



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 700748

LIQUEFACT

Assessment and mitigation of liquefaction potential across Europe: a holistic approach to protect structures/ infrastructure for improved resilience to earthquake-induced liquefaction disasters.

H2020-DRA-2015

GA no. 700748



Deliverable D9.2

Quality Procedures Manual

v. 1.0

Author(s):	Katie Hiscock (PM) Prof. Keith Jones (PC)
Responsible Partner:	Anglia Ruskin University (ARU)
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05/07/2016	01	Katie Hiscock	First Draft	Draft
26/07/2016	02	Katie Hiscock and Keith Jones	Second Draft	Final

List of Partners

Participant	Name	Country
ARU (Coordinator)	Anglia Ruskin University Higher Education Corporation	United Kingdom
UNIPV	Universita degli Studi di Pavia	Italy
UPORTO	Universidade do Porto	Portugal
UNINA	Universita degli Studi di Napoli Federico II.	Italy
TREVI	Trevi Societa per Azioni	Italy
NORSAR	Stiftelsen Norsar	Norway
ULJ	Univerza v Ljubljani	Slovenia
UNICAS	Universita degli Studi di Cassino e del Lazio Meridionale	Italy
SLP	SLP Specializirano Podjetje za Temeljenje Objektov, D.O.O, Ljubljana	Slovenia
ISMGEO	Istituto Sperimentale Modelli Geotecnici Societa a Responsabilita Limitata	Italy
Istan-Uni	Istanbul Universitesi	Turkey



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Glossary

Acronym	Description
CA	Consortium Agreement
DoW	Description of Work
EC	European Commission
EEAB	External Expert Advisory Board
EILD	Earthquake Induced Liquefaction Disaster
GA	Grant Agreement
PM	Project Manager
PC	Project Coordinator
PO	Project Officer
WP	Work Package
WPL	Work Package Lead

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Executive Summary

Recent events have demonstrated that Earthquake Induced Liquefaction Disasters (EILDs) are responsible for tremendous structural damages and fatalities causing in some cases half of the economic loss caused by earthquakes. With the causes of liquefaction being substantially acknowledged, it is important to recognize the factors that contribute to its occurrence, to estimate hazards, then to practically implement the most appropriate mitigation strategy considering the susceptibility of the site to liquefaction, the type and size of the structure. The LIQUEFACT project addresses the mitigation of risks to EILD events in European communities with a holistic approach. The project deals not only with the resistance of structures to EILD events, but also with the resilience of the collective urban community in relation to their quick recovery from an occurrence. The LIQUEFACT project sets out to achieve a more comprehensive understanding of EILDs, the applications of the mitigation techniques, and the development of more appropriate techniques tailored to each specific scenario, for both European and worldwide situations.



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Introduction, Goal and Purpose of this document

The LIQUEFACT project is a collaborative project involving 11 partners from 6 different countries (UK, Italy, Portugal, Slovenia, Norway and Turkey) including representation from 4 EU Members States and is organised in three phases (Scoping, Research and Implementation) across nine work packages (WPs), each of which encapsulates a coherent body of work. The first 7 WPs highlight the major technical activities that will take place throughout the project and have been scheduled to correlate with one another. The final 2 WPs (WP8 and WP9) are the continuous activities which will take place throughout the duration of the project.

In order to ensure the smooth running of the project for all project partners management structures and procedures are necessary to facilitate effective and efficient working practices. Following the management information included in the Grant Agreement (GA) and its annexes, the Consortium Agreement (CA), Commission rules as contained in the Guidance Notes and organisational Risk Management policies and procedures including Corporate Risk Strategy, Policy and Guidance and Health and Safety Policies this manual highlights important procedures to be carried out in order to monitor, coordinate and evaluate the management activities of the project.

Goal: This document aims to provide a plan of quality control and analysis of potential risks that may arise during the project planning and implementation.

Scope of this document

The Quality Procedures Manual is based upon the Description of Work (DoW) which defines:

- Project Objectives
- Milestones
- Work Packages and their timings
- Work Package Tasks and Deliverables
- Details on project implementation (management structure, management procedures, risk management)

The Quality Procedures Manual details the roles and responsibilities described in the DoW further and defines the quality policies, processes and procedures aimed at ensuring the achievement of all project goals. This document summarises all regulations and guidelines regarding the management structures and procedures and is designed to be used as an entry point in case a specific issues needs to be resolved or a question arises. Aggregating information from the GA and its annexes, the CA and further decisions within the consortium.

Target Audience

This deliverable is written primarily for all consortium members involved in the delivery of the LIQUEFACT project and may further act as an avenue for members to clarify theirs and others roles within the consortium and to understand the formal procedures.



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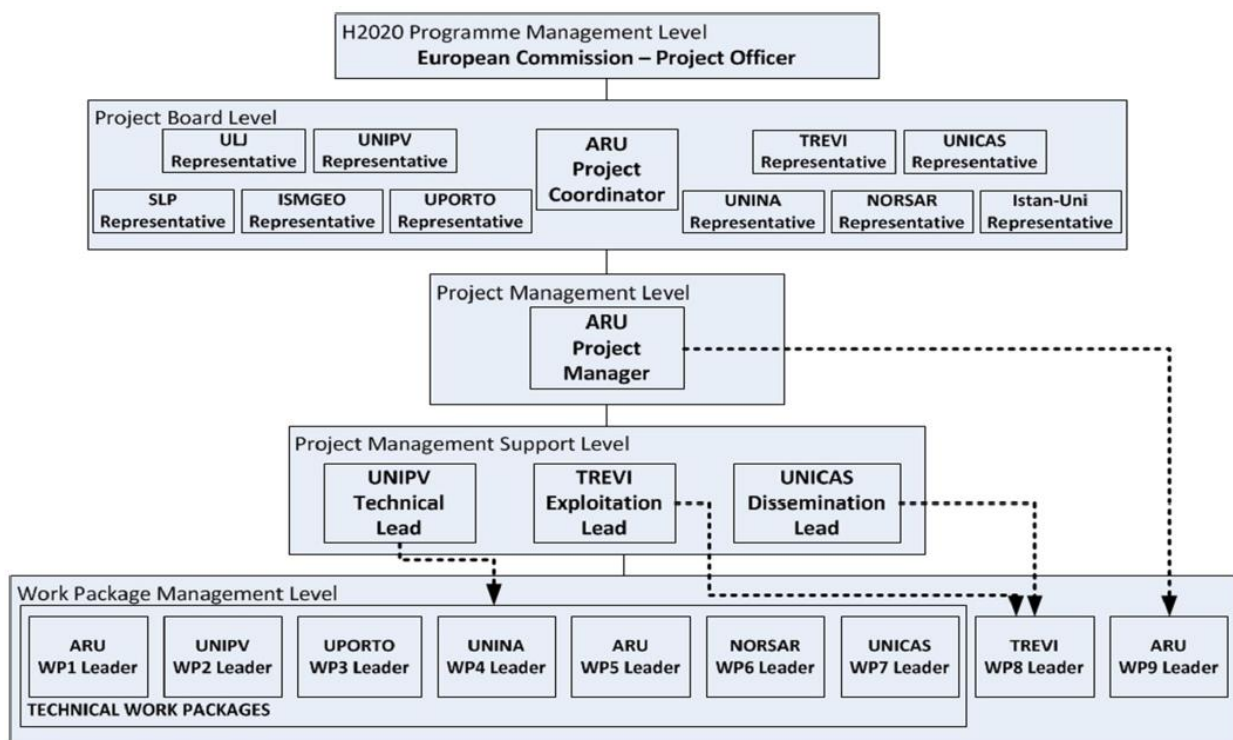
As the project Deliverables are one of the most important ways to communicate project results and successes with the European Commission, the management of such documents is an important step in developing, preparing and revising tasks, Deliverables and milestones in order to achieve project success.

Management Structure (Project)

The LIQUEFACT project management is based on experiences gathered during previous national and international research projects, using approved methods applied in successful EC projects in which the consortium partners have been involved. Ensuring effective decision making, a clear and concise flow of information and the production of high quality reports and deliverables.

The management structure is described in the GA (Chapter 5, page 60 – 61), with further Responsibilities of Parties and Governance structure complemented in the CA (Section 4, page 5 – 6 and Section 6, page 7 – 12).

Figure 1. Management Structure and Project Board



Project Board/Project General Assembly – the ultimate decision-making body of the consortium including one senior representative from each project partner including WP leaders, to be decided by the individual institution/organisation.

Project Coordinator – the authorised legal entity acting as the supervisory body and responsible for the successful delivery of the project.



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The Project Coordinator (ARU) has the overall responsibility for the project, acting as the executive of the Consortium. The PC is accountable for:

- Day to day management of the project
- Tracking progress in line with the project schedule
- Maintaining common project agreement
- Liaison with the EC representing the consortium
- Coordinating the preparation and distribution of all deliverables
- Maintaining tracking of costs, resources and scheduling
- Scheduling and arranging periodic meetings
- Maintaining the quality assurance of the technical reports and deliverables
- Supporting the technical coordination between work packages
- Organising the project reviews with the EC
- Performing risk management

External Expert Advisory Board (EEAB) – assist and facilitate the decisions made by the Project Board.

Figure 2. External Expert Advisory Board (EEAB)

Expert/Advisory Group Member (EEAB) Name	Member Abbreviation	Country
Balfour Beatty Ground Engineering	BalfourB	United Kingdom
Assicurazioni Generali S.p.A.	Generali	Italy
University of Canterbury	UoC	New Zealand
Chamber of Geophysical Engineers of Turkey	CGET	Turkey
University of Tokyo	UoT	Japan

Management Team – assists the Coordinator and the Project Board. Project partners will allocate their own member of the Management team from the:

- **Technical Lead** – (UNIPV) ensure technical issues raised by WP leaders do not adversely impact the project.
- **Exploitation Lead** – (TREVI) establish and implement the exploitation strategies and project results.
- **Dissemination Lead** – (UNICAS) develop detailed exploitation planes for project results and maintain/update throughout the project

Work Package Leaders – responsible for the delivery of specific WPs with input from all other named partners



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Figure 3. Work Package Leader details

Management Level	Decision Scope	Escalate to:
WP Leader	Task-level or WP-level planning decisions where impact is contained within one WP and planned contingencies exist.	TL, EL, or DL
TL	Technical issues that affect one WP but without existing contingencies to keep WP within tolerance and affect multiple WPs where contingencies exist	PM
DL / EL	IPR/Communication issues that affect one WP but without existing contingencies to keep within tolerance and affect multiple WPs where contingencies exist	PM
PM	Issues that affect multiple WPs but without existing contingencies to keep within project tolerance and project-level financial planning issues where planned contingencies exist	PC / PB
PC / PB	Project-level strategic issues that affect main EC call scope and where contingencies exist	EC project Officer

Quality Assurance Policies

The description will include specific quality criteria within a set tolerance. The description will also include quality methods that specify certain activities during the project to review and approve deliverables within the consortium before it is submitted to the EC. For transparency and to avoid confusion during the project, responsibilities for reviewing deliverables will be assigned to a partner not directly involved in producing the deliverable. Approving deliverables will fall under the remit of the PB. Also, a quality register of quality activities planned and undertaken (*e.g.* workshop, reviews, inspections, testing, pilots, acceptance and audits) will be kept.

1. Quality Planning – providing a secure basis for agreement between project partners on the overall quality expectations, requirements and acceptance criteria.
2. Quality Control – achieved by implementing, monitoring and recording the quality methods and responsibilities defined
3. Quality Assurance – provided by the EC by checking the project's direction and management are adequate for the nature of the project and that it complies with their standards and policies, which LIQUEFACT will adhere to.
 - i. Compliance with the work plan (DoW), Grant Agreement (GA) and approved budget shall be achieved
 - ii. All deadlines and agreed schedules for activities, tasks and deliverables shall be kept
 - iii. The responsibilities within the project shall be defined and every person involved in the project shall be aware of his/her duties and importance/significance of tasks
 - iv. Foreseeable delays or quality problems shall be reported as soon as possible
 - a. From the WP leaders to the Project Coordinator (PC)
 - b. From the PC to the Project Officer (PO)
 - v. All deliverables shall be reviewed prior to their delivery and submission to the EC and publication



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- a. Internal review of every Deliverable, with a minimum of 2 internal reviewers
- b. External review of critical and high-impact Deliverables
- vi. Major activities shall be planned and recorded including;
 - a. All meetings, video conferencing and web calls
 - b. All dissemination activities
- vii. All non-confidential project results shall be published via appropriate channels/media in a timely manner.

Academic outputs

In order to ensure all academic writing across all project partners is of a high quality and reflects the aims and objectives of the LIQUEFACT project a Writing Quality Assurance Committee will be created and convened to review and assess the quality of work prior to external publication.

Quality Assurance Processes

1. Management of Deliverables
2. Project Reporting
3. Financial Management
4. Identification of Issues/Problem Solving
5. Risk Management

Figure 4. Project Milestones - <https://ec.europa.eu/research/participants/grants-app/reporting/DLV-700748>

The screenshot shows the SyGMA - System for Grant Management interface. The top navigation bar includes 'Grant Management' and 'Project Continuous Report'. Below this, there are several status indicators for different project areas: Summary for publication (red X), Deliverables (blue i), Milestones (blue i), Critical Risks (green check), Publications (red X), Dissemination (green check), Patents (PT) (red X), and Gender (green check). The main content area is titled 'Milestones' and contains a table with the following data:

Number	Name	Lead Beneficiary	Delivery Date (Annex I)	Achieved	Delivery Date (actual)	Comments
1	Comprehensive project scoping complete	ARU	01 Nov 2016	<input checked="" type="checkbox"/>		
2	Case study sites prepared and analyse	UNIPV	01 Feb 2017	<input type="checkbox"/>		
3	European liquefaction hazard GIS map	UNIPV	01 May 2017	<input type="checkbox"/>		
4	Approaches for simulating liquefaction	UPORTO	01 Oct 2017	<input type="checkbox"/>		
5	Small scale centrifuge test models	UNINA	01 May 2018	<input type="checkbox"/>		
6	Simplified models for structural vulnes	ARU	01 Nov 2018	<input type="checkbox"/>		
7	Field demonstrations of liquefaction m	UNINA	01 May 2019	<input type="checkbox"/>		
8	End of project	UNICAS	01 Nov 2019	<input type="checkbox"/>		

Configuration Management Strategy – Managing Change

The Configuration Management Strategy (CMS) defines the technical and administrative activities concerned with the creation, maintenance and controlled change of the detailed description of the deliverables (configuration items). This acts as the project's agreed baseline and issue/change control procedures will be used to ensure that all issues and changes that may affect this baseline are identified, assessed and either approved, rejected or deferred. Issues may be raised at any time during the project by partners or anyone directly associated with the project or its outcome and covers any relevant event that has happened, was not planned, and requires management action. It



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can be a concern, query, request for change, or off-specification raised during the project. LIQUEFACT’s controls for issues, changes and configuration management will be defined and established at the start of the project and then review and updated (if necessary) every 6 months.

LIQUEFACT’s CMS will incorporate the standard policies and processes set by the EC’s framework programme but will also define the way issues are handled that is specific to our consortium and project.

Change authority will be delegated by the PB to other management levels in line with the project management decision making mechanism.

Project Meetings and Reviews

Meetings and General Communication: During LIQUEFACT, we will use a number of scheduled meetings to monitor progress and agree plans for the next stage. The schedule of PB meetings is shown in Figure 5 below.

Figure 5. Meeting Schedule and Purpose

Meeting Title	Purpose	Month
Kick-Off Meeting	Formally open project; approve first 6-month work plan (WP1, WP8, WP9)	0 (kick-off)
Mid-Period 1 Meeting	Manage Milestones 1 (approve/contingency); Review results and progress of WP1, 8 and 9; Approve work for next stage (WP1, 2, 3, 4, 5, 8 and 9); approve issuing of Mid-Period Report	7
Period 1 – End Meeting	Manage Milestones 2, 3 (approve/contingency); Review results and progress of WP1, 2, 3, 4, 5, 8 and 9; report to European Commission at End of Period Review; approve issuing of End of Period Report; approve work for next stage of (WP2, 3, 4, 5, 6, 8 and 9)	14
Mid-Period 2 Meeting	Manage Milestones 4 (approve/contingency); Review results and progress of WP2, 3, 4, 5, 6, 8 and 9; approve work for next stage (WP2, 3, 4, 5, 6, 8 and 9); approve issuing of Mid-Period Report	21
Period 2 – End Meeting	Manage Milestone 5 (approve/contingency); Review results and progress of WP2, 3, 4, 5, 6, 8 and 9; report to European Commission at End of Period Review; approve issuing of End of Period Report; approve work for next stage (WP2, 3, 4, 5, 6, 7, 8 and 9)	28
Mid-Period 3 Meeting	Manage Milestone 6 (approve/contingency); Review results and progress of WP2, 3, 4, 5, 6, 7, 8 and 9; approve work for next stage (WP2, 3, 4, 6, 7, 8 and 9); approve issuing of Mid-Period Report	35
Final Period / Project Meeting	Manage Milestone 7,8 (approve/contingency), report to EC through Final Review, formally close project, approve issuing of final project report, approve final PUDF, agree post-project implementation plans	42

In addition to the PB meetings, there will be a number of technical meetings and working group meetings arranged on an ad-hoc basis. These will normally be three-monthly to enable review of the Technical Progress Reports. At all meetings, minutes will be taken and circulated to all project partners. Meeting locations will vary depending on the need to access technical equipment and to minimise travel costs. Ad-hoc progress meetings will make use of teleconferencing and video conferencing, where possible.



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Throughout the course of the project, members may be asked to host general project meetings. The main tasks involved in hosting a meeting are:

- Provide precise details about how to reach the venue and recommended accommodation
- Provide meeting rooms for accomplishing the agenda plenary and parallel sessions
- Provide audio-visual equipment necessary for any presentations
- Provide suitable refreshments during the meeting and breaks
- Provide Internet connections

Following the success of the Kick –Off meeting hosted in the UK in May 2016, the next scheduled Mid-Period 1 Meeting is proposed to take place in Bologna, Italy in the first week of October 2016 (Month 6). This all partner meeting will include an Advisory Board meeting, Project Progress meeting, Site Visit and the opportunity to discuss any forthcoming WP issues.

Communication

LIQUEFACT will use communication models for both scheduled and unscheduled communication. Scheduled communication will cover reports, deliverables and other planned documents. Unscheduled communication will cover the raising of issues and the implementation of any consequent actions.

Since the planning and commencement of the LIQUEFACT project and following the Kick-off meeting completed in June 2016 (Month 2) some communication procedures have been discussed and agreed among all partners.

External Communication and Dissemination is managed within the Dissemination and Exploitation Work Package (WP8) lead by TREVI. While day to day information flow, internal communication and administrative aspects of project communication are managed with the Consortium Project Management (WP9) lead by ARU.

In order to reduce expenses internal communication is predominantly organised via telecommunication e.g. email, telephone, online messengers (Skype) and online platforms (Adobe Connect). Consortium meetings will be conducted in person in order to enhance the personal/professional relationships, collaborative activities and decision making in a suitable environment.

In exceptional circumstances (especially when there is short notice) emergency board meetings may be held as telephone/video conferences.

Progress Meetings

All partners will be invited to meet for a monthly web conference using Adobe Connect or a similar online tool, at a regular time to be mutually agreed by the consortium. With discussion focussed on open action items and specific topics raised by partners and are possible at any time upon written request to the PC or PM.

Emergency meetings may be initiated at short notice (minimum 1 week in advance)



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All significant questions, problems and deviations from the work plan (milestones, deliverables, budget, subcontracting etc.) will be communicated immediately to the Project Coordinator/Manager and Work-Package Leader.

Meetings

Consortium meetings will be organised by the PM under the supervision of the PC alongside a representative from the hosting organisation. Meeting preparations will normally include a pre-agenda and post-report including the meeting minutes and dissemination of any presentations for comments and approval by the attendees. If no comments are received within 2 weeks the minutes will be approved.

The Chairperson of the Consortium body shall prepare and send each member of the Consortium a written agenda via email, within a minimum number of days preceding the meeting.

A template of the Meeting Agenda will follow a concise scheme and be made available for all partners.

In each Agenda the following information will be presented:

- Project Reference
- Date
- Location
- Contact personnel
- Proposed speakers/attendees
- Scheduling of information/presentations
- Additional activities i.e. site visits, B2B meetings, Consortium dinner etc.

In each Minutes document the following information will be presented:

- Project Reference
- Date
- Location
- Chair
- List of Attendees
- Apologies
- Details of any Audio or Visual Recordings
- The Agenda
- Session name with description of activities for each session
- List of Actions including what each partner is expected to do, who has the responsibility to take the action forward, which partners are involved and timings/dates.



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Figure 6. Meeting log

Meeting Type	Frequency	Notice	Sending of Agenda	Adding Agenda Items

Reporting

Reports represent a main project deliverable. The timely submission of activity/scientific/technical and management/financial reports is a main contractual duty, and delays in providing reports may lead to missing funding for the subsequent period. For EC funded projects reports include 1) periodic reports at the end of each reporting period, 2) a final report at the end of the project and, on request of the EC and/or coordinator 3) short progress reports.

Scheduled Reporting: In order to keep the amount of time spent on project administration to a minimum, a simple reporting structure will be used. This will certify maximum effort on task delivery whilst ensuring transparency of task progress. **Every month** task leaders will prepare a **Monthly Progress Update** for the WP Leaders. The report will detail the currently active tasks and the progress made, as well as a record of any issues and envisaged problems or delays. These reports will be no longer than 1 page and will use a pre-defined template format. **Every 3 months** the WP Leader will use the progress update to assemble a **Progress Report**. This will detail the planned vs. actual work, raised issues and resultant actions, implemented risk strategies and their impact and plans for the next reporting period. This will also use a pre-defined format. This document will be passed to the PM in order to facilitate progress monitoring. **Every 6 months** the PM will issue a short. **Management Report** to the PB and EC detailing the project progress for the last reporting period, in line with the consortium’s contractual obligations. **At each milestone** the PM will present a **Milestone Report** to the Project Board. This will be a short document summarising the planned vs. actual achievements of the previous project stage. It will also summarise any major issues and the risk strategies implemented and describe/update all management strategies for the next stage. This document will be assembled from the Progress Reports and will be used by the PB to approve the next project stage.

Unscheduled Reporting: Each management position will maintain an issue log. As issues arise, these will be recorded in the logs and dealt with by assigning an action (recorded in each partner’s action list). If appropriate, WP Leaders will escalate issues to an appropriate manager. The PM will be made aware of any escalated issues. Should an issue be considered serious enough by the PM, it will then be escalated to the PB for resolution. Resultant actions will filter down to the appropriate project partners. Software tools will be used to integrate the issue logs and action lists to ensure all information is brought to the attention of the relevant manager.



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Financial Management – Budget

All partners have completed extensive resource budgeting to ensure they have the main resources required to successfully deliver the project and have allocated resources effectively.

The Project Coordinator and Work Package Leaders are responsible for all work defined in the project plan being completed within budget.

Disclaimer: Anglia Ruskin University cannot be held responsible for any incorrect or non-conform project data in reports or audits.

At all times partners will follow the H2020 funding rules set out in the EC reference documents and pay particular attention to the following key points

- Costs claimed for reimbursement must be eligible and duly justified:
- Costs must be actual, incurred between the project start and end dates (cf. Grant agreement), in accordance with usual accounting/management principles of the beneficiary;
- Direct costs include the following main items: personnel (additional/permanent personnel incl. social charges), travel, consumables, equipment (only depreciation reimbursed!), subcontracting.
- All costs must be proven to be linked to the project; VAT is NOT reimbursed by EC;
- Indirect costs (overheads) are calculated on the total direct costs (excluding subcontracting costs) according to the different models (Real indirect cost, flat rates, etc.) – each institution/organisation selects its model;
- Direct and indirect cost are dispatched into “activity types” (Research, Demonstration, Coordination/Support, Management, Others);

Audits can be carried out during the project life time and until 5 years after the project. Therefore, all key documents and activity evidences (contracts, reports, timesheets, important e-mails, lab-logbooks, etc.) must be filed carefully.

Timesheets/Financial returns

Timesheets are mandatory for EC projects: “Working time to be charged must be recorded throughout the duration of the project by timesheets”. Timesheets must be filled in and signed on a monthly basis, and must allow auditors to reconcile personnel cost claims with hours worked per activity types. Follow the institutional instructions.

For the LIQUEFACT project a simplified timesheet template will be developed and the H2020 standard number of 1720 working (‘productive’) hours per year for a Full Time Equivalent has been considered. The use of this timesheet model and standard working hours is mandatory for all concerned in LIQUEFACT research.

For researchers and project partners who wish to keep a more detailed record in addition, higher resolution timesheet templates (hours per day) will be made available on request.

All timesheets must be submitted to the PC (ARU).



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Risk Management

All risks in the LIQUEFACT project will be actively managed through pre-work package risk assessments, the maintenance of a risk log and clear ownership of issues and risks throughout the project management chain. These will be implemented through three interconnected tools:

1. Prior to the start of each work package, we will perform a detailed risk assessment for that work package. The risk assessments will explore the potential hazards (technical, operational and external) and identify their likelihood, severity and impact on each individual task. They will also describe mitigation measures to be taken in the event of the risk occurring, with triggers for activation of these measures detailed in the risk assessment. Finally each risk assessment will prioritise the mitigation measures for each risk to define a complete contingency plan for each risk that minimises retardation of the project. Each WP risk assessment will be collated into a single, living document that is continuously reviewed, updated and re-issued to reflect changes both within the project and in external factors (market, competition, regulation etc.). The Technical Lead will be responsible for drawing up and maintaining these risk assessments.
2. During the lifetime of work packages risks will be managed and communicated through regular reporting on progress and emerging issues. Separate reporting structures will be implemented within tasks, work packages and the whole consortium (as described in the Communication Strategy, below). This reporting will allow the project management to allocate additional resources to tasks that are at risk of underperforming or to implement mitigation strategies as arranged in the risk assessment. The structure of the tasks within each work-package has also been designed to reduce overlap between the activities in different tasks. These measures ensure that, should risk triggers be activated, implementation of contingencies causes as little disruption as possible and the minimum of additional resources are used.
3. Finally we will use milestone control points. These define discrete project stages, each reliant on the completion of a previous milestone. The project management team may use these points to decide if the required level of progress has been achieved in order to justify continuation to the next stage. If milestone requirements are not met, the management will be able to effectively implement contingency strategies without excessive adverse impact on other project stages

However, even if some objectives are not fully achieved and contingencies have to be applied, the project will still accelerate the roll-out and adoption of an innovative system significantly beyond the state of the art. No ambitious, collaborative project of this nature is risk-free so we will make sure that, even with the realisation of all identified risks, the project will still justify its creation



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Figure 7. Critical Risks and Mitigation Measures -

<https://ec.europa.eu/research/participants/grants-app/reporting/DLV-700748>

Risk	Work Package	Description of Risk	Proposed Risk -Mitigation Measures
1	1, 7	Insufficient participation of external experts and end users with technical assistance and transfer of knowhow of actual industry needs	Specialized meetings with comprehensive involvement and elicitation of national and thematic experts
2	2, 7	Lack of data in the selected case studies to perform full validation of the project	Any problem with the quality or non-availability of data will be detected in the early stage of the project to proceed to alternative sites/case studies with a plan for each strategic application worked out at kick off meeting
3	3	The dynamic numerical analyses on foundations in critical infrastructures and pipelines, tunnelling and underground stations, may not be possible to calibrate by the pilot tests (WP4), due to high complexity of implementation of the field prototypes and limitations of the models.	The calibration will be focusing in the simplest structures available from the field pilot tests and a more extensive attention will be made to the centrifuge physical models.
4		Possible technical or legal obstacles to produce dynamic actions on site to check 'directly' the effectiveness of the soil liquefaction mitigation techniques under study	The technologies that we are thinking to produce dynamic actions have been already used elsewhere, provided that local restrictions have been respected. The effectiveness of liquefaction mitigation techniques can be correctly checked also by indirect methods (laboratory and in-situ testing) without risk of failure.

There are no unforeseen critical risks for the LIQUEFACT project. As seen on the EC Participants Portal.



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Figure 8. Critical risks listed on EC Participant Portal

Number	Description	Work Package No.	Risk Mitigation Measures	State of the Play Reference Reporting Period	State of the Play Mitigation Measures Applied	State of the Play Risk Materialized	State of the Play Comments	Actions
1	Insufficient participation of external experts and end users with technical assistance	1,7	Specialized meetings with comprehensive involvement and elicitation of national and					
2	Lack of data in the selected case studies to perform full validation of the project	2,7	Any problem with the quality or non-availability of data will be detected in the early					
3	The dynamic numerical analyses on foundations in critical infrastructures and pipeline	3	The calibration will be focusing in the simplest structures available from the field pits					
4	Possible technical or legal obstacles to produce dynamic actions on site to check 'dise	4	The technologies that we are thinking to produce dynamic actions have been already					

Risk Assessment

Prior to the start of each work package, we will perform a detailed risk assessment for that work package.

The risk assessments will explore the potential hazards (technical, operational and external) and identify their likelihood, severity and impact on each individual task. They will also describe mitigation measures to be taken in the event of the risk occurring, with triggers for activation of these measures detailed in the risk assessment. Finally each risk assessment will prioritise the mitigation measures for each risk to define a complete contingency plan for each risk that minimises retardation of the project. Each WP risk assessment will be collated into a single, living document that is continuously reviewed, updated and re-issued to reflect changes both within the project and in external factors (market, competition, regulation etc.). The Technical Lead will be responsible for drawing up and maintaining these risk assessments.

During the lifetime of work packages risks will be managed and communicated through regular reporting on progress and emerging issues. Separate reporting structures will be implemented within tasks, work packages and the whole consortium (as described in the *Communication Strategy*, below). This reporting will allow the project management to allocate additional resources to tasks that are at risk of underperforming or to implement mitigation strategies as arranged in the risk assessment.

The structure of the tasks within each work-package has also been designed to reduce overlap between the activities in different tasks. These measures ensure that, should risk triggers be activated, implementation of contingencies causes as little disruption as possible and the minimum of additional resources are used.

Finally we will use milestone control points. These define discrete project stages, each reliant on the completion of a previous milestone. The project management team may use these points to decide if the required level of progress has been achieved in order to justify continuation to the next stage.



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If milestone requirements are not met, the management will be able to effectively implement contingency strategies without excessive adverse impact on other project stages.

Managerial Risks

It is proposed that the WPLs will assume the role of Risk Managers for the Work Package, will fill in the template provided by the PC and will report on WP risks at each Consortium Meeting or whenever critical issues on risk mitigation are raised.

At each Consortium meeting WPLs will present an updated risk and contingency plan with a focus on the WPs related activities.

The risk associated with the task will be prioritised using the matrix shown below.

For High and Medium rated risks the assessors must describe against each risk the control measures that they recommend should be introduced to reduce the risk to tolerable levels.

Figure 9. Risk Matrix and Risk Monitoring template

Likelihood ↓	Severity of outcome	Severity of outcome	Severity of outcome	Severity of outcome
	<i>Minor Injury <u>or</u> little or no damage/ process interruption</i>	<i>Significant injury <u>or</u> serious damage/ process interruption</i>	<i>Major injury <u>or</u> major damage/ process interruption</i>	<i>Death <u>or</u> catastrophic damage/ process interruption</i>
Improbable	LOW	LOW	LOW	LOW
Remote	LOW	LOW	MEDIUM	MEDIUM
Possible	LOW	MEDIUM	MEDIUM	HIGH
Probable	LOW	MEDIUM	HIGH	HIGH
Likely	LOW	MEDIUM	HIGH	HIGH



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Subject of assessment (May be an activity, hazard or relate to an individual) If chemical and / or biological hazards exist then a COSHH form must be completed	RA conducted by.	Date.	RA ref. no.
List the risk/s involved or describe the hazard			
List the current control measures in place.			
Current risk level. High / Medium / Low (See risk matrix) (Delete as appropriate)			
List the actions required to reduce the risk, include reference to any written safety procedures.		Date actioned	Actioned by
Revised risk level. High / Medium / Low (See risk matrix) (Delete as appropriate)			
RA verified by:			Date.
Risk assessment issued to the following;			Date.
Risk assessment review date. (Usually annually)			
Risk assessment reviewed by.			

Ethics and Security

All ethics issues will follow both European and national legislations and be assessed by formal submission to a project partner's local Research Ethics Committee (where these exist) and, through the Project Coordinator to ARU's Research Ethics Committee. Both Committees' approval will be required before any data collection begins.

No work is to be completed until ethical approval has been granted by PC (ARU).

Implementation/Exploitation Risks

Reports represent a main project deliverable. The timely submission of activity/scientific/technical and management/financial reports is a main contractual duty, and delays in providing reports may lead to missing funding for the subsequent period. For EC funded projects reports include 1) periodic



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reports at the end of each reporting period, 2) a final report at the end of the project and, on request of the EC and/or coordinator 3) short progress reports.

Conflict Resolution Procedures

As a general rule, project management will aim for consensus building, promoting mediation over voting in order to ensure maximum cooperation and collaboration within the consortium.

In the case of conflict between 2 or more parties, the Project Management Board (PMB) has the authority of arbitrator and the responsibility for conflict resolution.

Normally, conflicts will be resolved by voting on a simple majority. Specific provisions for conflict resolution, rights and obligations of participants are covered by the Consortium Agreement.

Project Presentation/Dissemination

An externally facing website has been created at; www.liquefact.eu (Deliverable D 8.1) to support the dissemination and exploitation activities of the project, create awareness of project results in the EU and further abroad and strengthen collaborative opportunities with relevant stakeholders.

The external website highlights details of

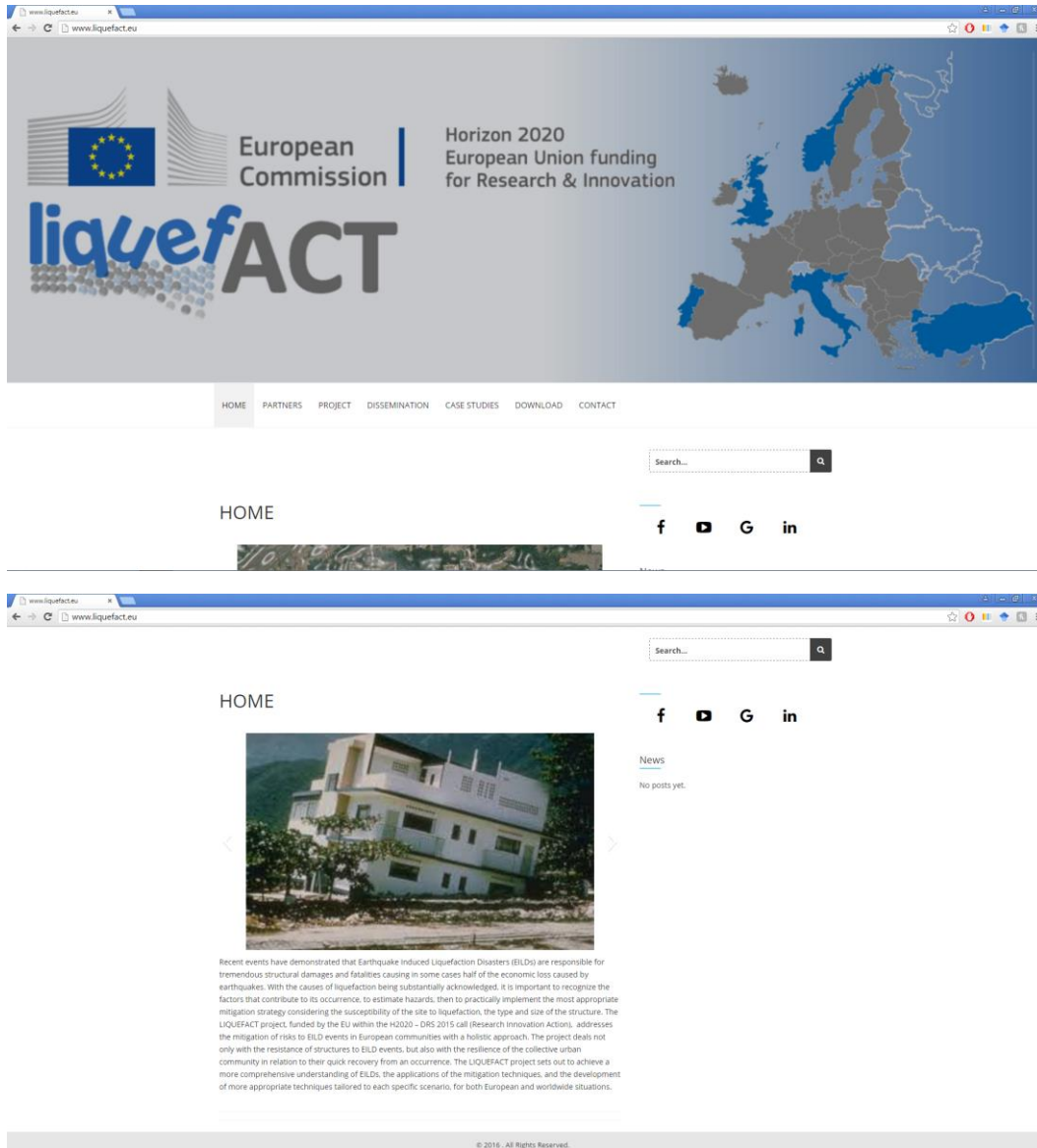
- Partners and the Expert Group
- Project Overview, Objectives and Work Packages
- Deliverables, Reports, Publications and Workshops
- Case Studies
- Downloadable content for public use

Additionally the website also links to Facebook, YouTube, Google and LinkedIn accounts which have all been designed, created and will be managed by the consortium.



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Figure 10. LIQUEFACT External project website



Effective internal communication is also essential for the success of this project, as all partners must be made aware of any emerging issues and progress reports. To facilitate this communication, a dedicated website for internal communications will be created and will form part of a secure project website accessible via login and password for internal project partners.

Templates

Templates will be created for use by all project partners to ensure consistency across WPs and Deliverables.

These will include:



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- Press Release Reports
- Pre-Workshop Reports
- Post-Workshop Reports
- Meeting Agendas
- Deliverables
- Event Report
- Minutes
- Presentation
- Press Release
- Timesheets
- Financial Reporting