

Ministry of Public Works, Transports and Housing  
ROMANIAN-JAPANESE CENTER

林井俊明

BUDGET  
for 2002 - 2007

- USD -

Denumire indicator	Cod	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
<b>TOTAL AMOUNT</b>		54,648	209,732	191,894	169,809	169,809	125,869
<b>COMMON COSTS</b>	01	45,536	187,944	184,944	162,859	162,859	120,657
STAFF CHARGES	02	27,347	112,162	112,162	112,162	112,162	84,121
MATERIALS	20	18,189	75,782	72,782	50,697	50,697	36,535
INVESTMENT COSTS	70	9,112	21,788	6,950	6,950	6,950	5,213
<b>COMMON COSTS</b>	01	45,536	187,944	184,944	162,859	162,859	120,657
STAFF CHARGES	02	27,347	112,162	112,162	112,162	112,162	84,121
Salaries	10	19,697	78,786	78,786	78,786	78,786	59,090
Social security	11	4,595	18,381	18,381	18,381	18,381	13,786
Unemployment	12	985	3,939	3,939	3,939	3,939	2,954
Health security	13	1,379	5,515	5,515	5,515	5,515	4,136
Travels	14	692	2,770	2,770	2,770	2,770	2,078
- travels in the country	1401	692	2,770	2,770	2,770	2,770	2,078
- foreign travels	1402	-	-	-	-	-	-
<b>MATERIALS</b>	20	18,189	75,782	72,782	50,697	50,697	36,535
Maintenance	24	10,657	42,627	42,627	42,627	42,627	31,970
Materials :instalat ion fee'	25	6,062	24,250	21,250	6,250	6,250	3,200
Equipments (furniture )	26	1,015	7,085	7,085	-	-	-
Other charges	30	455	1,820	1,820	1,820	1,820	1,365
<b>INVESTMENT COSTS</b>	70	9,112	21,788	6,950	6,950	6,950	5,213
Car,fax,computer,soft - public sources	72	9,112	21,788	6,950	6,950	6,950	5,213

## BUDGET

for 2002 - 2007

- thousands lei -

Denumire indicator	Cod	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
<b>TOTAL AMOUNT</b>		<b>1,836,173</b>	<b>7,996,999</b>	<b>7,307,739</b>	<b>6,454,375</b>	<b>6,454,375</b>	<b>4,783,304</b>
<b>COMMON COSTS</b>		<b>1,530,010</b>	<b>7,155,111</b>	<b>7,039,191</b>	<b>6,185,827</b>	<b>6,185,827</b>	<b>4,581,893</b>
STAFF CHARGES	01	918,872	4,226,895	4,226,895	4,226,895	4,226,895	3,170,171
MATERIALS	02	611,138	2,928,216	2,812,296	1,958,932	1,958,932	1,411,722
INVESTMENT COSTS	70	306,163	841,888	268,548	268,548	268,548	201,411
<b>COMMON COSTS</b>		<b>1,530,010</b>	<b>7,155,111</b>	<b>7,039,191</b>	<b>6,185,827</b>	<b>6,185,827</b>	<b>4,581,893</b>
STAFF CHARGES	02	918,872	4,226,895	4,226,895	4,226,895	4,226,895	3,170,171
Salaries	10	661,806	3,044,309	3,044,309	3,044,309	3,044,309	2,283,232
Social security	11	154,389	710,237	710,237	710,237	710,237	532,678
Unemployment	12	33,090	152,215	152,215	152,215	152,215	114,161
Health security	13	46,326	213,101	213,101	213,101	213,101	159,826
Travels	14	23,251	107,033	107,033	107,033	107,033	80,275
- travels in the country	1401	23,251	107,033	107,033	107,033	107,033	80,275
- foreign travels	1402	-	-	-	-	-	-
<b>MATERIALS</b>		<b>611,138</b>	<b>2,928,216</b>	<b>2,812,296</b>	<b>1,958,932</b>	<b>1,958,932</b>	<b>1,411,722</b>
Maintenance	24	358,063	1,647,107	1,647,107	1,647,107	1,647,107	1,235,330
Materials ;instalaion feed	25	203,683	937,020	821,100	241,500	241,500	123,648
Equipments ;furniture	26	34,104	273,764	273,764	-	-	-
Other charges	30	15,288	70,325	70,325	70,325	70,325	52,744
<b>INVESTMENT COSTS</b>		<b>306,163</b>	<b>841,888</b>	<b>268,548</b>	<b>268,548</b>	<b>268,548</b>	<b>201,411</b>
Car,fax,computer,soft - public sources	72	306,163	841,888	268,548	268,548	268,548	201,411

Date: 28 June, 2002 (Ver.3)

Project Design Matrix (PDM)

Main Target Group: Civilians in Bucharest, Romania

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

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Overall Goal</b> Measures against earthquake-induced disasters in Romania are strengthened.</p>	<p>1. Number of citizens who are expected not to be injured and/ or killed by earthquake damage 2. Value of economic losses that are expected to be prevented from earthquake damage</p>	<p>1. MLPTL/ Center report or survey report 2. Survey report</p>	
<p><b>Project Purpose</b> Improvement and dissemination of technology for reducing building collapse in case of great earthquakes are achieved.</p>	<p>1. Number of buildings/ housing units retrofitted by technology introduced by Center, and number of residents and users of the buildings/ housing units 2. Number of buildings/ housing units that are expected to be designed based on technical manuals or regulations introduced by Center, and the number of residents and users of those buildings/ housing units 3. Level of the structural engineers' skills on post- earthquake evaluation for earthquake-damaged buildings 4. Disaster prevention preparedness of citizens</p>	<p>1-1. Report explaining number of retrofitted buildings, issued by MLPTL and other ministries 1-2. Questionnaire survey to contractors 2. Report explaining number of buildings that will be constructed by MLPTL and other ministries 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 residents. (Residents do not damage or remove structural elements.) -Other concerned ministries owning 1<sup>st</sup> class importance buildings finance retrofitting works.</p>
<p><b>Outputs</b> 1. Effective and low-cost retrofit techniques are developed by Center and acquired by structural engineers. 2. Regulations/ codes concerning seismic issues for both new buildings and existing ones are improved. 3. Post- earthquake evaluation techniques of the damaged buildings are developed by Center and acquired by structural engineers. 4. Disaster prevention education for the citizens is improved by Center.</p>	<p>1-1. Number of examined buildings/ housing units 1-2. Number of technical manuals 1-3. Number of seminars on retrofit techniques, structural engineers attended the seminar, and evaluation of the seminar by the participants 2-1. Availability of experiment equipment and facilities (number of experiments and data) 2-2. Number of technical manuals and regulations, including draft of the new code which are newly developed or improved by Center 2-3. Number of seminars on regulations/ codes concerning seismic issues, structural engineers attended the seminar, and evaluation of the seminar by the participants 3-1. Number of technical manuals 3-2. Number of seminars on quick inspection of damaged buildings, structural engineers attended the seminar, and evaluation of the seminar by the participants 4-1. Number of seminars on earthquake disaster prevention, citizens attended the seminar, and evaluation of the seminar by the participants 4-2. Number of printed matters published by Center, and evaluation of the printed matters by citizens</p>	<p>1-1. MLPTL/ Center report 1-2. MLPTL/ Center report 1-3. MLPTL/ Center report and questionnaire survey 2-1. MLPTL/ Center report 2-2. MLPTL/ Center report 2-3. MLPTL/ Center report and questionnaire survey 3-1. MLPTL/ Center report and questionnaire survey 3-2. MLPTL/ Center report and questionnaire survey 4-1. MLPTL/ Center report and questionnaire survey 4-2. MLPTL/ Center report and questionnaire survey</p>	

Annex 3-1

<p><b>Activities</b></p> <p>1-1. To examine the building seismic performance listed in the MLPTL's retrofit projects</p> <p>1-2. To support and evaluate MLPTL's retrofit projects</p> <p>1-3. To study the methods of building retrofitting (strength and ductility, and displacement-based methods)</p> <p>1-4. To prepare manual explaining retrofit methods</p> <p>1-5. To disseminate the technical information to structural engineers by seminar</p> <p>2-1. To prepare equipment and facilities for seismic structural testing</p> <p>2-2. To implement experiment and analyze data</p> <p>2-3. To study the methods of seismic design (shear strength and ductility, and displacement-based design)</p> <p>2-4. To prepare equipment for strong-motion earthquake record (underground, free field and building)</p> <p>2-5. To collect ground information (microtremor characteristic, underground soil condition) and analyze/accumulate the data</p> <p>2-6. To prepare equipment and facilities for soil test/ investigation</p> <p>2-7. To study the methods for soil test</p> <p>2-8. To accumulate the data on earthquake intensity corresponding to ground condition</p> <p>2-9. To accumulate the data on input earthquake -ground-motion to buildings</p> <p>2-10. To prepare the manual of input design earthquake- ground-motion</p> <p>2-11. To disseminate the technical information to structural engineers by seminar</p> <p>2-12. To prepare draft of technical manuals, regulations and new codes</p> <p>3-1. To collect information concerning post- earthquake evaluation techniques (quick inspection of damaged buildings and judgment of damage degree)</p> <p>3-2. To prepare technical manual explaining the methods of post-earthquake evaluation techniques</p> <p>3-3. To disseminate the technical information to structural engineers by seminar</p> <p>4-1. To investigate disaster prevention preparedness of the citizens</p> <p>4-2. To disseminate information on disaster prevention preparedness to the citizens by seminar</p> <p>4-3. To publish printed matter concerning disaster prevention preparedness to the citizens</p>	<p><b>Inputs</b> (Japanese side)</p> <p>1. Dispatch of expert persons</p> <p>-Number of long-term experts: 3 persons</p> <p>-Number of short-term experts: Approx. 6 persons per year</p> <p>2. Acceptance of counterpart training: Approx. 4 persons are accepted every year</p> <p>3. Equipment provision</p>	<p>(Romanian side)</p> <p>1. Arrangement of counterparts and administrative staffs</p> <p>2. Necessary budget</p> <p>3. Necessary facilities</p>	<p>-Economic conditions of each side do not get worse.</p> <p>-Trained engineers remain active for ongoing projects.</p> <p><b>Pre-conditions</b></p> <p>-Great earthquake does not occur before the Project is completed.</p> <p>-Unexpected severity of earthquake is not identified.</p>
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**Summary of Preparatory Evaluation Analysis (Project-type Technical Cooperation)****Project name: Reduction of Seismic Risk for Building and Structures****Country: Romania****Area: Bucharest****Project Term: /2002 to /2007****I. Background of the Project**

Romania is a country in Europe that is notorious for earthquakes. In particular, earthquake damage has been concentrated on the capital city, Bucharest.

On March 4, 1977, an earthquake of magnitude Mw7.5 occurred in Vrancea province. At this time, most of the damage was concentrated on Bucharest. It was recorded that 1,578 people (1,424 people in Bucharest) were killed and the cost of the damage was 3 billion dollars (2 billion dollars in Bucharest). Moreover, 1.4 billion dollars of this sum, which was 70 percent of the total damage in Bucharest, was caused by building collapse. The government considers it important to retrofit fragile buildings, which might collapse in future earthquakes in Bucharest. The government identified the 115 most fragile buildings in Bucharest and MLPTL declared its intention to gradually put the retrofitting scheme for the 115 buildings into practice. However, Romania lacks state-of-art technology to effectively retrofit the buildings.

In the background mentioned above, in August 1998 the Romanian government asked the Japanese government to dispatch some earthquake-engineering experts. The Japanese Government acknowledged this request, and dispatched experts and also accepted Romanian trainees.

In this Project, technology transfer emphasizing earthquake engineering is to be implemented. The cooperation for this Project aims to improve the quality of earthquake disaster prevention technology in Romania by reducing disaster caused by building collapse in earthquakes.

**II. Implementing organization**

1. Supervisory agency: Ministry of Public Works, Transports and Housing (MLPTL)
2. Counterpart agency : Romanian-Japanese Center for Seismic Risk Reduction (RJC-SRR)

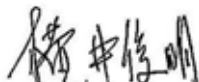
**III. Summary of the Project**

## 1. Project Purpose and Overall Goal

## 1-1. Project Purposes

Project Purpose has been set "improvement and dissemination of technology for reducing building collapse in case of great earthquakes are achieved." Achievement level of the Project Purpose will be confirmed by the following verifiable indicators.

- 1) Number of buildings/ housing units retrofitted by technology introduced by the Center, and number of residents and users of the buildings/ housing units
- 2) Number of buildings/ housing units that are expected to design based on technical manuals or regulations introduced by the Center, and the number of residents and users of those buildings/housing units
- 3) Skill level of the structural engineers on post- earthquake evaluation for earthquake-damaged buildings
- 4) Disaster prevention preparedness of the public



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## 1-2.Overall Goals

Overall Goal has been set "Measures against earthquake-induced disasters in Romania are strengthened."  
Achievement level of the Overall Goal will be confirmed by the following verifiable indicators.

- 1) Number of citizens who are expected not to be injured and/ or killed by earthquake damage
- 2) Value of economic losses that are expected to be prevented from earthquake damage

## 2.Outputs

The Project's goal will be achieved when the following four components (i. Development of effective retrofit method, ii. Development of an appropriate seismic design standard, iii. Dissemination of technical information for retrofitting of earthquake-damaged buildings to the structural engineers, and iv. Improvement of disaster prevention skills of the public) work in a well-balanced way. These components can be assumed as "Outputs" by showing the following expressions.

Output 1.Effective and low-cost retrofit techniques are developed by the Center and acquired by structural engineers (Development of effective retrofit method).

Output 2.Regulations / codes concerning seismic issues for both new buildings and existing ones are improved (Development of appropriate seismic design standard).

Output 3.Post-earthquake evaluation techniques of the damaged buildings are developed by the Center and acquired by structural engineers (Dissemination of technical information for restoration of earthquake-damaged buildings to the structural engineers).

Output 4.Disaster prevention education for the citizens is improved by the Center (Improvement of disaster prevention skills for the public).

## 3.Expected Inputs

### 3-1.Japanese side

- Dispatch of experts (3 long-term experts are stationed at the Project site, and approximately 6 short-term experts are dispatched every year.)
- Acceptance of counterpart training in Japan (approximately 3 persons are accepted every year.)
- Equipment provision

### 3-2.Romanian side

- Arrangement of counterpart and administrative staff
- Allocation of adequate budget
- Adequate facilities needed at the Project site

## 4.Project management and implementation structure

The "Center", implementing body will be established at the start of the Project when the Japanese side begins the technical cooperation. The "Center" staff will be provided mainly by Technical University of Civil Engineering of Bucharest (hereinafter referred to as UTCB) and Building Research Institute (hereinafter referred to as INCERC). The Secretary of State of MLPTL will function as a Project Director, who is the highest in rank in charge of Project management, and the present director of INCERC is expected to be the manager of the Center. (Project manager: P/M)

The Project is managed jointly by three Japanese long-term experts and their Romanian counterparts. Short-term experts (six experts in maximum) are to be dispatched to the Project per year in the field of earthquake engineering and seismic technology, if necessary.

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#### IV. Summary of Results of Evaluation Analysis

The Government prepared the system to promote the retrofitting of fragile buildings by legal framework in 1994. However, since then, the retrofitting work has not progressed and only from 2001 the works started at 4 buildings. The main reasons why the retrofitting work has not progressed is not only lack of budget but also lack of techniques related to effective retrofitting. However, the retrofitting work will be expected to promote because retrofitting techniques will be developed through the planned Project. During the 5-year term of the Project, 115 buildings are expected to be retrofitted by contractors. This could save the lives of 8,831 people. The effect of the Project will prove to be significant.

Although immediate beneficiaries who are technically transferred are seismic engineers and geophysicists, the final beneficiaries are the citizens. This project is oriented to a large public. Moreover public sector is required to provide quality social service to secure safety of the citizens' lives and properties, and to construct social and economic infrastructure efficiently. From these viewpoints, it is difficult and even impossible for private sectors to implement disaster prevention programs to save citizen's lives and their property from earthquake disaster. Therefore, it is necessary for the public sector to do this. It is appropriate to implement this Project by ODA.

Among advanced and earthquake prone countries are US and Japan. Japan, especially, has accumulated experiences in earthquake engineering and can thus make great contributions to this field.

The organization for managing the Project or The "Center" will be established when Japan starts the technical cooperation. Therefore, whether or not the Project will be appropriately managed cannot be judged yet at the present time. However, about the financial aspects, the Project budget will be allocated by the MLPTL. Continuous support from MLPTL is assured even after Project termination.

#### V. Project-management risk by external factors

##### 1) Policy aspect

In the Action Plan of the Governance Program until 2004, earthquake disaster prevention is stated as an important matter. The government policy on earthquake issues might be changed in the future due to a change of governments. Accordingly, budget allocations for earthquake disaster prevention may be restricted, or the preferential level of budget allocation might be shifted to another area. However, Romania, especially Bucharest has been damaged by earthquakes many times up until the present, so high priority remains to be placed on earthquake disaster prevention.

##### 2) Economic aspect

As far as GDP growth rate for the past ten years is concerned, signs of positive growth (93-96 years) were sometimes seen, while negative growth (97-99 years) was also seen. Stability of the economy on the macro level has not been achieved. Under the scenario of prolonged period of negative economic growth, it is thought that the budget allocation from MLPTL might be affected. In this case securing the budget becomes essential. Therefore, it is necessary to consider some ways to secure adequate budget by joint research with other enterprises or to obtain other subsidies.

#### VI. Evaluation and monitoring system

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1. Outputs' Verifiable Indicators for middle/ final-term evaluation.

Verifiable Indicators of the Outputs explained in III-2 are as follows. Achievement level of the Outputs is confirmed by the following verifiable indicators.

Output 1

1-1. Number of buildings/ housing units examined

1-2. Number of technical manuals

1-3. Number of seminars on retrofit techniques, number of structural engineers attended the seminar, and evaluation of the seminar by the participants

Output 2

2-1. Availability of experiment equipment and facilities (number of experiments and data)

2-2. Number of technical manuals and regulations, including draft of the new code which are newly developed or improved by the Center

2-3. Number of seminars on regulations/ codes concerning seismic issues, number of structural engineers attended the seminar, and evaluation of the seminar by the participants

Output 3

3-1. Number of technical manuals

3-2. Number of seminars on quick inspection of damaged buildings, number of structural engineers attended the seminar, and evaluation of the seminar by the participants

Output 4

4-1. Number of seminars on earthquake disaster prevention, number of citizens attended the seminar, and evaluation of the seminar by the participants

4-2. Number of printed matters published by the Center, and evaluation of the printed matters by citizens

2. Evaluation timing

The Project activities will be;

- 1) Monitored by the Project Team (Experts and Counterparts) and report progress of the Project to JICA and chairperson of the Joint Coordinating Committee every six month..
- 2) Monitored by the Joint Coordination Committee once a year;
- 3) Evaluated by the JICA Mid-term Evaluation Team in the third year of the Project;
- 4) Evaluated by the JICA Project Evaluation Team six months before the termination of the Project;
- 5) Evaluated by the JICA some years after the termination of the Project.

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Plan of Operation

Items	Plan of Operation											
	Oct-02	Nov	Dec	Jan-03	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Seminars	Seminar on Seismic Risk Reduction in Romania (Strategy)	Seminar on Seismic Risk Reduction in Romania (Advanced Knowledge and Technology)	Seminar on Seismic Risk Reduction in Romania (Countermeasures for Romanian Buildings)	Seminar on Seismic Risk Reduction in Romania (Manual and Guideline)	Seminar on Seismic Risk Reduction in Romania (Summary of Activity)							
Seismic Evaluation	Study on Japanese Seismic Evaluation Method and its application to Romanian Buildings	Preparation of Draft of the Manual for Seismic Evaluation of Buildings in Romania	Draft of the Manual for Seismic Evaluation of Buildings in Romania	Manual for Seismic Evaluation of Buildings in Romania	Dissemination and Application using Manual							
Seismic Retrofitting	Study on Japanese Seismic Retrofitting Method and its application to Romanian Buildings	Preparation of Draft of the Manual for Seismic Retrofitting of Buildings in Romania	Draft of the Manual for Seismic Retrofitting of Buildings in Romania	Manual for Seismic Retrofitting of Buildings in Romania	Dissemination and Application using Manual							
MLPTL Support	Technical Assistance to MLPTL Retrofitting Project	Technical Assistance to MLPTL Retrofitting Project	Technical Assistance to MLPTL Retrofitting Project	Technical Assistance to MLPTL Retrofitting Project	Technical Assistance to MLPTL Retrofitting Project							
Earthquake Design Code	Study on Japanese Seismic Design Method and its application to Romanian Buildings	Preparation of Draft of the Manual for Advanced Earthquake-Resistant Design of Buildings	Draft of the Manual for Advanced Earthquake-Resistant Design of Buildings	Manual for Advanced Earthquake-Resistant Design of Buildings including Draft of New Code	Dissemination and Application using Manual							
Post Earthquake Inspection and Restoration	Study on Japanese Method for Post-Earthquake Inspection and Restoration and its application to Romanian Buildings	Preparation of Draft of the Manual for Post-Earthquake Inspection and Restoration	Draft of the Manual for Post-Earthquake Inspection and Restoration	Manual for Post-Earthquake Inspection and Restoration	Dissemination and Application using Manual							
Structural Testing	Study on Testing and Data Processing Methods	Testing of Beam and Column Elements to Develop Retrofitting Techniques	Testing of Wall Element to Develop Retrofitting Techniques	Testing of Structural Frame to Develop Retrofitting Techniques	Proposal for Feasible Retrofitting Techniques for Buildings in Romania							
Soil Testing	Study on Testing and Data Processing Methods	Investigation of Bucharest Ground Condition and Effect to Earthquake Ground Motion	Data-base of Bucharest Ground Condition and Draft of the Manual of Zonation Map for Seismic Design	Manual for Zonation Map for Seismic Design	Dissemination and Application using Manual							
Earthquake Observation	Study on Earthquake Observation and Data Processing Methods	Investigation of Characteristics of Ground and Building Responses	Study on Design Earthquake Ground Motion for Buildings	Draft of the Manual for Design Earthquake Ground Motion for Buildings	Manual for Design Earthquake Ground Motion for Buildings and its Dissemination							
Disaster Prevention and Preparedness for Citizen	Seminar	Seminar	Seminar	Seminar	Seminar							
Mentoring of Activity (Report, etc.)												

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Annex 3-4

Tentative Staff List Categorized by Output and Activity of PDM

Output 1(Leader: Vacareanu, R. Assoc. prof. dr.)(UTC, D1, PT)

1.1	Prof. D.Lungu(INCERC, P/M, FT)	Cornea, T.(UTC, D1, FT)	Gabor,M.,Prof.dr.(UTC, D1,PT)	Pavel,C.prof.dr.(UTC,D1,PT)
	Postelnicu,T.,Prof.dr.(UTC, D1,PT)	Badea,D.(Project Bucuresti)(D1,PT)	Stanescu, I.(MLPTL)(D1,PT)	Mironescu, M (D1,PT)
	Capatina (D1,PT)			
1.2	Prof. D. Lungu(INCERC, P/M, FT)	Cornea, T. (UTC, D1,PT)	Gabor,M.,Prof.dr.(UTC, D1,PT)	Pavel,C.prof.dr.(UTC,D1,PT)
	Postelnicu,T.,Prof.dr.(UTC, D1,PT)	Badea,D.(Project Bucuresti)(D1,PT)	Stamatide,C.,(MLPTL)(D4,PT)	Stanescu(MLPTL)(D1,PT)
	Tomoiala, Gh.(MLPTL)(D4,PT)	Mironescu, M (D1,PT)	Capatina (D1,PT)	
1.3	Arien, C. (UTC, D2,FT)	Cornea, T. (UTC, D1,FT)	Cristea,Gh.,Prof.dr.(UTC, D4,PT)	Gabor, M., Prof. dr.(UTC, D1,PT)
	Iancovici, M.,Asis.prof.(UTC, D3,PT)	Pavel,C.prof.dr.(UTC,D1,PT)	Popa, V., asist.prof. (UTC, D3,PT)	Postelnicu,T.,Prof.dr.(UTC, D1,PT)
	Vacareanu,R.Ass.prof.dr.(UTC, D1,PT)	Chiriaz, C.(INCERC, D1,FT)	Felix, O.(INCERC, D2,FT)	Georgescu, D., Dr.(INCERC, D3,PT)
	Badea,D.(Project Bucuresti)(D1,PT)	Mironescu, M (D1,PT)	Capatina (D1,PT)	
1.4	Cornea, T. (UTC, D1, FT)	Gabor, M., Prof. dr. (UTC, D1,PT)	PavelC.prof.dr.(UTC,D1,PT)	Postelnicu,T.,Prof.dr.(UTC, D1,PT)
	Vacareanu,R.Ass.prof.dr.(UTC, D1, PT)	Georgescu, D.Dr.(INCERC, D3,PT)	Badea, D.(ProjectBucuresti)(D1,PT)	Stamatide, C.,(MLPTL)(D4,PT)
	Stanescu, I. (MLPTL)(D1,PT)	Mironescu, M (D1,PT)	Capatina (D1,PT)	
1.5	Gabor, M., Prof. dr. (UTC, D1,PT)	Iancovici,M.Asis.prof.(UTC, D3,PT)	Pavel,C.prof.dr.(UTC,D1,PT)	Postelnicu,T.,Prof.dr.(UTC, D1,PT)
	Stanescu, I. (MLPTL)(D1,PT)	Tomoiala, Gh.(MLPTL)(D4,PT)	Georgescu,E.S.Dr.(INCERC)(D4,PT)	

\*Number 1.1-1.5 indicates Activity number of PDM.

Output 2(Leader: Pavel,C.prof.dr)(UTC,D1,PT)

2.1	Prof. D. Lungu(INCERC, P/M, FT)	CotofanaD.,Assist.prof.(UTC, D3,PT)	Gabor, M., Prof. dr. (UTC, D1,PT)	Iancovici,M.Asis.prof.(UTC, D3,PT)
	Pavel,C.prof.dr.(UTC,D1,PT)	Popa, V., asist.prof. (UTC, D3,PT)	Vacareanu,R.Ass.prof.dr.(UTC, D1,PT)	2 technicians (FT)
	1 electronic engineer (FT)			

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2.2	Cotofana D, Assist. prof. (UTCB, D3, PT) Popa, V., asist. prof. (UTCB, D3, PT) Aldea, A., Lecturer (UTCB, D3, PT) Iancovici, M., Asis. prof. (UTCB, D3, PT) Vacareanu, R., Assoc. prof. dr. (UTCB, D1, PT) Crainic, L., prof. dr. (UTCB, D1, PT)	Gabor, M., Prof. dr. (UTCB, D1, PT) Vacareanu, R., Assoc. prof. dr. (UTCB, D1, PT) Cornea, T. (UTCB, D1, FT) Pavel, C., prof. dr. (UTCB, D1, PT) Chirazi, C. (INCERC, D1, FT) Chesaru, E., prof. dr. (UTCB, D1, PT)	Iancovici, M., Asis. prof. (UTCB, D3, PT) 2 technicians (FT) Cotofana D., Assist. prof. (UTCB, D3, PT) Popa, V., asist. prof. (UTCB, D3, PT) Felix, O. (INCERC, D2, FT)	Pavel, C., prof. dr. (UTCB, D1, PT) 1 electronic engineer (FT) Cristea, Gh., Prof. dr. (UTCB, D4, PT) Postelnicu, T., Prof. dr. (UTCB, D1, PT) Georgescu, D., Dr. (INCERC, D3, PT)
2.4	Arion, C. (UTCB, D2, FT) 1 or 2 geophysicists (FT)	Borcia, C. (INCERC, D2, FT) 2 technicians (FT)	Sandu, C. (INCERC, D2, PT) 1 electronic engineer (FT)	
2.5	Aldea, A., Lecturer (UTCB, D3, PT) Borcia, C. (INCERC, D2, PT)	Arion, C. (UTCB, D2, FT) Bucataru, R. (INCERC, D3, FT)	Demetriu, S., Assoc. prof. (UTCB, D2, PT) Sandu, C. (INCERC, D2, PT)	1 or 2 geophysicists (FT) 1 or 2 geophysicists (FT)
2.6	Arion, C. (UTCB, D2, FT) 1 electronic engineer (FT)	Bucataru, R. (INCERC, D3, FT)	1 or 2 geophysicists (FT)	2 technicians (FT)
2.7	Aldea, A., Lecturer (UTCB, D3, PT)	Arion, C. (UTCB, D2, FT)	Bucataru, R. (INCERC, D3, FT)	1 or 2 geophysicists (FT)
2.8	Aldea, A., Lecturer (UTCB, D3, PT) Borcia, C. (INCERC, D2, PT)	Arion, C. (UTCB, D2, FT) Sandu, C. (INCERC, D2, PT)	Demetriu, S., Assoc. prof. (UTCB, D2, PT)	
2.9	Aldea, A., Lecturer (UTCB, D3, PT) Sandu, C. (INCERC, D2, PT)	Arion, C. (UTCB, D2, FT)	Demetriu, S., Assoc. prof. (UTCB, D2, PT)	Borcia, C. (INCERC, D2, PT)
2.10	Prof. D. Lungu (INCERC, P/M, FT) Vacareanu, R., Assoc. prof. dr. (UTCB, D1, PT)	Aldea, A., Lecturer (UTCB, D3, PT) Borcia, C. (INCERC, D2, PT)	Arion, C. (UTCB, D2, FT) Sandu, C. (INCERC, D2, PT)	Cornea, T. (UTCB, D1, FT)
2.11	Prof. D. Lungu (INCERC, P/M, FT) Vacareanu, R., Assoc. prof. dr. (UTCB, D1, PT) Cristea, Gh., Prof. dr. (UTCB, D4, PT)	Aldea, A., Lecturer (UTCB, D3, PT) Borcia, C. (INCERC, D2, PT)	Pavel, C., prof. dr. (UTCB, D1, PT) Stanescu, I. (MLPTL, D1, PT)	Postelnicu, T., Prof. dr. (UTCB, D1, PT) Stamatida, C. (MLPTL, D4, PT)
2.12	Prof. D. Lungu (INCERC, P/M, FT) Demetriu, S., Assoc. prof. (UTCB, D2, PT)	Aldea, A., Lecturer (UTCB, D3, PT) Gabor, M., Prof. dr. (UTCB, D1, PT)	Arion, C. (UTCB, D2, FT) Pavel, C., prof. dr. (UTCB, D1, PT)	Cornea, T. (UTCB, D1, FT) Postelnicu, T., Prof. dr. (UTCB, D1, PT)

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Vacareanu,R.Assoc.prof.dr.(UTCB, D1,PT)	Georgescu,D.,Dr.(INCERC, D3,PT)	Georgescu,E.S.,Dr.(INCERC,D4,PT)	Badea,D(ProjectBucuresti,D1,PT)
Stanescu, I. (MLPTLD1,PT)			

\*Number 2.1-2.12 indicates Activity number of PDM.

**Output 3(Leader: Georgescu, D., Dr. (INCERC, D3,PT)**

3.1	Cristea, Gh., Prof. dr.(UTCBD4,PT)	Postelnicu,T.,Prof. dr. (UTCB, D1,PT)	Chiriasi, C.(INCERC, D1,FT)	Felix, O.(INCERC, D2,FT)
	Georgescu,D.,Dr.(INCERC, D3,PT)	Georgescu,E.S.,Dr.(INCERC,D4,PT)	Badea,D.(ProjectBucuresti,D1,PT)	
3.2	Cristea, Gh., Prof. dr. (UTCB, D4,PT)	Gabor, M., Prof. dr. (UTCB, D1,PT)	Pavel,G.prof.dr(UTCBD1,PT)	Postelnicu, T., Prof. dr. (UTCB, D1,PT)
	Chiriasi, C. (INCERC, D1,FT)	Felix,O(INCERC, D2,FT)	Georgescu,D.,Dr.(INCERC, D3,PT)	Georgescu, E.S., Dr. (INCERC,D4,PT)
	Badea,D(ProjectBucuresti,D1,PT)			
3.3	Prof. D. Lungu(INCERC, P/M, FT)	Cristea, Gh, Prof. dr. (UTCB, D4,PT)	Gabor, M., Prof. dr. (UTCB, D1,PT)	Jancovici, M, Asis. prof. (UTCB, D3,PT)
	Postelnicu,T.,Prof.dr.(UTCB, D1,PT)	Georgescu, D., Dr. (INCERC, D3,PT)	Georgescu,E.S.,Dr.(INCERC,D4,PT)	Stanescu, I. (MLPTLD1,PT)

\*Number 3.1-3.3 indicates Activity number of PDM.

**Output 4(Leader: Georgescu, E.S., Dr.)(INCERC,D4,PT)**

4.1	Popa, V., asist.prof. (UTCB, D3,PT)	Felix, O(INCERC, D2,FT)	Georgescu,E.S.,Dr.(INCERC,D4,PT)
	Stamatiade, C(MLPTLD4,PT)		
4.2	Prof. D. Lungu(INCERC, P/M, FT)	Popa, V., asist.prof. (UTCBD3,PT)	Georgescu, E.S.,Dr.(INCERC,D4,PT)
	Stamatiade, C., (MLPTLD4,PT)	Tomoiila, Gh., (MLPTLD4,PT)	
4.3	Prof. D. Lungu(INCERC, P/M, FT)	Popa,V.,asist.prof.(UTCBD3,PT)	Georgescu, E.S.,Dr.(INCERC,D4,PT)
	Stamatiade, C. (MLPTLD4,PT)		

\*Number 4.1-4.3 indicates Activity number of PDM.

\*\*FT: Full time PT: Part time, D1-4: Division1-4, P/M: Project Manager

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