REPUBLIC OF MONTENEGRO

MINISTRY OF INTERIOR AFFAIRS

REPORT OF MONTENEGRO FOR THE UNITED NATIONS' WORLD CONFERENCE ON DISASTERS REDUCTION (WCDR, Kobe-Hyogo, Japan, 2005)

Component I POLITICAL ORIENTATION AND INSTITUTIONAL ASPECT

1.1 A national policy on disasters risk reduction does not exist in Montenegro. Due to its multi-disciplinary and multi-sector nature, managing disasters risks as well as protection and rescue in the case of extraordinary situations and disasters' alleviation, falls into the field of interest of many different institutions which, because of the quality coordination from the state level, requires a clear definition of the roles and responsibilities of all the participants in this process that is extremely significant to the state.
Despite of very enviable experiences acquired after the disastrous Montenegrin earthquake of 1979, as well as exceptional contributions in managing the seismic risk through the spatial-city planning arising from a very well known project UNDP-YUG/79/104 (*Spatial plan of the Republic and general town plans of Montenegro municipalities' centers*) which has been strongly promoted through a wide system of involved specialized UN agencies, it can be said that the results of this project represented a characteristic contribution to the further development of the international strategy for seismic risk reduction.

Besides this, there has been a pioneer promotion of an integral approach to the planning of the sustainable development with emphasis at the same time on a consistent approach towards environmental protection.

As far as the regulations are concerned, they are basically brought down to the regulations of the former SFRY (Socialist Federal Republic of Yugoslavia):

a) Regulations on the technical standards for building construction objects in seismic areas, 1981;

b) Regulations on the technical standards for designing and calculation of the engineering objects in seismic areas (the proposal of the rules book);

There are neither specific regulations nor standards for the other areas of activity, and if the reduction of the seismic risk is treated at all, then it is only in the form of a basic mention.

In that sense, we consider as extremely significant the project " Support to the reform of the Ministry of Interior Affairs of Montenegro - Strategic document: vision, values, mission, challenges and key issues", which is being carried out in cooperation with the Danish Institute for human rights. According to this project, one of the key areas of the MIA activities are extraordinary situations, which for its goal has the creation of the integral strategy for managing disasters risks, protection, rescue and alleviation of disasters, in order to prevent human tragedies and reduce damages appearing on that occasion.

In this way, Montenegro would obtain the exact responsible body for management of disasters, risks, protection, rescue and alleviation of disasters – extraordinary situations. This service would have for its purpose the protection of life, health and property of citizens, then preserving the conditions necessary for life and work and undertaking the measures in order to reduce the risk and alleviate disasters, as well as overcoming extreme situations- earthquakes, fires, floods, landslides,

droughts, avalanche, ice on rivers and other natural disasters, technical-technological accidents, damages, traffic accidents, mine and tunnel accidents, damages on oil and gas plants and other undesirable effects of hazardous materials (toxic, radio-active, contagious etc.).

1.2 The national body for multi-sector coordination and cooperation in the field of disasters risk reduction does not exist in Montenegro. But, through the project stated in point 1.1, the forming of a national body for the multi-sector coordination has also been anticipated.
In the beginning of 1999, just before the bombardment of FRY by NATO, the body for coordination was formed, which assigned certain institutions for preventing the possible disasters.

1.3 The Ministry of Interior Affairs carries out three projects:
- Project "Managing the risk of hazardous materials traffic", through all the elements defined by the term traffic – supply, usage, warehousing and transportation. The Project especially covers the explosive materials, radio-active materials and poison.
- Project " Managing the risk of arms and military equipment traffic"
- Project "Managing the risk of fire in the open space".

All these projects are directly connected to the activities of the Ministry of Interior Affairs given in point 1.1.

1.4 We do not have such a National Plan.
Montenegro does not have NEAP and is not included in the project financed by the Austrian Government, which was concluded through its office in Serbia and Montenegro. The project is at this moment being carried out by Serbia under the patronage of Austrian experts.

1.5 Regarding the Laws or Regulations for construction of the objects, besides the statements given under point 1.1, it can be said that they have been in a certain way initiated and established after the Skopje earthquake in 1963 (dating from the Federal Law on construction of the objects from 1965), and additionally renewed after the Montenegrin earthquake in 1979. Both federal and republic Laws were renewed on several occasions, with the Book of Rules listed under (a) – amended with the new map of the earthquake regionalization, dated with the year 1981. Otherwise, the Republican Law on construction of the objects in renewed form was passed in December 2000. It is necessary to point out two specially important directives of this Law:

- legal declaration of the whole territory of the republic for the area vulnerable to the earthquake hazard, so that the construction of each object must be based on the application of the principles for seismic design (and planning).
- Founding of the Republican Engineering Chamber for town planning and construction of the objects (the only one authorized for issuing licenses to individuals and companies that are professionally engaged in these activities).

As far as the *Law on Planning and spatial planning* is concerned, it can be said that not only by its form so far but also in the prepared draft of the new Law, it has remained only in the principle directing towards the application of the seismic planning principles. So, it is without any significant directives and quotation of the standards needed, even without directing to the

application of the practice of the project UNPD-YUG/79/104, as its own and authentic example of the best practice (Best Practice).

1.6 N/A

1.7 There is no such participation, apart from the activities of the Red Cross of Montenegro, Aviation Union of Montenegro and Fire Union of Montenegro as the participants in the stated project "Managing the risk of fires in the open space of Montenegro", and apart from the efforts of the Yugoslav association for earthquake engineering (JUZI), as the follower of the oldest national society for earthquake engineering in Europe (founded after the Skopje earthquake in 1963). Its efforts are oriented towards several bases and directions – first of all the strengthening of education, then towards professional and scientific competence, public information, endeavors in improving the institutional and legislative organization etc.
Some of the recent and extremely relevant activities are related to:
(1) initiative and cooperation in the organization of the International conference "Actual issues in managing the seismic risk in Montenegro and the region", held in Montenegrin Academy for Science and Art (CANU) 15.04.2004, on the 25th anniversary of the disastrous Montenegrin earthquake of 1979.
(2) active participation in the current preparation of the new Law on Planning and spatial planning;
(3) promotion of the initiative of DPPI Stability Pact for South-Eastern Europe;
(4) national promotion of the strategy from Yokohama and WCDR 2005 etc.

Component 2 IDENTIFICATION OF THE RISK

2.1 There are ongoing preparations in the Ministry of Interior Affairs, through the project stated in point 1.1, to locate and estimate the dangers separately for each local community, each region and the state of Montenegro. The estimation of dangers will also include the border zones with neighboring countries, as well as certain regions which will be considered important for all (through the contacts with neighboring countries). This activity will be realized in cooperation with other ministries in charge (Ministry for Protection of the environment and spatial planning, Ministry of Health, Ministry of Agriculture, forestry and waterpower, Ministry of Traffic etc.), scientific institutions and individuals.

Several types of maps have been done for the area of seismic hazard so far.
- The map of expected earthquakes with maximum intensity for the period of hundred years (the map of seismic regionalization of the Republic), for the conditions of the medium soil (finalized in 1986),
- Six maps of expected earthquakes with maximum intensity (on the solid rock) for recurrent periods of time from 50, 100, 200, 500, 1000 and 10000 years, with the probability of realization of 63% (finalized in 1987).
- The maps of seismic micro-divisions of urban zones for all the municipalities of Montenegro, realized in the period from 1984 until 1986.

Historical and contemporary data on seismic prospecting of Montenegro and surrounding (according to the seismological base of the national seismological network stations of Montenegro) have been included in the process of the maps' elaboration.
Right now, the preparations are being done for the elaboration of the new maps of seismic hazard for several recurrent periods of time and levels of probability
(with maximum acceleration and intensity), for the needs of the republican spatial planning elaboration.
All the maps are available to all the companies which are engaged in designing the building structures in seismic conditions. Related basis and data are compulsory to be used by planning and designing organizations. Some of the maps are included in the official technical standards for construction in seismic areas.

2.2 Relevant evaluation of vulnerability and capacity of the urban structures and built environment, with the specific engagement of RZUP from Podgorica and IZIIS from Skopje, was carried out after the earthquake in 1989. This analysis represented an integral part of the project UNDP-YUG/79/104. Relatively extensive and specific evaluation of the perceived vulnerability was carried out on the basis of the damage analyses for a stock of over 64000 objects – inspected after the earthquake and classified by various bases. By the way, more detailed data, related to afore given, exist in relevant products of this project available with all involved UN agencies (UNCHS, UNDRO, UNESCO, UNIDO, UNEP and others). Unfortunately, due to known circumstances – partly resulted from the disintegration of Yugoslavia, an obvious neglect of these products in domestic conditions can be concluded.
Prior to the beginning of the war conflict in 1999, MZZS and UP made in cooperation with the MIA and the Army (ABH) the estimation of the risk for both vulnerability and capacity. The list of all potentially risky objects and technologies was made, as well as the protection measures.

2.3 The risk of eventual radioactive contamination caused by the accidents in surrounding areas (Chernobyl type) is being monitored 24 hours a day with the monitoring device PCRM on location called CETI. In case of increased phons of gamma-radiation, an alarm is sounded with subsequent notification and alert through the authorized bodies (Headquarters for notification and alerting, MZZS and UP, MIA, inspections and others). There are available results stored in PC at CETI. CETI also has a mobile monitoring station for following up the air contamination and meteorological parameters (SO2, Sox, NO, NO2, NOx, ozone, hydrocarbon –CH, CH4 and non-methane, CO, CO2, aromatic hydrocarbon- benzene, toluene and xylene (BTX), pendant particles) and meteorological parameters (direction, course and speed of the wind, temperature, pressure, air humidity), with the elaboration of the network of contamination lay out. Besides that, CETI owns the transmitting sampler devices for examination of toxic substances in the air, transmitting dosimetric devices for determining alpha, beta and gamma radiation, portable chemical and toxicological laboratories for determining the presence of toxic substances in surface and sea waters, portable laboratory for determining the PCB in the soil, portable laboratory for determining and defining TPH (total oil hydrocarbon in the sea), as well as other essential samplers for water, air and soil.
CETI is also included in ALMERA monitoring network for over the limit movement of radionuclide and in UNEP's network for monitoring POP
(persistent organic polluters).

Documentation about the equipment and results is available in CETI (Centre for eco-toxicological research of Montenegro).

In the field of hydro-meteorological activity, organization and functioning of measuring and observing system, as well as the service for weather forecast, can be treated as mechanisms for evaluation and location of the risk.

2.4 Particularly in relation to the seismic risk, only after the 1979 earthquake which disastrously hit the Montenegrin seaside and its background (see the statements in point 2.2).

Supervision of the ecological risk is under the authority of inspection bodies, while taking of measures for evaluating the risk and consequences is under the authority of CETI. Examples are:

- Control of all imported goods and building materials in relation to the content of radioactive contamination and determination of the hazardous waste,
- Decontamination of Arza cape from the ammunition with impoverished uranium immediately upon obtaining information about contamination,
- Control of all the places after the 1999 bombardment used to be done the same day after the halt of assault in cooperation with the intervention units of Montenegro's MIA,
- Intervention on examining the cause of large contaminations immediately after the receipt of information: Spilling of fuel-carrying vehicle in Moraca river, spilling of crude oil in Skadar lake, damage of tanker in the port of Bar, death of fish in Tara river from cyanide poisoning, death of fish in Moraca river, train accident with anode resin (PAH) next to the water pumping station for Zagoric area, cracking of the barren soil dam in Mojkovac and others.

2.5 The existing systems have already been stated previously. CETI is at the moment the only institution engaged in these examinations, radioactive and toxic substances monitoring. Republican Weather Bureau and Seismological Bureau have notification system from the fields of their activity.

Republican Weather Bureau performs the evaluation and distribution of information for:

- heavy fall
- storm winds
- high temperatures
- meteorological index for fire danger

Information is related to the territory of the whole Republic, except for the fire danger index which is for now being forecasted for the southern part of the Republic and for Podgorica. Information is submitted to:

- State media
- Port director's office
- Coastal radio-station
- MIA-Inspector's office for the protection from fire, explosions, accidents and technical protection of the objects.

Component 3 MANAGEMENT OF KNOWLEDGE

3.1 Not available. Good example is the Centre for eco-toxicological research of Montenegro. The main information users are MZZS and UP, MIA, Ministry of Health and Ministry of Agriculture, Forestry and Waterpower engineering. All reports are forwarded first to the authorized inspection bodies, and from there further on to the Ministries and the Government.

3.2 Unfortunately, there is no wider coordinated cooperation with the academic and other research institutions regarding the alleviation of possible disasters.

Partially, the Civil Engineering faculty of the Montenegro University (and its institute /Center for earthquake engineering), Republic's Seismological Bureau as well as Geological Bureau of Montenegro. Otherwise, a characteristic 8-year project (OSI-172, financed by SMRN&ZS): "Explorations in earthquake engineering for the needs of seismic risk reduction in FRY" (Podgorica, 2002) should be highlighted as especially important for the wider international community too. Project carrier was the Civil Engineering Faculty with Professor Bozidar Pavicevic as its coordinator.

3.3 There are educational programs related to disasters risk reduction at the Civil Engineering Faculty in Podgorica - for structural deparment and civil engineering-planning one, respectively architectonic-planning major. Educational programs for both given majors can be attached to this report.

(See Attachment with the National Report for this component)

Also, courses are being organized by IAEA from time to time (for radioactive contamination and accidents) and by UNEP - for accidents under chemical contaminations.

3.4 Partially existing in the fields of the fire risk on residential, industrial and other objects, as well as fires in the open space-green areas and forest complexes. Also, it is important to mention trainings programs which are being carried out by the Red Cross of Montenegro, focusing on care, reanimation and lodging of victims in cooperation with the authorized health institutions, and with Fire Union of Montenegro regarding the education of the population from the fire protection aspect.

3.5 N/A

3.6 Very occasionally, as by rule at the anniversary of the 1979 Montenegrin earthquake.

Component 4 MEANS/ INSTRUMENTS FOR RISK MANAGEMENT

4.1 There is a good example: decontamination of Arza cape by DU, placing a ban against a cement bin construction in Boka bay.
Project UNDP-YUG/79/104, already mentioned in point 2.2. Otherwise, the results of this project are on the whole treated as the best example for conditions in the regions of Balkans and Mediterranean through the systems of involved UN agencies. In that context,

corresponding regional projects for the support of this project were initiated, and by that for risk reduction in these regions.

4.2 Partially.

4.3 Establishing permanent radioactive contamination monitoring and air quality monitoring; training Hemosan Company for prevention of oil spills spreading at sea;
Note: Financing of these activities is inadequate and does not provide the maintenance security and upgrading of the instrumentation and other equipment.

Component 5 READINESS AND PLANNING FOR UNPREDICTED EVENTS

5.1 These plans are necessary, but unfortunately they are being made only when the real danger already exists, and not in peacetime conditions (example: creation of the intervention unit on the eve of 1999 bombardment).
In Montenegro, a Law on Intervention Supplies (Official Gazette of Montenegro, no.69/03) was passed replacing the preceding Law on Commodity Reserves. In accordance with the Law on Intervention Supplies, the Government of Montenegro has adopted the plan for intervention supplies in conditions of serious market disturbances. The Plan provides for the continuance in supplying the market of Montenegro Republic with products which are necessary for satisfying the basic needs of the population in conditions of serious market disturbances:
- wheat, basic wheat products, edible oil, sugar, salt and others;
- means for personal hygiene;
- medicines and medical materials;
- petroleum derivates.

Serious market disturbances are defined as circumstances caused by natural disasters, direct war threat, blockade of Montenegro's borders and other reasons that are not possible to be predicted. The Government of Montenegro is the one that makes a decision declaring the existence of serious market disturbances and the period of duration. The obligation of the Ministry of Economy (as per the authorization by the Government) is to enter a contractual relationship with the specialized organizations for trade and distribution of goods regarding the intervention supply, warehousing and goods distribution, which makes the conditions for:
- providing the structure and the quantity of goods as predicted by plan and
- making arrangements for payment of these goods and transportation costs, as well as securing the full efficiency under given circumstances.

An integral part of the Plan is the review of the supply carriers per municipalities.
Financial means for realization of the Plan are provided by the Ministry of Finance from the budget reserves, with prior consent of the Government.

Component 6 Necessity of Good Practice in Managing Disasters Risk

An example could be the practice from emergency phase as well as from the post-earthquake phase (renovation and reconstruction) after the 1979 earthquake.

(See Annex with the National Report for this component)

Component 7 PRIORITIES TO BE DEALT WITH AT THE WORLD CONFERENCE ON DISASTER REDUCTION

Priority must be an adequate organization and qualification of the institutions and services for permanent monitoring of potential ecological disasters risk: radioactive contamination, chemical accidents, ecological accidents at sea and inter-state lakes, as well as POP monitoring in cross-border context. Of course, the monitoring of other disasters has to be provided: earthquakes, floods, fires, explosions, chemical and others. Countries which are in the process of joining have the need for financial help in equipping, as well as expert assistance in organizing and educating professional institutions and inhabitants.

ANNEX WITH COMPONENT 3.3

Subject: Earthquake-resistant design and planning
Educational profile: civil engineering-planning major
Number of classes and semester, 2+2 (30+30), IX

A. Content of the subject

1. INTRODUCTION. GENERAL ASPECTS OF SEISMIC RISK REDUCTION

Management of seismic risk. Main segments and steps in seismic risk reduction: policy, planning and execution. Identification and resolution in a given context of all the relevant aspects, and especially: social, technical, administrative, political, legislative and economic (thematic matrix PPI/STAPLE)

The role and the significance of earthquake engineering in seismic risk reduction. Earthquake-resistant design, spatial-city planning and preparation against earthquakes as the main means and integrative aspects of seismic risk alleviation.

General earthquake effects, with special review of experiences after the 1979 Montenegrin earthquake.

Contemporary approaches to the planning and design of seismically resistant objects, economical aspects of earthquake endanger, criteria for seismic design and planning.

Earthquakes and seismic waves, size and intensity of the earthquake, earthquake movement and determination of the seismic hazard, basic parameters of the earthquake effect with the special significance for earthquake-resistant design and planning.

2. EARTHQUAKE-RESISTANT DESIGN. THEORY OF CONSTRUCTIONS' SEISMIC RESPONSE.

Main aspects of determining the constructions seismic response. Review of up-to-date methods and approaches for constructions seismic analyses. Elastic and non-elastic constructions response.

Elastic vibrations of simple constructions (systems with one degree of clearance). Constructions modeling and movement equations. Reaction of the system to earthquake, response spectra.

Elastic vibrations of multi-storey constructions (systems with more degrees of clearance). Movement equations. Frequencies and vibration forms. Analyses of the earthquake response with a modal superposition.

Basic methods of seismic analyses. Analyses via equivalent static forces. Dynamic analyses. About the selection of analyses methods.

Elastic analyses of reinforced concrete buildings seismic reaction. Frame systems. Basic constructive features of the frames and shear walls (earthquake-resistant walls). About the static analyses methods for the frame systems with special review on Uto's method.

Constructions dynamic characteristics. Estimate of dynamic characteristics of construction models (methods of Stodola and Holzer). Restitution force. Characteristics of absorption. Dynamic examination of constructions.

Analyses of non-elastic constructions response. The significance of non-elastic response analyses and its methods. Behavior of non-elastic response.

Criteria of seismic security. Entering energy and resistance force. Factors of ductility and the limits of drift. Effect of deterioration. Criteria for breaking and seismic security.

2.2 Behavior of objects' construction under the earthquake effect.

About the basic aspects of constructive response. Principles of static and dynamic adaptation. Energetic balance and concept of ductility.

Physico-mechanical properties and seismic response of constructive materials, with special review of steel and concrete. About the properties of brittleness and ductility related to the voltage state function.

2.3 Basic principles of earthquake-resistant design and directives for reaching the efficient seismic resistance of the objects.

About the significance of the aspect of integral system performance ground-foundations-infilling (non-constructive elements).

Principles of founding earthquake-resistant objects, determination and defining the constructive forms of buildings and other directives.

The control of the breaking shape.

Concept of isolation and energy dissipation.

2.4 Earthquake-resistant design of objects foundation engineering.

Seismic response of the ground. Subsidence of dry sands. Liquefaction of saturated non-cohesive soil. Dynamic characteristics of the ground.

2.5 Seismic security and strengthening the constructions of existing buildings.

General notes, significance of determining the seismic security of existing objects. Review of existing status and contemporary approaches.

Earthquake-resistant design for repairing and strengthening the existing buildings. Basic means and methods. Specific problems in relation to the types of constructive components. Empirical and theoretical models of seismic vulnerability for buildings. General methodology of seismic design for repairing and strengthening the constructive elements and systems.

3. SEISMIC RISK REDUCTION THROUGH CITY-SPATIAL PLANNING

3.1 Methodological aspects

Basic definitions. Additional review of seismic effects, as well as other natural hazards. General goals of planning. Structure of city-spatial planning. Analyses and control of risk. Seismic region division for the needs of planning. Strategic goals.

3.2 Policies and forms of city-spatial planning

General. Measures for manipulation of hazard. Distribution as the control of vulnerability. Concentration and density as the two key aspects of development. Main measures of control at the local planning level. Vulnerability control through a detailed city planning and designing.

3.3 Some specific elements of importance

More significant factors in seismic risk reduction. Conflicts of physical development. Limits and barriers.

3.4 Measures for implementation and control

Means needed for effective formulation and carrying out of the policy and strategy of seismic risk reduction through the city-spatial planning. System for decision-making support.

3.5 Legislative-institutional aspects

4. READINESS FOR EARTHQUAKE AND MANAGEMENT IN EXTRAORDINARY CIRCUMSTANCES. IMPLEMENTATION.

4.1 General review

Introduction. Review of relevant experiences after the 1979 Montenegrin earthquake. Contemporary approaches and experiences. Readiness for earthquake as the significant factor of seismic security.

4.2 Management in extraordinary circumstances

Post-earthquake circumstances and conditions, needs and operations. Quota planning and plans for extraordinary occasions. Components and procedures for development of plans for post-earthquake operations and circumstances. Housing of population after the earthquake and programming of restoration and construction in the post-earthquake period.

4.3 Institutionally-organizational aspects

Legislative institutional aspects. Organizational aspects and procedures. Systems for decision-making support for management in extraordinary circumstances.

4.4 Developing the collective social consciousness on earthquake danger.

The role and importance of the public information and education system within the context of overall effective readiness for earthquake.

B. PRACTICAL PROGRAME

Practical experience is in principle oriented towards the elaboration of the annual work, given in a specific way to each candidate separately. It also means the other forms of more detailed explaining of the teaching subject matter:

1. Annual work. This work should include the basic segments of civil engineering-constructive project of multi-storey building, with the processing of the elements which are defined depending on the evaluation of required and appropriate scope of work.
This work, namely project, based on previously defined basis and data, as per rule should follow the general procedure on earthquake-resistant designing and planning of the given object.
Project proposal, per this assignment, especially includes: technical report, static and dynamic evaluation, dimensioning of certain constructive elements, appropriate drafts, as well as other supplements when needed.

2. Other elements of practical program. Other ways of consideration and more detailed interpretation of the subject matter are adapting to the development of the process of teaching and realization of the program's content. In addition, among other things it means presentation of certain practical examples, respectively solving the problems. Within the frame of these presentations, as well as within the whole teaching process, efforts will be made towards using various modern means of presentation – slide and video projections, computer technology etc.

C. STUDENTS OBLIGATIONS

These obligations, in accordance with the Statute of the faculty, include the regular attendance at teaching sessions – lectures and practices, as well as the successful elaboration of the annual work.

D. THE LIST OF LITERATURE

Besides the available notes, prepared by the subject teacher, the list of the basic and wider literature is given in the enclosure.

E. CONDITIONS FOR SIGNATURE

Conditions for signature are regular fulfillment of obligations by the students which (among other conditions issued by the Statute and appropriate decisions of the Academic Council of the school) mean the presence at the teaching sessions in percentage not less than 80% of the anticipated classes/ lectures/ practical classes, as well as the annual work defense before the subject teacher.

F. THE METHOD OF TAKING AN EXAMINATION

The examination consists of written and oral part. The written part is eliminatory.

Podgorica, 19.06.1998.

Subject teacher,
Bozidar S. Pavicevic

ANNEX WITH COMPONENT 6

Component 6: ANNEX

REVIEW OF SOME EFFECTS AND EXPERIENCES OF THE MONTENEGRIN EARTHQUAKE OF 1979

GENERAL DATA

As it is known, the disastrous Montenegrin earthquake dated 15.04.1979 was the strongest earthquake that ever took place in Europe. It had the intensity of I=IX/X degrees of MCS scale and magnitude of M=7,0 degrees (according to Richter scale) and it was followed by large number of strong aftershocks, among which the strongest one was 24th of May with the intensity of VIII degrees of MCS scale, while its magnitude was M=6,1 degrees (of Richter scale).

This earthquake caused an enormous damage on the whole Montenegrin seaside and a large area belonging to a certain number of municipalities in the continental part of Montenegro. Otherwise, the earthquake seized the territory of ex Yugoslavia in size of over 50.000 km2, including Dubrovnik region in Croatia. Also, it hit at the same time the areas of Skadar and Lesh in Albania.

Concerning the consequences in relation to the Republic of Montenegro from the aspect of the total losses and damages (see Table 1. and illustration 1.), it is especially important (among other things) to point out following:

- That due to the lucky concurrence of events only 101 human lives were lost in Montenegro and 35 in Albania;
- That over 100 thousand people lost their homes;
- That the total scope of damages, direct and indirect, amounted to not less than 4,5 billion USD (today worth more than double), which was representing 4 annual gross national incomes of Montenegro for 1979, respectively 10% of the total gross national income of former Socialist Federal Republic of Yugoslavia.

Along with stated, it seems extremely appropriate to remind that prevailing of so dramatic consequences was primarily possible to be accomplished with the united efforts of ex-Yugoslav republics- emerging not only in immediate and emergency post-earthquake phase but also at the later stage of renovation and reconstruction of the suffered areas.

In the previously given context, one can realize the significance and the role of the *Program* for immediate and further *post-earthquake activities*, initiated and prepared by the Republic's Bureau for town planning and design (RZUP) for the governmental and other authorized bodies of Montenegro. Nevertheless, as it has already been mentioned, this program routed the basic post-earthquake measures and activities, as it was the identification of the main factors and segments of the general seismic security which was the foundation for all mentioned measures and activities on repairing and renovation of suffered areas, as well as for all the plans for reconstruction and further physical development in Montenegro.

Of course, the first global activity that should be extracted from that program is the *Project for determination and classification of damages on objects with the estimation of their usage level.*

Table 1. Project was implemented according to the methodology that was prepared by RZUP Titograd, in cooperation with IZIIS from Skopje. This project, including the inspection and survey of over 64.000 objects (different purposes, types of material and types of construction), represents the unique operation on the world scale. Otherwise, the whole project was implemented with the engagement of over 660 engineers, architects and technicians from all over former Yugoslavia – and with RZUP as the leader and organizer of the whole operation in close cooperation with the authorized state bodies from some republics and suffered areas' municipalities.

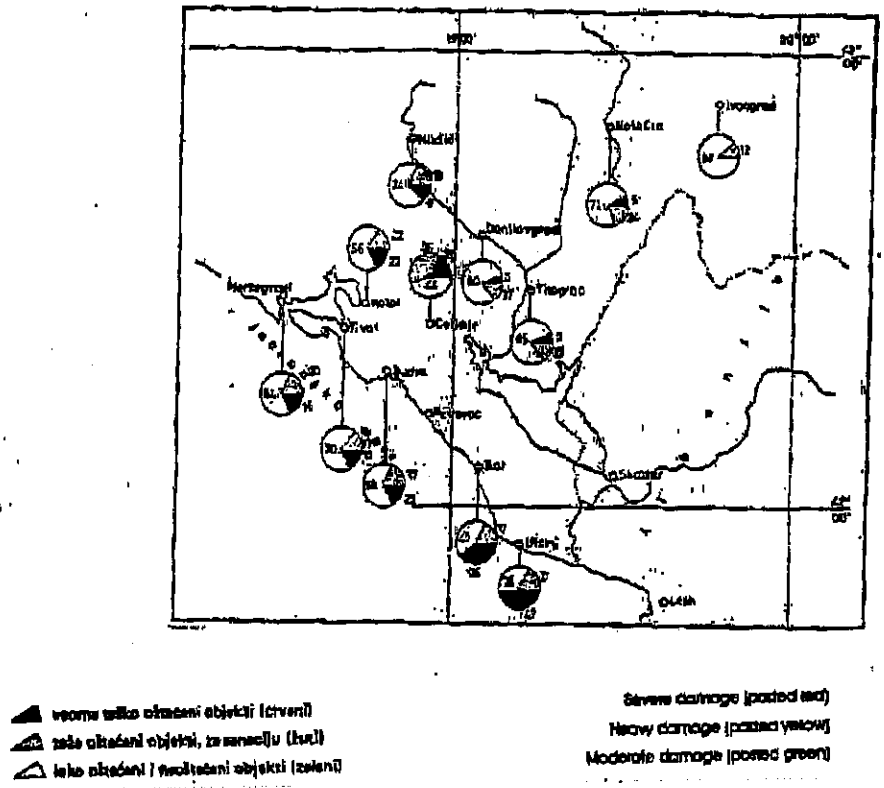

Illustration 1. Discrete distribution of objects damaged in the 1979 Montenegrin earthquake (presented by municipalities)

Very important support was given by the international community, out of which for this occasion it is to be especially pointed out the technical assistance of the United Nations, realized through its Program for development (UNDP)- respectively its corresponding specialized agencies.
In the given context- along with already emphasized UNDP Project YUG/79/104: *Spatial plan of the Republic and general town plans of Montenegro*, it is worthy to give reminiscence of other projects within the scope of the United Nations technical assistance, realized on the regional basis and with participation of the whole number of specialized UN agencies that primarily served as immediate support to previously stated project YUG/79/104. But, they were at the same time

oriented towards dissemination and promotion of their results, respectively experiences, on the whole region of Balkans and later Mediterranean. In that regard, the following projects of international character are to be highlighted.

1) Spatial plan of the Republic and general town plans of Montenegro (UNDP/UNDRO Project YUG/79/104);

2) International consulting council for issues of restoration and reconstruction of the Montenegro area that suffered in 1979 earthquake (UNDP/UNCHS/UNDRO Project YUG/79/003);

3) Seismic risk reduction in the region of Balkans (UNDP/UNESCO Project RER/79/014);

4) Construction of objects under seismic conditions in the region of Balkans (UNDP/UNIDO Project RER/79/015);

5) Spatial-town planning in Mediterranean earthquake zones (UNEP/MAP Program PAP/RAC/83/6: Land-use Planning in Mediterranean Earthquake Zones").

Thematic project (with the author of this document as its coordinator) was treating one out of six actions with key priority from the program called PAP. It is significant to stress that the Program for Priority Actions, PAP, along with the Blue Plan, represents the structural component of the Mediterranean action plan MAP (with the participation of all the countries-signatories of so called "Barcelona convention on Mediterranean protection"), with UNEP regional activity center – RAC from Split as the carrier of its realization. MAP Technical Reports Series No 17, UNEP/PAP/RAC, Athens/Split, 1987.

Later, this project emerged into so called SEISMED Project: "Cooperation program for seismic risk reduction in the region of Mediterranean", with the head office in Genoa, Italy. Otherwise, the participation of Socialist Federal Republic of Yugoslavia in this project (as well as of this author) was interrupted with the beginning of its disintegration.

Table 1: Integrated review of the surveyed buildings classification and their damage caused by the Montenegrin earthquake dated 15.4.1979, given for twelve municipalities

Classification		MUNICIPALITIES																						Total	
		Ulcinj		Bar		Budva		Tivat		Kotor		H.Novi		Cetinje		Niksic		Titograd		Danilovg.		Ivangrad		Kolasin			
		No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build.	%	No of build	%
No. of surveyed buildings		6729		10057		2609		2962		6482		5737		6937		3315		5026		5237		735		717		57610	100
Property	Private																										
	Soufal																										
Function	Resident.																										
	Tourist.																										
	Industr.																										
	Agricult.																										
	Others																										
Construction	Brick																										
	Reinf. Concrete																										
	Steel																										
	Wooden																										
	Others																										
I Usable objects	Un-damaged																										
	(A)																										
	(B)																										
	Total I																										
II Tempor. unusable objects	(C)																										
	(D)																										
	Total II																										
III Unusable objects	(E)																										
	(F)																										
	(G)																										
	Total III																										

(A): Damaged but without the construction damage;
(B): With minor construction damage;
(C): With moderate construction damage;
(D): With considerable construction damage;
(E): Severely damaged;
(F): Partly damaged;
(G): Completely destroyed;

Tabela 1: *Zbirni prikaz klasifikacije upotrebljivosti pregledanih zgrada i ukupnog ... od 15. aprila 1979. dat za ... opština*

KLASIFIKACIJA		OPŠTINE																								UKUPNO	
		Ulcinj		Bar		Budva		Tivat		Kotor		H.Novi		Cetinje		Nikšić		Titograd		Danilovgrad		Ivangrad		Kolašin			
		Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%	Broj zgrada	%
Broj pregledanih zgrada		[illegible]	100	10357	100	1559	100	[illegible]	100	[illegible]	100	[illegible]	100	6977	100	3312	100	[illegible]	100	[illegible]	100	[illegible]	100	[illegible]	100	[illegible]	100
Spratnost	[illegible]	[illegible]	94	9558	91	[illegible]	[illegible]	2590	87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	[illegible]	[illegible]	[illegible]	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Namjena	[illegible]	[illegible]	71	[illegible]	[illegible]	1160	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	71	[illegible]	77	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	167	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	331	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Konstrukcija	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	91	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
I Upotrebljivi objekti	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	729	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31	114	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	201	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1257	[illegible]	[illegible]	[illegible]	291	[illegible]	[illegible]	10
	Ukupno I	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
II Privremeno neupotrebljivi objekti	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	407	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Ukupno II	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20
III Neupotrebljivi objekti	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	[illegible]	13
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	7	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	27	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	1		[illegible]	4
	Ukupno III	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]