

4. RESULTS OF EVALUATION

4-1 Relevance

The Project was highly relevant to the needs of Romania and its national policy, the needs of the target group, and Japan's assistance policy to Romania.

4-1-1 Relevance to the national policy and needs of Romania

The Overall Goal and the Project Purpose were highly relevant to the national policy of Romania and its needs. Romania is prone to earthquakes and the population faces a real risk of building collapse due to earthquakes that can occur any time, considering of the recurrence period after the big earthquake in 1977. Romanian national policy indicates the needs of seismic risk reduction. The National Development Plan 2007-2013 refers it in several sections such as environmental protection, public safety in emergency situations, and social inclusion (people living in vulnerable buildings). Retrofitting of vulnerable buildings is one of the most important actions to promote. In 1997 the government classified buildings into four categories according to vulnerability to seismic risk, and 122 buildings in Bucharest were listed up as Class I (most vulnerable), which were given priority in retrofitting. The Government of Romania is fully supporting retrofitting projects and works through budgetary allocation both for residential and public buildings classified as Class I risk.

4-1-2 Relevance to the needs of the target group

The Project aimed to respond to the needs of the citizens in Bucharest by identifying them as its main target group. It was appropriate because they will ultimately benefit from safer buildings built or retrofitted by the techniques improved by the Project. More directly, the Project targeted structural engineers, although they were not defined as the main target group in the PDM. Targeting structural engineers was appropriate because earthquake-resistant design and retrofitting is not possible without improvement of their skills and knowledge in the new techniques.

4-1-3 Relevance to Japan's Assistance policy

The project was also relevant to the Japan's assistance policy in Romania. JICA's Country Assistance Program in Romania (drafted in July 2005) identifies seismic risk reduction as one of their programs in the area of development of social and economic infrastructure in order to promote industries, trade and investment.

4-2 Effectiveness

The project was sufficiently effective to achieve its Project Purpose, but it has some institutional limitations.

4-2-1 Process of achievement of the Project Purpose

It is no doubt that the project has contributed to improvement of the technology to reduce the risk of building collapse. The new techniques developed by the Project will be widely shared by the structural engineers through manuals and seminars, and they will be imposed as the national Codes in the area of seismic design and evaluation. The outcome of the Project has been widely presented to the public by technical papers and by the presentations in national and international conferences.

Following the recommendation of the Mid-term evaluation, the Project added into

its activities the design of retrofitting of two buildings in order to apply the new techniques. This action was useful to increase the effectiveness of the Project as it can accelerate application of the techniques, even partly.

4-2-2 Strategy of the Project

Within the framework of the Project, its strategy was appropriate. On the technical side, the Project has contributed to improvement and dissemination of the techniques. Also in the area of raising public awareness, the Project has been successful in improvement of general knowledge and awareness of citizens in earthquake damage prevention, although sometimes the seminars led to discussions on more practical and legal issues that were beyond the Center's role. Since 2005 the Project has also been focusing on education of school children on earthquake damage prevention, using the experiences in earlier seminars for the residents of the Class I buildings.

The implementation of retrofitting work with the new techniques was in principle beyond the Project framework. Promotion of earthquake-resistant buildings is fundamental in seismic risk reduction, but the Project would not be able to accelerate the pace of retrofitting of the vulnerable buildings on its own. It is not able to totally convince the residents of the vulnerable buildings, because it cannot offer practical solutions of economic burden and other types of inconveniences caused by retrofitting work. The reluctance of the residents is the biggest obstacle to promote retrofitting, and the Project might be able to contribute to reduce the inconveniences caused by the implementation of retrofitting work in the site.

4-2-3 Implementing organization

MTCT created the Center for implementation of the Project by governmental ordinance in 2002. The Center's structure as a national institution under MTCT in collaboration of UTCB and INCERC had positive aspects, such as having in-house researchers in spite of limited budget and its seemingly unstable status in the long term.

4-3 Efficiency

The Project was efficient judging from the following observations:

4-3-1 Result of Romanian inputs

The Romanian inputs have contributed efficiently to the production of the Outputs of the Project.

The Romanian Project members participated actively in the Project. The fact that the majority was part-time posed some challenges in the progress of the project activities, if compared to a case of all full-time members, but most of the challenges were overcome. Another challenge was that there were always vacant positions with resignation of staff due to low level of salary. And the Center could not employ new staff members due to the governmental regulation.

The Romanian side shouldered operational budget and project offices. Separate project sites in UTCB and INCERC was convenient for the part-time staff and for collaborating activities with either of them. Japanese experts had to visit both sites very often, and it was inconvenient.

4-3-2 Result of Japanese inputs

The Japanese inputs have contributed efficiently to the production of the Outputs of

the Project.

The Japanese experts were dispatched appropriately on the whole in terms of expertise, quality, timing and duration of service. The short-term experts were also appreciated by the Romanian Project members since they met the needs of the Project well.

The equipment provided by JICA to the Center was appropriate in terms of quantity, quality and timing. The equipment is well utilized and maintained on the whole. Although due to some administrative problems, the Cone Penetration Testing Machine could not be used outside of the Center.

The counterpart training in Japan was highly appreciated. The participants utilized well the new skills in their project activities, although some staff left the Project after the counterpart training.

The local activity cost by JICA was appropriately disbursed for the activities.

4-4 Impact

The Impact of the Project has been remarkable in the technical aspect, and also in the social aspects to some extent, but it has been limited in the policy aspect. These three aspects need to be approached altogether to reduce the earthquake-induced damage, especially in promotion of retrofitting of vulnerable buildings.

Regarding the extent the Overall Goal will be achieved, it is certain that “measures against earthquake-induced disasters in Romania” will be strengthened on the technical aspect, as well as on the social aspect with some limitations. The project was successful to develop awareness of the citizens of the needs of retrofitting and appropriate behaviors in case of earthquakes, but many citizens are still reluctant to accept retrofitting work of their apartments due to financial or other types of foreseen inconveniences. This gap needs to be tackled by strategies in the policy aspect.

Looking at the Indicator of the Overall Goal: “*within 5 years after the completion of the Project, number of housings evaluated and retrofitted as well as newly built using the outcomes of the Project will increase to such extent that is satisfactory to stakeholders (including administrative agency, academic institution, professional association),*” most Project members estimate that it would be difficult to achieve the “satisfactory” level in increase of retrofitting. The progress of retrofitting largely depends on the government’s policy on how to offer practical solutions to overcome the obstacles on the residents. Some citizens have developed high expectations on the new techniques from Japan and think that it could offer a miracle solution to overcome the inconveniences during retrofitting work, but at the same time it might create a risk of a disappointment with the reality that even the new technology would not able to do so. The uncertain nature of earthquakes also makes it difficult to take urgent and effective approaches to overcome the reluctance of the residents regarding retrofitting.

4-5 Sustainability

Sustainability of the Project needs to be strengthened. The technical sustainability is very high, but the Center and MTCT need to take actions to improve institutional and financial sustainability.

4-5-1 Technical sustainability

The technical sustainability is very high. Romanian staff of the Project and Japanese

experts agreed that the technical capacity of Romanian project members has been well developed so that they could continue the activities of the Center independently, including the skills in utilization and maintenance of equipment.

However, the capacity of the Center in public awareness raising and policy-related work needs to be further strengthened after the Project completion.

4-5-2 Institutional sustainability

The recognition of seismic risk reduction in Romanian national policy is a positive factor for the Center. From the institutional point of view, the sustainability of the Center is not fully guaranteed. Thus, the Center should analyze and propose the ways to enable to operate its mission effectively after the completion of the Project.

4-5-3 Financial sustainability

Financial aspects of the Center pose a challenge to its sustainability. The framework of the financial arrangements for the Center should be analyzed after the completion of the Project to allow the Center to operate in its full potential.

5. CONCLUSION AND RECOMMENDATIONS

5-1 Conclusion of the Evaluation

The Project Purpose and Overall Goal are valid and in line with the policy of MTCT as well as with the principle of Japanese cooperation to Romania.

In the Project, the followings are the most highly rated achievements.

- The first retrofitting design using modern techniques was completed for a soft-story building in Bucharest.
- As a result of the cooperation between JICA experts in the Center and INCERC, manuals of earthquake education for school students were issued.
- Seminars and meetings with the residents in vulnerable buildings, students and engineers were held frequently, which improved their understanding on the earthquake effects and countermeasures.
- State of the art equipments were provided and are operated properly by well-trained Romanian counterparts.

Through the achievement of each Output, the Project Purpose is highly likely to be achieved by the end of the Project owing to sufficient ownership of the Center to the Project. Transfer of technology has also been made appropriately through the daily activities and counterpart training on the strong partnership of Japanese experts and Romanian counterparts.

The followings positively contributed for the achievement of the Project;

- 1) The counterparts already had sufficiently high level of technical skills and knowledge when the Project started. Five (5) counterparts had benefited from JICA training courses and Japanese experts before the Project.
- 2) Dispatch of forty-one (41) Japanese short-term experts and implementation of trainings in Japan for twenty-nine (29) counterparts were efficiently coupled with the tasks to be dealt with in the Project.
- 3) In the Mid-term evaluation, the Project members and the parties concerned reached to common understanding on the achievement of the Project and Project Purpose and Outputs.
- 4) The Advisory Committee consisting of BRI and NILIM/MLIT was established and functioned well.

Meanwhile, tasks to be tackled still remain. In order to strengthen the achievement of the Project Purpose and to near the achievement of Overall Goal, implementation of retrofitting work has to be promoted based on the achievement of the Project. Further efforts are necessary to promote implementation of retrofitting works under institutional and financial framework of MTCT, with building up a system for appropriate quality management. The issues need to be addressed as promptly as possible.

5-2 Recommendations

The Joint Evaluation Team recommends the following points to the Project and related authorities:

<Recommendations during the Project>

(1) Approval on technical guidelines/ manuals developed in the Project by the Government of Romania

In order to achieve the Project Purpose, the technical guidelines and manuals need

to be approved and/or endorsed by MTCT. So far, at the initiative of MTCT to issue new generation of seismic regulations, the seismic design code and the inspection manual for post-earthquake buildings were approved and enforced by MTCT. In addition, approval of other manuals and guidelines should be promoted by the Project.

(2) Publication of the achievement

As indicated in PDM, publication of brochure about retrofitting and/or disaster preparedness should be promoted for publicity of the Project and dissemination of the achievement.

(3) Quality management techniques for implementation of retrofitting work

The Project needs to continue its activities to ensure the achievement of the Outputs and Project Purpose. Improvement and dissemination of retrofitting technology is great achievement by the Project. However, appropriate quality management on actual retrofitting work is also essential to assure the effectiveness of the retrofitting design developed by the Project. The Center should promote the activities for improving quality for implementation of retrofitting work, involving engineers, design offices and construction companies.

(4) Clarification of the Role of the Center after the Project

The Center was established to implement the Project. For continuous utilization of the Outputs produced by the Project, the Center needs to sustain its function even after the Project duration. The role of the Center after the Project should be clarified at as early stage as possible during the Project.

(5) Implementation method of retrofitting work

It is clear that just improving and disseminating technology for reducing building collapse is not leading to immediate and quick implementation of retrofitting work. The Project should conduct a case study regarding the possibility of an efficient implementation method to reduce the inconveniences of the residents during retrofitting.

<Recommendations after the Project >

(6) Support to implementation of retrofitting work

The technology adapted to the Romanian condition by the Project needs to be applied to implementation of retrofitting work. The Center should continuously support implementation of retrofitting works.

(7) Effective utilization, operation and maintenance of equipments

The Project has effectively utilized the equipments provided by JICA, and there is no doubt that utilization of those equipments is essential also after the Project. NCSRR under cooperation with MTCT and the partner institutions should utilize those equipments effectively by well-trained engineers for further improvement and dissemination of technology, and sustain appropriate operation and maintenance of those equipments after the Project.

(8) Continuance of educational activities for disaster risk reduction

The Project has a positive impact on people's awareness in seismic disaster risk reduction by activities for disaster prevention education. The Center should continue

those educational activities as one of the key activities.

(9) Cooperation with neighboring countries

There are many countries with a risk of seismic disasters and vulnerable buildings in the neighboring area of Romania. The Project plans to hold a seminar to disseminate achievement of the Project to the neighboring countries. The Center should sustain further cooperation with those countries for reduction of seismic disaster risk.

5-3 Lessons Learnt

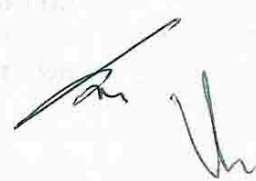
The Joint Evaluation Team has found the following lessons learnt from the Project:

(1) Importance of quality control management in the construction process

The retrofitting work consists of design and construction. In the design process, various seismic evaluation methods and retrofitting techniques are needed. In the construction process, both skills of workers and quality management by the engineers are essential. The Project considered the design process within the Project Purpose, but the construction process was left outside. In order to ensure a proper implementation of the modern retrofitting design, the construction process assisted by quality control management is necessary to be considered in activities of the projects at the time of project formulation.

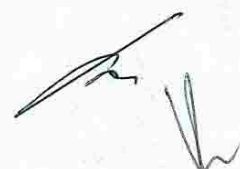
(2) Necessity of activities for convincing “What is seismic disaster?”

Because seismic disasters tend to happen with a longer recurrence period than other types of natural disasters, it is common that many people could not keep the crucial experience of a seismic disaster in mind. Therefore, educational activities to embody the image of seismic disaster are essential in the projects to reduce seismic disaster risk.



6. REQUEST FROM THE CENTER

The Center considered the necessity and importance to improve and disseminate quality management technology for implementation of retrofitting work based on the new retrofit techniques endorsed by the Government of Romania in the Project. In order to achieve this, the Center requested an extension of the Project. The Japanese Team judged the request reasonable, and promised to convey the request and inform the conclusion after discussion with the Japanese authorities concerned.



Annex 1 Project Design Matrix (PDM)
(Ver.6)

Date: 18 Mar. 2005

Name of the Project: The Project on Reduction of Seismic Risk for Building and Structures

Main Target Group: Civilians in Bucharest, Romania

Narrative Summary Overall Goal	Verifiable Indicators	Means of Verification	Important Assumptions
<p>Measures against earthquake-induced disasters in Romania are strengthened.</p>	<p>Within 5 years after the completion of the Project, number of housing evaluated and retrofitted as well as newly built using the outcomes of the Project will increase to such extent that is satisfactory to stakeholders (including administrative agency, academic institution, professional association)</p>	<p>1 MTCT/Center report or survey report 2 Survey report</p>	
<p>Project Purpose</p> <p>Improvement and dissemination of technology for reducing building collapse in case of great earthquakes are achieved.</p>	<p>1 By the end of the Project period (September 30, 2007), technology introduced by Center will be incorporated in the detailed design of retrofitting for one or more buildings built before 1940 and for one or more buildings built after 1940 2 Information on climate change projection over Mongolia is publicized once before the end of the project period.</p>	<p>1-1 Report explaining number of retrofitted buildings, issued by MTCT and other ministries 1-2 Questionnaire survey to contractors 2 Report explaining number of buildings that will be constructed by MTCT and other the seminar participants 3 Questionnaire survey of seminar effect to the seminar participants 4 Questionnaire survey of seminar effect to the seminar participants</p>	<p>Residents and users consensus on retrofitting works will be obtained. Building structure is properly maintained by the residents. (Residents do not damage or remove structural elements.) Other concerned ministries owning 1st class importance buildings finance retrofitting works.</p>
<p>OUTPUTS</p> <p>1 Effective and low-cost retrofit techniques are developed by Center and acquired by structural engineers.</p> <p>2 Regulations/codes concerning seismic issues for both new buildings and existing ones are improved by MTCT and Center.</p> <p>3 Post-earthquake evaluation techniques of the damaged buildings are developed by Center and acquired by structural engineers.</p> <p>4 Disaster prevention education for the citizens is improved by Center.</p>	<p>1-1 Not less than 1 technical manual on effective and low-cost retrofit techniques are developed (1 manual including 1-2 Not less than 8 seminars on effective and low-cost retrofit techniques are held and not less than 400 structural engineers participate. 1-3 Not less than 80% of participants to the seminar are satisfied. 2-1 Not less than 4 technical manuals on earthquake resistant design (new buildings or retrofitting) are newly developed or improved by Center (4 manuals include: (1) seismic evaluation of existing buildings, (2) seismic retrofitting design, (3) limit design earthquake ground motion (4) seismic 2-2 Not less than 4 seminars on manuals are held and not less than 200 structural engineers participate. 2-3 Not less than 80% of participants to the seminar are satisfied. 3-1 Not less than 1 technical manual on post-earthquake evaluation techniques of the damaged buildings are developed (manual shall include the following subjects; (1) quick inspection of damage (2) damage degree evaluation) 3-2 Not less than 5 seminars on post-earthquake evaluation techniques of the damaged buildings are held and not less than 250 structural engineers participate. 3-3 Not less than 80% of participants to the seminar are satisfied. 4-1 Not less than 5 seminars on earthquake disaster prevention are held and not less than 250 citizens participate. 4-2 Not less than 80% of participants to the seminar are satisfied. 4-3 Not less than 2 printed matters on earthquake disaster prevention are published by Center (2 printed matters; (1) legal incentives for retrofitting. (2) disaster prevention) 4-4 Not less than 80% of citizens who read the printed matters are satisfied.</p>	<p>1-1 MTCT/Center report 1-2 MTCT/Center report 1-3 MTCT/Center report and questionnaire survey 2-1 MTCT/Center report 2-2 MTCT/Center report 2-3 MTCT/Center report and questionnaire 3-1 MTCT/Center report 3-2 MTCT/Center report and questionnaire survey 4-1 MTCT/Center report and questionnaire survey 4-2 MTCT/Center report and questionnaire survey</p>	

Activities	INPUTS		
	Japanese Side	Romania Side	
1-1 To examine the building seismic performance listed in the MTCT's retrofit projects 1-2 To support and evaluate MTCT's retrofit projects 1-3 To study the methods of building retrofitting (strength and ductility, and displacement-based methods) 1-4 To prepare manual explaining retrofit methods 1-5 To disseminate the technical information to structural engineers by seminar 2-1 To prepare equipment and facilities for seismic engineers by seminar 2-2 To implement experiment and facilities and analyze data 2-3 To study the methods of seismic design (shear strength and ductility, and displacement-based design) 2-4 To prepare equipment for strong-motion earthquake record (underground, free field and building) 2-5 To collect ground information (microtremor characteristic, underground soil condition) and analyze/accumulate the data 2-6 To prepare equipment and facilities for soil test/investigation 2-7 To study the methods for soil test 2-8 To accumulate the data on earthquake intensity corresponding to ground motion 2-9 To accumulate the data on input earthquake-ground-motion 2-10 To prepare the manual of input design earthquake-ground motion 2-11 To disseminate the technical information to structural engineers by seminar 2-12 To prepare draft of technical manuals, regulations and new codes 2-13 To establish a database of existing data on structural testing 3-1 To collect information concerning post-earthquake evaluation techniques (quick inspection of damaged buildings and judgment of damage degree) 3-2 To prepare technical manual explaining the methods of post-earthquake evaluation techniques 3-3 To disseminate the technical information to structural engineers by seminar 4-1 To investigate disaster prevention preparedness of citizens 4-2 To disseminate information on disaster prevention to the citizens by seminar (such as legal incentives for retrofitting, disaster preparedness) 4-3 To publish printed matters concerning disaster prevention preparedness and retrofitting to the citizens 5-1 To select the target buildings for introducing new technology 5-2 To make proposals for retrofitting the target building	1 Dispatch of expert Number of long-term experts: 3 persons Number of short-term experts: Approx. 6 persons per year 2 Acceptance of counterpart training: Approx. 4 persons are accepted every year 3 Equipment provision	1 Arrangement of counterparts and administrative staffs 2 Necessary budget 3 Necessary facilities	•Economic conditions of each side do not get worse. •Trained engineers remain active for ongoing projects. Pre-Conditions •Great earthquake does not occur before the Project is completed. •Unexpected severity of earthquake is not identified.

Annex 2 Plan of Operation(PO)

Activities	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
2-6. To prepare equipment and facilities for soil test/ investigation																								
2-7. To study the methods for soil test																								
2-8. To accumulate the data on earthquake intensity corresponding to ground condition																								
2-9. To accumulate the data on input earthquake - ground-motion to buildings																								
2-10. To prepare the manual of input design earthquake- ground- motion																								
2-11. To disseminate the technical information to structural engineers by seminar																								
2-12. To prepare draft of technical manuals, regulations and new codes																								
2-13 Databasing of existing structure testing data. Iasi INCERC																								
3-1. To collect information concerning post- earthquake evaluation techniques																								
3-2. To prepare technical manual explaining the methods of post- earthquake evaluation techniques																								
3-3. To disseminate the technical information to structural engineers by seminar																								
4-1. To investigate the level of disaster prevention preparedness of the citizens																								
4-2. To disseminate information on disaster prevention preparedness to the citizens by seminar																								
4-3. To publish printed matter concerning disaster prevention preparedness to the citizens																								
5-1. To select the target building for introducing new technology																								
5-2. To make proposals for retrofitting the target building																								

