NEWSLETTER of NCSRR ***Issue No. 2, September 2003***

Visit of Japanese Ambassador in Romania, HE Naotoshi Sugiuchi, at NCSRR on July 10 2003

On July 10 2003 *HE* Naotoshi Sugiuchi, the Japanese Ambassador in Romania, visited the *National Center for Seismic Risk Reduction*. It was a very great honor for the staff of the Center and it was a golden opportunity to present to the highest representative of the Japanese Government in Romania the results and achievements of *JICA* Project on Reduction of Seismic Risk for Buildings and Structures in Romania. The Japanese Ambassador visited the premises and the laboratories of *NCSRR*, observed the microtremor measurements performed by the staff of the Center together with Japanese experts, Figure 1, and then draw the conclusions of the visit during a meeting with Japanese and Romanian professionals working for the *JICA* Project, Figure 2. The Ambassador congratulated and encouraged the staff and advised for taking more and more actions to promote the *JICA* Project and its results.

Fig. 1. Observing the microtremor measurements

Fig. 2. During the conclusions meeting

NCSRR equipments for strong ground motion observation and soil investigation

The equipments for strong ground motion observation, soil testing and investigation received by the *National Center for Seismic Risk Reduction* within the *JICA Technical Cooperation Project on Seismic Risk Reduction for Buildings and Structures* in May 2003 were installed by the staff of *NCSRR* in partnership with professionals from *Technical University of Civil Engineering of Bucharest, UTCB* and from *INCERC* Bucharest and with the invaluable help of Japanese experts and technicians dispatched in Romania in June and July 2003.

The equipments for strong ground motion observation are installed outside Bucharest on a path that follows the directivity of the maximum seismic energy from Vrancea subcrustal seismic source. The *ETNA-Kinemetrics* accelerometers are placed in free field outside Bucharest, Figure 3 and *ALTUS K2-Kinemetrics* in boreholes, Figure 4 and buildings inside Bucharest, Figure 5. The principle of borehole instrumentation is presented in Figure 6 and the location of the instrumented boreholes is given in Figure 7.

The *ALTUS K2-Kinemetrics* accelerometers and *EPISENSORS* are placed in buildings inside Bucharest as follows:

- ✓ Stefan cel Mare 44 residential building – high-rise *RC* frame structure, Figure 8
- ✓ Stefan cel Mare 42 residential building – mid-rise *RC* soft story structure, Figure 9
- ✓ National Television Tower Building – high-rise *RC* frame structure, Figure 10
- ✓ *BRD-GSG* Tower Building – high-rise *RC* inner cores and perimeter frames, Figure 11

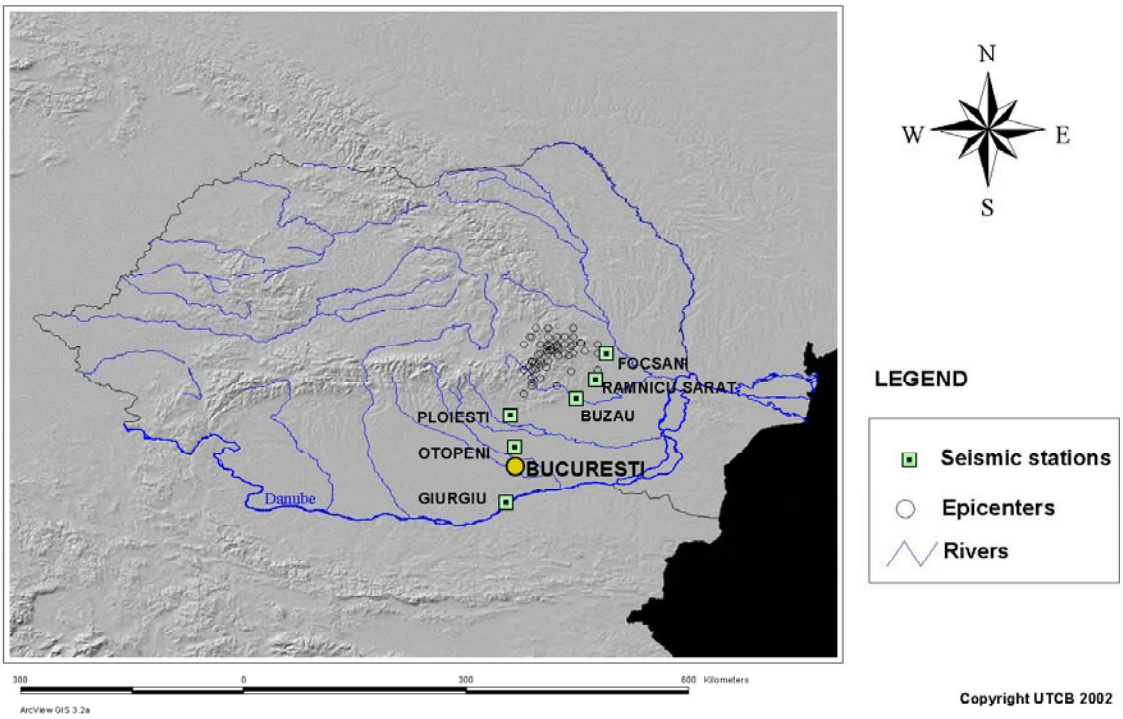

Fig. 3 Seismic instrumentation outside Bucharest installed within the *Project*
Note: Otopeni location was canceled

Fig. 4 Seismic instrumentation of borehole

Fig. 5 Seismic instrumentation of buildings

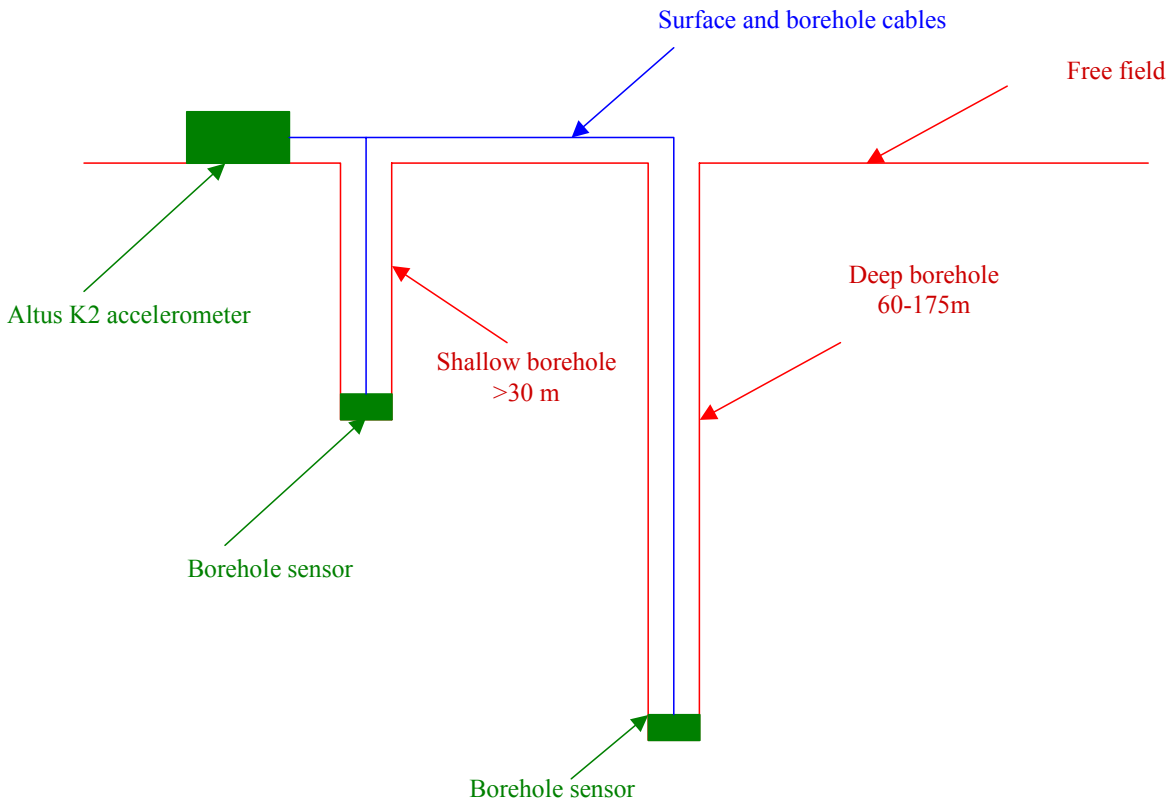

Fig. 6. Principle of borehole instrumentation

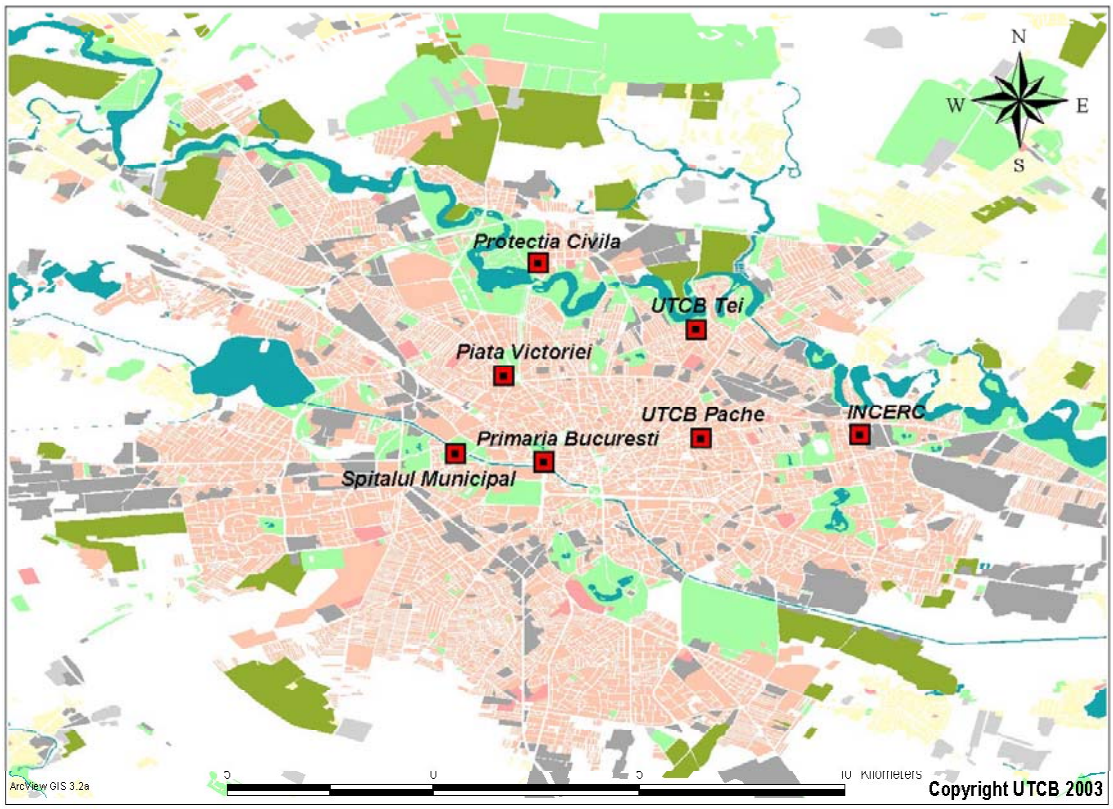

Fig. 7. Bucharest borehole seismic instrumentation installed within the *Project*

Fig. 8 Building Stefan cel Mare 1

Fig. 9 Building Stefan cel Mare 2

Fig. 10 *TVR* Tower Building

Fig. 11 *BRD-GSG* Tower Building

The location and characteristics of seismic observation instruments within the *NCSRR* network are given in Table 1, Table 2 and Table 3.

Table 1. *NCSRR* Seismic Network - Borehole instrumentation in Bucharest

No.	Site	Surface sensors location	Shallow borehole depth, m	Deep borehole depth, m	Type of instruments
1	*UTCB* Tei/*NCSRR*	free field	-30	-78	*K2/ FBA-23DH*
2	*UTCB* Pache	1 storey building	-28	-68	*K2/ FBA-23DH*

No.	Site	Surface sensors location	Shallow borehole depth, m	Deep borehole depth, m	Type of instruments
3	*INCERC/NCSRR*	1 storey building	-25	-150	*K2/ FBA-23DH*
4	Civil Protection Hdq.	1 storey building	-30	-69	*K2/ FBA-23DH*
5	Piata Victoriei / Filantropia Hospital	free field	-29	-151	*K2/ FBA-23DH*
6	City Hall	free field	-28	-54	*K2/ FBA-23DH*
7	Municipal Hospital	free field	-30	-70	*K2/ FBA-23DH*

Table 2. *NCSRR* Seismic Network - Free field stations in Romania

No.	Site	Sensor location	Type of instrument
1	Focsani	2 storey building	*ETNA*
2	Ramnicu Sarat	1 storey building	*ETNA*
3	Buzau	1 storey building	*ETNA*
4	Ploiesti	3 storey building	*ETNA*
5	Giurgiu	2 storey building	*ETNA*

Table 3. *NCSRR* Seismic Network - Building instrumentation in Bucharest

No.	Site	Station location	Sensor 1	Sensor 2	Sensor 3	Type of instruments
1	Stefan cel Mare 1	10^{th} floor (base)	10^{th} floor (top)	4^{th} floor	basement	*K2/ Episensor ES-T*
2	Stefan cel Mare 2	basement	7^{th} floor (top)	Free field (to be installed)	-	*K2/ Episensor ES-T*
3	*TVR* Tower	13^{th} floor (base)	13^{th} floor (top)	basement	-	*K2/ Episensor ES-T*
4	*BRD-GSG* Tower	19^{th} floor	3^{rd} basement	-	-	*K2/ Episensor ES-T*

The equipments for soil testing and investigation consist of drilling equipment, borehole sensor, data acquisition and processing systems and triaxial testing equipment (presented in Figure 12 and in Figure 13). *PS* logging equipment - Figure 14 and Figure 15 - is used to measure the *P*-waves and *S*-waves velocity in boreholes before seismic instrumentation as presented in Figure 16. The equipment is also used for microtremor analysis and evaluation of dynamic characteristics of buildings, Figure 17.

The objectives of strong motion observation and soil testing and investigation equipments are:

- ✓ data collection on ground motion to examine the characteristics of earthquakes;
- ✓ soil condition investigation and seismic hazard investigation in Bucharest to develop the city microzonation;

- ✓ data collection on seismic building response to examine the buildings behavior;
- ✓ revision of strong ground motion design parameters and developing new models for strong ground motion simulation.

Fig. 12 Triaxial testing apparatus

Fig. 13 Results from triaxial test

Fig. 14 Borehole sensor for *PS* logging

Fig. 15 Data acquisition system for *PS* logging

Fig. 16 Borehole *PS* logging before seismic instrumentation

Fig. 17 Measurement of dynamic characteristics of buildings

NCSRR gratefully acknowledge the worthy support and the very hard work of the Japanese experts and technicians dispatched in Romania in June and July 2003, as follows: Kashima-san from *Building Research Institute*, Tsukuba, Kazama-san from *Tokyo Soil Research*, Kanehira-san and Kobayashi-san from *OYO Seismic Instrumentation Corp*., Itoh-san and Soyama-san from *Seiken Inc*. Meanwhile, the continuous and generous support of *Ministry of Transports, Constructions and Tourism of Romania*, of *JICA* Romania through its Resident Representative, Furukawa-san and of *JICA* long term-experts in Romania – Hurukawa-san, Mikame-san and Tojo-san - is gratefully acknowledged.

Questionnaire Survey performed by NCSRR and JICA Experts on state of mind of citizens about seismic disaster protection in vulnerable buildings of Bucharest

General

The Questionnaire Survey was developed by the *National Center for Seismic Risk Reduction* and Japanese experts in cooperation with specialists from the *Ministry of Transports, Constructions and Tourism of Romania* in order to investigate and evaluate disaster preparedness of citizens in Bucharest central area. The purpose was to make clear the present state of mind of residents who live in the vulnerable buildings in downtown Bucharest and then to have a feed back on effective actions to promote retrofitting of their buildings. The questionnaire survey shall be repeated again later on, in order to compare the progress in earthquake attitude and preparedness of citizens.

The questionnaire had 7 categories of questions, as follows:

- ✓ C0. General data on age, gender, education background, profession, working/retired and income situation of apartment owners
- ✓ C1. State of mind of apartment owners - residents concerning knowledge about earthquake disasters
- ✓ C2. Preparedness of apartment owners for earthquake disaster prevention
- ✓ C3. Knowledge and recognition of residents on the vulnerability and risk level of their buildings
- ✓ C4. Response of residents to retrofitting work
- ✓ C5. Knowledge level of residents on laws in force and financial incentives concerning the national retrofitting program
- ✓ C6. Negative factors against retrofitting works; suggestions to avoid such negative factors, with free place for writing answer.

Questionnaires have been distributed by *NCSRR* and *MTCT* in April-May 2003 to some 340 apartment owners and other 115 presidents of owners associations in seismic risk class I buildings in downtown Bucharest. The ratio of return was 44,8% (a number of 204 out of 455). *NCSRR* staff, using specific software, assured the processing.

Conclusions of questionnaire survey

The questionnaire survey of *NCSRR* within *JICA* Project proved to be useful in understanding the opinions and thinking of citizens who live in the vulnerable buildings of Bucharest central area, concerning earthquakes effects and retrofitting. The positive answers show a remarkable consciousness about the seismic risk in Romania and in Bucharest and are very well correlated to the age and profession structure as well as with the experience of living nearby collapsed buildings after the March 4, 1977 earthquake.

The age, even in case of retired people, has a positive influence on citizens' experience and attitude towards seismic risk reduction, while gender is significant only in some specific

aspects. On the other hand, the large number of retired persons with reduced income explains the reluctance to apply for loans / credits.
The presence of many educated persons (high-school and university) explains the understanding of risk level as well as the large number of interesting suggestions.
The large number of suggestions denotes that citizens are very concerned about their situation at risk, although their solutions are sometimes already covered with general solutions by laws or need further discussions. Many of the suggested measures are the same with those promoted recently by *MTCT* and citizens must be informed about it.
There is a need of a better communication to help citizens in managing the bureaucratic aspects, to fill-in the forms, to answer their legal and financial fears, to convince citizens that the quality control system provides quality of projects and earthquake engineering is efficient. There is a special need to ensure the full cooperation of citizens in this process, in order to be closer to consensus for deciding about strengthening, to limit the cases of special legal measures for access in interior of some apartments only in the situations of absentees and/or bad will owners. The causes of negative answers can be related to the exaggerate confidence of some citizens in the efficacy of 1977 strengthening works.
The citizens want to decide inside the owners associations, with a 51% vote ratio, but they also want the support of public institutions as *MTCT* and *NCSRR*, the assistance of Japanese experts and their advanced technologies, the control of works by *INCERC* etc. Although figures of over 60% agreement of residents in many cases can be considered as relatively preferable rates for the first survey, even such rates are expected to increase by repeated campaigns of rising awareness by *NCSRR* activities.

Japanese short-term experts in Romania in March-May 2003

- Dr. Hiroshi Fukuyama – period: April 2003; place – National Center for Seismic Risk Reduction; topic – earthquake resistant code
- Dr. Koichi Kusunogi - period: April 2003; place – National Center for Seismic Risk Reduction; topic – seismic evaluation and retrofitting
- T. Yoshihara - period: March-May 2003; place – National Center for Seismic Risk Reduction & Ministry of Transports, Constructions and Tourism; topic – technical assistance on MLPTL retrofitting activity

Dr. Hiroshi Fukuyama and Dr. Koichi Kusunogi delivered a seminar on *Seismic Rehabilitation Methods Used in Japan* on April 18 2003 at the Technical University of Civil Engineering of Bucharest. More than 60 professionals from higher education and design attended the seminar.

Yoshihara –san delivered an earthquake disaster prevention seminar on May 7 2003 at the Ministry of Transports, Constructions and Tourism. The seminar was headed and convened by HE Miron Mitrea, the Minister of Transports, Constructions and Tourism, HE Ileana Tureanu, Secretary of State and HE Hiroshi Furukawa, Resident Representative of *JICA* Romania.

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