



This publication
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The NATO Science for Peace
and Security Programme

SEISMIC UPGRADING OF BRIDGES IN SOUTH-EAST EUROPE BY INNOVATIVE TECHNOLOGIES

(SPS) Programme)

(SfP Project Number 983828)

PROJECT PLAN

Submitted to the
Science for Peace and Security Programme

Public Diplomacy Division
NATO

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PROJECT CO-DIRECTORS

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May 2009

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PRESENTATION OF NATO SfP PROJECT PLAN

Project NATO SfP: 983828

SEISMIC UPGRADING OF BRIDGES IN SOUTH-EAST EUROPE BY INNOVATIVE TECHNOLOGIES

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University of Kassel, GERMANY

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University "Ss Cyril and Methodius", Skopje, FYR MACEDONIA

Brussels, July 6 2009



*This publication
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1. THE CURRENT STATUS OF THE TECHNOLOGY FOR SEISMIC PROTECTION OF BRIDGES :

I. CLASSICAL BRIDGE SYSTEMS: RESEARCH TOWARD IMPROVEMENTS

1. Problems with providing required level of safety & reliability
2. Disturbances of Functioning of Transportation Networks
3. Severe Damages & Total collapse
4. Long-Term Consequences
5. **Limited Possibilities for Improvements**

II. INNOVATIVE BRIDGE SYSTEMS: INTENSIVE INNOVATIVE RESEARCH

1. Japan: Established Long-Term Research Program
2. U. S. A.: New Projects
3. New Zealand: Innovative Developments
4. Italy, ...EU: Intensive Innovative Research
5. **Open Possibilities for Qualitative Improvements**

- **IN THE REGIONS WITH HIGH SEISMICITY:**
 - Development of Improved Seismic Isolation Systems For Seismic Protection of Bridges is of The Highest Priority Today in The World and in Europe**

-Topic of the Present Project

2-A. THE GOALS OF THE PROJECT :

THE MAIN MULTI-TASK GOALS OF THE OVERALL NATO SFP INNOVATIVE PROJECT ARE:

- (1) *Development (creation) of a new highly efficient bridge seismic isolation system (ML-GOSEB-System), based on innovative integration of concepts of Multi-Level Seismic Energy Dissipation and Globally Optimized Seismic Energy Balance;***
- (2) *Mobilization of scientific potential in the region for advanced solving of NATO policy related complex safety problems including the principal topic of seismic upgrading of existing bridges;***
- (3) *Close Cross-Border cooperation and regional project development approach;***
- (4) *Promotion of application of the advanced technologies for seismic protection of bridges;***
- (5) *Reduction of the necessary financial resources;***
- (6) *Harmonization of the achieved level of safety and security;***
- (7) *Successful application of European standards;***
- (8) *Providing of own innovative scientific contribution to seismic isolation of bridges;***
- (9) *Motivation of end users toward application of innovative technologies;***
- (10) *Providing a general impetus to scientific staff and young researchers toward development and application of advanced technologies through successful international cooperation.***

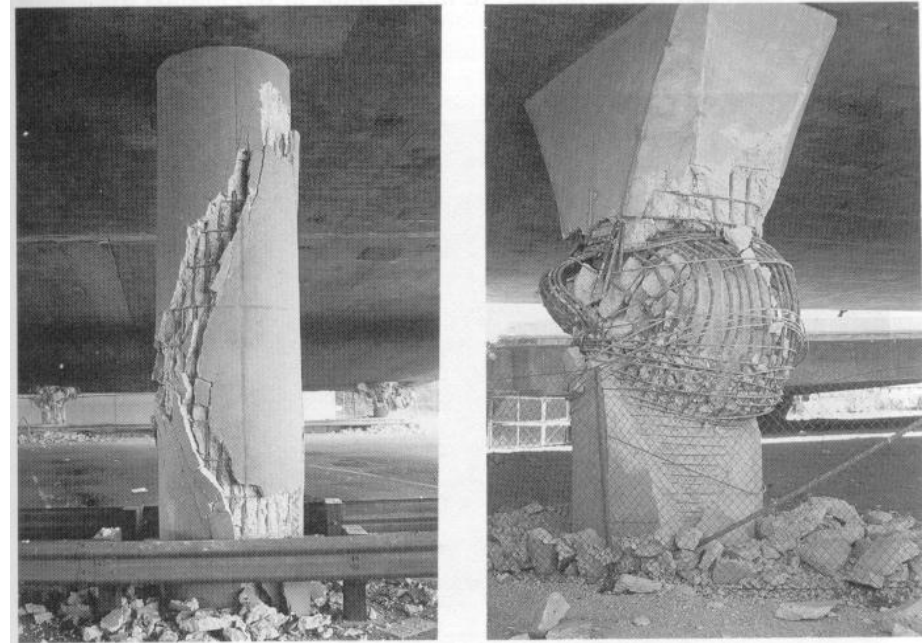
2-B. THE GOALS OF THE PROJECT :

TYPICAL EXAMPLES OF OBSERVED SEVERE DAMAGES AND TOTAL COLLAPSES OF EXISTING BRIDGES IN SOME RECENT WORLD EARTHQUAKES :



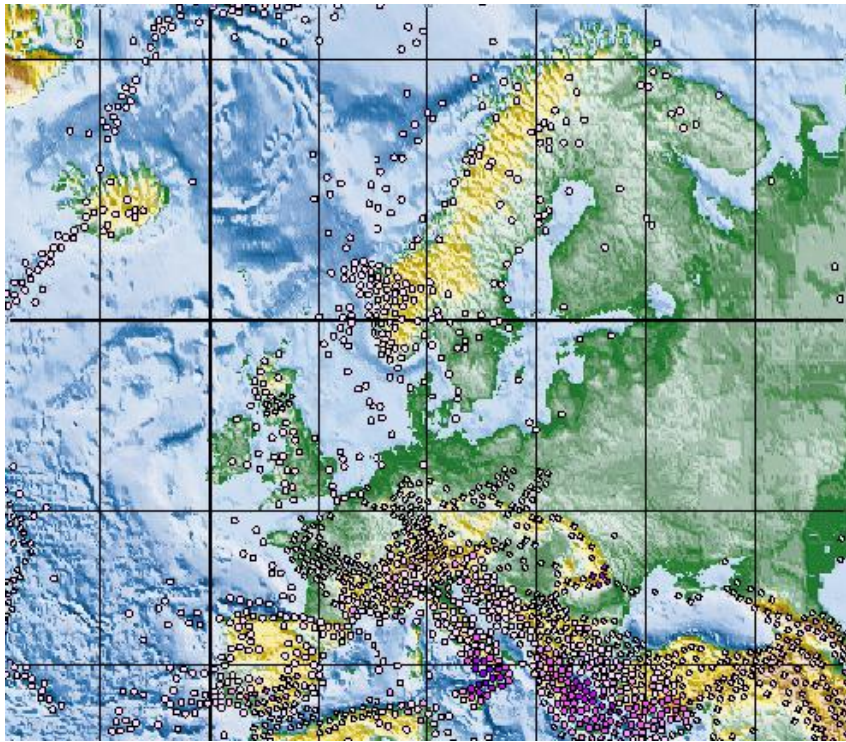
TYPICAL BRIDGE COLLAPSE:
A) KOBE, JAPAN, M=7.2, 1995, COLLAPSE OF HANSHIN LINE

TYPICAL BRIDGE COLLAPSE:
B) NORTRIGE, U.S.A., 1994, M=6.7: PIER'S TOTAL SHEAR FAILURE

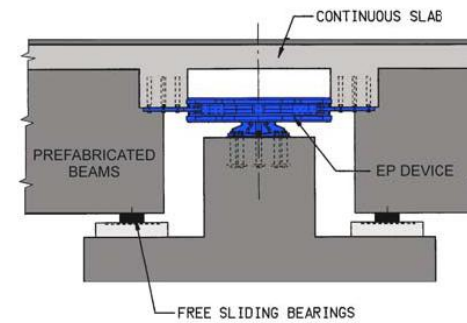


2-C. THE GOALS OF THE PROJECT :

**HIGH SEISMICITY IN SEE, EXISTING SINGLE-YIELDING DEVICE,
NEW “ML-GOSEB”-SYSTEM :**



A) The South-East European Countries have suffered in the past from very serious seismic disasters



B) Existing Single-Yielding ED Devices



C) New “ML-GOSEB”-System

3. THE NOVELTY IN THE PROJECT (IN 3 DOMAINS) :

DOMAIN-1: Instead of unreliable and costly traditional methods, offered is a *novel concept for seismic upgrading of existing bridges* based on seismic isolation enabling:

- (1) Reliable technical solutions;
- (2) Reducing of the necessary financial resources;
- (3) Promoting of new physical principles;
- (4) Drastic reduction of seismic risk; and
- (5) Continuous functioning of the road systems.

DOMAIN-2: The new ML-GOSEB system represents a high performance seismic isolation system for bridges based on an optimized seismic energy balance and creative integration of:

- (1) Advantages of seismic isolation by an adopted optimized “seismic isolation concept”;
- (2) Advantages of the seismic energy dissipation by the adopted new multi-level multi-directional seismic energy dissipation devices or “seismic energy absorbers”, and
- (3) Advantages of the effective displacement control by the incorporated optimized “displacement stoppers” at appropriate locations.

DOMAIN-3: The proposed integral innovative concept is characterized by the achieved very high vibration control performances.

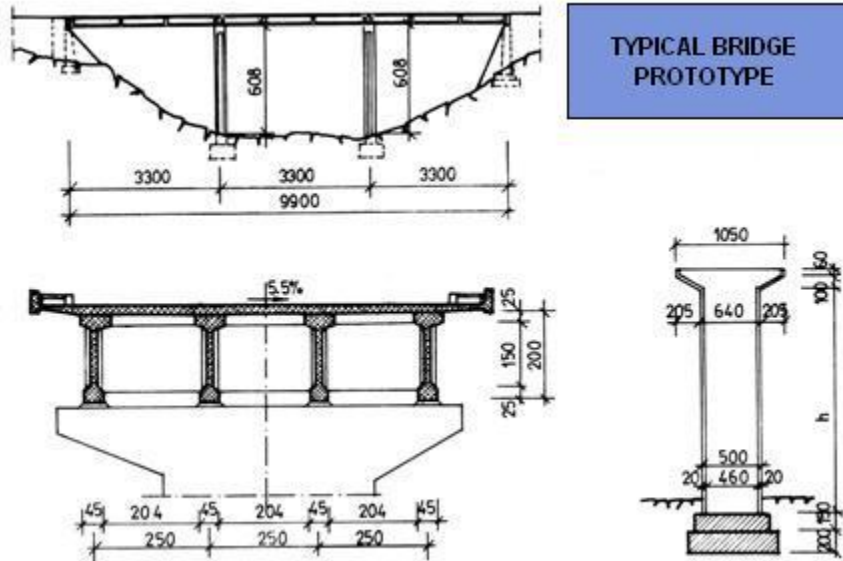
**THE DEVELOPMENT OF THE NEW ML-GOSEB SYSTEM WITHIN THIS PROJECT
WILL INCLUDE**

**REALIZATION OF THE FOLLOWING MAIN SCIENTIFIC DEVELOPMENT
PHASES:**

- (1) DEVELOPMENT OF INNOVATIVE TECHNICAL CONCEPT (SOLUTION);**
- (2) CONSTRUCTION OF FULL-SCALE PROTOTYPES;**
- (3) EXPERIMENTAL LABORATORY TESTING OF THE CONSTRUCTED PROTOTYPE MODELS;**
- (4) DEVELOPMENT OF NEW THEORETICAL MODELS FOR REALISTIC RESPONSE SIMULATION OF THE
NEW ML-GOSEB SYSTEM;**
- (5) DEVELOPMENT OF NEW ADVANCED SOFTWARE FOR REALISTIC RESPONSE SIMULATION OF THE
NEW ML-GOSEB SYSTEM; AND**
- (6) DEVELOPMENT OF AN INNOVATIVE DESIGN PROCEDURE FOR PRACTICAL APPLICATION OF THE
NEW ML-GOSEB SYSTEM FOR SEISMIC PROTECTION OF BRIDGE STRUCTURES.**

4-C. THE SCIENTIFIC ACTIVITIES OF THE PROJECT :

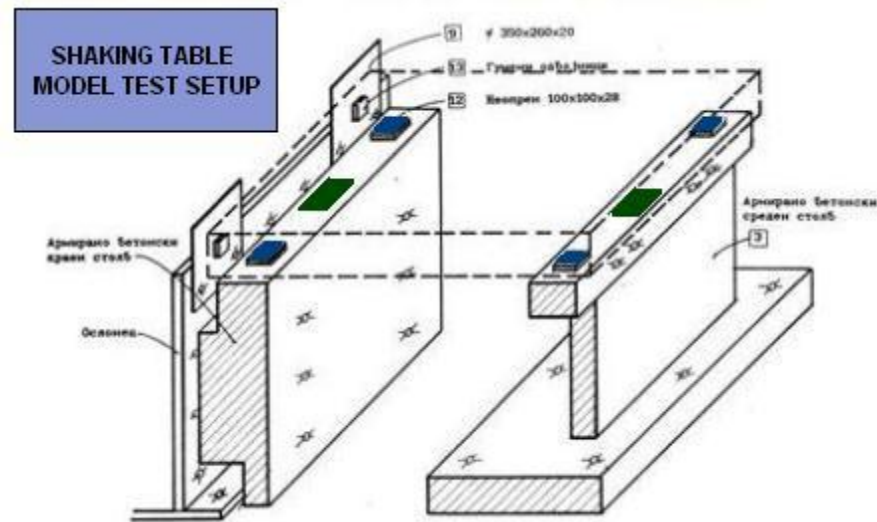
TEST SET-UP FOR REALIZATION OF EXPERIMENTAL TESTING PROGRAM-3:



TYPICAL BRIDGE
PROTOTYPE

TYPICAL BRIDGE PROTOTYPE: SELECTED FOR
SEISMIC SHAKING TABLE VALIDATION TESTS
UNDER REAL EARTHQUAKE EXITATIONS

TESTING PROGRAM-3: SHAKING TABLE
VALIDATION TESTS OF BRIDGE MODELS WITHOUT
AND WITH NEW ML-GOSEGB SYSTEM UNDER
SIMULATED REAL EARTHQUAKE EXITATIONS



SHAKING TABLE
MODEL TEST SETUP

5. THE DELIVERABLES / MILESTONES :

D1: ADVANCED METHOD FOR STRUCTURAL STATE DIAGNOSIS

D2: ADVANCED METHOD FOR SELECTION OF BRIDGE SEISMIC UPGRADING TECHNOLOGY

D3: PROTOTYPES OF NEW HYSTERETIC ENERGY DISSIPATION COMPONENTS

D4: PROTOTYPES OF NEW HYSTERETIC ENERGY DISSIPATION DEVICES

D5: DEVELOPMENT AND ADVANCED MODELING AND ANALYSIS OF BRIDGES WITH NEW "ML-GOSEB" SYSTEM

D6: ADVANCED DESIGN PROCEDURE FOR APPLICATION OF NEW ML-GOSEB SYSTEM FOR SEISMIC PROTECTION OF NEW AND SEISMIC REVITALIZATION OF EXISTING BRIDGES

D7: SPECIAL DELIVERABLE FROM NATO Sfp PROJECT WITH LONG-TERM EFFECTS:
ESTABLISHMENT OF NEW REGIONAL SEISMIC INNOVATION NETWORK "ReSIN" FOR PROMOTION OF SEISMIC ISOLATION TECHNOLOGY FOR EFFICIENT SEISMIC PROTECTION OF BRIDGES AND IMPORTANT STRUCTURES

Reporting	Deliverable
1 st Progress Report	<ul style="list-style-type: none"> • Web site of the Project
2 nd Progress Report	
3 rd Progress Report	<ul style="list-style-type: none"> • Advanced method for structural state • Advanced method for selection of bridge • Prototypes of new hysteretic energy
4 th Progress Report	<ul style="list-style-type: none"> • Prototypes of new hysteretic energy
5 th Progress Report	<ul style="list-style-type: none"> • Advanced Modeling and Analysis of
Final Report	<ul style="list-style-type: none"> application of the new ML-GOSEB system for seismic protection of

<p>members</p> <p>9.2. Identification of supporting entities, governmental bodies, financing sources; Creation of seismic innovation technology network</p>												
<p>9.3. Promotion of ReSIN as specific long-term benefit from the NATO SfP Project (Coordination of new idea and activities with the NATO SfP program office)</p>												

6. THE QUANTIFIED CRITERIA FOR SUCCESS :

No.	Criteria for success	R. W.
1	-New method for bridge state diagnosis; -New method for selection of optimal seismic upgrading technology.	15
2	-Creation and testing of new energy dissipation components (EDC); -Creation and testing of new ML-MD hysteretic energy dissipation devices.	15
3	-Development of the new ML-GOSEB System applicable for efficient seismic protection of new and seismic upgrading of existing bridges	35
4	-Seismic shaking-table validation tests of a bridge prototype model with and without ML-GOSEB System under real earthquakes	15
5	-Advanced seismic response simulation of bridges with the new ML-GOSEB System.	15
6	-Dissemination of the results	5
T O T A L: Advanced seismic protection of new and seismic upgrading of existing bridges with new ML-GOSEB system by the end-users		100

7-A. THE INSTITUTES INVOLVED IN THE PROJECT, THEIR EXPERTISE AND CONTRIBUTIONS OF EACH PARTNER TO THE PROJECT :

I. GERMANY: *Prof. Dr. UWE DORKA, NPD*

Department of Civil Engineering, University of Kassel, Kassel

- | | |
|--|---|
| <ol style="list-style-type: none">1. Expertise in SEE cooperative projects (stability pact, first joint DFG-project in SEE)2. Leading EU Institution in Earthquake Engineering Research with a strong history of EU projects in this field (CASCADE, ESACMASE, EFAST,SERIES etc.)3. Leading developer of advanced seismic testing methods in the world4. Internationally acclaimed expertise in seismic control | <p><i>Contributions:</i></p> <ul style="list-style-type: none">• Project management with PPD• Consulting on vulnerability assessment and seismic risk data base• Consulting on seismic testing• Consulting on GOSEB system development and qualification |
|--|---|

II. FYR MACEDONIA: *Prof. Dr. DANILO RISTIC, PPD*

Institute of Earthquake Engineering and Engineering Seismology, IZIS, University "Ss Cyril and Methodius", Skopje

IZIS:

- World Known Institute, IZIS, UN Center
- 2. Large Laboratory, Testing Ref. 44 Years
- 3. Large Shaking-Table, Oper. 29 Years (1980)
- 4. IZIS, 44 Years Experience in Earthq. Eng.
- 5. Research & Education Center: MSc, PhD

CONTRIBUTIONS:

- Bridge Diagnosis & Upgrading Method
- 2. Testing of ED Components
- 3. Testing of ED Devices
- 4. Shaking-Table Test of Bridge Models
- 5. Innovative Research

7-B. THE INSTITUTES INVOLVED IN THE PROJECT, THEIR EXPERTISE AND CONTRIBUTIONS OF EACH PARTNER TO THE PROJECT :

III. ALBANIA: *Vice Dean ARIAN LAKO*, Project Co-Director

Civil Engineering Faculty, Polytechnic University of Tirana, Tirana

- Leading Research Institution: *Main Contributions*

1. Albania Bridge Data Base
2. Bridge Seismic Design Practice
3. National Bridge Upgrading Plans
4. Bridge Construction Plans

IV. BOSNIA & HERZEGOVINA: *Prof. Dr. DAMIR ZENUNOVIC*, Project Co-Director

Faculty of Mining, Geology and Civil Engineering, University of Tuzla, Tuzla

- Leading Research Institution: *Main Contributions*

1. B&H Bridge Data Base
2. Bridge Seismic Design Practice
3. National Bridge Upgrading Plans
4. Bridge Construction Plans

V. SERBIA: *Prof. Dr. RADOMIR FOLIC*, Project Co-Director

Faculty of Technical Sciences, University of Novi Sad, Novi Sad

- Leading Research Institution: *Main Contributions*

1. Serbia Bridge Data Base
2. Bridge Seismic Design Practice
3. National Bridge Upgrading Plans
4. Bridge Construction Plans

8. EXPLAIN WHO YOUR END-USERS ARE AND HOW THEY CONTRIBUTE TO THE PROJECT :

WHO I. FYR MACEDONIA: HOW

1. Government in General; - Bridge data, Experts, Survey;
2. Ministry of Environment and Physical Planning - Bridge constr./ upgrading plans.

WHO II. ALBANIA: HOW

1. Ministry of Public Works, Transport and Telecommunication; - Bridge data, Experts, Survey;
2. Ministry of Environment, Forest and Water Administration - Bridge constr./ upgrading plans.

WHO III. BOSNIA & HERZEGOVINA: HOW

1. Federal Ministry of Transport and Telecommunication; - Bridge data, Experts, Survey;
2. Ministry of Environment and Turism - Bridge constr./ upgrading plans.

WHO IV. SERBIA: HOW

1. Government in General; - Bridge data, Experts, Survey;
2. Provincial Secretariat for Architect. Planning & Civil Engineering. - Bridge constr./ upgrading plans.

9. HOW THE PROJECT MANAGEMENT IS TO BE REALISED :

	COUNTRY: RESEARCH GROUP	PARTICIPATION IN
1	GERMANY	CONSULTANCY/ PARTICIPATE IN ALL WP'S
2	FYR MACEDONIA /Lead WP'S/	LEADING: WP1&WP4 LEADING: WP2, WP3, WP5, WP6, WP7, WP 8, WP9
3	ALBANIA	COUNTRY: WP1&WP4 PARTICIPATE: WP2, WP3, WP5, WP6, WP7, WP 8, WP9
4	B & H	COUNTRY: WP1&WP4 PARTICIPATE: WP2, WP3, WP5, WP6, WP7, WP 8, WP9
		COUNTRY: WP1&WP4
SK - Regional Joint Research Centre: R-JRC		
		WP 5, WP 6, WP 7, WP 8, WP 9

WP-7: PROJECT COORDINATION ACTIVITY AND MANAGEMENT	WP-1: BRIDGE SAFETY, STATE DIAGNOSIS, SELECTION OF SEISMIC UPGRADING
	WP-2: DEVELOPMENT OF NEW ML-GOSEB-SYSTEM FOR SEISMIC ISOLATION
	WP-3: EXPERIMENTAL TESTING OF ML-MD ENERGY DISSIPATION DEVICE
	WP-4: BRIDGE MODEL SHAKING-TABLE TESTS OF ML-GOSEB-SYSTEM
	WP-5: METHOD FOR PRACTICAL APPLICATION OF THE NEW ML-GOSEB SYSTEM
	WP-6: DEVEL. OF ORIGINAL SOFTWARE AND SOFTWARE PURCHASE
	WP-8: TRAINING OF YOUNG SCIENTISTS (PERMANENT ACTIVITY)
	WP-9: ESTABLISHMENT OF NEW REGIONAL SEISMIC INNOVATION NETWORK (ReSIN)

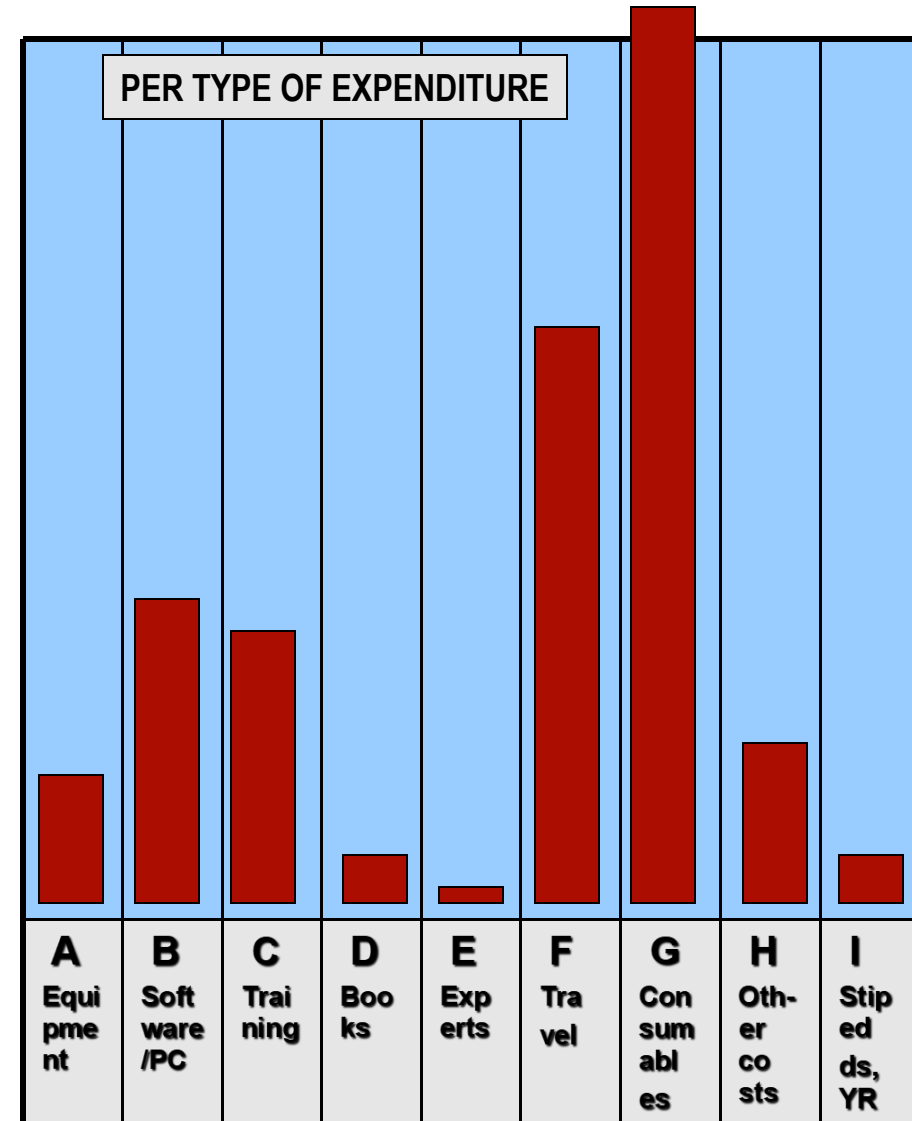
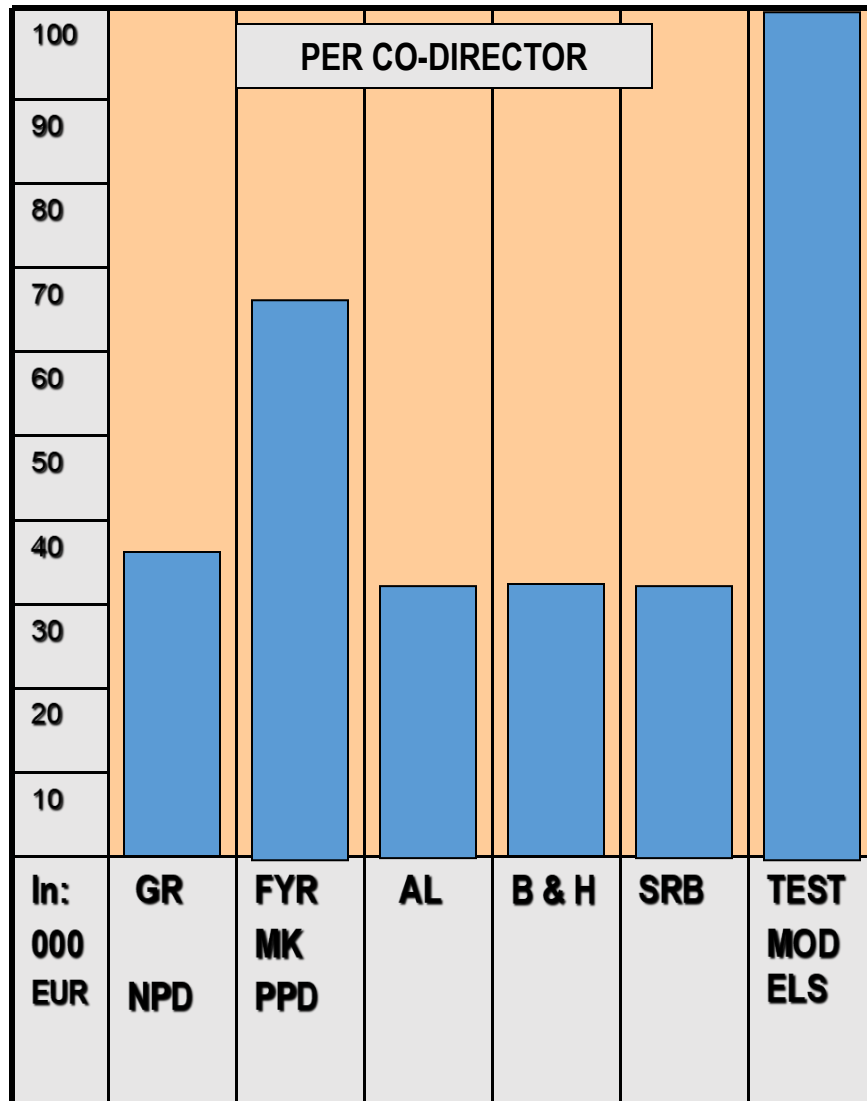
Table 7.1. Description of the role of Each Participating Group in Working Packages

	Research Group from:	Participation in:
1	Germany	Consultancy: Participation in All Working Packages
2	FYR Macedonia	<u>Counrty</u> Part of the Study in: WP-1, WP-4; Leading Research Participation in: WP-2, WP-3, WP-5, WP-6, WP-7, WP-8, WP-9;
3	Albania	<u>Counrty</u> Part of the Study in: WP-1, WP-4; Partial Participation in: WP-2, WP-3, WP-5, WP-6, WP-8, WP-9;
4	Bosnia and Herzegovina	<u>Counrty</u> Part of the Study in: WP-1, WP-4; Partial Participation in: WP-2, WP-3, WP-5, WP-6, WP-8, WP-9;
5	Serbia	<u>Counrty</u> Part of the Study in: WP-1, WP-4; Partial Participation in: WP-2, WP-3, WP-5, WP-6, WP-8, WP-9;

WP1. Evaluation of bridge seismic safety margins and development of advanced methods for bridge state diagnosis and selection of an optimal bridge seismic upgrading technology

Task no.	Specification of The Task
WP1.1	Study and evaluation of seismic exposure of existing bridges and new planned bridges in Southeast Europe based on available seismicity data (particularly in MK, AL, B&H and SRB)
WP1.2	Study and basic classification of existing bridges in the main project related categories by structural systems, material used, time of construction, deterioration degree, possible seismic upgrading options etc.
WP1.3	Selection of typical existing bridge prototypes (in MK, AL, B&H, SER) and compilation of essential background data related to structural design, site conditions, seismicity, etc.
WP1.4	On-site non-destructive ambient or forced-vibration tests of selected bridge prototypes for experimental investigation of dynamic properties
WP1.5	Development of an advanced methods for bridge state diagnosis and selection of optimal bridge seismic upgrading technology

10. THE DISTRIBUTION OF THE POSSIBLE NATO FUNDING (PER CO-DIRECTOR AND PER TYPE OF EXPENDITURE :



Project number: SfP - 983828

Expected duration of the Project: 3 years

Project Co-Director: Prof. Dr. DAMIR ZENUNOVIC, Tuzla, Bosnia and Herzegovina

Budget component (EUR)	Year of expenditure		
	1 st	2 nd	3 rd
(A) Equipment			
(B) Computers and software	4100,00	3200,00	2000,00
(B1) 3 laptops	1800,00	900,00	
(B2) 2 printers	300,00	300,00	
(B3) 1 license of DIANA/or similar software (concrete, steel, geotech.)	2000,00	2000,00	2000,00
(C) Training	2000,00	2000,00	2000,00
(C1) Training of two young researches	2000,00		2000,00
(C2) Study tours for two young researches		2000,00	
(D) Books, journals	500,00	500,00	500,00
(E) Experts – Advisors			
(F) Travel	2900,00	2900,00	3500,00
(F1) Meetings/Workshops	2900,00		2900,00
(F2) Conferences; Dissemination of results and achievements		2900,00	600,00
(G) Consumables - Spare parts	500,00	500,00	1000,00
(G1) Project specific consumables and spare parts	500,00	500,00	1000,00
(H) Other costs	500,00	1400,00	1500,00
(H2) Miscellaneous	500,00	1400,00	1500,00
(I) Stipends for young researchers:			

11. HOW A POSSIBLE NATO FUNDING WOULD CHANGE THE PREVIOUS RESEARCH IN YOUR INSTITUTE / IN YOUR COUNTRY :

	RESEARCH CHANGE IN THE INSTITUTE			RESEARCH CHANGE IN THE COUNTRY
1	STIMULATED FUTURE PLANING OF INNOVATIVE PROJECTS		1	START OF ADVANCED SEISMIC PROTECTION OF EXISTING BRIDGES
2	APPLICATION OF ADVANCED TESTING PROCEDURES		2	START OF ADVANCED SEISMIC PROTECTION OF NEW BRIDGES
3	OPEN NEW FIELD OF ADVANCED SEISMIC PROTECTION OF STRUCTURES		3	REGION: ADVANCED SEISMIC PROTECTION OF EXISTING BRIDGES
4	OPEN NEW TREND OF ORIGINAL SOFTWARE DEVELOPMENT		4	REGION: ADVANCED SEISMIC PROTECTION OF NEW BRIDGES
5	STIMULATED YOUNG RESEARCHERS FOR CREATIVE WORK		5	NEW QUALITY IN PROVIDING REQUIRED SAFETY AND SECURITY
6	NEW ERA: TEST-BASED DEVELOPMENT OF INNOVATIVE TECHNOLOGY		6	NEW ERA: ADVANCED SEISMIC PROTECTION OF BRIDGES AND IMPORTANT STRUCTURES

12. THE PROJECT STRENGTHS AND THE OPEN ISSUES :

	PROJECT STRENGTHS			PROJECT OPEN ISSUES
1	REGIONAL APPROACH FOR REALIZATION OF INPORTANT INNOVATIVE PROJECT		1	UNKNOWN FUTURE FINANCING SOURCES FOR REALIZATION OF CONSTRUCTION WORKS
2	JOINT BENEFIT GAINED FROM THE USE OF SKOPJE DYNAMIC TESTING LABORATORY		2	MODEL FOR JOINT MANAGEMENT OF CONSIDERED REGIONAL PROJECTS AND WORKS
3	REGIONAL APPROACH FOR SOLVING COMMON SEISMIC SAFETY PROBLEM		3	UNKNOWN JOINT BODY FOR HARMONIZATION OF REGIONAL ACTIVITIES
4	OPEN NEW ERA FOR LONG-TERM CROSS-BORDER AND REGIONAL COOPERATION (NATO-Prospects)		4	
5	SUPPORT FROM RESPONSIBLE INSTITUTIONS IN ALL PARTICIPATING COUNTRIES		5	
6	DISSEMINATION OF EXPERIENCE FROM PREVIOUS RESEARCH REALIZED IN IZIIS SKOPJE		6	

13. PROJECT CONTRIBUTION TO STABILITY, SECURITY, PEACE

NEED AND PRIORITY OF EXPECTED END-RESULTS:

The development of transportation networks in SEE, compatible with EU networks, is activity which is given the highest priority by the EU, NATO and all countries in the process of accessing EU.

- Region with high seismicity with high earthquake risk related to major bridges;
- Total number of existing bridges is very large, exceeding 15000;
- Most of bridges are older than 40-50 years and with poor maintenance and inadequate safety.

1	CONTRIBUTION TO STABILITY	<ul style="list-style-type: none">• SEISMICALLY SAFE INFRASTRUCTURES ARE AN IMPORTANT PREREQUISITE TO STABLE ECONOMIC AND SOCIAL DEVELOPMENT OF SEE WHICH HAS NOT BEEN ACHIEVED TO DATE. THIS PROJECT WILL MAKE A SUBSTANTIAL CONTRIBUTION TOWARDS THIS GOAL.
2	CONTRIBUTION TO SECURITY	<ul style="list-style-type: none">• THE SEISMIC THREAT TO INFRASTRUCTURES IS ALSO A THREAT TO SECURITY: NOT ONLY THE IMMEDIATE THREAT TO HUMAN LIFE BUT ALSO AS A RESULT OF UNSTABLE POST-QUAKE DEVELOPMENT CONDITIONS E.G. DUE TO DYSFUNCTIONAL MAIN ROAD CONNECTIONS.
3	CONTRIBUTION TO PEACE	<ul style="list-style-type: none">• INFRASTRUCTURES THAT ARE RESILIENT TO NATURAL HAZARDS SUBSTANTIALLY CONTRIBUTE TO SECURITY AND STABLE DEVELOPMENT AND AS A RESULT, TO PEACE.• FOR THE FIRST TIME, IMPORTANT SCIENTIFIC INSTITUTIONS IN SEE WILL COOPERATE SUSTAINABLY (ReSIN NETWORK) IN A PROJECT OF BASIC IMPORTANCE. SCIENTIFIC COOPERATIONS OF THIS KIND ARE KNOWN TO HAVE A PROFOUND AND LASTING EFFECT ON MUTUAL UNDERSTANDING AND PEACE

SfP No. 983828: SEISMIC UPGRADING OF BRIDGES IN SOUTH-EAST EUROPE BY INNOVATIVE TECHNOLOGIES


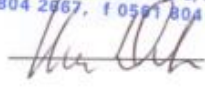




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12. Agreement by all Parties:

Signatures of all Project Co-Directors and, for those from the Partner or Mediterranean Dialogue countries also of the Head of their institution, are required declaring their agreement to the Project.

Project: PDD(SPS)-(ESP.EAP.SFP 983828)

Project Title: **Seismic Upgrading of Bridges in South-East Europe By Innovative Technologies**

Names and position	Stamp&Signature	Date:
NPD Prof. Dr. Uwe Dorka (Nato Country Project Director) Head of Section, Steel- & Composite Structures, Department of Civil Engineering, University of Kassel Kassel, Germany	 	<u>6.5.09</u>
PPD Prof. Dr. Danilo Ristic (Partner Country Project Director) Department of Engineering Structures Institute of Earthquake Engineering and Engineering Seismology (IZIIS) University "St. Cyril and Methodius" Skopje, FY Republic of Macedonia		<u>2.04.2009.</u>
Other Co-Directors Vice Dean Arian Lako (Partner Country Project Co-Director) Civil Engineering Faculty Polytechnic University of Tirana Tirana, Albania		<u>06.04.2009</u>
Prof. Dr. Damir Zenunovic (Partner Country Project Co-Director) Faculty of Mining, Geology and Civil Engineering, University of Tuzla Tuzla, Bosnia and Herzegovina		<u>14.04.2009.</u>
Prof. Dr. Radomir Folic (Partner Country Project Co-Director) Faculty of Technical Sciences University of Novi Sad, Novi Sad, Serbia		<u>April, 23. 2009</u>

12. Agreement by all Parties: (Continued: Rector of the University)

Signatures of all Project Co-Directors and, for those from the Partner or Mediterranean Dialogue countries also of the Head of their institution, are required declaring their agreement to the Project.

Signature of The Head of Institution: **Rector of The University**

Names and position	Stamp&Signature	Date:
RECTOR/SKOPJE: Prof. Dr. Velimir Stojkovski Rector University "St. Cyril and Methodius" Skopje, Republic of Macedonia	 	<u>06.05.2009</u>
RECTOR/TIRANA: Academician Prof. Dr. Jorgaq Kaçani Rector Polytechnic University of Tirana, Tirana Albania	 	<u>06.04.2009</u>
RECTOR/TUZLA: Prof. Dr. Džemo Tufekčić Rector University of Tuzla, Tuzla Bosnia and Herzegovina	 	<u>15.04.2009.</u>
RECTOR/NOVI SAD: Prof. Dr. Prof. dr Radmila Marinković-Nedučin Rector University of Novi Sad, Novi Sad, Serbia	 	<u>22.04.09.</u>

12. Agreement by all Parties: (Continued: Dean/Director)

Signatures of all Project Co-Directors and, for those from the Partner or Mediterranean Dialogue countries also of the Head of their institution, are required declaring their agreement to the Project.

Signature of The Head of Institution: **Deans/Directors**

Names and position

Stamp&Signature

Date:

DIRECTOR/SKOPJE:

Prof. Dr. Mihail Garevski
Director
Institute of Earthquake Engineering and
Engineering Seismology, (IZIIS)
University "St. Cyril and Methodius"
Skopje, FY Republic of Macedonia



3/07/09

DEAN/TIRANA:

Prof. Dr. Andrea Maliqari
Dean
Civil Engineering Faculty
Polytechnic University of Tirana, Tirana
Albania



07. 04. 2009

DEAN/TUZLA:

Prof. Dr. Abdulah Bašić
Dean
Faculty of Mining, Geology and Civil
Engineering
University of Tuzla, Tuzla
Bosnia and Herzegovina



14.04.2009.

DEAN/NOVI SAD:

Prof. Dr. Ilija Čosić
Dean
Faculty of Technical Sciences
University of Novi Sad
Novi Sad, Serbia



April 23 2009

BOSNA I HERCEGOVINA
FEDERACIJA BOSNE I HERCEGOVINE
FEDERALNO MINISTARSTVO PROMETA I
KOMUNIKACIJA

BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
FEDERAL MINISTRY OF TRANSPORT AND
COMMUNICATIONS

Broj: 01-27-457/09
Sarajevo, 27.03.2009. godine

**UNIVERZITET U TUZLI
RUDARSKO –GEOLOŠKO-GRADJEVINSKI
FAKULTET TUZLA
n/r gosp. Docent dr. sc. Damir Zeunović, dipl. inž.grad.**

PREDMET: Letter of support

Federal Ministry of Transport and Communications is expressing its support and interest to participate in proposed NATO SfP project „Seismic Upgrading of Bridges in South-East Europe by Inventive Technologies“.

The development of transportation network in Bosnia and Herzegovina, mobilization of scientific potential and Cross-Border cooperation in regional development projects are very important project objectives and from essential interest for Federal Ministry of Transport and Communications.

Federal Ministry of Transport and Communications will be the end user of all the inovative product resulting from the realization of project and will make available all data of interest for the successful realization of the project including data related to:

1. Road networks;
2. Existing bridges;
3. Technical documentation;
4. Data from latest surveys of bridges;
5. Development plans;
6. Maintenance;
7. Priority activites.

Dostaviti:
- naslov
- evidencija
- arhiva


MINISTER
Najl Sećkarović

**P4. BOSNIA & HERZEGOVINA: University of Tuzla
Faculty of Mining, Geology and Civil Engineering**

University of Tuzla

Address: M.Fizovića Fiska 6, 75 000 Tuzla, Bosnia and Herzegovina

Telephone and fax: +387 35 300 500, 300 547

Web page: www.untz.ba

Rector: Dr.sc. Dzemo TUFEKCIC

Tuzla University, containing 42 study profiles organizes and realizes teaching-scientific process at undergraduate and postgraduate level of the study at nine faculties containing around 15000 students. 500 teachers and associates employed at the University and 237 teachers and associates as outside collaborators are participating in the teaching-scientific process. In addition to this number, 200 associates are employed at this University doing expert, administration-technical and auxiliary jobs. 28 years of development of university education and science-research institutions preceded forming of the University of Tuzla. During 60s high schools, colleges and institutions for science-research activities have been formed in Tuzla as a result of economic and social needs and determinations of

How to report on grants**SfP Projects Grants**

SfP Project Directors' Bulletin












SfP Guidelines for the Preparation of Project Plans

SfP Project Management Handbook

SfP Consultants

Visual Identity Guidelines**SfP Project Management Handbook**

This Management Handbook should be used by SfP Co-Directors who have successfully presented their full Project Plan and who have received the first Grant Letter for starting their SfP Project.

Complete Handbook			-	-
Annexes				
1	a Payment Request Form (PRF)			-
	b Instructions for the Submission of PRF			-
	c Overview of Payments from the Operational Account		-	
	d Overview: Example		-	
2	a Regulations and Accounting for Mission Expenses			-
	b Mission Expense Form (MEF)			-
	c MEF: Example			-
3	a Requirements for the Six-monthly Progress Reports			-
	b Table "Milestones, Deliverables and Schedules": Outline		-	
	c Table: Example		-	
4	- Budget Forms for six-months Progress Reports			
	a SfP NATO Budget Table		-	
	b SfP NATO Budget Summary Table		-	
	c SfP National Contribution Table		-	
5	Property Inventory Procedure			-
6	Criteria for Success Table		-	
7	Outline for the SfP Summary Report			-
8	Guidelines for the Preparation of the Final Report			-
9	NATO Tax Exoneration Certificate			-
10	Example of a Standard Customs Clearance Letter			-

NATO**SCIENCE FOR PEACE - PROGRAMME****PROJECT MANAGEMENT HANDBOOK**

Edition May 2006

Subject to modification by the SfP Programme Office
Co-Directors should regularly consult the electronic version available through Internet:
<http://www.nato.int/science> (information for grantees)

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EXAMPLE OF A COMPLETED

MISSION EXPENSE FORM (MEF)

Project number: **SfP - 999999**Name of the traveller: **Mr. Vladimir Smirnoff**Business address: **Institute for Laser Science, RAS, St. Petersburg, Russia**Responsible Project Co-Director: **Dr. Slava, St. Petersburg, Russia**Purpose of the Mission: **Travel to the Conference "Laser 2001" in Berlin, Germany; meeting with three other SfP project participants (Dr. A, Mr. C, Prof. D)**

DESCRIPTION OF TRAVEL:

From	To	Date	Dep./Arr.	Means of Travel
St. Petersburg, Russia	Berlin, Germany	17.11.01	9:00/12:10	Plane
Berlin, Germany	St. Petersburg, Russia	20.11.01	16:00/21:50	Plane

EXPENSES:

Item	Expenses in local currency	EUR
Air-tickets	440 USD	487 EUR
Accommodation	3 nights x 80 EUR	240 EUR
Living expenses	4 days x 50 EUR = 200 EUR	200 EUR
Visa	700 rubles	25 EUR
Total expenses		952 EUR

MISSION ADVANCE (paid from the operational account of Dr. Slava) **714 EUR**FINAL BALANCE DUE TO TRAVELLER (paid from the operational account of Dr. Slava) ... **238 EUR**

I herewith certify that these expenses were incurred for my mission carried out in the framework of the SfP project as described above. The original back-up documents are attached to my Mission Expense Form and are sent to the responsible Project Co-Director.

Traveller's Signature: **signature of Vladimir Smirnoff**Date: **22.9.2006**

REQUIREMENTS FOR THE SIX-MONTHLY PROGRESS REPORTS
--

Progress on all projects is reported to the SfP Programme Office twice per year, covering the periods:

- from the start of the project until 31 March
- from the start of the project until 30 September

It is the responsibility of either the NPD or the PPD that 4 hard copies of the full report are received by the SfP Programme Office no later than 20 April and 20 October, respectively, to coincide with NATO's allocation of funds for the next semester. If applicable, one copy should also be sent to the NATO Consultant as well as by each member of the IPR Committee. The NPD and the PPD should sign the Progress Report.

1. THE CONTENTS OF THE PROGRESS REPORT

The six-monthly Progress Report is a narrative report and must be a stand-alone document. I.e. no reference should be made to previous reports without a brief description.

The overall objectives of the Project and the way in which the tasks and activities of the various participating groups have contributed towards achieving these objectives must be clearly stated. In particular, the Progress Report should include a summary of the current status of the work for each of the participating groups and for the Project overall in relation to the milestones and deliverables schedule given in the approved Project Plan. This information should be supported by specific accomplishments and quantified wherever possible in charts, graphs and schedules.

If delays or obstacles have been encountered, their effect on the expected outcome of the Project should be assessed and the actions planned to overcome them should be described.

A short section relating to young scientists associated with the Project, including their names, organisations and contribution to the Project, should be included in the Report.

The following paragraphs explain in detail where to place all the requested information:

2. THE STRUCTURE OF THE PROGRESS REPORT

- Title page: give the project number, full title, short title, and Project Co-Directors' names; the name(s) of person(s) who prepared the report should be marked and the date of the report should be given.
- Mark the report clearly with "MAY Progress Report – year" or "NOVEMBER Progress Report - year".
- The second page: the table of contents (TOC);
- The third page: a list of abbreviations;
- The fourth page: a list of Co-Directors and end-users with updated mailing addresses, contact numbers and e-mails (important for keeping the database at NATO up-to-date);
- The fifth page: a short introduction to the project (background and objectives). It should become clear why and how this project is carried out and what will be the end-results and the implementation;
- The sixth (and seventh page, if applicable): an overview of the entire project in form of a bar chart "Project Structure and Activities" (outline and example see *Annex 3b and 3c*). Explain briefly delays or obstacles and give reference to the chapters in the Progress Report where more details can be found.

Five separate chapters (a, b, c, d, and e) should follow. In order to facilitate the identification of the different chapters of the report it would be greatly appreciated if paper of the following colours would be used:

- | | |
|--------------------------------|--------|
| a) Technical Progress | white |
| b) Financial Status | rosé |
| c) Equipment Inventory Records | rosé |
| d) Criteria for Success Table | yellow |
| e) Summary Report | white |

PROJECT PARTICIPANT – BOSNIA AND HERZEGOVINA

Ass.Prof.Dr. Damir ZENUNOVIC
Project Co-Director

WORKING PLAN (31.03. – 30.09.2011.)

WP 1.1. Study and evaluation of seismic exposure of existing bridges and new planned bridges in SouthEast Europe based on available seismicity data (particularly in MK, AL, B&H and SRB)

The necessary documentation seismicity of Bosnia and Herzegovina were obtained.

WP 1.2 Study and basic classification of existing bridges in the main project related categories by structural systems, material used, time of construction, deterioration degree, possible seismic upgrading options etc.

Together with other country partner extended bridge management system to view the bridges in terms of this work package.

WP 1.3 Selection of typical existing bridge prototypes (in MK, AL, B&H, SER) and compilation of essential background data related to structural design, site conditions, seismicity, etc.

Select 1 prototype bridges in each country partner, with different soil condition and with some differences in mean of structure system.

Adoption of the prototype. Collection and analysis of technical details of the prototype bridges and environmental condition.

WP 1.4 On-site non-destructive ambient or forced-vibration tests of selected bridge prototypes for experimental investigation of dynamic properties

2 day Workshop Tuzla, May 27th and 28th 2011 – Bridges exposed to dynamical excitation
Sesion 1 - Measurements of foundation soil parameters Prof. Eldar Husejnagic will invite expert

Sesion 2 - Measurements of ambient or forced-vibration of bridges Prof.Uwe Dorka and Prof. Danilo Ristic

The aim of the workshop is to prepare staff for the testing of selected prototype bridges.

Activities during the workshop:

1. The definition proposed by WP 1.2.
2. Defining the list of bridges for testing and adjustment of measurement
3. Open discussions on paragraph 1.5.
4. Develop a basic idea for the numerical analysis of selected prototype bridges

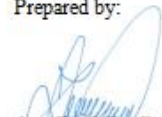
WP 1.5 Development of an advanced methods for bridge state diagnosis and selection of optimal bridge seismic upgrading technology

Assessment of selected prototype bridges using the approved form. Coordination between country partner.

FINANCIAL PLAN (31.03. – 30.09.2011.)

1. Purchase of 2 laptops for analysis of field measurements and numerical analysis using the licensing software. (Deadline end of the purchase process 30 April 2011.). **1.800 EUR**
2. 2 day Workshop Tuzla May 2011 – Bridges exposed to dynamical excitation **500 EUR**
3. Equipment (Sensors) **4000 EUR**
4. Site measurements in Bosnia and Herzegovina **500 EUR**
(Measurements in Serbia/Albania will be paid from Serbian/Albanian funds)
5. Participation in numerical analysis which will be performed in Serbia or Albania or Macedonia (purchase of software or using of distributed software) **2.000 EUR**

Prepared by:



Ass. Prof. Dr. Damir Zenunovic
Project Co-Director, Bosnia and Herzegovina

Novi Sad, March 25, 2011

SFP NATO BUDGET SUMMARY TABLE

Project number: SfP - 983828	Project short title: SfP - ISUbridge
Report date:	Duration of the Project ¹ : Feb. 2010 until Jan. 2013
The Project is in the year (please indicate): 1 - 2 - 3 - 4 - 5 ¹	

Breakdown per Project Co-Director (to be completed in EUR ³)			ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in financial planning compared to the approved Project Plan
Project Co-Director's name, city, country	APPROVED BUDGET: Total year 1-5	CURRENT COST OUTLOOK: Total year 1 - 5	since 08.02.2010 until 31.03.2011 ²	for the following 6 months	for the following period until project's end	
Damir Zenunovic, Tuzla, Bosnia and Herzegovina	28000,00	28000,00	939,96	10.936,00	16.127,04	
TOTAL (must be identical with TOTALs given in 'Breakdown per item'):	28000,00	28000,00	939,96	10.936,00	16.127,04	

Breakdown per item (to be completed in EUR ³)			ACTUAL EXPENDITURES	FORECAST EXPENDITURES		Comments on changes, if any, in financial planning compared to the approved Project Plan
Damir Zenunovic, Tuzla, Bosnia and Herzegovina	APPROVED BUDGET: Total year 1-3	CURRENT COST OUTLOOK: Total year 1 – 3	since 08.02.2010 until 31.10.2010 ²	for the following 6 months	for the following period until project's end	
(a) Equipment		4.000,00		4000,00	0,00	
(b) Computers - Software	9.300,00	7.800,00	0,00	3800,00	4.000,00	
(c) Training	6.000,00	4.586,00	0,00	586,00	4.000,00	
(d) Books - Publications	1.500,00	1.000,00	0,00	0,00	1.000,00	
(e) Experts - Advisors		0,00	0,00	0,00	0,00	
(f) Travel	9.300,00	8.700,00	939,96	2000,00	5.763,04	
(g) Consumables - Spare parts:	1.900,00	1.364,00	0,00	0,00	1.364,00	
(h) Other costs and (i) miscell...		550,00		550,00	0,00	

Project Co-Director: <i>(name, city, country)</i>		Dr.Damir Zenunovic, Tuzla, Bosnia and Herzegovina		
	ACTUAL EXPENDITURES	FORECAST EXPENDITURES		
Detailed Budget Breakdown <i>(to be completed in EUR³)</i>	<i>(1) from 08.02.2010 until 07.12.2013²</i>	<i>(2) for the following six months</i>	<i>(3) for the following period until project's end</i>	Comments on changes, if any, in the financial planning compared to the approved Project Plan
(a) Equipment				
<i>Microtremors (Paid by NATO)</i>	4.565,00			<i>The Project Plan change is explained under item 8. Technical Progress Report</i>
<i>Trigger</i>	1.600,00			<i>The Project Plan change is explained under item 8. Technical Progress Report</i>
<i>Microtremors, Freight Costs</i>	225,60			
<i>Trigger, Freight Costs</i>	106,90			
Subtotal "Equipment"	6.497,50	0,00	0,00	
(b) Computers - Software				
<i>Laptops</i>	1.472,51			
<i>1 license of software (ARTEMIS)</i>	7.950,00			
<i>1 license of software (SAP2000)</i>	570,00			
Subtotal "Computers - Software"	9.992,51	0,00	0,00	
(c) Training				
<i>Training Workshop Sofistik Novi Sad</i>	586,00			
<i>Conference Skopje and Workshop Skopje</i>	978,37			
<i>Workshop Neum, Bosnia and Herzegovina</i>	1.008,70	0,00	0,00	
Subtotal "Training "	2.573,07	0,00	0,00	
(d1) Books and Journals <i>(global figure)</i>	0,00			
<i>Books</i>	364,60			
(d2) Publications <i>(global figure)</i>	0,00			
	364,60	0,00	0,00	

