

SPATIAL AND URBAN PLANNING AND DEVELOPMENT IN EARTHQUAKE-PRONE AREAS

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Introduction

In man's coping with natural and other environmental hazards, modern urban planning and design can be seen as a major preventive instrument. At least on one side, while on the other side these activities seem to influence only a minor portion of environmental change. Leaving aside some of its historical aspects, e.g., the tradition of the fortified city or the recommendations of Vitruvius and others for selection of safe and healthy sites on which cities ought to be built, one is inclined to observe the history of modern urbanism as an account of activities aimed primarily at the concentration of internal urban functions, e.g., resident, production and consumption, transportation and recreation. Even the great methodological turning point initiated by Sir Patrick Geddes with his dictum "survey before plan" has meant more for the consideration of general physical, social, and economic conditions of the site, the population and its activities, than the considerations of the problematique with which we try to deal in such specific areas as earthquake engineering, or the mitigation of earthquake impacts in human settlements, for that matter.

A number of major earthquakes and other natural disasters, as well as the awareness of the fragile state of international peace and security, have--in my view--only during the last decade or so brought about a more organized and systematic specialization in urban planning and development. Therefore, it seems natural and necessary that a series of international professional deliberations on earthquake engineering end up with a link to the broad field of social and economic aspects of earthquakes and of planning to mitigate their impacts.

This being said, one must mention that the planning and development criteria introduced to increase the resistance and the resilience of both human settlements and their component parts have been appropriately formulated to cope with a variety of risks or catastrophic impacts. It is definitely very difficult, or even inappropriate, to differentiate too strictly among the requirements imposed on urban planning and development for reasons of safety against natural or other disasters. Such complexities become particularly relevant when we start to deal with various aspects of disaster-relief actions, e.g., immediate help to the affected, evacuation, temporary housing. etc.

Coming back to the more specific examination of the role of environmental planning and development, we would like to emphasize two essential conditions, related to the qualitative characteristics of our activity: First, in this context (and, of course, in many others), planning and development of human settlements ought to be seen in its broader spatial interdependency and its more narrow (physical) relationship with the building itself. Secondly, it is important to be aware of the basic nature of planning achieved or practiced in a given country, e.g., is planning primarily a corrective or an adaptive activity, or is it of more innovative or comprehensive character.

As far as the first characteristic is concerned, planning acts and documents at various levels serve to ensure upward and downward coordination. But, the second characteristic seems to be more demanding for one principal reason. What we have in mind is the fact that the incrementalism of adaptive planning and the holism of comprehensive planning do present themselves as two poles of one dialectic pair. By its virtue such a relationship helps in simultaneously dealing with the detail and with the general structure of a given system. In reality the two poles could be dealt with in different institutional frameworks, but they can still jointly influence most important decisions.

In this paper, a short account will be made of Yugoslav urbanism before the Skopje earthquake of 1963, and paths it has followed in the aftermath, since the catastrophe of the capital city of the Macedonian Republic does represent a point of reconsideration of many professional criteria in our country. At the same time, it is interesting to compare this concrete experience with the urbanistic consequences of the Ljubljana earthquake of 1895. Before I limit myself to the generalizations necessary for the presentation of "the state of the art in Yugoslavia," based on such examples, let us remind ourselves that we deal with two completely different historical and social cases. The Ljubljana earthquake at the very end of the last century was a relatively modest event, although it caused considerable damage to buildings, including some important historical monuments which were lost forever. The memory of this earthquake was very much alive with the elderly until recently, and it renders a theme, obviously worth exploring in fiction and even in a movie. It brought to this provincial and sleepy capital of the Slovenes a considerable reconstruction effort, followed by local entrepreneurship, and it also occasioned the birth of Slovenian town planning.

There was a design competition for the new master plan in which at least two important figures of that time participated. Among others who submitted entries were Camillo Sitte and Max Fabiani, the first of whom became later a world symbol of the "culturalistic" approach in urban planning while Fabiani during the years to come engaged as his assistant a young Slovenian architect who ultimately became the principal author of the first city plan of Minneapolis, Minnesota. This was Ivan-John Jager. Fabiani's urban design structure, further developed by local architects, became an extraordinarily persistent system controlling the formation of the central urban area for many decades. The Austro-Hungarian Empire poured in assistance, of which the most visible were three complexes of military barracks designed in the best tradition of 19th century eclectic architecture.

The lesson to be learned from this case--deliberately introduced here with a few anecdotes--repeated itself many times later on. The concentrated reconstruction effort, the reevaluation of the city's function, and similar circumstances gave a strong development impetus, followed by the influx of new population and many other coinciding factors.

Skopje in 1963 had a population of approximately 180,000 inhabitants. It was the fourth largest Yugoslav community. It now has more than 400,000 inhabitants and is the third largest city in this country. The Skopje earthquake was one of the most severe in Europe in recent times. Within five seconds more than a thousand people had been crushed to death, three times as many injured, and 150,000 rendered homeless.

By the nature of the emergency which prompted it, the Skopje Urban Plan Project was unlike any other operation of its kind. It was undertaken by the United Nations Special Fund, and brought together some of the best talent in urbanism of our era. The impressive volume, titled Skopje Resurgent, became not only a monumental account of the UN town planning project but also the first reference book for students of disaster relief.

The massive material assistance of the international community, and above all of the citizens of this country, the heavy emphasis on development of technical and social infrastructure, and the over-all situation of regional development in southern Yugoslavia, have been crucial causes of the extraordinary growth and change of Skopje.

The two examples cited, and the spirit of their presentation, could be interpreted as valid arguments for natural disasters as triggers of accelerated development. While they in fact remain such, these cases were brought forward to indicate another argument, i.e., the change of attitude within the planning profession, both locally and on the international level. In a certain way this Conference seems to be a late aftermath of all these events, of course strongly "supported" by other sad events that have occurred in recent years, at the least: the earthquakes of Banja Luka--Bosanska Krajina (1969), of Friuli and Soča (Isonzo) Valley (1976), and of the Montenegrin coast (1979).

All this brings us to the essential questions of the frame of reference for our theme. I am indeed far from the ambition to assume that a complete frame of reference could be presented in one paper of this kind, but I also think that our Conference will help to build one to the degree needed for the articulation of adequate urban planning and design criteria for human settlements in earthquake-prone areas. I am probably sharing the views of many others, if I say that what we have right now are simply fragments of empirical knowledge and a very initial embryo of a relevant general theory.

Let me suggest (with no further explanation) that a possible frame of reference could be constructed around the following structure:

THE (EVOLVING) CONCEPT OF CONTINGENCY PLANNING

Institutional and Methodological Base	(permanent vs. emergency)
Planning and Design Criteria	(common /for disasters/ vs. specific /for earthquakes)
Information Base	(past vs. new experiences)

The State of the Art in Yugoslavia

Concepts

Among several innovations in Yugoslav planning two are particularly important and have permeated methodological discussions for several years. The first, and indeed the essential one, is the concept of self-management planning. It is an instrument of direct democracy, obliging the self-managing subjects, i.e., the basic organizations of associated labor, the self-managed communities of interest, and the local communities to play the primary role in the planning process. The second is planning for contingencies, manifested in an ever increasing importance exerted by the aspects of civil defence, disaster prevention, disaster relief facilitation, and defence and security in general.

The nature of the socio-political organization is dual, i.e., one of the state and the other of self-management exist side by side; various levels of government (and self-management organizations and communities) are engaged in the encountering planning process. This process is especially emphasized on the level of local government, the municipality, and/or the commune.

The normative concept is, as usually, much more evolved than the reality of new planning practice, but since the introduction of the new system of planning in 1974, considerable progress has been made and sophistication achieved.

Urban design in modern terms, meaning spatial and morphological conceptualization of planning and goals parameters, has not been fully integrated into the new planning system as yet. It nevertheless shows several new characteristics, primarily in the area of synchronization of site planning (and designing) with the mid-range (5 years) societal planning targets.

Urban planning and development find themselves linked to the governmental institutional structure on one side, and to the socialized decision-making of the self-managed subjects on the other. Different stages in the programming, designing, and implementation processes are functionally linked either to the binding legal requirements of the state or to the "contractual" obligations formulated by the self-managed societal factors.

Let us use an example from the area of contingency planning. The self-management part of the role dwells at the level of an organization, or a local community, or a self-management community of interest. It takes care of defence and prevention requirements at this level, including the co-ordinating procedures of self-management negotiations

(of self-management subjects among themselves). On the other hand, the Communal Assemblies, and respectively the Assemblies of the Republics provide for choices of strategies and goals.

Regional Planning

At the level of regional planning which, in fact, begins at the level of one or more communes, the most important concept, emerging particularly in the S.R. of Slovenia, is the concept of polycentrism. Polycentrism means balanced development, means conscious decentralization (and deconcentration), and means--above all--a source of mobilization of creative forces of the community at large. The concept of polycentrism is visible in the system of settlements or in the network of urban centers. The inherited structure of distribution of settlements over the territory, excellent accessibility and other natural and anthropogenous factors, here definitely enhanced the polycentric pattern of development, although political reality sometimes drives it into an exaggerated dispersion or fragmentation.

The self-managing system as the basic characteristic of our socio-political reality, the awareness of the exposed position of this country (in all aspects), and the resulting forms of contingency planning, and finally the concept of polycentrism of development, form the background against which a short--but much more concrete--description of planning and development technicalities and indeed, dilemmas will be depicted.

Structural Planning Level

Here we deal with the human settlement as a whole and its immediate physical and socio-economic hinterland. The plan is long-term in principle, but must contain implementation strategies. The last "generation" of plans is gradually turning towards a very pronounced emphasis on the information base and information flows.

If we remain in the domain of seismic contingencies, we must remark that this level of plans includes a seismological analysis and seismic zoning (microseismic regionalization). On the basis of this the detailed criteria for site plans are established, taking into account social and economic (or even financial) considerations connected with a seismic contingency.

The second relevant element of the contents is the spatial articulation of urban areas, observing similar considerations as above.

Next are the communal facilities systems with a seismological sensitivity analysis, then the communications corridors, etc.

Contingency planning components bring into structural plans alternative land uses in the case of emergencies, provisional housing, and other areas, etc.

It is beyond any doubt that the legal requirements and by-laws, guiding the preparation of plans in many instances do not correspond with the reality: the real environment meaning lack of funds for analysis, lack of qualified professionals, difficulties with implementation of land use policies, let alone the land management problems.

Detailed Planning Level

On this level, the configuration of the built environment is expressed, and we tend to link here the translations of broader urban planning and development criteria with architectural and engineering aspects of structures themselves. The latter enable us to apply very detailed structural requirements as far as seismic risk is concerned. It is here again that the mitigation of earthquake impacts must be explored and presented in operational detail.

There is one most important factor to be considered on this level of planning and development and that is the attitude of population. It spans all the way from cultural values to the time-budgeting of the individual households. Our people show a dominant preference for individual homes, they are to a large degree engaged in private initiative, as far as housing is concerned, and they also tend to cultivate a very close relationship with the social and physical environment of their origin. These attitudes are most relevant elements of any contingency planning, but as such they are not easy to cope with.

The level of economic development, and the inherited problems with housing shortage, underdevelopment of urban facilities, and many other aspects are forcing the planners into many extremes as far as settlement densities, urban development strategies, and the like are concerned.

It is probably not necessary to repeat the well-known fact that the detailed planning level is to a maximum degree linked with forms of implementation. Thereby we try to maximize the earthquake contingency criteria at this level, too.

The Problems of Conflicting Criteria

Paradoxically enough, the concept of contingency oriented urban planning and development is rather pronouncedly provoking many conflicting criteria. The planners and designers are often willing to leave their resolution to political decision making.

We do not have time to enter a thorough analysis of such conflicting criteria, but we must mention a few:

- construction economics vs. earthquake safety (expressed on one side by the height of buildings and by the density, and by the limitation of both on the other side);
- social vs. engineering aspects of settlement pattern: (compact and "socio-petal" as against dispersed and "socio-fugal" patterns; individualistic vs. controlled; continuous vs. intermittent patterns, etc.);
- architectural variety vs. safety conditioned compactness, etc.

It is clear that we should not aim at any polarization when faced with such dichotomies, but the right choice of the intermediate solution still seems to be a real art. Our own experience indicates that multiple hazard prevention requirements help. In other words, the choice depends not only on earthquake considerations, but also fire destruction, contamination, and other rights.

The problem of conflicting criteria is especially grave when we are faced with lack of buildable land, high cost of communal infrastructure, housing shortages, etc.

Detailed Urban Planning and Design Provisions for Alternative Uses of Urban Spaces and Facilities

The general guideline is simple: make possible the quick alternation of land uses and facility functions; a park becomes a hospital area, or a housing estate, a square or a stadium becomes a site of improvised municipal government offices. These examples are not fictional, the author saw them in Skopje and Banja Luka. The improvisations had a charming appeal in spite of the tragic circumstances. Both cities have later become planned in a more spacious fashion.

Our contingency plans provide for alternative uses and also for alternatives of the alternatives. In technical terms such provisions are integrated in the overall contingency plan and are not discussed publicly. The imminent problem of adjustment is solved later at the level of the local community civil defense system.

There are two elements of a conventional urban plan or site design which are extremely sensitive in terms of alternative uses, and indeed also in terms of generic use in the contingency conditions. These are roads and streets and communal utilities. We know of one general recommendation which states that sub-systems which are capable of functioning independently must be foreseen. Obvious as such a recommendation is, it is not easy to fulfill principally for economic reasons of high initial investment costs and of demanding maintenance.

By and large, the planning and development criteria, stemming from the evaluation of future contingencies, require a certain time to enter into the subconsciousness of the planner's or designer's working process. Once they are there, they in fact enrich the argumentation for additional open spaces, articulation of urban spaces, amount of greenery in the settlement, order in the pattern, etc., etc.

More elaborated planning and development controls, requested in the more responsible contingency planning system, must work against some of the concepts or habits in current urban development philosophies of the general public. For example, some limit must be imposed on the concept described as "freedom to build." Similarly the laxness of land policies ought to be corrected. Eventual loss of human life and property and of cultural values is hard to compare with the above mentioned advantages, often advocated in the populist jargon of socially sensitive planners of today.

REFERENCES

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