development plan, irrespective of the technique it was made with as well as regardless of whether it is similar or not to the real world, must always be ordered and composed in a well-thought-out

manner. There are no two plans-images composed identically or even similarly, yet there are certain principles governing the composition of elements constituting the plan image. The said composition process can be aided by Composition Quality Control (CQC), developed as an author's method for putting in order issues related to architectural environment design. Proper and skilful use of these tools may result in the creation of various kinds of atmosphere, feelings, emotions which can be experienced by the observers. Various effects may be achieved, such as statics, order, balance and harmony or the opposite ones, such as dynamics, chaos or imbalance. In the area of a negative impact of the object on its environment, the decrease in visual quality of the surroundings occurs by means of a considerable departure from the rules of composition. In the composition process of Agora Shopping Mall, its structural framework mesh becomes deformed and the number of its variables is growing. In consequence, a random factor is dominant, as a result of which a distinctly different composition of the plans on each storey is achieved. The functional plan (FP) may adopt many values on individual levels. The final modification lies closer to the theories of experimental plans than to well-known rules of composition.

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