BIM mess and BIM alternative

By Alexander Yampolsky, July 2015

BIM history is connected with the confusion, the essence of which is wrong understanding, what are the drawings.

The common misconception is that drawings are the views and projections. Actually, drawings are principal schemes.

What is the difference?

Principal scheme of reinforcing mesh and input data (parameters) for modeling or manufacturing of three particular reinforcing meshes are shown in Fig. 1.

Mark	Dimensions, mm		
	A	b	c
C1-10	1280	250	105
C1-11	1600	260	115
C1-12	1770	270	125

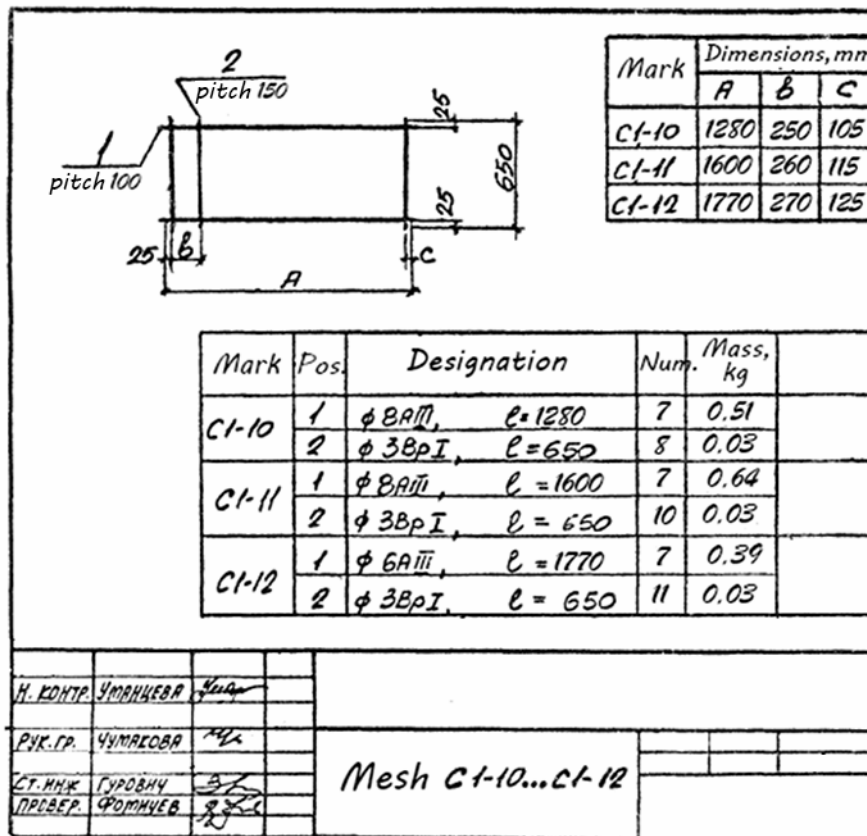| Mark	Pos.	Designation		Num.	Mass, kg
C1-10	1	ϕ 8AПI,	ℓ = 1280	7	0.51
	2	ϕ 3Bp I,	ℓ = 650	8	0.03
C1-11	1	ϕ 8AПI,	ℓ = 1600	7	0.64
	2	ϕ 3Bp I,	ℓ = 650	10	0.03
C1-12	1	ϕ 6AIII,	ℓ = 1770	7	0.39
	2	ϕ 3Bp I,	ℓ = 650	11	0.03

Mesh C 1-10...C1-12

Fig. 1. Principal scheme and parameters of reinforcement meshes
(working drawing)

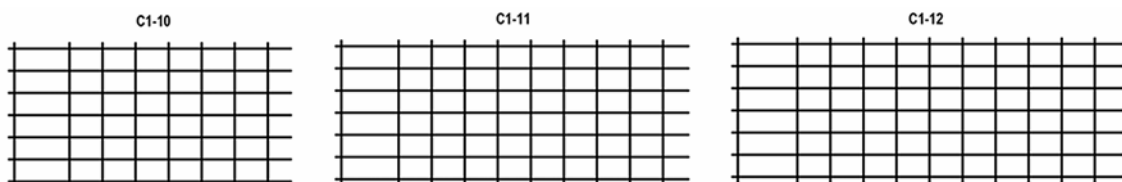Fig. 2 illustrates meshes projections which you can quickly get from the information model.

Fig. 2. Projections of reinforcement meshes

Projections are not of interest. They are less-informative billets to make drawings.

Let us talk about principal schemes specifying their main special features.

1. Principal schemes are linguistic structures comprising conventional symbols: texts and simplified pictures. Symbols in construction drawings are standardized. Concerning each symbol, there is an agreement how and in what context the symbol should be interpreted.
2. Principal schemes are primarily focused on human perception and interpretation. It is a mean to explain things from a person to person, a mean to achieve understanding. Everywhere - in science, technology, art - principal schemes are used to explain the essence of anything.
3. Principal schemes are primary with respect to any construction.
Buildings are constructed according to standardized principal schemes (drawings).
Programs for information modeling also use principal schemes for model generation. Any object input box in these programs is a principal scheme - a set of conventional pictures supplemented with text and numeric parameters.

So, drawings are principal schemes.
BIM theorists claim that it is not good that the focus on drawings is the cause of stagnation in structural designing.
"...There are two strategic limitations of drawings:
(1) they require multiple views to depict a 3D object in adequate detail for construction, making them highly redundant and thus open to errors;
(2) they are stored as lines, arcs and text annotations that is only interpretable by some people; they cannot be interpreted by computers".

Regarding item (1), without going into details, I can say that just information models are monstrously redundant from the point of view of comprehension. Indeed, instead of one member of a group of similar objects (e.g., a joint or a detail), thousands of clones are in the model. A huge amount of details results in disorientation of the observer and hiding of the sense of the observed matter.
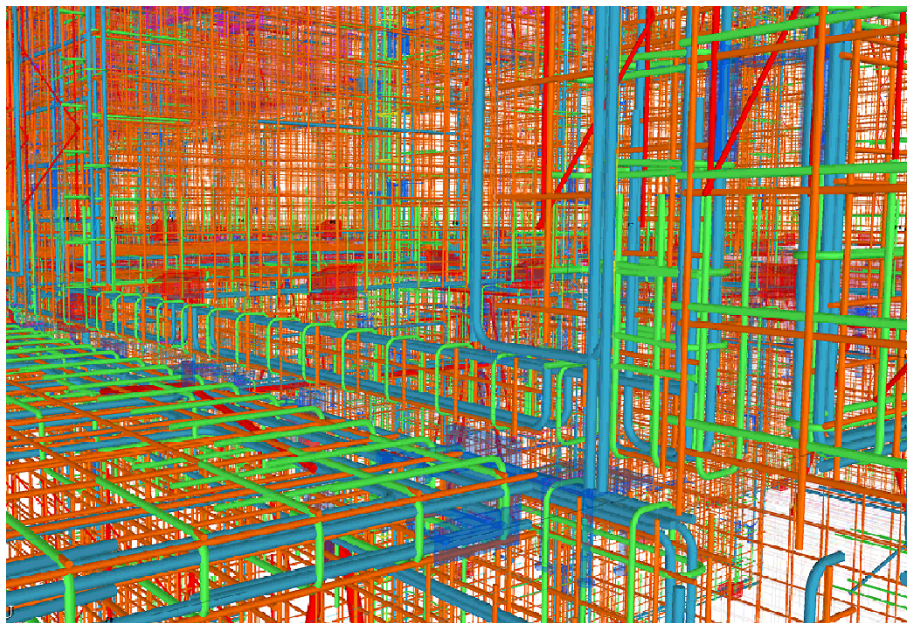

Fig. 3. Reinforcement cage of the building
(information noise)

The statement given in item (2) is out of date. "3D-interpteter of work drawings" is yet created and available for testing.

The following statement was put as one of the main claims to 3D-interpreter during the discussion:

"...Model development using work drawings as the input data is quite complicated and required high proficiency. Modeling in BIM software is easier and more vividly".
This claim is serious; this refers to fundamental comparison: BIM vs. traditional designing.

In BIM technology, the emphasis is made on a model. Drawings, if they are necessary indeed, are the secondary matter, just views and projections of the model. BIM theorists claim: based on correct model, correct drawings are worked out automatically.
That is not so.
Suppose you have absolutely correct model. If you appoint an insufficient number of views and sections or appoint them in the wrong places, you will receive incorrect work drawings. As a result, not quite the thing, which is built in the BIM software, would be constructed on the site. All model validations using the clash detection software would be a waste of time.

There is only one way to verify accuracy of drawings - to build the model under these drawings. Until recently, it was impossible. Now, 3D-interpreter creates under drawings an electronic copy of the building, which would be built on a construction site using the same drawings. If the drawings are wrong (for example, not enough sections are set, or they are set not in the right places), the model will be incorrect; and you will find this fact either through visual examination or using the clash detection software.

Then the question arises – is it not possible to refuse the drawings. They need only to humans, so let us get the man out of the building. 3D printer can operate based on the data contained in the model. It does not need understanding; and, therefore, it does not need drawings.
Unfortunately, it is speculative fiction. Building and facility management is not the field that you can entrust to machines. It is the field of unforeseen risks and uncertainties. Who will take decisions that affect the life of many humans? 3D printer?

BIM concept has birth defects. Nevertheless, BIM evangelists urge to blow up the established order, thereby creating a lot of problems that do not exist now.
Is there an alternative?
It really exists. Designers must learn to make interpretable drawings and developers must learn to make reliable interpreters. It is not a revolution. It is the following step along the path that designers of pyramids have started to make yet.

References
1. Program "3D-interpreter of work drawings" may be downloaded from the page:
http://3d-int.ru/english.html
2. Article "How to make interpreted drawings" may be downloaded by link:
http://3d-int.ru/How_to_make_interpreted_drawings.pdf