CEDR Transnational Road Research Programme
Call 2013: Ageing Infrastructure Management-
Understanding Risk Factors

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CEDR
Conférence Européenne des Directeurs des Routes
Conference of European Directors of Roads

Re-Gen
Risk Assessment of Ageing Infrastructure

Project Management Plan (PMP): Including Quality Plan and Communications Plan

Milestone No. M1.1
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Roughan & O Donovan Innovative Solutions (ROD-IS), Ireland
Gavin and Doherty Geosolutions Ltd. (GDG), Ireland
Slovenian National Building and Civil Engineering Institute (ZAG), Slovenia
Institut Français des Sciences et Technologies des Transports de L'amenagement et des Reseaux (IFSTTAR), France
Rambøll Denmark A/S, Denmark
Delft University of Technology, Netherlands

Re-Gen
risk assessment of ageing infrastructure

CEDR Call 2013: Ageing Infrastructure Management- Understanding Risk Factors

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Author of this milestone:
Mark Tucker & Alan O Connor, Roughan & O' Donovan Innovative Solutions

PEB Project Manager: Tom Casey, NRA, Ireland

Table of contents

Executive summary

This report describes the Re-Gen Project Management Plan. It describes the overall project scope and objectives. Project execution is discussed in detail and addresses issues such as the management structure, the work package structure, both internal and external project communication procedures and change management procedures.

The project output is described in terms of the deliverables and milestones. Risk and financial management procedures are described and reference is made to the completed deliverable *D1.1 Quality Assurance Plan*.

1 Introduction

The Project Management Plan (PMP) is a formal, approved document being utilised to manage the execution of the Re-Gen project. This PMP documents the actions necessary to define prepare, integrate and coordinate the various planning activities. The PMP defines how the project is executed and controlled and ultimately closed. It is progressively elaborated by updates throughout the course of the project.

The PMP is also a communication vehicle for ensuring key stakeholders share and understanding of the project.

2 The Project Scope

2.1 Overview

Across, Europe there is a need to build an understanding of the external factors that will influence the management of national road networks over the coming 20-30 years. These will include the predicted performance of the asset, projected traffic forecasts, potential impact of climate change and how all of this may be impacted by limited funding. Equally, with demand for a single interlinked European road network, the ability to provide optimised planning and maintenance strategies is likely to become even more important.

The Re-Gen hypothesis is that adopting a network-wide probabilistic risk based approach will provide a scientific structure to (i) ensure safe lifecycle analysis of road assets consisting of bridges, retaining walls and steep embankments and (ii) to inform key decisions regarding prioritised maintenance expenditure. The risk based approach will ensure optimised lifecycle performance of the infrastructure, within the context of *evolving traffic demands* and *climate change effects*. The proposed framework will consider the different types of risk faced by national road administrations – for example, safety risk, such as structural safety, financial risk, such as that arising from a maintenance backlog, or by managing the increasing demand for emergency repairs, operational risk, commercial risk and reputational risk. This risk methodology can then be used by national road administrations for the development of asset management policies, to communicate with stakeholders and to support funding submissions

The risk will be assessed considering not only the probability of failure of an element/network but also based upon the consequences of that failure. As a result the prioritisation of these structures for repair should be planned based upon the associated risk, where risk is defined as the product of the (probability of failure) x (consequence) of that failure. Such a risk based approach will provide Owners/Managers with the facility to optimise budgets/resources from the perspectives of minimisation of cost, i.e. considering alternative rehabilitation strategies including the do-nothing option, for maximised service life performance, Figure 1.

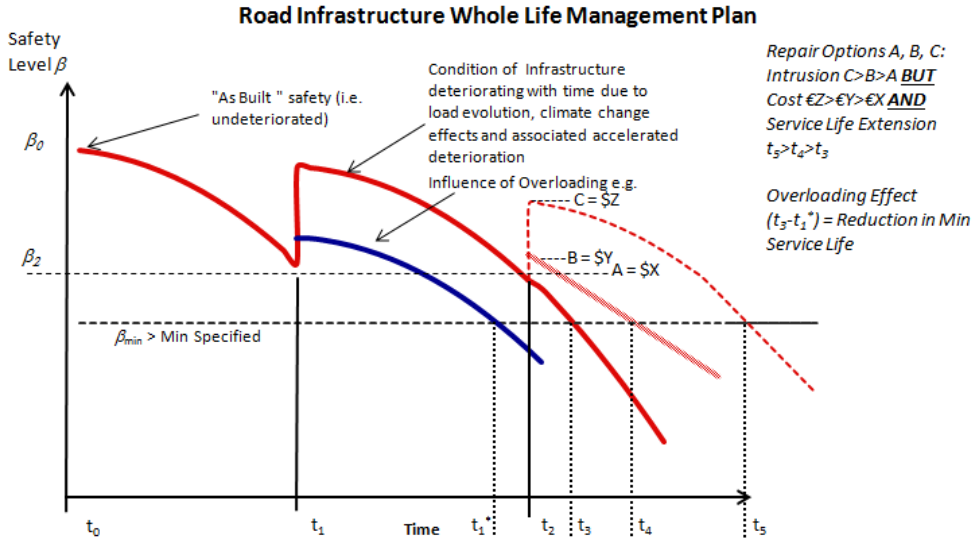

Figure 1: Life Cycle Performance Optimisation

2.2 Objectives

The Re-Gen objective is to provide Road Owners/Managers with best practice tools and methodologies for risk assessment of critical infrastructure elements, such as bridges, retaining structures and steep embankments, considering the effects of climate change and increased traffic and loads.

To achieve these objectives Re-Gen will;

1. Produce a State of the Art Report focused on consideration of;
   (a) asset performance and deterioration;
   (b) prediction of traffic growth;
   (c) fore sighting work on developing scenarios for the future;
   (d) climate change prediction.

2. Detail the development of a risk based methodology for prioritisation of maintenance actions from the perspectives of;
   (a) safety;
   (b) operation;
   (c) finance;
   (d) commercial;
   (e) reputation;
   and to demonstrate its use in a Web based tool.

3 Project Execution

3.1 Introduction

Over the last five years, extensive research efforts have yielded new analysis and design tools that can provide more realistic predictions of infrastructure damage state, which can be used as part of a probabilistic predictive maintenance strategy as illustrated in Figure 1.

The primary objective for the RE-GEN consortium is to demonstrate to road owners/managers across the EU how probabilistic risk based techniques may be widely applied to optimise performance for minimised cost whilst maintaining the minimum specified safety level as required by National Authorities and/or Codes of Practice.

Ageing, aggressive environmental conditions and natural hazards are some of the causes for the progressive degradation of infrastructures over their lifetime. In addition to these, the increase in traffic levels over time leads to increased structural performance demands. Even the inherently conservative initial design of structural systems may not protect a structure from these threats. The effect of structural ageing is perhaps most widely apparent in road infrastructures deterioration, exacerbated by an increase in traffic over time and as demonstrated in recent research by the effects of climate change which increase carbonation and corrosion rates. In this context, stakeholders require decision-support tools to allocate funds for assessment and maintenance of bridges in an optimal way under financial constraints.

The purpose of this project is to provide risk management and decision tools which may be employed by infrastructure owners/managers in optimizing the lifecycle performance of (i) their already built infrastructure and (ii) future construction. To a certain extent, these tools will be future proofed, given that the effect of climate change and increasing volumes of traffic on the estimated risk will be accounted for. In order to develop a set of risk management and decision tools, information is required in the following areas:

1. Prediction of Deterioration Considering Climate change;
2. Traffic Effect Forecasting;
3. Risk profiling.

3.2 Management Structure

Re-Gen has a clear organisation structure in order to ensure that the project results in the expected outcomes according to its objectives. The work to be done is divided into Work Packages (WP) and further subdivided into Tasks. All work package leading organisations have designated a responsible representative to their work package. The management structure is characterised by;

- A project coordinator, ROD-IS, who supervises the consortium, is responsible for communication with the Project Executive Board (PEB) for Re-Gen, monitors the project progress, and safeguards the quality of the work.
- Five work packages in which the project activities will be executed, Figure 2.
- Five work package leaders who are responsible for the execution and quality of all activities within their WP.
- Fourteen personnel who execute the activities under the direction of the WP leaders.

- An Executive Committee, which supervises and directs all project activities. The Executive Committee consists of the project coordinator and the WP leaders.
- A project support staff, employed by the Project Coordinator, which is responsible for the contracts between the project partners, the financial administration of the project, and general administrative support.
- A Project Executive Board (PEB), established by CEDR, to supervise the project. The PEB consists of representatives of different NRAs. The PEB members consist of Rolf Rabe (BASt, Germany), Tom Casey (NRA, Ireland), Albert Daly (NRA, Ireland), Alex Tam (HA, UK), and Jenne van der Velde (RWS, Netherlands). Tom Casey is the Project Manager for Re-Gen and Jenne van der Velde is the PEB Chair for the Ageing Infrastructure call.

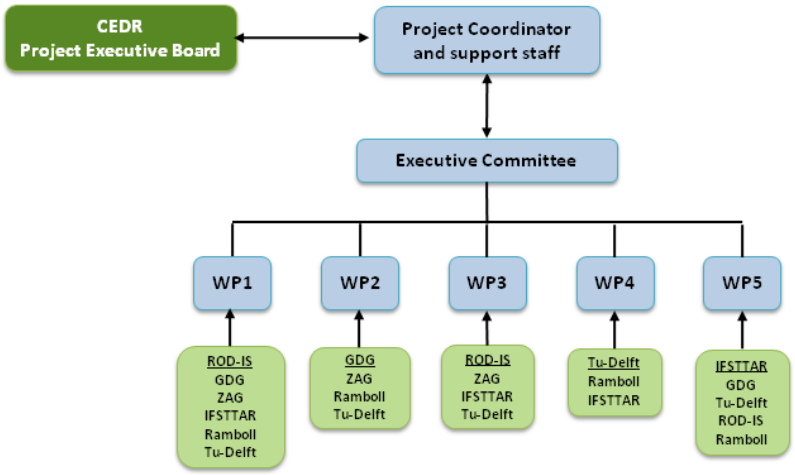

Figure 2 Project Management Structure

3.3 Work Package Structure

Work packages are developed around the required information listed in 3.1 above. The work package structure is shown in Figure 3.

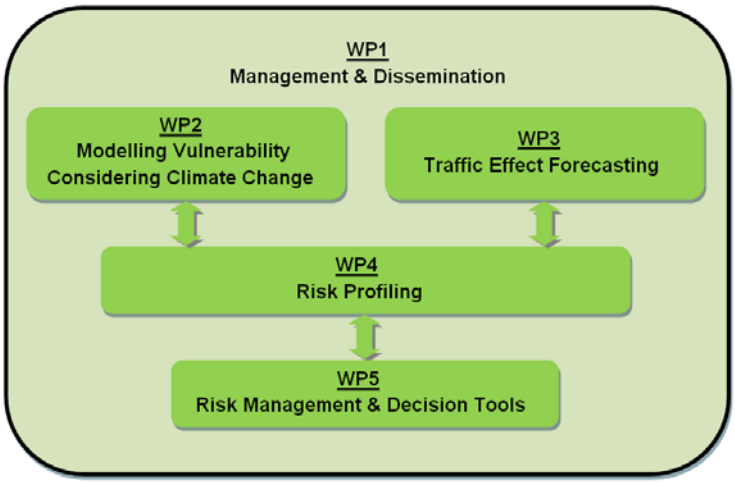

Figure 3: Work Package Structure

The first technical work package, WP2, is concerned with the effect of climate change on the prediction of deterioration of infrastructure elements. The aims of this work package it to focus on the temporal nature of the structural response considering the effects of climate change.

The second technical WP, WP3 deals with Traffic Forecasting. Traffic tends to increase with economic growth, which can be seen in Figure 4. Furthermore, heavier and longer freight vehicles are coming to the market. This has very significant implications for infrastructure safety. Increased volumes of heavy vehicles can increase the rate of fatigue damage in pavements and steel bridges. For concrete bridges however, the problem is one of risk – greater numbers of heavy vehicles increases characteristic maximum load effects and hence reduces reliability, especially for older structures. The second work package will examine the effect of increased levels of traffic and heavy vehicles on infrastructure reliability and risk.

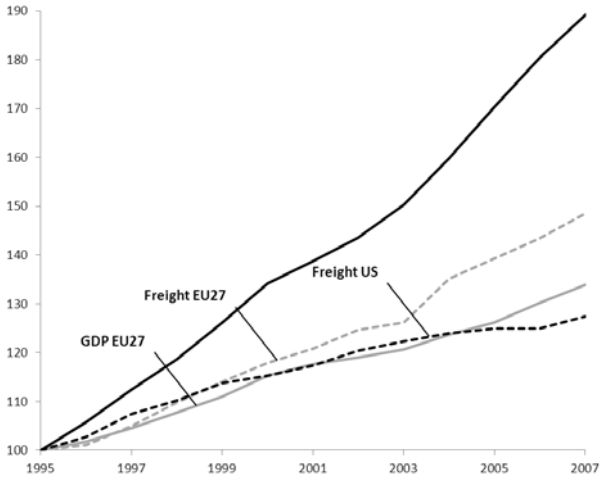

Figure 4 Road Freight and Gross Domestic Product (GDP) indexes for US (US Department of Transport) and EU27 (European Commission) using the year 1995 as a reference (1995=100)

ROD-IS have pioneered methods (i.e. log run simulations) to determine lifetime effects, e.g. by simulating 1000 years of traffic loading events. In this project these techniques will be employed to demonstrate how site-specific traffic data (i.e. Weigh-in-Motion data, WIM) can lead to avoidance of unnecessary repairs of serviceable structures without compromising the required level of safety as specified by codes of practice.

The third technical work package provides a methodology to estimate the risk associated with an element of infrastructure. Having determined the influence of (i) climate change on resistance of bridges and retaining structures and (ii) modeling traffic growth to determine lifetime maximum load effects, this work pack will focus on bringing these two together to provide a methodology to estimate the probability of failure, pf, of the infrastructure at the considered limit state. In order to estimate the level of risk, a detailed treatment of the consequences of failure is also required in order to arrive at a risk profiling methodology, considering risks related to (i) Safety, (ii) Operation, (iii) Financial, (iv) Commercial and (v) Reputation.

Considering the significant expenditures required for keeping infrastructure safe and functional, it is clear that refinements are required in the current infrastructure management methodology. The financial implications demand a realistic framework for assessment of

infrastructures, and uniform ranking criteria to identify the critical nodes in the network. The final technical WP will draw together the outputs from the other WP's to prescribe a set of risk management and decision tools which may be employed by infrastructure owners/managers in optimizing the lifecycle performance of infrastructure elements, including bridges and retaining walls. These optimization tools will predict the optimal frequency and extent of maintenance cycles and preventive measures on each of the critical nodes of the network. Prominent sources of damage will be identified in each category of infrastructures, and the appropriate models for analysing these scenarios determined. This will allow the efficiency of input parameters to be improved to reflect the impacts of climate change and traffic growth more clearly in the performance prediction models. This can be applied to either existing infrastructure elements or planned infrastructure elements.

3.4 Consortium Agreement

A Consortium Agreement between the Partners has been signed. The Consortium Agreement identifies issues that may arise during the implementation of the project, such as:

- Responsibilities of Parties and liabilities towards each other;
- Governance structure including management structure, voting rights, meeting organization etc;
- Financial provisions;
- Intellectual property arrangements, including foreground and background ownership and access rights and commercial ownership;
- Conflict management and resolution.

The agreement has been ratified by the PEB and is considered to represent the contract between the partners. No amendments can be made to this agreement unless in exceptional circumstances and only at the agreement of the executive committee and PEB.

3.5 Key Stakeholders

As the development of a risk based optimisation tool that can be used by National road authorities to manage their maintenance strategies, stakeholder involvement is very important to the success of the project.

The key stakeholders identified consist of the road authorities of those countries who are funding the Ageing Infrastructure call as follows;

- The Danish Roads Directorate, Denmark;
- The Federal Ministry of Transport and Digital Infrastructure, Germany;
- The National Roads Authority, Ireland
- Rijkswaterstaat, The Netherlands;
- The Slovenian Roads Agency, Slovenia

This does not exclude other road authorities playing an important role, in particular the French road authority

3.6 Project Communication

A strongly-integrated project like Re-Gen requires extensive communication between the collaborating participants. As a basis, we use standard communication techniques such as email, phone, teleconferences, and face-to-face meetings.

3.6.1 Internal Communication

3.6.1.1 Emailing and Email lists

Email is one of the main means of communication within the Re-Gen project. For efficient communication the project has set up a group mailing list, regen@rod.ie, including all participants. The mailing list is managed by the Project Coordinator. All participants in the project are on this list. Participants can be amended (i.e. added or removed) by notifying the Project Coordinator.

If necessary, the Project Coordinator will establish additional mailing lists during the course of the project.

When sending project related emails, it is required to insert 'Re-Gen' prominently into the email title/subject to allow for easy identification among recipients. Additionally, an email title/subject should also include references to aspect of the project it is associated with (such as work package, deliverable and milestone abbreviations).

3.6.2 Teleconference

In the Re-Gen project, teleconferences will be held as required. A number of mediums can be used such as;

- Skype (audio and/or visual);
- 247 meeting (audio only via telephone);
- Vidyo, Adobe Connect or other suitable audio visual programme.

For computer-based communications, Skype is one of the more powerful tools in this arena and is currently available for all important platforms (Mac, Windows, and Linux) for free. Skype also allows instant messaging and enables project members to get in touch briefly and rapidly.

247 meeting is the ROD-IS teleconferencing facility whereby ROD-IS sets up an event and provides the partners with a dial in number and event code in order to participate. Calls are typically charged at the participant's local rate.

The other audio visual facilities can be used depending on the availability of the software to the participants.

The initiator of the meeting (the host) should suggest their preferred method of conducting the teleconference.

3.6.3 Project Meetings

Face to face project meetings will be held every 6 months. However, the timing may vary as meeting can be arranged around conferences and other dissemination events. It is also intended to hold the meetings across all the partner countries so as to spread out the costs of travelling etc. to all partners. A project review will be conducted at these meetings as described in *D1.1 Quality Assurance Plan*.

3.6.3.1 Preparation of Project Meetings

When organising a face-to-face meeting within Re-Gen, there are a number of issues to take care of in addition to the usual procedures. A checklist of some important issues is provided below;

- Objective - Organise a meeting only if it is really required and there is a well-identified objective;
- Unique title - Give every meeting a unique title that everybody can refer to in their reporting and other communications;
- Provide the following information: Organizer, dates, information on location & accommodation, directions to the destination, goals, agenda;
- Agenda - the Agenda has to be provided either by the work package leader – in case it is a work package related meeting – or by the project coordinator in accordance with all project partners. A draft agenda should be circulated two weeks in advance of the meeting for comment;
- Announce the meeting to the whole project well in advance in accordance with the Consortium Agreement Use the general mailing list;
- Relevant material has to be provided in advance to allow all participants to prepare for the meeting accordingly (e.g presentations, WP sessions etc.). Use the general mailing list.
- Organise lunches and evening meals (if event requires a stay over). Lunches should be provided by the Host organisation free of charge to the participants. Costs of the evening meals/dinners should be borne by each participant themselves.

3.6.3.2 Execution of Project Meetings

During the meeting, there are a number of important points to keep in mind in addition to the meeting organisation. The initiator of the meeting is responsible to ensure that minutes are taken.

- Agenda: Follow the agenda during the meeting.
- Minutes: Keep minutes of all sessions of the meeting. Send the participants of the meeting the minutes at most 10 calendar days after the meeting. Participants have 15 calendar days from the receipt of the minutes to raise any issues.
- An attendance list should be created.

3.6.3.3 Post Meeting Tasks

After meetings, the following tasks have to be considered:

- Action items agreed during a meeting must be followed up as agreed;

- Travel Budget: Every partner has a travel budget allocated in the project budget. This travel budget serves two purposes:
  - Participating in Re-Gen project meetings, such as General Meetings, Work Package meetings or PEB Review meetings. It must be ensured by the partner that sufficient budget is available for attending these meetings as required.
  - Other travel: This comprises travel for disseminating Re-Gen results, e.g. by presenting a Re-Gen publication at a conference, or other travel necessary for obtaining information required for performing agreed Re-Gen tasks.
- Every partner is responsible for the costs associated with attending meetings, i.e., must make sure that there is sufficient budget available for performing its task and taking part in internal meetings as required.

3.6.4 External Communication

3.6.4.1 Project Manager and PEB

Communication with the Project Manager from the NRA is primarily conducted via email/telephone. Deliverables, requests for amendments and general queries are to be submitted to the PM via email. The coordinator is the direct point of contact with the Project Manager.

At the first meeting of the PEB and project Coordinators in August 2014, it was noted that there are six PEB meetings planned to the end of the project (April 2015), three with the PEB and Consortium Leaders (so called Big meetings) and three with only the PEB members (so called Small meetings to which the Consortium Leaders may be invited if the PEB members think this is appropriate).

In relation to the meetings the following points are to be noted;

- Two weeks before the meeting the Consortium Leaders will send a progress report to the Project Managers of the PEB. The PEB will look for a uniform standard for these reports.
- The meetings will be held in Schipol airport, except the last meeting which is being planned for the TRA conference in Poland.
- PEB Big Meeting: First day: 2 hour presentation/discussion per project (total 6 hours), 2 hour discussion with PEB and consortia, start time 10am. Second day, 1 hour per project discussion, 2 hour discussion, only PEB members, start time 9am, end time approximately 4pm.
- PEB Small Meeting: 1.5 hour per project discussion (PEB members only), consortium Leaders tentatively available (based on project progress), start time 9:30am, end time approximately 4pm.

The dates of the proposed meetings re as follows;

- Small - 5 November 2014
- Big - 11 and 12 February 2015
- Small - 24 June 2015
- Big - 16 and 17 September 2015
- Small - 17 February 2015
- Big - 25 – 28 April 2016

The progress reports are to be prepared by the coordinator and submitted to the PEB Project Manager. The progress reports will be presented at the PEB meetings (by the Project Manager or the Consortium Leader) for discussion and formal approval.

The progress report should consider, among other items;

- Status of the project
- Project risks (including 'in kind' actions of the PEB as providing data etc)
- Deliverables

The coordinator will request that each WP leader provides an update on the progress within their work package, and the work completed since the previous reporting period. Sufficient detail should be provided by the partners to enable the coordinator to produce a comprehensive report.

3.6.4.2 Project Website

A website which acts as the public face of the project has been developed in order to detail the activities and achievements of Re-Gen (http://www.re-gen.net/), provide information concerning future project events and to act as a dissemination platform for project outputs.

3.6.4.3 Dissemination Events

Dissemination activities are vital to ensure that the outputs of the research reach a wide an audience as possible. All partners are responsible for dissemination activities and as such should notify the Coordinator of any relevant events at which the results of Re-Gen can be presented.

3.7 Change Management

While changes in the project scope and outputs are not anticipated, a change request process is being implemented to ensure all change requests are recorded and approved by the PM/PEB. Partners requesting an amendment are required to complete the form in Annex A and submit it to the coordinator for review. The coordinator will then submit the request to the PM.

4 Project Output

4.1 Overview

Project output is in the form of Deliverables and Milestones which are required to be completed at various dates throughout the duration of the project. The success of the project will be measured by the quality of the deliverables produced.

A Microsoft Word document template has been provided for use in the preparation of project outputs. Partners are required to use these templates for all official project documents. In the case of documents which have been distributed for internal review, it is requested that drafts are sent as Word files to assist with the review process. Once finalised documents have been agreed, it is requested that the documents be in PDF formats.

A register of documents is also being created to track the progress of reports.

4.2 Deliverables

Deliverables fall within the remit of the Work Packages and as such a Work Package Leader or Task Leader shall be assigned the production and editing of a particular deliverable. An overview of the deliverables and the partner responsible is provided in Table 1. Note that the review process to ensure high quality deliverables are produced is described in detail in Deliverable *D1.1 Quality Assurance Plan.* Deliverables are submitted to the Re-Gen Client's project manager for approval.

Table 1: Partner Responsibilities-Deliverables

WP No.	Deliverable No.	Deliverable Title	Partner Responsible
1	D1.1	Quality Assurance Plan	ROD-IS
1	D1.2	RE-GEN Project Website	ZAG
1	D1.3	Report on enhanced dissemination activities including roadshow and surgeries	ROD-IS
2	D2.1	Report of Climate Change predictions (including key Variables)	GDG
2	D2.2	Register of Critical Infrastructure Elements	Tu-Delft
2	D2.3	Ranked list of models for different Damage Processes	GDG
3	D3.1	Guidelines on collecting WIM data and forecasting of traffic load effects on bridges	ZAG
3	D3.2a[1]	Review of the most critical existing structures under growing traffic	ROD-IS
3	D3.2b[1]	Advice for precise assessment	IFSTTAR
4	D4.1	Report on the Literature Review on risk frameworks and definition of road infrastructure failure	Tu-Delft
4	D4.2	Report on risk optimization in road infrastructure elements	Tu-Delft
5	D5.1	Risk Analysis software tool	IFSTTAR
5	D5.2	Final report on optimisation of management strategies under different traffic, climate change and financial scenarios.	IFSTTAR

4.2.1 Deliverables Schedule

The deliverable schedule is shown in Table 2. Amendment to these dates will require approval from the NRA project manager. A change request form (see Annex A) has been produced to document any requests for amendments to the Research Services Agreement (RSA).

The procedures in place to ensure the deliverables are produced to a high quality and submitted on time are described in detail in the *D1.1 Quality Assurance Plan.*

Table 2: Deliverables

Deliverable No.	Deliverable Title	Due Date
D1.1	Quality Assurance Plan	06/2014
D1.2	RE-GEN Project Website	06/2014
D1.3	Report on enhanced dissemination activities including roadshow and surgeries	03/2016
D2.1	Report of Climate Change predictions (including key Variables)	06/2014
D2.2	Register of Critical Infrastructure Elements	03/2015
D2.3	Ranked list of models for different Damage Processes	06/2015
D3.1	Guidelines on collecting WIM data and forecasting of traffic load effects on bridges	03/2015
D3.2a[1]	Review of the most critical existing structures under growing traffic	06/2015
D3.2b[1]	Advice for precise assessment	06/2015
D4.1	Report on the Literature Review on risk frameworks and definition of road infrastructure failure	01/2015
D4.2	Report on risk optimization in road infrastructure elements	12/2015
D5.1	Risk Analysis software tool	02/2016
D5.2	Final report on optimisation of management strategies under different traffic, climate change and financial scenarios.	03/2016

Note [1]: Deliverable will be issued as one report (D3.2). Split shown here for reviewing purposes only.

4.3 Milestones

Milestones also fall within the remit of the Work Packages and as such a Work Package Leader or Task Leader shall be assigned the production and editing of a particular milestone. An overview of the milestones and the partner responsible is provided in Table 3. Note that the review process for milestones is similar to that for deliverables and is described in detail in Deliverable *D1.1 Quality Assurance Plan.* Milestones are not necessarily submitted to the Re-Gen PM for approval, however they are reviewed internally and approved by the project Coordinator, ROD-IS.

Table 3: Partner Responsibilities-Milestones

WP No.	Milestone No.	Milestone Title	Partner Responsible
1	M1.1	Project management Plan (**PMP**): Including Quality Plan and Communications Plan.	ROD-IS
1	M1.2	Completion of one roadshow and 6 surgeries,	ROD-IS

Table 3: Partner Responsibilities-Milestones

WP No.	Milestone No.	Milestone Title	Partner Responsible
		one in each of the funding countries.	
2	M2.1	Infrastructure Surveys Completed.	GDG
3	M2.2	Final report sent to WP4 for implementation in Risk Framework.	GDG
3	M3.1	Reliable WIM traffic data information samples from partner countries collected.	ZAG
4	M4.1	Probability and consequence models for road infrastructure element failure complete.	Tu-Delft
5	M5.1	Literature review of existing management strategies.	IFSTTAR
5	M5.2	Proposition of a multi-criteria optimization framework for critical infrastructure elements that integrates risk profiles (for infrastructures) and economic aspects.	IFSTTAR
5	M5.3	Determination of optimal management strategies of infrastructures under different projected traffic forecasts, scenarios of climate change, and financial constraints.	IFSTTAR

4.3.1 Milestones Schedule

The milestone schedule is shown in Table 4. Amendment to these dates will require approval from the NRA project manager. A change request form (Annex A) has been produced to document any requests for amendments to the Research services agreement. The procedures in place to ensure the deliverables are produced to a high quality and submitted on time are described in detail in the *D1.1 Quality Assurance Plan.*

Table 4: Milestones

Milestone No.	Milestone Title	Due Date
M1.1	Project management Plan (PMP): Including Quality Plan and Communications Plan.	07/2014
M1.2	Completion of one roadshow and 6 surgeries, one in each of the funding countries.	11/2015
M2.1	Infrastructure Surveys Completed.	12/2014
M2.2	Final report sent to WP4 for implementation in Risk Framework.	06/2015
M3.1	Reliable WIM traffic data information samples from partner countries collected.	12/2014
M4.1	Probability and consequence models for road infrastructure element failure complete.	05/2015
M5.1	Literature review of existing management strategies.	08/2014
M5.2	Proposition of a multi-criteria optimization framework for critical infrastructure elements that integrates risk profiles (for infrastructures) and economic aspects.	04/2015
M5.3	Determination of optimal management strategies of infrastructures under different projected traffic forecasts, scenarios of climate change, and financial constraints.	07/2015

5 Project Close

The end of the project is scheduled for April 2016. It is expected that the project will be closed by a final seminar and final meeting for the coordinator with the PEB. At this time all deliverables and milestones will be completed.

6 Risk Management

This section of the deliverable presents identified risks concerning various aspects in Re-Gen. This document serves as a reference book for looking up how to react if a specific risk occurs.

As this document holds risks for the entire project, all partners are involved in the creation process. This was necessary, as each partner has an expertise and therefore a unique perspective for possible risks of their area of expertise.

(a) Late delivery of Milestone
It will be necessary for all WP leaders to advise of any issues in relation to milestone completion allowing sufficient time for corrective action to take place to avoid milestones being missed.
(b) Late delivery of Deliverables
It will be necessary for all WP leaders to advise of any issues in relation to deliverable completion allowing sufficient time for corrective action to take place to avoid deliverables being delayed.
(c) Overspending
Mis-management of the budget could lead to partners being under resourced and unable to provide sufficient resources to complete work at the required level of quality. ROD-IS, as coordinators will manage the overall budget against work completed.
(d) Meeting of Objectives
It is important that the project achieves its original objectives. Various problems such as technological problems, lack of communication etc. may all hinder the quality assurance process.
(e) Loss of critical partners
Various circumstances such as dropout, bankruptcy, health issues etc. may lead to the loss of critical partners. The consortium is built with some redundancy concerning the skills of core partners. Thus, it is possible to compensate for certain losses. Moreover issues can be balanced by re-allocating resources to partners with the capability to replace lost resources. For the case of a loss of a critical skill, project management will maintain a list of replacement partners from the consortium's network that can be called in to the project by means of emergency subcontracting or by joining the project.
(f) No consensus on important matters
To prevent the consequences of the consortium not being able to reach a consensus, the consortium should strictly follow the decision making procedures defined in the consortium agreement.
(g) Lack of information
The quality of the project outputs will depend on the information available. As described, literature sources will be used to gather information required for the project. Additional or missing information will be obtained in interviews with key experts of the NRAs. As the partners are well known in a network of specialists in the area (e.g. PIARC, FEHRL, …), personal contact will help to get response.
(h) Demonstration of the tool

This is one of the key project objectives and we will need suitable realistic case studies to adequately demonstrate its usability to ensure take up by NRA's. As ageing infrastructure causes serious concerns in the PEB countries (and worldwide), we expect to find suitable demonstration applications. In the unlikely case that problems arise in this regard we may be required to work with theoretical problems, which whilst not ideal is a possible solution.

(i) Cooperation amongst the partners
There is always the risk of a lack of cooperation between the partners. However, the partners of this project are well known and have proved to be productive in their cooperation in other (CEDR and EU Framework) projects. Furthermore they have proved to be experts in this field. It is proposed to hold quarterly telephone conferences, a kick-off meeting and a mid-term meeting to provide platforms for the partners to express concerns about cooperation. In this way, any issues can be resolved without affecting the productivity of the project.

(j) Financial Risk.
There is always a risk that some partners will underestimate the financial contribution required to achieve the objectives of their specific tasks or will spend more resources than are allocated to them. The project manager will ensure, through close observation of the progress of the WP's, that partners stay focused and on budget.

(k) Personnel availability.
The project may experience delays if key personnel leave an organization. However, given that the partners involved are all relatively large companies and this kind of work is their core business, all of the consortium partners will have additional personnel available if they are required.

(l) Implementation limited to the countries involved.
Although the tool will be firstly demonstrated to the countries involved, the tool will be applicable at an international level. Furthermore, the results of the research will be shared internationally. The tool will be available for every CEDR member and the guideline to the tool will be described in a way that an expert should be capable to use it correctly.

(m) Disputes, Non performing partners.
Procedures to deal with internal disputes or for non conforming partners are defined within the Consortium Agreement which all partners will be required to sign before initiation of the project.

7 Financial Management

Financial management of the project and partners will be undertaken by the coordinator ROD-IS. The overall budget is broken down into 5 separate payments as shown in Table 5. Each partner will receive the % payment indicated of their total budget at each payment stage. As the payments are linked to the deliverables and milestones it is essential that these are completed on time.

Partners should invoice ROD-IS 1 week in advance of the payment date for the required % and ROD-IS will subsequently invoice the NRA on the payment date.

Table 5: Payment Schedule

No.	Due date	%	Amount	Associated milestones/deliverables
1	04/2014	10%	€41 093	Project Kickoff and D1.1, D1.2, D2.1.
2	10/2014	25%	€102 734	M1.1, M2.1, M3.1, M5.1.
3	04/2015	25%	€102 734	D2.2, D3.1, D4.1 and M5.2.
4	10/2015	25%	€102 734	D2.3, D3.2 and M2.2, M4.1, M5.3.
5	04/2016	15%	€61 639	D1.2, D4.2, D5.1, D5.2 and M1.2.
		100%	**€410 934**	

8 Quality Assurance

The procedures in place to ensure quality of the work conducted and the output is described in detail in *D1.1 Quality Assurance Plan*.

9 Conclusions

This report represents Milestone 1.1, the Project management Plan. The report considers the overall project scope and objectives and project execution. Project Communication is given particular emphasis.

Project output is described in terms of the deliverables and milestones are also described, along with the various risks that can impact on the management of the project. Financial management procedures are also addressed.

10 Acknowledgement

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Annex A: Change Request Form

CHANGE REQUEST FORM

No.:			
Rev. No.:			
Date:			
Change Requester:			
Change Category (Check all that apply):	☐ Objectives	☐ Deliverables	☐ Resources
	☐ Tasks	☐ Milestones	☐ Programme
Effected Work Package (Check all that apply):	☐ WP1	☐ WP2	☐ WP3
	☐ WP4	☐ WP5	☐ ALL
Change Request:			
Reason for Request:			
Are there any risks associated with this change?	☐ Yes	☐ No	
	Please provide details:		

Decision

Change Request Approval:	☐ Yes	☐ No
	If No, Please outline the reasons;	
Name:	**Position:**	**Date:**