Modelling (Simulation) and Reality

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Abstract
In a terms of studying and practical design a sufficient experience of analytic work of our lab shows, that the view of suggesting scheme on the same kind of process development is accompanied by sadden mistakes or conscious inaccuracies. Traditional conventions of architectural models same times with no paying attention to scale and size may drive to cause of distortion from the points of view to them. Power and possibilities of modern CAD initiates same sort of temptations and errors. For our point of view, solving the above problems is having same restrictions, one of which, may be – providing a visual coincidence of the videoframes of building site and it’s model done whether by small scale modelling or CAD. According to our practice a different methods of superimposing of real and designing spaces are shown in this article.

Introduction
The sufficiently great exerience of our laboratory’s analitical work under the conditions of educational and real projecting has showen, that the reflection of the proposed obejct in its various stages by traditional methods is often accompanied by casual or conscious mistakes and inaccuracies. To some degree it can be explained by the properties of the used means of presentations, such as e.g. small scale models, graphic representations (free-hand drawings, mechanical drawins, perspectives projected manually) computer models of various complexity.

Each kind of model makes it possible to describe and investigate certain properties of the space, ignoring inevitably a number of other properties. For example, it is possible to investigate by means of a model:

- spatial and three-dimensional organization of the model as a set of closed spaces;
- structure of the building including work of building structures;
- visual environment of interiors and exteriors - when examining the small-scale model by an endoscopic device or microvideocamera.

From graphic representation it is possible to use axonometric drawing to describe properties of the first item mentioned above, for the second item - epures, working drawings in orthogonal projection and for the thrid - representation of perspectives.

Evidently it is possible to get the most qualitative and complete description of the projected object with the help of computer models.
(We shall not dwell on comparative labour-intensiveness of executing various models - it has been discussed repeatedly including at our previous conferences). The model representations of space are united by their "virtuality", isolation from the real surrounding world even if its fragments (also modelled) are a component of projected representations (also simulation). It can lead to mistakes when deciding realization of the project. Our laboratory is occupied constantly with these problems. Let us examine a number of mistakes, which can be divided into three groups:

- mistakes in traditional reflection of designs displayed by means of videomodelling;
- mistakes in videomodelling caused by inaccurate original information;
- mistakes of computer modeling (including animation), caused by software-hardware possibilities of computer technologies and absence of coordinated restriction of representations. We shall base on fragments of work executed by us (with some of them participants of our conference are acquainted already) analysing them from a new point of view, different from the previous one.

1. Errors in Graphic Representations.

Offering a designed object for discussion, the author voluntarily or involuntarily faces a temptation to show it in the most effective way ignoring at the same time the possible difference from the future perception after the construction. At the last conference we showed videomaterial of a version of the museum complex project in Borovitskaya Square in the centre of Moscow. Near this site there stand such structures as the world-known Moscow Kremlin and the recently built Church of Crist the Saviour. So the main requirement when designing was consideration for the historic environment.

During preparation of design documents were executed panoramas (drawn by hand) seen from main directions of observation which the authors recommended to use when preparing videomaterial. One of the view is shown in Fig.1. Here the grandeur of the Church is stressed, and really it is a significant structure. The designed complex seems fairly small against its background. These documents were given to the client for getting permission for the construction.

However when we began to superpose at first the small-scale model (Fig.2), and then the computer model (Fig.3) with video shots taken approximately from the same point (superposition "virtuality" and reality) we were convinced (and demonstrated it to the authors) in its considerable difference from the original notions. Of course in this situation the panorama seen in Fig.1 was not included in videomaterial. The authors came to the conclusion about the necessity of making changes in the project (and using this time our technique in the process of the work to...
check solutions). The final result is shown in Fig.4.

Nevertheless some time after we handed in our videomaterial to the client a new competition for the designing of the Moscow Kremlin museums was announced.

The second example is connected with the project of one of civic buildings also in the centre of Moscow. Here the view of the designed building is shown which we received superimposing the real videospace with the model (M 1:200) (Fig.6a) and a watercolour executed by the author - a view from the same point (Fig.6b). Such foreshortenings can be often seen in various projects - they look out effectively, but cannot be seen in reality and not help to form true idea of the future object.

2. Errors in video modelling in the case of wrong original information. Here we can mention an example which we saw in one of the first works after which we began to pay greater attention to the accuracy of measurements in models offered to us for work. In the model (M 1:500) one of the existing buildings (used by us for superimposing with a real video shot - in the video shot the last left building corresponds to it) was shortened accidently by the man who made the model. It is difficult to notice this error without comparing with the real shot as the surface of the earth was not seen in the shot knowing that there were practically no uneven places in the relief on this site it was the horizontal measurements that we used for the superposition and it resulted in considerable enlargement of the projected building. (Fig.7). It is surprising neither the author nor clients paid attention to this mistake - we corrected it working at the second version of the project having checked out the dimensions of model buildings used by us (Fig.8).

3. Computer animation and reality. A special attention in video simulation should be paid to project got by purely computer methods. It is connected with practically unlimited possibilities of computers in this field and it exposes to temptation of getting effective, "trick" representations, sometimes to please the client but harmful for the future reality. The most characteristic thing is to use unjustified large angles of view, rather arbitrary trajectories and speed of moving while declaring them corresponding to the real ones. This misleads the observer and can harm solutions. If at the same time besides the designed objects the already existing space is modelled too (e.g. a real street in which some buildings are being projected) the great volume of processed information forces to put in considerable simplifications which produces a negative effect on the following perception. For example the demonstration computer movement along one of old Moscow streets with the aim of showing some buildings under reconstruction does not provide...
a real perception (fragment of one of diploma works) (Fig.9, Fig.10). As the provision of demonstrativving the similar and synchronic movement in a real video space and “virtual” computer one is not a sufficiently simple task realized in an educational laboratory we have chosen a variant in which fragments of computer animations of projected objects alternate with corresponding real video shots (with attempts to archive the same trajectories and speed of movement).

For example, originally the architekt prepared a purely computer variant of reconstructions one of Moscow sport complexes. The movement in the computer model, sufficiently conventional, did not make it possible for non-specialists to appreciate the offered solution in full measure. Using the main fragment of the computer animation (Fig.11) we have made corresponding video shots of the existing buildings which were to be reconstructed following the computer trajectories as near as possible (Fig.12). As it is easier to give the video camera movement characteristics corresponding to the behavior of a real observer the videofragments are perceived easier in this case in contrast to the computer ones. As a result this method oriented the observer better and helped to a positive solution.