Jana Šafránková

SURVEY ON SUSTAINABLE DEVELOPMENT IN THE KNOWLEDGE OF CIVIL ENGINEERING GRADUATES

Introduction

The concept of sustainable development is currently used in many areas of human activities and relates to the assessment of their impacts. There are many definitions of this concept but usually it is understood as such economic, social and technologically possible development to satisfy the needs of present generation without endangering the possibilities of the future generations to satisfy their needs. In the key Czech Act on Environment of 1992, it is understood as such development, which keeps the possibilities of the present and future generations to satisfy their needs and at the same time it does not impact biodiversity and preserves natural functions of ecosystems.

To consider the sustainable development in the branch of construction and building we can see that many of the surroundings in our space are the built structures.

Man needs the built structures for:

- The place to live in,
- The place to work at (in the last decades, the majority of people in Europe and US do not work in agriculture, so they need the built structures for their work),
- The mobility in land (roads),
- The entertainment and recreation (theatres, cinemas, restaurants, shopping malls).

In this context we consider the issue what are the social aspects of sustainable development in the frame of construction and building and what skills should the graduates of the Civil Engineering Faculty master.

These issues have been in the focus of the research at the Faculty of Civil Engineering of the Czech Technical University in Prague already for three years with the contribution of the Department of Social Studies. There are two main research projects "The Aspects of Environment in Construction" and "Management of Sustainable Development". These research project are linked to the process of preparation of the Czech companies to enter the EU construction market. This process is supported by theoretical and applied approach from the point of view of philosophy, sociology, psychology, law and economy. The entire field belongs to the widely discussed issues of environmental protection and at the same time it belongs to the basic duties of enterprises, businessmen and state not only in the Czech Republic but also in all developed countries of the world.

Social aspects of construction impacts on the built environment and citizens.

Construction activities impact the environment. Built structures and mainly the major ones are of high impact on the area, where they are located. They take part of the country and sometimes change also the landscape. The impact of construction and building activities is difficult to solve and difficult to describe by technical means only.

Each building structure is being built primarily for the purpose of effect. The effect is of different meaning for various professions:

- for economists - profit (financial),
- for producers or developers - profit,
- for future residents - dwellings,
- for politicians - employment opportunities in the region, dwellings,
- for sociologists - stability of social system,
- for ecologists - preservation of natural environment.

Each of the involved parties proposes its usually "complex" solution based on preference of different effects and needs and resulting limitations. The key assumption is that the parties must have clear priorities. However to take the social aspects into account there must be co-operation between technicians and sociologists and psychologists, supported by acts and directives, as it is becoming natural in the practice of western countries (Šafránková, Fidler, 2001)

The information needed for analysis of social impacts of construction activities is offered by sociology:

- information on current state of the art in the affected newly built area and analysis of possible negative and positive impacts on citizens,
- sociology can prepare the case study of the area since each area is specific,
- sociology can participate in the process of information of the citizens and identify public opinion,
- to monitor and analyse the ex-post situation in the area, e.g. whether the residents accepted the building structures and spatial organisation as it has been designed and how they are getting adapted to it.

In the frame of social impact assessment on the citizens, it is necessary to analyse the following factors:

- number of affected citizens and the size of affected area,
- economic impacts, changes in ownership, employment,
- social and demographic structure of the region and area,
- existing and future potential of the area when taking account of the purpose of building structure,
- difficulties with the construction process and the impact on the area in use,
- impacts of building structure operation, safety risks and impacts on transport infrastructure,
- aesthetic impacts, impacts on cultural heritage, impacts on ethnic minorities, disturbing of habits, psychological impacts.

Social aspects and social impacts are related to the impacts on employment, to health state of the population and also the secondary impacts on social infrastructure are considered. Well-being of the population can be disturbed by noise, dust, air pollution or aesthetically wrong location of the structure in the landscape. The impacts of special concern come from the fear of unfavourable health effects or threats of accidents of various risky building structures. These fears can result in the permanent stress for sensitive people, which really damage the health. Unfortunately, the majority of such evaluation can be only in the state of prediction of future impacts.

These issues are currently embedded in the procedure of Environmental Impact Assessment (EIA). The analysis of social and psychological aspects of the impacts of redevelopment process in the area is related to the Czech EIA Act No. 100/2001, which in the procedure of EIA takes into account the social impacts and assessment of impacts on citizens and environment.....impacts on property and cultural monuments, and others. As it results from the EIA Act of 1992 and its amendment in 2001, in the Czech Republic there are followed mostly the impacts on environment from the point of air, water and soil pollution, biodiversity and electromagnetic field.

Social aspects of the EIA process are the least discussed part of environmental protection and at the same time the social impacts on citizens are not clearly articulated. The key question is which factors should belong among social aspects, how to analyse them and gain information and what should be their role in the EIA procedure.

In the Czech EIA Act there are included the following factors:

- the impacts on population and environment must be assessed, including landscape, real estate property and cultural monuments under legislative protection and their synergies (article 2),
- record, description, assessment and evaluation of expected direct and indirect impacts of implemented and non-implemented proposed development (article 5.1),
- the proposer must always state the outline of the main feasible alternatives and the reasons for the option of the alternative in relation to environment (article 6.2), and submit the expert review done by authorised person (Šafránková, 2001).

The basic problem is that neither in the Czech EIA Act nor in the related directives these problems are tackled from the social point of view and thus it is not clear what everything has to be taken into account by the graduates of the Civil Engineering Faculty.

The same approach it is possible to use in social impact assessment of brownfields. Brownfields are the areas with new uses in the formerly built areas, mainly the industrial sites. Current European trend shows that it is not possible to build only on greenfields but it is necessary to focus on regeneration and redevelopment of the non-used areas. Civil engineers and architects think of new use of these areas from the point of view of redevelopment and new investments. Sociologist and often also psychologists can see the social, cultural, psychological and also aesthetical aspects of the area concerned.

Social aspects in relation to brownfields:

- Social approach: newly built area will bring new opportunities for production and business, which means the employment opportunities. It can also open new residential areas in downtowns; cultural facilities for various social groups, administration floor space as well as improve social communication of people within urban areas.
- Cultural approach: it will bring new identity for the area (contrast to the former industrial or military use, new image of the area with new land uses).
- Aesthetical impacts (to design newly built area in order to achieve good social atmosphere and attract local people).
- Impact on cultural heritage (the design and image of building structures to be suitable for future generation).
- Other aspects are in other fields, e.g. the impact on ethnic minorities in vicinity of the area concerned or disturbing the habits of the citizens in negative/positive sense, or it is even possible to extend leisure time facilities and influence psychological aspects of living in new areas.

Sociological survey as one of the ways to obtain information.

The background for solution of social issues should be sociological survey and sociological analysis of the problems in the frame of which the following topics should be tackled:

- survey of public opinion and standpoints - focused on perception of people about the development proposals,
- survey of motivation - focused on what people think or do,
- survey to find out social and economic tendencies,
- survey of evaluation - focused on rating the success of public participation programmes in comparison with the wished objectives.

The results of these surveys offer valuable information and guidelines for acting that are very important for professionals.

In the surveys it is possible to use these main techniques:

- Public opinion polls - to identify the standpoints and motivation of target groups, estimates their possible acting and behaviour.
- Observation - to see behaviour of people in various situations as well as their reactions to stimuli.
- Panel situation - measuring of changes in the standpoints, opinion and behaviour of the citizens in the course of the process in order to use the results in favour of regeneration.

These techniques explore the reactions of the citizens to the development proposals; the support to the problems can be measured as well as the influence of various interest groups, e.g. environmentalists as well as the degree of public awareness of the issues of concern (Šafránková, 2001).

Knowledge of the Civil Engineering Faculty students on sustainable development

The knowledge the students of the Civil Engineering Faculty of the ČVUT should be equipped in relation to sustainable development of the construction process and building structures are directly linked to the environment and from the point of view of sociology also with urban sociology that focuses on all aspects of human settlements.

Theoretical sociology does not deal much with these issues in recent 20 years. The last book " The Nascent of the City", (Horská, Maur, Musil , 2001) prevailingly tackles with spatial issues of the settlement structures. In the introductory paper to the monothematic issue of the Czech Sociological Journal the author M. Illner states that there are many socially significant urban problems in our current society that challenge sociological analysis (Illner, 2003). Among the problems which impact socio-spatial structure of the cities belong: residential segregation, suburbanisation, depopluation of the city centres, revitalisation of housing estates, revitalisation of industrial areas and their integration.

The next important sociological issue is the development of urban society with its spatial impacts. In the case of Czech society, the most important issues to consider are:

- high stagnation of urban population, changes in demographic structures,
- changes in socio-economic structure of the citizens - the share of the employees in industry radically decreased and the share in the tertiary sector increased,
- number of unemployed people in the cities increased,
- privatization changes the relationship between the owners and often also the conditions of dwelling,
- part of transformation of urban society is deepening of socio-economic disparities,
- slow but irreversible is the ethnic, national and cultural heterogenity of the citizens,
- big cities expand in their surroundings and form metropolitan regions (Illner, 2003)

What knowledge of these issues should the students of the Civil Engineering Faculty take for their professional practice?

- Knowledge on characteristics of current society and its gradually changing social structure. The main trend is decreasing number of people employed in industry and, increasing number of people in middle class and increasing richness of small layer of upper class.
- Social needs for housing relate to the characteristics of social groups, from the point of view of the status and age. There are different needs for housing, working and living conditions between various social and age groups.
- The graduate should know about the social needs and behaviour of different social groups and their perception of space, communication, materials and colours, which contribute to better feelings of man in his/her environment (with the awareness that it can be highly individual).
- Other issues relate to awareness of continuity in the built area and life-long existence of building structures and communications, from the historical point of view as well as from socio-cultural point of view.

- Continuity in land-uses of urban areas is very important for changes in the process of redevelopment and mainly for new functions in the areas, e.g. brownfield regeneration schemes.
- The graduate of civil engineering should be aware of social aspects of the EIA procedure.
- The graduate of civil engineering should obtain some information on the opportunities to use sociological surveys on the above mentioned and other issues. He/she will not be the manager of sociological surveys but should be acquainted with them.

Conclusions

The knowledge of the Civil Engineering Faculty graduates about the issues of social aspects of sustainable development should be not only part of their equipment but also the inevitable part of management of each building company, mainly this, which acts in the living environment.

There are several other questions to think of:

- At which level of decision- making should be the responsibility for social impacts of building structures taken - at the governmental level or local level?
- What knowledge of communication with the public and social impacts on the citizens, i.e. from applied sociology should the civil engineer master?
- What competences should belong to the civil engineers based on this knowledge?
- In the decision-making procedures there should be the balanced conditions for technicians, economists, sociologists and ecologists, i.e. we are searching for such solutions that can be implemented in a feasible technological and economic way and at the same time with the least possible negative impacts on environment and with minor socio-psychological impacts on the citizens. In which way is this problem possible to solve?
- Is it possible to determine and describe the differences between local and global needs of the society?

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