Anita PAWLAK
Silesian Technical University,
The Centre of Geometry and Engineering Graphics,
ul. Krzywoustego 7, 44-100 Gliwice
tel./ fax: 0-32 237 26 58, e-mail: anita.pawlak@polsl.pl

SHAPING GEOMETRICAL FORMS OF BUILDING OBJECTS IN THE LIGHT OF DEVELOPMANT OF CONCRETE TECHNOLOGY

New directions in the development of concrete technology influence shaping of 'building landscape' which in the recent years has experiences many transformations.

The paper includes short historical outline of concrete as well as description of development of this material. In the simplified way, by means of a scheme, estimated time of chosen types has been determined, beginning with regular concrete (Fig 1).

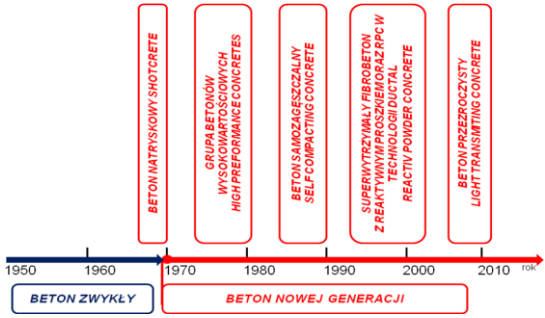

Fig.1. Time frames spanning introduction of particular types of concrete

Regular concrete is used till today however, it is rarely used without admixtures or additives which improve its quality. Currently it is mainly used in family housing. For construction of special objects with complex shape or difficult conditions of building-in, modified concrete is used i.e. modern concrete included in a new generation of concretes. Many types of this material can be differentiated but the most common ones has been chose:

- selfcompacting concrete (SCC),
- shotcrete (SN),
- high performance and ultra high performance concrete (BWW, BBWW),
- reactive powder concrete (RPC),

- ultra high performance Ductal concrete ,
- light transmitting concrete

The above mentioned concretes except for light transmitting one can be characterized by extraordinary durability and possibility of fast realization in an engineering task. What is more, their mechanical properties such as high resistance to compression or extension, which has been backed up by means of using microfibers, allow free shaping of object geometry. Plasticity and ability to self compacting result in a fact that we can use it in places which are hard to access.

From geometric aspect common index for regular concrete and modern one is the fact that we can find examples of usage of both of them in such object forms as ruled surfaces, including Catalan surfaces or screw ones, or rotary surfaces e.g. sphere, parabola or hyperbola. Nevertheless, modern concretes become an alternative to architects, who by aid of computer aided techniques create surfaces of complex shape. Many examples can be given of mutual intersection of surfaces, their difficult connection (Fig.2) or the usage of Bezier's surface as inspiration for creating object form.

Fig.2. A bus stop in Casar deCaceres in Spain.

Additionally buildings made of these concretes are often the ones of significant sizes and unusual esthetic values, for examples those with light transmitting concrete (Fig. 3).

Fig.3. An example of usage of light transmitting concrete wall.