Ref. Ares(2022)268902 - 14/01/2022

Funded by European Union Civil Protection
Grant Agreement Number 874421

Vulnerability assessment of embankments and bridges exposed to flooding hazards

Deliverable 7.4

Digital Newsletter 4

Project Information

Grant Agreement No.	874421
Project Acronym	oVERFLOw
Project Full Title	Vulnerability assessment of embankments and bridges exposed to flooding hazards
Starting Date	1 December 2019
Duration	32 months
Call Identifier	UCPM-2019-PP-AG
Topic	UCPM-2019-PP-PREV-AG: Prevention in civil protection and marine pollution
Project Website	www.projectoverflow.eu
Project Coordinator	Prof. Meho Sasa Kovacevic
Organisation	Faculty of Civil Engineering, University of Zagreb
E-mail	msk@grad.hr
Telephone	+385 (1) 4639 250

Partner Information

Sveuciliste u Zagrebu Gradevinski Fakultet	Croatia
Infra Plan Konzalting	Croatia
GEKOM - geofizikalno i ekološko modeliranje d.o.o.	Croatia
VEILIGHEIDSREGIO ZUID-HOLLAND ZUID	Netherlands
INGEO BV	Netherlands
ZAVOD ZA GRADBENISTVO SLOVENIJE	Slovenia
Uprava Republike Slovenije za zaščito in reševanje	Slovenia

Document Information

Work Package	7
Deliverable Title	Digital Newsletter 4
Version	1.0
Date of Submission	14/01/2022
Main Editor(s)	Mirko Kosič, Andrej Anžlin, Mario Bacic
Contributor(s)	-
Reviewer(s)	Irina Stipanovic
Citation	Kosič M., Anžlin, A., Bacic, M. (2022). oVERFLOw Deliverable 7.4: Digital Newsletter 4

Document Classification:									
Draft		Final	**X**	Confidential		Restricted		Public	**X**

History			
Version	**Issue Date**	**Status**	**Distribution**
1	10/01/2022	For review	IPK
1	13/01/2022	For review	All partners

The information contained in this report reflects the views of the Author(s) and the Commission does not accept responsibility for the use of this information.

Executive Summary

This report outlines the project activities performed in the six months of the oVERFLOw project in accordance with Annex I of Grant Agreement no. 874421.

Considering the extended timetable of the project according to Grant Agreement Amendment, this digital newsletter covers the project activities performed from the 1st of July 2021 (M20) to 31st of December 2021 (M25).

It is the fourth of the fifth digital newsletter that will be published until the end of the project. An additional newsletter will be published at the end of the project (31st of July 2022) to summarise the activities performed in the last 8 months. The content of this deliverable will be publicly available and will be shared through the project website and social media publications.

Keywords: Newsletter, project activities.

Table of Contents

Project Information 1
Partner Information 1
Document Information 2
Executive Summary 3
1 Abbreviations and Acronyms 5
2 Background 6
3 Objective/Aim 7
4 Report on project activities 8
4.1 3rd oVERFLOw consortium meeting 8
4.2 UAV and geophysical investigations on the Dutch case study embankment 10
4.3 WP6 online kick of meeting 11
4.4 4th oVERFLOw consortium meeting 11
4.5 Dissemination activities 14
5 Conclusions 15

1 Abbreviations and Acronyms

Abbreviation / Acronym	Description
CPA	CIVIL PROTECTION AGENCY
FCEZG	SVEUČILIŠTE U ZAGREBU GRAĐEVINSKI FAKULTET
IPK	INFRA PLAN KONZALTING J.D.O.O.
INGEO	INGEO BV
IMP	INFORMATION MANAGEMENT PLATFORM
GEKOM	GEKOM – GEOFIZIKALNO I EKOLOŠKO MODELIRANJE D.O.O.
VRZHZ	VEILIGHEIDSREGIO ZUID-HOLLAND ZUID
ZAG	ZAVOD ZA GRADBENISTVO SLOVENIJE
URSZR	UPRAVA REPUBLIKE SLOVENIJE ZA ZAŠČITO IN REŠEVANJE

2 Background

In accordance with Annex I of Grant Agreement no. 874421, ZAG is the lead beneficiary for preparing six-months project newsletters, which are aimed at giving regular updates on the performed project activities. As a result of the extension of the project in accordance with the Grand Agreement Amendment, an additional newsletter will be published at the end of the project (31st of July 2022). This is the fourth newsletters of total five newsletters that will be published by the end of the project and covers the project activities performed from the 1st of July 2021 (M20) to the 31st of December 2021 (M25).

3 Objective/Aim

The oVERFLOw project is funded under the European Union Civil Protection Mechanism framework, according to the following call topic UCPM-2019-PP-PREV-AG: Prevention in civil protection and marine pollution.

The objective of this deliverable is dissemination of project activities performed in the fourth six-month period of the project. The content of this deliverable will be publicly available and will be shared through the project website and social media publications.

4 Report on project activities

This report outlines the project activities performed in the fourth six-month period of the oVERFLOw project in accordance with Annex I of Grant Agreement no. 874421. The deliverable covers the period from the 1st of July 2021 (M20) to the 31st of December 2021 (M25). It is the fourth of the five digital newsletter that will be published until the end of the project.

The activities performed were the following:

- 3rd oVERFLOw consortium meeting in Ljubljana (Slovenia) –14th of July 2021
- Final on-site investigations on the Dutch case study - 17th and 18th of August 2021
- WP6 online kick-off meeting – the 17th of September 2021
- 4th oVERFLOw consortium meeting in Delft (the Netherlands) – 25th to 26th of November 2021
- Dissemination activities

These activities will be described in more detail in the following chapters.

4.1 3rd oVERFLOw consortium meeting

The 3rd oVERLOw consortium meeting was held at ZAG in Ljubljana (Slovenia) on the 14th of July 2021 (*Figure 1: Figure 1*). The aim of the meeting was to present the current progress of the project activities and discuss future steps.

Figure 1: Meeting in Ljubljana at ZAG premises

In the first part of the meeting, the coordinator presented the current state regarding the submission of deliverables, and it was concluded that the deliverables are submitted in accordance with the updated timeline defined in the Grant Agreement Amendment. The work package and task leaders then presented the work conducted since the last consortium meeting.

The coordinator noted that the activities on WP1 are proceeding according to the plan.

WP2 beneficiaries report that most of the deliverables have been submitted. Several meetings were held with CPAs at the case study areas for the input to the Information Management Platform (IMP). The current activities were focused on implementing the IMP, which represents the final stage of WP2.

WP3 beneficiaries report that significant progress was made in relation to the on-site investigations on the Croatian case study area. FCEZG reported that complete photogrammetry and thermal model of the riverbanks (right and left) had been made. Borehole drillings and geophysical investigations using the seismic methods have been conducted, while CPT investigations and geo-electric measurements (ERT) were still ongoing. ZAG presented the on-site work conducted on the case study bridges, which included a bathymetric survey of the Kupa riverbed and a drone inspection of both case study bridges. Vibration measurements of the two bridges were also conducted. Both institutions report that future activities will be focused on the preparation of Deliverable D3.1 and D3.2.

In relation to WP4, InGEO presented the work on the development of fragility curves for the selected dike in the Dutch case study section. ZAG presented the methodology for fragility analysis of the case study bridges as well as the current progress regarding the fragility analysis of the Banija Bridge.

IPK as WP5 leader, presented the progress related to the risk assessment framework for determining direct and indirect consequences of flooding on the two case study areas.

The VRZHZ noted that more concrete work on WP6 is yet to be started due to inter-relation with the output of previous WPs. Activities are, however, proceeding in accordance with the Grant Agreement Amendment.

The meeting concluded with a discussion of the dissemination activities and next steps. Following the meeting, a group photo of all participants was taken in front of the ZAG building (*Figure 2*). Afterwards, a social dinner on a boat trip over the Ljubljanica river was organised by the host.

Figure 2: Participants of the 3rd oVERFLOw consortium meeting in Ljubljana

4.2 UAV and geophysical investigations on the Dutch case study embankment

As a final step in in-situ investigations of case study areas, an UAV (drone) and geophysical investigations of Oostmolendijk was conducted on the 17th and 18th of August 2021 by FCEZG, with the presence of INGEO and VRZHZ. Drone investigations provided a complete 3D point cloud of Oostmolendijk and this enabled extraction of the relevant cross-sections used in the subsequent vulnerability analysis, Figure 3.

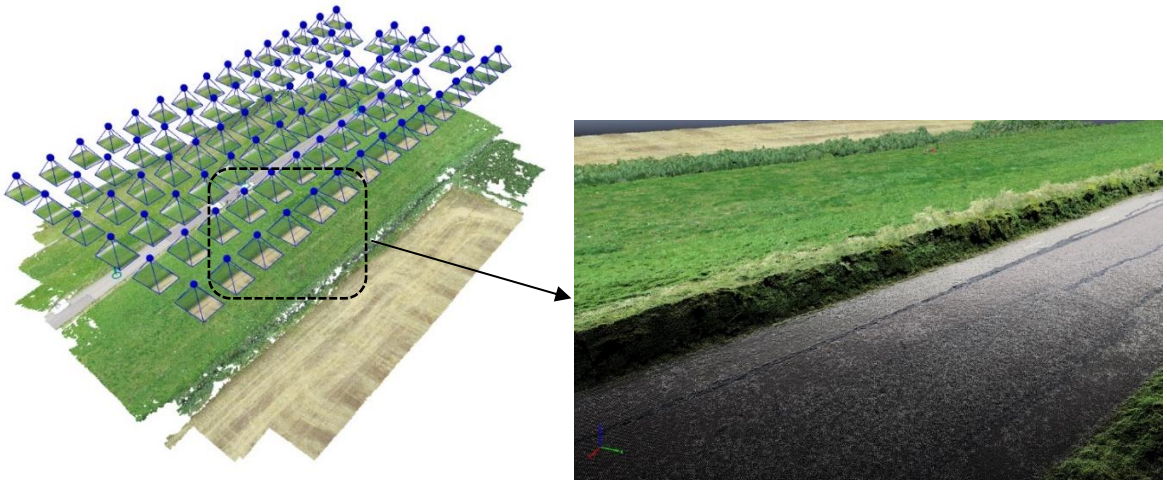

Figure 3: A 3D point cloud of the Oostmolendijk

Further, a geophysical campaign was conducted (Figure 4), using multi-geophysical approach with the combination of seismic (MASW) and geoelectrical (ERT) investigations. Four longitudinal geophysical profiles were defined and these provided important information on the type and depths of relevant layers beneath the Oostmolendijk. Due to their character to cover a large volume of soil and investigated embankments as long linear structures, these investigations are particularly useful for the vulnerability analysis within WP4.

Figure 4: Acquisition of the geophysical data on the Oostmolendijk using both MASW and ERT

4.3 WP6 online kick of meeting

Considering the revised timetable of the project in accordance with Grant Agreement Amendment, a kick-off was organised by VRZHZ soon after the beginning of the WP6 tasks. The meeting was held online on the 17th of September 2021. The meeting was joined by all institutions involved in the WP6 task. The goal of the meeting was to define and discusses the contribution of all involved institutions in fulfilling the tasks of WP6.

Each institution prepared a short presentation with a description of its role in the WP6, expected planning and interdependencies with other WPs. The challenges and meetings to be planned were discussed. Regular monthly meetings were scheduled to follow the progress of WP6 activities.

4.4 4th oVERFLOw consortium meeting

The 4th oVERFLOw meeting was held between the 25th and 26th of November 2021 in Delft (the Netherlands). The meeting was organised as a two-day event and was aimed at the presentation of the current progress of the project activities and discussion of future steps. The first day of the meeting was devoted to the consortium debate, while on the second day, a site visit to Oostmolendijk was organised.

At the begging of the meeting, the coordinator gave an update on the progress of activities. It was concluded that all foreseen deliverables had been submitted, and all milestones have been realised with respect to extended delivery and realisation dates as defined by Grant Agreement

Amendment. WP leaders, with the contribution of WP participants, then presented the work conducted since the last consortium meeting.

The coordinator noted that the activities on WP1 are proceeding as planned.

WP2 leader ZAG noted that all scheduled task has been completed and that the IMP was established for both case study areas. The IMP will serve as the backbone for future activities through WP4, WP5 and WP6.

FCEZG and ZAG reported that since the last consortium meeting, all WP3 deliverables had been submitted, and the outputs are now used for the currently ongoing work of WP4. FCEZG presented the additional surveying, geotechnical and geophysical investigations performed on riverbanks of Kupa river in Croatia, as well the work conducted on Oostmolendijk in August 2021.

A large part of the meeting was devoted to the presentation of WP4 results, where great progress was made since the last consortium meeting. InGEO presented a newly developed methodology for embankment system failure probability and fragility curves for the Oostmolendijk, which consider the potential for several relevant failure mechanisms. FCEZG noted that the fragility curve analysis for the Croatian case study is in progress where several failure mechanisms are considered. ZAG presented the work conducted for the development of fragility curves for Banija bridge with developed several failure scenarios with respect to varying water levels. For the state road bridge (Karlovac Bridge), a simplified analysis will follow due to limited input data.

IPK presented the ongoing efforts of WP5 in determining overall risks (direct and indirect, tangible and intangible) due to flooding of case study areas, as well as the methodology for calculation of costs due to flooding. Following the discussion among consortium members, it was agreed that a separate workshop between WP5 and WP6 will be held by the end of January 2022 to agree on hazard scenarios and on the relevant information to be included in the work of WP6.

The VRZHZ noted that work on WP6 has started and that a kick-off meeting was organised in September 2021. The WP leader noted that the progress of WP6 is strongly related to the outputs of WP4 and WP5. To track the progress of the activities, monthly WP6 meetings were planned and will be organised as an online workshop every third Wednesday of a month.

The last part of the meeting was devoted to the discussion of the performed dissemination activities and next steps.

Immediately after the meeting, FCEZG, InGEO and VRZHZ had a meeting with representatives of Dutch Waterboard to present the work conducted in WP3 (investigation works) and WP4 (fragility analysis) for the Oostmolendijk and discuss the needs of Waterboard and potential future steps regarding the mitigation measures.

The first day of the meeting (*Figure*) concluded with a social dinner organised by the host. On the second day, the consortium members headed for a site visit of the Oostmolendijk, where they met with a representative of Dutch Waterboard (*Figure*).

Figure 5: 4th oVERFLOw consortium meeting

Figure 6: Consortium members at the location of OOstmolendijk (Dutch case study)

4.5 Dissemination activities

Since the publishing of the 3rd digital newsletter (June 2021), several dissemination activities have been performed. The most important dissemination activities in the last 6 month were the following:

- FCEZG published additional paper 'Fragility Curves for Slope Stability of Geogrid Reinforced River Levees' in the Special Issue 'Dam Safety, Overtopping and Geostructural Risks' of an open-access journal 'Water', indexed within Scopus, SCIE (Web of Science), Ei Compendex, GEOBASE, GeoRef, AGRICOLA, AGRIS, CAPlus / SciFinder, Inspec, and many other databases. Journal Rank is following: JCR - Q2 (Water Resources) / CiteScore - Q1 (Geography, Planning and Development), while the Impact Factor is 3.103 (2020); 5-Year Impact Factor: 3.229 (2020).
  The paper was published on September 23rd 2021.
  The research funding source (project oVERFLOw) is highlighted at the end of the paper.
  Paper URL: https://www.mdpi.com/2073-4441/13/19/2615
  Paper DOI: https://doi.org/10.3390/w13192615

- FCEZG published a paper 'Impact of the climate changes on the flood protection systems: example of the oVERFLOw project', with a presentation, on a 8th Congress of Croatian Civil Engineers, held in Vodice (Croatia) on 3rd to 5th of October 2021.

- URSZR included a presentation of the oVERFLOW project at the SORBA fair – the 8th International fair of Defence, Security, Protection and Rescue, which was organised in Gornja Radgona (Slovenia) between the 23th and 25th of September 2021.

- Presentation of the oVERFLOW project at the Chamber of Commerce and Industry within the Slovenian Presidency of the EU Council on the topic of the Digitalization in civil engineering. For this ocasion, ZAG prepared a promotional video, which included the work performed within the oVERFLOw project. The video was posted on the YouTube platform and is available on the following link:
  https://www.youtube.com/watch?v=cC2qfHjQBBw

- FCEZG published a paragraph in the journal of the Croatian Geological Association (Special Issue), where a description and importance of the oVERFLOw project is given

- VRZHZ published an article under the title 'Better view of dike condition' describing the oVERFLOw activities with focus on the in-situ investigations of Oostmolendijk. An article is published in journal GRIP in November 2021 (Issue 10, Number 2).

5 Conclusions

This report outlines the project activities performed in the fourth six-month period of the oVERFLOw project in accordance with Annex I of Grant Agreement no. 874421. The deliverable covers the period from the 1st of July 2021 (M20) to the 31st of December 2021 (M25). It is the fourth out of the five digital newsletters that will be published until the end of the project. In accordance with the Grant Agreement Amendment, an additional newsletter will be published at the end of the project (31st of July 2022) to summarize the activities performed in the last eight months. The content of this deliverable will be publicly available and will be shared through the project website and social media publications.

The progress of the project oVERFLOw can be followed on our web page:

https://projectoverflow.eu/

and oVERFLOw project social media profiles:

Facebook: https://www.facebook.com/OVERFLOw-project-108534450696939/

Twitter: https://twitter.com/oVERFLOWprojec1

LinkedIn: https://www.linkedin.com/in/overflow-project-541b101a0/