

- FORESEE -

Future proofing strategies FOr RESilient transport networks against Extreme Events



– Deliverable 8.7–

Report on the contribution to Standardization

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D8.7 Report on the contribution to Standardization

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1 INTRODUCTION

FORESEE is a H2020 project focused on the development of a reliable and easily implementable toolkit for providing resilience assessment schemes, considering traffic disruption due to flooding, landslide structural damage or other events related with transport infrastructures. It considers both natural and man-made events. This toolkit should help transport managers to monetize resilience for investment decisions, to develop a performance-based risk assessment framework applied to transport infrastructures.

FORESEE project received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement number 769373. More information and its results can be found in [this website](#).

This report is focused on the standardisation related with FORESEE. The main goal set by FORESEE partners was to promote and disseminate the results of the project using the European and International Standardisation system, to ensure the acceptance and utilisation by the market of the developed solutions.

In this project, the standardisation activities are coordinated by the [European Union Road Federation \(ERF\)](#), with the support of the Spanish Association for Standardization (in Spanish, [Asociación Española de Normalización, UNE](#)).

The incorporation of part of the results of FORESEE in current or future documents issued by CEN was a primary objective, to facilitate its use by industry public bodies. A CEN document should promote the use of the methodologies developed in public and private procurement, industry internal processes and, in some cases, can be cited in European, national or regional regulations.

Standardisation documents are, by definition, voluntary, but it is very common that, for certain uses, public administration enforces their application. An example can be the harmonised standards, used for CE marking purposes, some test standards or the Eurocodes. Thus, including the result in an existing standardisation document (EN or ISO standard, a Technical Specification (TS) or Report (TR) or a Workshop Agreement (CWA)) can have a very important impact in the market.

In addition, the standardisation system constitutes a source of information and provides peer-review from experts from different countries and industries. Thus, the feedback from members of ISO and CEN committees is considered very valuable.

2 EXECUTIVE SUMMARY

The European Union Road Federation (ERF) coordinated the standardisation activities within the FORESEE project, with the support of the Spanish Association for Standardization (UNE), member of the European Committee for Standardization, CEN.

The dissemination of the results of FORESEE in the European and International environment was a primary objective, to make available the information generated by the project to industry and public administrations, to promote its use in public and private procurement and to constitute the basis for future developments. The standardisation system was also used as a source of information, as feedback and peer-review.

To achieve both the dissemination of the results and the provision of input from experts within the standardisation system, ERF and UNE made presentations and send information in several standardisation bodies (see clause 4). The planification was established in [Deliverable 8.2 Standardization Landscape Report](#) (sub-task 8.4.1).

The main standardisation result is [CWA 17819:2021 Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events](#), a document available for free download in CEN website, based on the results of FORESEE. This development is explained in clause 5.

Considering the result (a standardisation document like the CWA 17819), FORESEE achieve a goal beyond the pre-standardisation activities, which can be considered a success of the project.

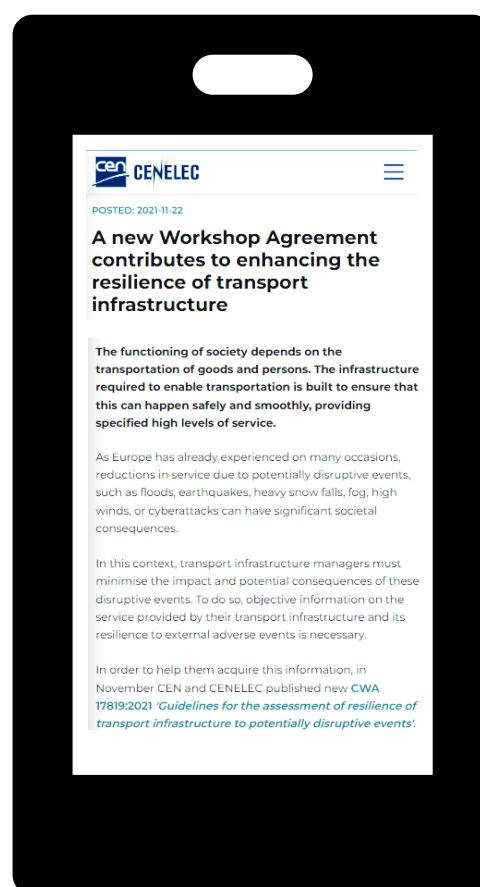


Figure 1. CEN News of the publication

3 ABOUT THE STANDARDISATION SYSTEM

3.1. INTRODUCTION

The standardisation system is based, both at International (ISO and IEC) and European (CEN/CENELEC and ETSI) level, on a national delegation principle. This means that the National Standardisation Body (NSB) of each country is a member of the supra-national standardisation organizations and defines its position based on the input from industry, research bodies, NGO, public administrations, etc. The standards are thus approved by a consensus based process between NSB. In Spain, the NSB is UNE (Spanish Association for Standardisation).

The use of the standardisation system as a tool to provide feedback and peer-review, during the early stages of the project, was considered very important for FORESEE. UNE participated in this task since the start of the project.



Figure 2. Tweet covering FORESEE kick-off meeting

The standardisation system, both at International and European level, the structure of the standardisation bodies and the relevant standards and projects identified, are explained in [D8.2 Standardization Landscape Report](#) and will not be *repeated* here; please check it for further information.

To have an idea of the dissemination potential of the standardisation system, CEN has 34 national members, and the national members of the mirror committees receive the information and documents. [CEN members](#) are the following (with links):

1. [Austria - Austrian Standards International \(ASI\)](#)
2. [Belgium - Bureau de Normalisation/Bureau voor Normalisatie \(NBN\)](#)
3. [Bulgaria - Bulgarian Institute for Standardization \(BDS\)](#)
4. [Croatia - Croatian Standards Institute \(HZN\)](#)

5. [Cyprus - Cyprus Organization for Standardisation \(CYS\)](#)
6. [Czech Republic - Czech Office for Standards, Metrology and Testing \(UNMZ\)](#)
7. [Denmark - Dansk Standard \(DS\)](#)
8. [Estonia - Estonian Centre for Standardisation and Accreditation \(EVS\)](#)
9. [Finland - Suomen Standardisoimisliitto r.y. \(SFS\)](#)
10. [France - Association Française de Normalisation \(AFNOR\)](#)
11. [Germany - Deutsches Institut für Normung \(DIN\)](#)
12. [Greece - National Quality Infrastructure System \(NQIS/ELOT\)](#)
13. [Hungary - Hungarian Standards Institution \(MSZT\)](#)
14. [Iceland - Icelandic Standards \(IST\)](#)
15. [Ireland - National Standards Authority of Ireland \(NSAI\)](#)
16. [Italy - Ente Italiano di Normazione \(UNI\)](#)
17. [Latvia - Latvian Standard Ltd. \(LVS\)](#)
18. [Lithuania - Lithuanian Standards Board \(LST\)](#)
19. [Luxembourg - Organisme Luxembourgeois de Normalisation \(ILNAS\)](#)
20. [Malta - The Malta Competition and Consumer Affairs Authority \(MCCAA\)](#)
21. [Netherlands - Nederlands Normalisatie-instituut \(NEN\)](#)
22. [Norway - Standards Norway \(SN\)](#)
23. [Poland - Polish Committee for Standardization \(PKN\)](#)
24. [Portugal - Instituto Português da Qualidade \(IPQ\)](#)
25. [Republic of North Macedonia - Standardization Institute of the Republic of North Macedonia \(ISRSM\)](#)
26. [Romania - Romanian Standards Association \(ASRO\)](#)
27. [Serbia - Institute for Standardization of Serbia \(ISS\)](#)
28. [Slovakia - Slovak Office of Standards Metrology and Testing \(UNMS SR\)](#)
29. [Slovenia - Slovenian Institute for Standardization \(SIST\)](#)
30. [Spain - Asociación Española de Normalización \(UNE\)](#)
31. [Sweden - Swedish Institute for Standards - SIS \(SIS\)](#)
32. [Switzerland - Schweizerische Normen-Vereinigung \(SNV\)](#)
33. [Turkey - Turkish Standards Institution \(TSE\)](#)
34. [United Kingdom - British Standards Institution \(BSI\)](#)



D8.7 Report on the contribution to Standardization

All the national standardisation organizations listed above received information about FORESEE and the CWA 17819, via CEN.

In addition, the international organization (ISO) has 167 members (the list is provided in [this link](#)). Many of their national standardisation organizations received information about FORESEE and CWA 17819 via some Technical Committees (see Clauses 0 and 0).

The main options studied by ERF and UNE for the participation in the standardisation system are explained in the subclauses below.

3.2. OPTIONS INSIDE EXISTING TECHNICAL BODIES

- A. **Participation** of FORESEE partners as experts or guests in current standardization working groups, or establishment of a Project Liaison with the Technical Committee for the participation as consortium in their works: This option is most suitable when new EN standards or TS (technical specifications) or TR (technical reports) start their development and the project timeframe allows for a participation of several years. However, the timespan of the document development can be different to that of the project and the timing for the availability of suitable project results can be not the most adequate. As explained in clause 4 below, members of FORESEE participated in WG meetings, to explain the results of the project.
- B. **Proposal (and leadership) of modifications** to existing EN standards or TS (technical specifications) or TR (technical reports): Suitable when some existing standard(s) can be improved with contributions from the project or need to be modified, for instance, to remove an existing technical barrier. As in the previous option, the timing of this action can likely range after the project end. Thus, if necessary, it usually will depend on the commercial interest of the relevant partners. For FORESEE, it was not considered feasible due to time restrictions.
- C. **Proposal (and leadership) of the elaboration of new standards**: This option is most adequate when there is a Technical Committee covering the scope of the project contribution, especially when this Technical Committee does not allow the elaboration of faster documents outside its structure (like the Workshop Agreement explained below). Usually, the full development of these documents takes a time which is not compatible with the normal project duration, so it is not a suitable option. This option (C) is more time consuming than options A and B and was not considered feasible due to time restrictions.
- D. **Submission of proposals for future consideration in standardization works**: This option is only recommended when none of the other options can be used, as there is no guarantee that this information will effectively be used in the future to take part of a new standard, and could be finally disregarded. However, if linked with a CWA (see below), it can be an interesting option, as a CEN document is issued (the draft) and existing Technical Bodies can decide to "upgrade" the document to EN standard in the future, using the CWA as a draft.

The documents cited above have the general characteristics:

- EN standard: the process, *in theory* takes between 2 and 3 years. *In practice*, it can need more time, as the defined methodology requires consensus between CEN members and the implications are *severe*, as a EN standard requires that all NSB shall supersede their national standards *in conflict* with the EN. The results of a research project are usually *beyond* the state of the art of industry and will take some years to become a EN standard.
- Technical Specification (TS): the process usually takes between 15 and 21 months, since activation. *In theory*, it is possible to deliver it but, as the results of the project usually need around 18 months to be *mature enough*, it is complicated. In addition, this document requires a high level of consensus in an established standardisation body.
- Technical Report (TR): As in the case of TS, requires certain level of consensus in a standardisation body, but the process is faster and for some projects might be feasible.



3.3. OPTIONS OUTSIDE EXISTING TECHNICAL COMMITTEES

The Workshop Agreement: this option is the most widely used in research and innovation projects, and is especially designed for them, among other uses like quickly evolving markets (e.g. information and communication technologies).

It implies the constitution of a new working group (Workshop) which works independently from existing Technical Committees, but coordinated with them. The document is approved directly by the members of the Workshop. Relevant TC are informed and any organization can participate.

The resulting document, the Workshop Agreements, are published by the Standards Organizations, can be [freely available to the public](#) with no cost and the only strong requirement is that their content cannot conflict with existing standards.

This was the selected option for the dissemination of the results of FORESEE.

3.4. CEN/CENELEC WORKSHOP AGREEMENT

The process and criteria to develop a CEN/CENELEC Workshop Agreement (CWA) is defined in [CEN-CENELEC Guide 29](#) and summarised below.

- i. To develop a CWA, any organization can contact a CEN Member. With the assistance of the CEN Member, the Proposer of a CWA prepares the *Workshop Proposal Form*, if possible with a *Project Plan* including a tentative calendar and the proposed content for the CWA.
- ii. The information above is sent to CEN Technical Board and to relevant CEN and/or CENELEC Technical Committees (TCs), if identified in the *Workshop Proposal Form*.
- iii. CEN/CENELEC Management Centre (CCMC) announces the proposal for a new CEN Workshop (CEN/WS) on its website at least 30 days before the kick-off meeting, including the draft Project Plan, the Agenda and Venue, the proposed Chairperson and the proposed Secretariat, with information on how to submit comments to the Workshop Draft Project Plan.
- iv. Kick-off meeting: The CEN Member and CCMC explains how the CEN/WS will operate and the Workshop Project Plan is revised and approved. The proposed Chairman should also be approved by participants.
- v. Draft and meetings: The Secretariat will make available the drafts, the agenda and minutes of the meetings and any other relevant document. To ensure transparency the documents are uploaded on *CEN Documents* (a electronic platform in which the documents generated are made available to experts). The WS will meet until consensus on a draft is achieved.
- vi. Public consultation (optional): If foreseen in the Final Workshop Project Plan, and in any case if the draft CWA covers safety aspects, an open commenting phase (minimum 30 days and 60 days if it covers safety aspects) is launched. CCMC will make the draft CWA available for external comments on the CEN Website and the CEN-CENELEC Website. CCMC will also notify the CEN Members. The comments are considered by the CEN/WS participants.
- vii. If agreement is reached amongst the WS participants on the final text of the CWA, the Secretariat submits the approved CWA to CCMC, to publish the document.
- viii. Revision of the validity of the CWA: Once published, a TC can decide to take on the responsibility for the maintenance of the CWA. In this case, the TC Secretariat will conduct the consultation for the review of the CWA after 3 years. After this period, the CWA can be confirmed for another 3 years, revised, withdrawn from the market. CWAs have a maximum lifetime of 6 years.

At any point in its lifecycle, a CWA can be transformed into another standardization deliverable (e.g. a TS or an EN), at the initiative of CEN Members or of a CEN and/or CENELEC Technical Body.



4. DISSEMINATION WITHIN THE STANDARDISATION SYSTEM

4.1. GENERAL

D8.2 listed several ISO and CEN Technical Committees. The following were identified as more relevant for FORESEE:

- ISO/TC 59 *Buildings and civil engineering works* and its WG 4 for *Resilience*
- ISO/TC 59/SC 17 *Sustainability in buildings and civil engineering works* and its WG 5 for *Civil Engineering works*
- ISO/TC 207/SC 7 *Greenhouse gas management and related activities* and its TG 2 for *Adaptation to climate change*
- ISO/TC 251 *Asset management*
- ISO/TC 262 *Risk management*
- ISO/TC 292 *Security and resilience*
- CEN/TC 350 *Sustainability of construction works*, and its WG 6 for *Civil Engineering works*
- CEN/TC 391: *Societal and Citizen Security*

4.2. REQUEST FOR FEEDBACK

During the second quarter of 2020, a request for feedback was sent to several Technical Committees like CEN/TC 350 and its WG 6, ISO/TC 59 and its WG 4, ISO/TC 59/SC 17 and its WG 5, ISO/TC 207, ISO/TC 262 or CEN/TC 226.

In some cases, the reply was circulated to all members. The examples below show the dissemination within sent to CEN/TC 350 "Sustainability of construction works".

 	
«Sustainability of construction works» CEN/TC 350	
Date :	Número du document:
2020-05-14	N 960
Assistant:	Responsable:
Stéphane CAZIER Téléphone : + 33 (0)1 41 02 82 63 stephane.cazier@afnor.org	Karine DARI Téléphone : + 33 (0)1 41 02 85 25 karine.dari@afnor.org
H2020-FORESEE Project for information and feedback request from CEN TC 350	
COMMENT	Find enclosed an introduction to the H2020 FORESEE Project
ACTION	<p>This document has yet been sent to WG6 and a presentation will be made in a next meeting.</p> <p>Do not hesitate to send me any comment you could have on this project.</p>
SOURCE	CEN/TC 350

Figure 3. Example of request of information sent to CEN Committees (first page)

The example below shows the dissemination and call for feedback within ISO/TC 59 "Buildings and civil engineering works".



Figure 4. Example of request of information sent to ISO Committees (first page)

A presentation about FORESEE was included in these emails. The figure below contains the first page of the PowerPoint.



Figure 5. Presentation of FORESEE circulated to ISO and CEN Committees

D8.7 Report on the contribution to Standardization

To provide a better idea of the impact of this request, this ISO/TC 59 has **82 members**:

- 29 as “participants”: France, United States, Austria, United Kingdom, Côte d'Ivoire, Democratic People's Republic of Korea, Germany, Malaysia, Russian Federation, Islamic Republic of Iran, Japan, Republic of Korea, Kazakhstan, Mauritius, Belgium, Cuba, Netherlands, Australia, South Africa, China, Saudi Arabia, Finland, Sweden, Norway, Nigeria, Spain, Italy, Uruguay, Czech Republic; and
- 53 as “observers”: Niger, Cameroon, Romania, Azerbaijan, Bulgaria, Belarus, India, Barbados, Philippines, Bhutan, Indonesia, Cyprus, Mexico, Fiji, Denmark, Ukraine, Egypt, Ethiopia, Estonia, Bolivia, Colombia, Chile, Tunisia, Costa Rica, Portugal, Argentina, Republic of Moldova, Serbia, Iceland, Hong Kong, Kenya, Lebanon, Mongolia, Malta, Hungary, Greece, Ireland, New Zealand, Poland, Pakistan, Armenia, Canada, Israel, Slovenia, Sri Lanka, Switzerland, Singapore, Viet Nam, United Republic of Tanzania, Thailand, Turkey, Trinidad and Tobago, Slovakia.

This TC also has 9 active Subcommittees (like SC 17 dealing with sustainability) and a WG covering resilience; these groups have their own members registered, with access to the information. As an example, in Spain the mirror committee of ISO/TC 59/SC 17 has more than 100 experts receive the document (just for Spain, one of the countries which participates). Thus, the dissemination of the information is very important.

4.3.PARTICIPATION IN MEETINGS

As a follow up of these emails and information provided, several presentations were arranged in working groups related with sustainability and resilience assessment of infrastructures, with the participation of Bryan Adey (ETH), Claudio Martani (ETH), José Díez (ERF) and Aitor Aragón (UNE).

2020-09-03. CEN/TC 350/WG 6, European working group for sustainability assessment of civil engineering works

A presentation, included, was made by Dr. Bryan Adey. It was circulated in WG 6 as N180.

The minutes of the meeting (circulated in the WG as N178), included the text shown below.



5. H2020 FORESEE Project presentation

Aitor Aragón thanks the opportunity to present the FORESEE project and outlines the topics considered ready for starting a standardization process via CWA:

3



- Flood analysis tool, with two parts. The first one provides a methodology and the second should provide criteria to consider (in the analysis) the potential changes due to climate change in the main parameters (pluviometry, soil, etc.)
- Measuring Levels of Service and Resilience in transport systems: Guidelines to measure and set targets for levels of service provided by, and resilience of, transport infrastructure. A CWA proposal should be sent to CEN in the following weeks. Bryan Adey will make a presentation about this topic.

Bryan Adey presents the project and the deliverables, including the definition of main elements like Level of Service and Resilience themselves. The first guideline explains how to measure, the second how to set target levels and the third provides examples. Examples from a simple case study are used. A statement about the on-going work to develop algorithms to assess the best way to plan risk reducing interventions on networks and to restore infrastructure within a networks after an event.

Figure 6. Minutes of CEN/TC 350/WG 6

2020-09-03. ISO/TC 59/SC 17/WG 5, International working group for sustainability assessment of civil engineering works

A similar presentation was made by Dr. Bryan Adey to this WG, the international *mirror* of CEN/TC 350/WG 6. It was circulated in WG 5 as N295. The minutes of the meeting (circulated in the WG as N293), included the following.

4. H2020 FORESEE Project presentation

(Document ISO/TC 59/SC 17/WG 5 N 295)

Mr Aitor Aragón thanks the opportunity to present the H2020 FORESEE project and outlines the topics considered ready for starting a standardization process via CWA (CEN-CENELEC Workshop Agreement):

- Flood analysis tool, with two parts. The first one provides a methodology and the second should provide criteria to consider (in the analysis) the potential changes due to climate change in the main parameters (pluviometry, soil, etc.)
- Measuring Levels of Service and Resilience in transport systems: Guidelines to measure and set targets for levels of service provided by, and resilience of, transport infrastructure. A CWA proposal should be sent to CEN in the following weeks. Bryan Adey will make a presentation about this topic.

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ISO/TC 59/SC 17/WG 5 N 293

Bryan Adey presents the project and the deliverables, including the definition of main elements like Level of Service and Resilience themselves. The first guideline explains how to measure, the second how to set target levels and the third provides examples. Examples from a simple case study are used. A statement about the on-going work to develop algorithms to assess the best way to plan risk reducing interventions on networks and to restore infrastructure within a networks after an event.

The presentation can be found as document **N 295**.


Further information on the project can be found here: <https://foreseeproject.eu/>

Figure 7. Minutes of ISO/TC 59/SC 17/WG 5

The presentation was circulated to experts, as shown in the example below (document uploaded in ISO Documents for ISO/TC 59/SC 17/WG 5 "Sustainability of civil engineering works").




D8.7 Report on the contribution to Standardization



ISO/TC 59/SC 17/WG 5 N 295

ISO/TC 59/SC 17/WG 5 "Civil engineering works"
Convenorship: UNE
Convenor: BURGUENO MUÑOZ Antonio Mr.



FORESEE H2020 project presentation

Document type	Related content	Document date	Expected action
General document / Other		2020-09-25	


WP1: Processes and methods to define metrics and targets of levels of service, risk and resilience
H2020-MG-7-1-2017: Resilience to extreme (natural and man-made events)

ISO/TC 59/SC 17/WG 5 Sustainability in civil engineering works

Prof. Dr. Bryan T. Adey, Leader Work Package 1, Leader Task 4.3

Deliverables

- D1.1 Guideline to measure levels of service provided by, and resilience of, transport infrastructure
- D1.2 Guideline to set the target levels of service provided by, and resilience of, transport infrastructure
- D1.3 Examples of using Levels of Service and resilience in governance



2

D1.1 Guideline to measure

1. Introduction (General, Service, Resilience, Conclusion)
2. The guideline (General, Definition of service, Definition of resilience, Measuring service, Measuring resilience)
3. Define transport system
4. Measure service (Define service, Determine how to measure service, Measure service)
5. Measure resilience (General, Identify resilience relevant parts of transport system, Determine how resilience is to be measured, Measure resilience directly using lost service and intervention costs, Measure resilience using indicators, Estimate percentage of fulfilment of resilience indicators)
6. Conclusion

3

Figure 8. Example of presentation made in CEN and ISO working groups

5. CWA 17819:2021

5.1.LAUNCH OF THE WORKSHOP


As indicated in clause 3, a CEN Workshop Agreement is usually considered the best track to introduce the results of research projects in the standardisation system. 3.4 explains the process to develop a CWA.

Thus, during 2020, FORESEE members prepared a proposal for a Workshop. The proposed title for the CWA was: *Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events*. The draft Business Plan and an assessment of the proposal were sent to CEN/CENELEC in October, proposing several dates for the kick-off meeting

A consultation within [CEN Members](#) and in their website (public) was launched in November, 2020. It included:

- Business plan (
- Draft agenda for the kick off meeting (January, 14th)





CEN Reference: BT N 12310
CENELEC Reference: BT167/DG11969/INF

Simultaneous circulation to CEN and CENELEC TECHNICAL BOARDS

BT by correspondence Agenda item: 5.1.7

For information

Issue date: 2020-11-25

SUBJECT

CEN-CLC/WS 018 'Steps to measure and set targets for the, the levels of service to be provided by, and the resilience of, transport infrastructure' - Announcement

BACKGROUND

In October 2020, UNE informed CCMC of its intention to submit a proposal for launching a new CEN-CENELEC Workshop.

The goal of this WS is to develop a CWA (CEN-CENELEC Workshop Agreement). This CWA will contain a methodology for infrastructure managers to properly measure the Level of Service (LoS) provided by, and the resilience of, their transport infrastructure to natural hazards. These steps will ensure that infrastructure managers can systematically identify appropriate resilience enhancing actions and ensure the effective allocation of limited resources.

This CEN-CENELEC Workshop was initiated through the FORESEE Project, short for "Future proofing strategies FOR RESilient transport networks against Extreme Events" which is an EU collaborative research project funded by Horizon 2020. The FORESEE project develops a toolkit to improve road and rail asset management schemes for authorities and infrastructure operators. The first draft of the CWA will be based on the reports produced by this project. For further details on FORESEE, see the website <https://foreseeproject.eu/>.

The Workshop's project plan and self-assessment form are attached (Annex I and II). From this self-assessment it follows that there is no need for BT approval to launch the Workshop.

The kick-off meeting will be held online on 14 January 2021. Information on how to register, as well as the agenda of the kick-off meeting, are provided on the CEN-CENELEC website: https://www.cenelec.eu/news/workshops/Pages/default.aspx?cti00_cti24_g_da994f3d_dca2_4702_97e1_67279f93f2d0_cti00filter=2020

A draft CWA will be available online and sent to registered participants by end December 2020.

Should you need any further information regarding this CEN-CENELEC Workshop and/or the kick-off meeting, do not hesitate to contact Samuel Gilet, CCMC Programme Manager (sgilet@cenelec.eu).

2020-11-23 – SG – TL

Figure 9. Document about FORESEE and the CWA sent to CEN members and Committees

The information above was circulated, in addition to CEN members, to several technical bodies. The example below is from CEN/TC 278, intelligent transport systems.

D8.7 Report on the contribution to Standardization




		DATE 2020-11-30	REFERENCE NUMBER CEN/TC 278/N 4345
		SUPERSEDES DOCUMENT N/A	
CEN/TC 278 Intelligent transport systems			
TITLE	Announcement: Kick-off meeting CEN/CLC Workshop on 'Steps to measure and set targets for the, the levels of service to be provided by, and the resilience of, transport infrastructure' on 14 January 2021		
SOURCE	Secretariat		
NOTE(S)	for information		
REQUESTED ACTION Circulated to Members, and to technical committees and organizations in liaison for			
<input checked="" type="checkbox"/> information <input type="checkbox"/> discussion <input type="checkbox"/> comments by <input type="checkbox"/> voting by (Only Members)			
(Members of the technical committee have an obligation to vote)			
www.ITSstandards.eu			
Secretariat: Netherlands Standardization-institute (NEN) Ms. Astrid de Haes T +31 15 269 04 66 Vinderweg 6 PO box 5059 2600 GB Delft The Netherlands E Astrid.deHaes@nen.nl			
		 	

Figure 10. Example of circulation of the kick-off meeting announcement in a CEN/TC

The Business Plan contained the main information about the proposal, including the scope, Chairman or timetable.



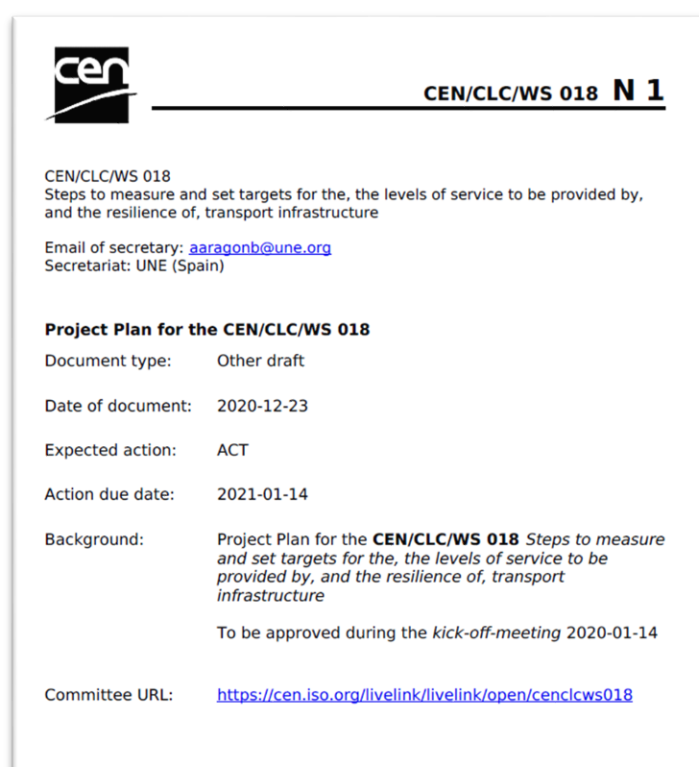


Figure 11. Main page of the Project plan of CEN/CLC/WS 018

The tentative timetable for the Workshop was:

Activities	Date
Official WS announcement and call for experts	November, 25 th , 2020
Circulation of the first draft to experts.	Before end of December, 2020
Kick-off meeting,	January, 14 th , 2021
Comments to the first draft, using CEN template	February, 15 th , 2021
Second meeting,	Before end of February, 2021
If needed, circulation of the new draft, for comments	Before end of March, 2021
If needed, third meeting for resolution of comments	April, 2021
Circulation of the final draft, based on the comments received and the feedback during the kick-off meetings, to be approved by correspondence (if possible)	Before end of June, 2021
Opening of public commenting phase	Before end of July, 2021

D8.7 Report on the contribution to Standardization

Activities	Date
Closing of public commenting phase	Before end of September, 2021
Comments analysis and implementation (by correspondence or in a meeting)	Before end of November, 2021
Delivery of CWAs to CCMC for publication	

The proposed Chairperson was: Dr. Bryan T. Adey, ETH Zürich (ETHZ). The proposed Secretariat was: Aitor Aragón, Spanish Association for Standardisation (UNE), CEN/CENELEC Member.

The proposed title was: "Levels of service and resilience of transport infrastructure — Guidelines for the assessment".

The proposed scope was:

These guidelines are to be used to determine 1) how to measure, the service provided by, and the resilience of, transport infrastructure, and 2) how to set service and resilience targets of transport infrastructure. It includes:

- *the concepts of how service and resilience can be measured,*
- *the concepts of how service and resilience targets can be set,*
- *the steps to determine how to measure service and resilience, and*
- *the steps to set service and resilience targets.*

The first draft for comments was developed by Dr. Bryan T. Adey and Dr. Claudio Martani, both members of FORESEE based on the deliverables:

- [D1.1 Guideline to **measure** Levels of Service and resilience in infrastructures](#)
- [D1.2 Guideline to set **target levels** of service and resilience for infrastructures](#)

The first draft (98 pages) was circulated to the experts registered in the Workshop. The figure below shows the first page of the document (document below).



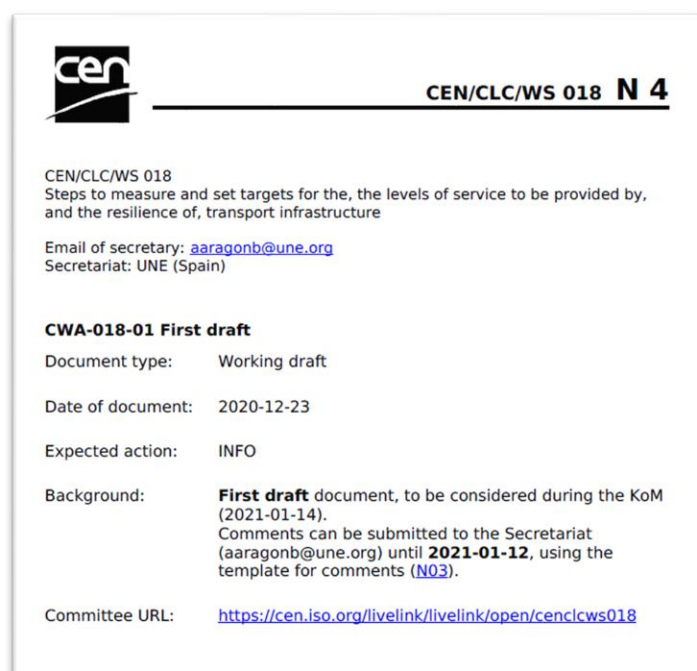


Figure 12. Main page of the first draft circulated to experts

A period for comments (to be discussed during the kick-off meeting) was established, until February, 12, with a template to organise them.

The Workshop code given by CCMC was "[CEN/CLC/WS 018](#)".

The main documents (agenda, first draft for comments, commenting template and the project plan) were circulated by the Secretariat, Aitor Aragón, to the registered experts on 2020-12-23.

D8.7 Report on the contribution to Standardization

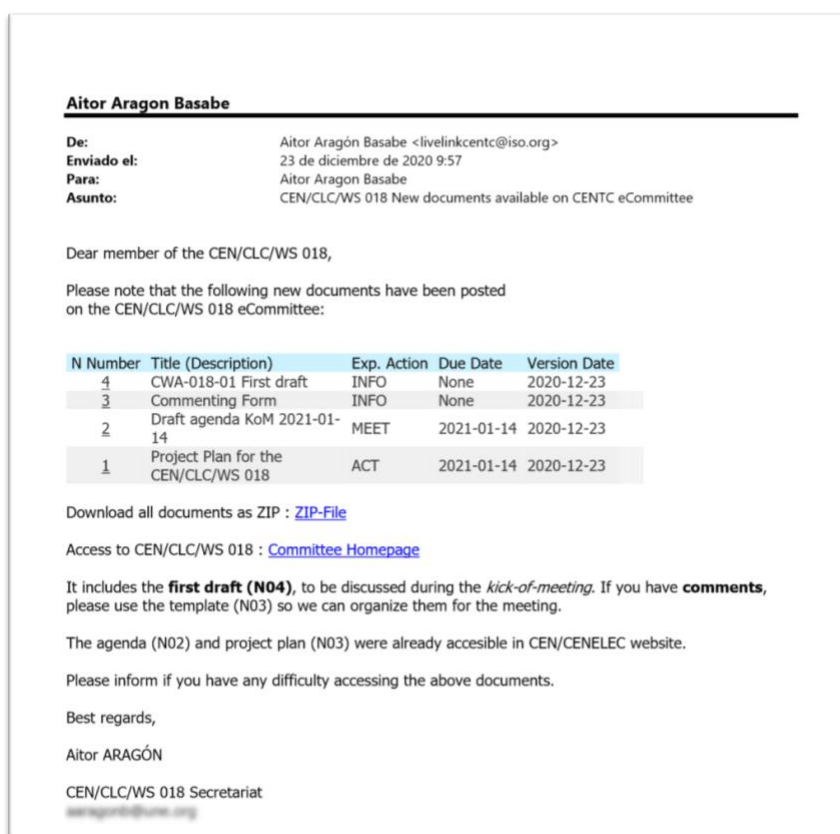


Figure 13. First email with information circulated to CEN/CLC/WS 018

This information about the kick-off meeting was also shared via social media, like Twitter or LinkedIn (see figure below).

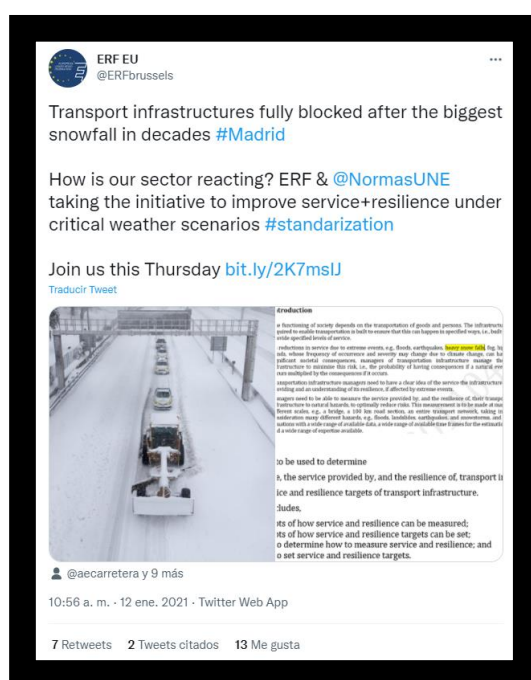


Figure 14. Example of information about the kick-off meeting in social media

5.2.MEETINGS

The kick-off meeting took place on January, 14th, 2021. The agenda, together with the report and main documents, were circulated to experts using *CEN Documents*. The image below shows the main items of the agenda.





 		CEN/CLC/WS 018
		Kick-off meeting - Draft Agenda 2020-11-23
CEN/CLC/WS 018: "STEPS TO MEASURE AND SET TARGETS FOR THE, THE LEVELS OF SERVICE TO BE PROVIDED BY, AND THE RESILIENCE OF, TRANSPORT INFRASTRUCTURE"		
Kick Off Meeting January 14th 2021 – 09:30 – 13:00 CET		
Venue : Zoom online meeting : https://cencenelec.zoom.us/j/91056341106?pwd=NWMxeEZ4YmFOWkZJa29XS0t2b0xiUT09;		
Draft agenda		
# Item	Topic	Speaker/Timing
1	Opening of the meeting	CCMC
2	Roll call of participants	CCMC
3	Adoption of the Agenda	CCMC
4	Presentation of Workshop concept	CCMC
5	General presentation of the Workshop a. Background of the proposal b. Draft of CWA presented c. Expression of needs	Dr. Bryan T. Adey, (WS Chairman) Mr. Aitor Aragón (WS Secretary)
6	Official establishment of the <i>INFRA-R</i> Workshop CEN/CLC/WS 018	
6a	Appointment of Workshop Chairman and Confirmation of the Secretariat	CCMC
	15' break	11:00 – 11:15
6b	Project plan: Discussion on title and scope	WS Chairman and Sec
6c	Project Plan a. Review of comments received b. Adoption of the WS CEN/CLC/WS 018 Project Plan	WS Chairman and Sec
6d	Organisation of the work	WS Chairman and Sec
6e	Any other business	
7	Next meeting, follow-up actions and their assignment	WS Chairman and Sec
8	Closure of the meeting	WS Chairman and Sec

Figure 15. Agenda of the kick-off meeting of CEN/CLC/WS 018

The presentations from the Chairman, the Secretariat and CEN/CENELEC Management Centre (CCMC) were circulated to experts after the meeting.

D8.7 Report on the contribution to Standardization

20 experts from different organizations participated in the kick-off meeting (the list is included in the minutes of the meeting). In addition to the Chairman (Bryan Adey) and the Secretariat (Aitor Aragón), the following organizations were represented in the kick-off meeting:

1. CEN/CENELEC Management Centre (CCMC)
2. Fraunhofer IAIS (FHG) - Germany
3. European Union Road Federation (ERF)
4. French Ministry for the Ecologic Transition (DIT/MARRN) – France
5. Deutsche Bahn AG (DB) – Germany
6. Gerthoffert, Jonathan (CEREMA) – France
7. CEMOSA – Spain
8. ETH Zürich (ETHZ) – Switzerland
9. Public centre for studies and testing of civil engineering works (CEDEX) – Spain
10. FORESEE project
11. German Center for Rail Transport Research (DZSF) – Germany
12. European Commission, as observer

Other organizations were registered and participated in other meetings, like RINA (Italy), Tecnalia (Spain) or Bast (Germany).

During the meeting, the business plan was approved by unanimity with the following modifications:

- **Title of the Workshop:** Assessment of the resilience of transport infrastructure to potentially disruptive events
- **Title of the draft:** Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events
- **Scope of the Workshop:**

These guidelines are to be used to determine:

How to measure the resilience of transport infrastructure to potentially disruptive events.

How to set targets for resilience of transport infrastructure to potentially disruptive events.

It includes:

- the concepts of how resilience can be measured;
- the concepts of how resilience targets can be set;
- the steps to determine how to measure resilience; and
- the steps to set resilience targets.

A **period for comments**, until February, 15th, was established. The collated comments were circulated to all experts.



D8.7 Report on the contribution to Standardization

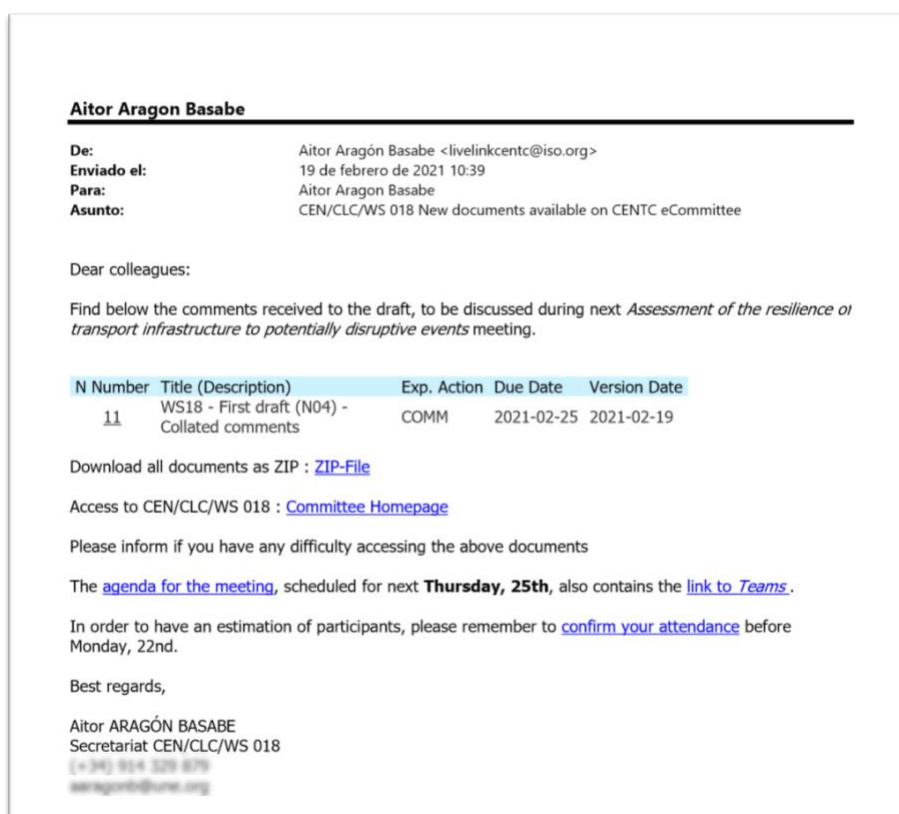


Figure 16. Circulation of the comments received to the first draft

The information about the meeting was also share in social media. An example, from the twitter account of UNE, is shown below.



D8.7 Report on the contribution to Standardization



Figure 17. Example of information about the kick-off meeting in social media

The **second meeting** took place the 25th of February. The agenda of the meeting, as circulated by email and uploaded in *CEN Documents*, is shown below.

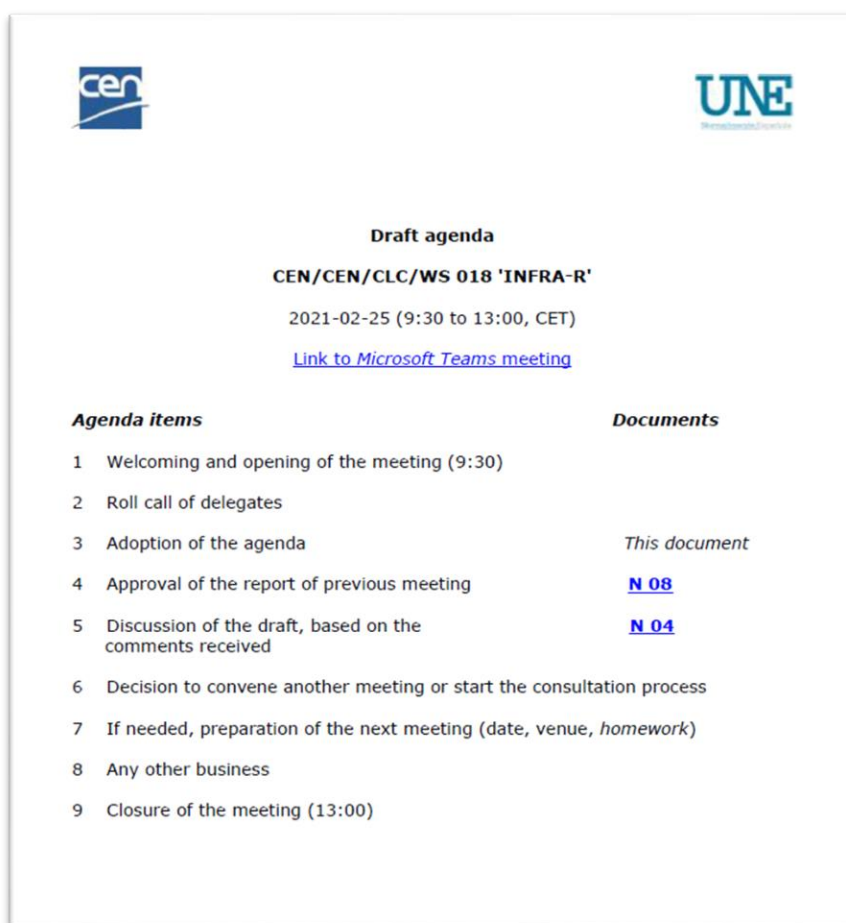


Figure 18. Agenda of the second meeting of CEN/CLC/WS 018

A new draft was discussed. The agenda and the minutes were circulated to experts, together with the result of the revision of the comments received.

D8.7 Report on the contribution to Standardization

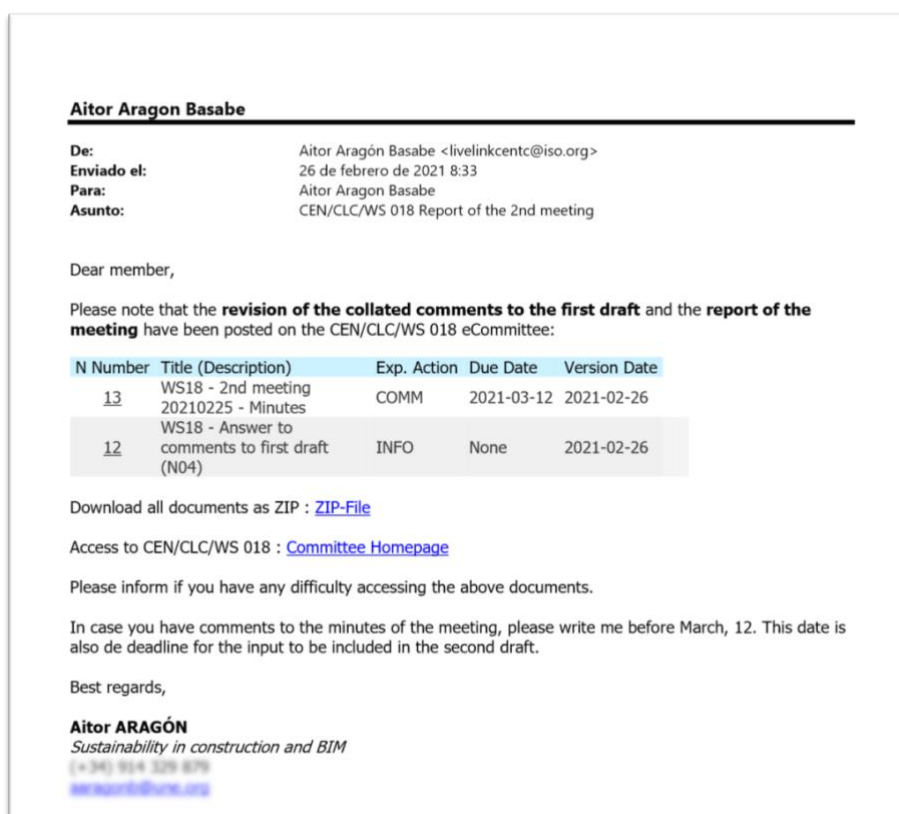


Figure 19. Circulation of the minutes of the second meeting of CEN/CLC/WS 018 and the comments solved by experts

A new call for comments based on an updated draft was sent, to deal with them in the third meeting. The drafts circulated to experts had two documents, one with tracked changed and other document "clear".

The **third meeting** took place the 3rd of June, with a new draft based on the result of the previous meetings.



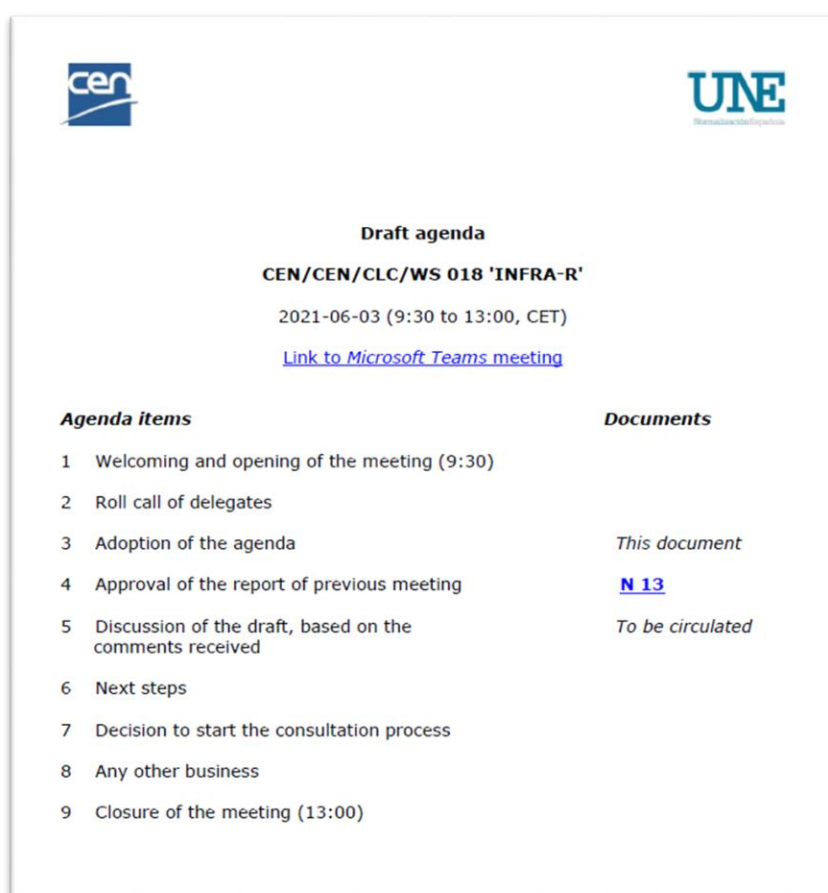


Figure 20. Agenda of the third meeting of CEN/CLC/WS 018

In this meeting, the document was reviewed again. This revision included the scope of the document, as the main discussion was about the approach for the extreme events: it was agreed to include not to restrict the scope to climate or natural hazards, but include also man-made events, like accidents or attacks.

The public consultation was approved, but before the draft was accepted by correspondence, to ensure all changes made during the meeting were included in the draft.

5.3.PUBLIC CONSULTATION

The layout of the draft was created by the editorial support team of UNE, based on the draft approved in the Workshop. This draft had 90 pages.

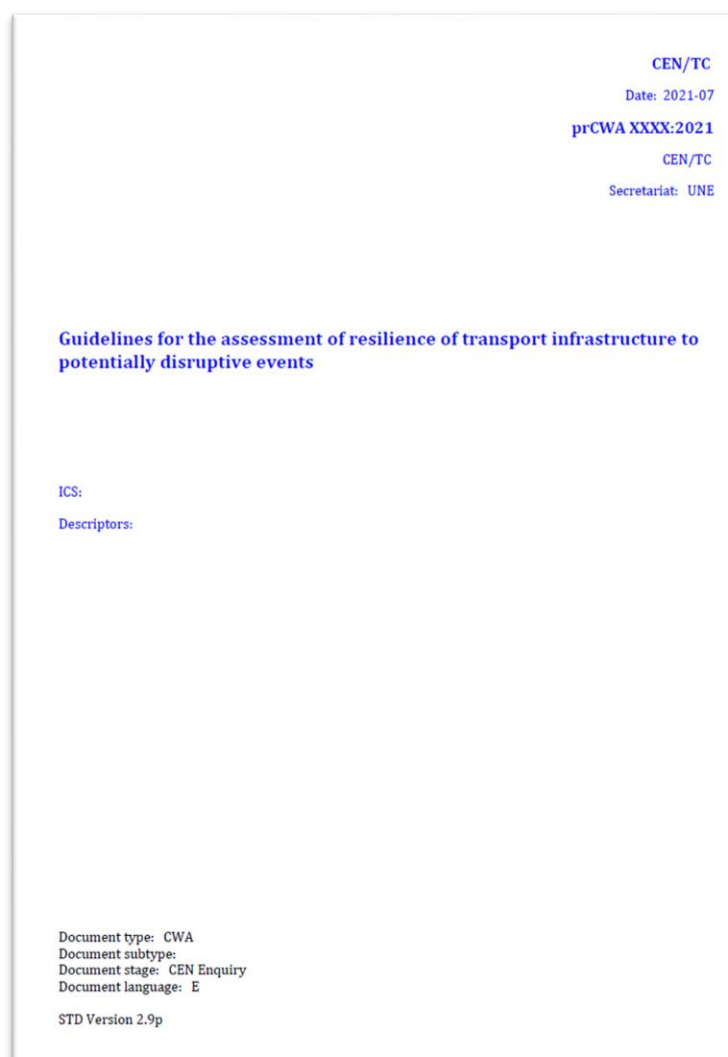


Figure 21. Main page of the draft for public consultation

During the public consultation period, the approved draft is distributed to CEN/CENELEC Members, relevant Technical Committees and made available to the public in [CEN/CENELEC website](#).



Figure 22. Public consultation of the draft in CEN/CENELEC website

D8.7 Report on the contribution to Standardization

The following email was sent to the Workshop members.

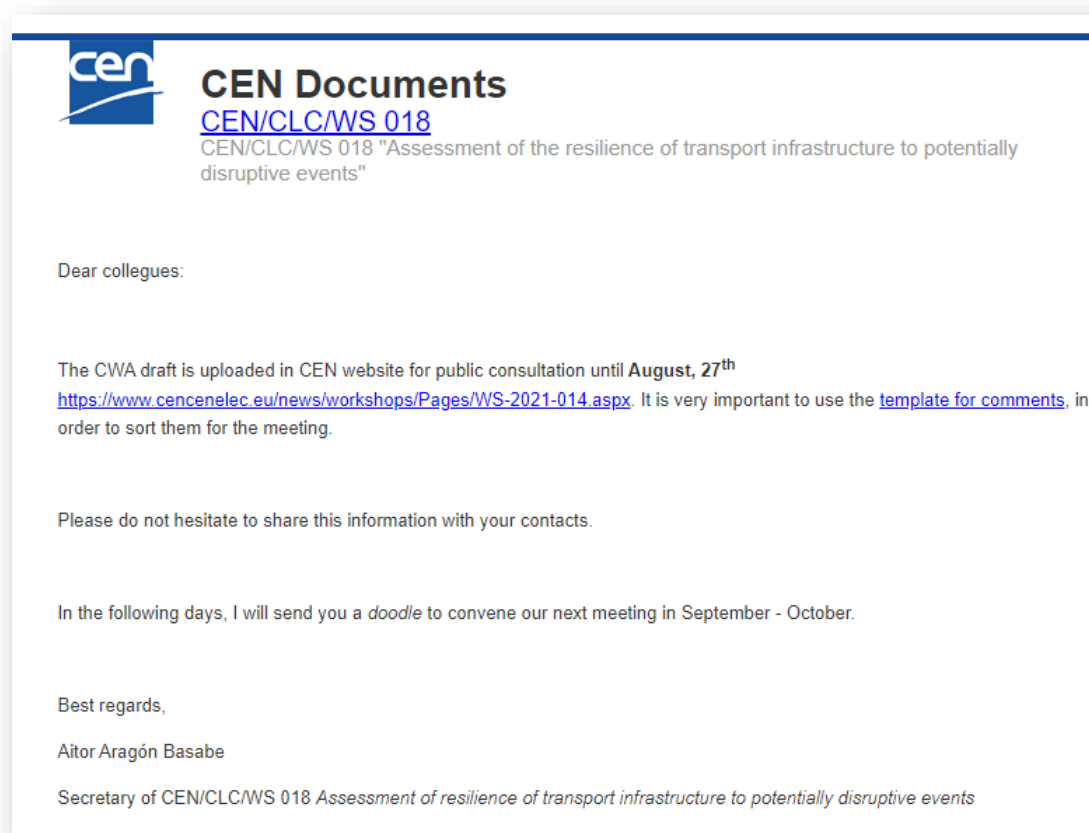


Figure 23. Information sent to CEN/CLC/WS 018 about the public consultation of the draft

For the public consultation period, to enhance participation and the dissemination of the results of FORESEE, dedicated emails were sent to some relevant TCs:

- ISO/TC 59 *Buildings and civil engineering works* and its WG 4 for *Resilience*
- ISO/TC 59/SC 17 *Sustainability in buildings and civil engineering works* and its WG 5 for *Civil Engineering works*
- ISO/TC 207 *Environmental management*
- ISO/TC 262 *Risk management*
- CEN/TC 350 *Sustainability of construction works*, and its WG 6 for *Civil Engineering works*

The following email was sent (example for ISO/TC 59 and its WG 4).

D8.7 Report on the contribution to Standardization

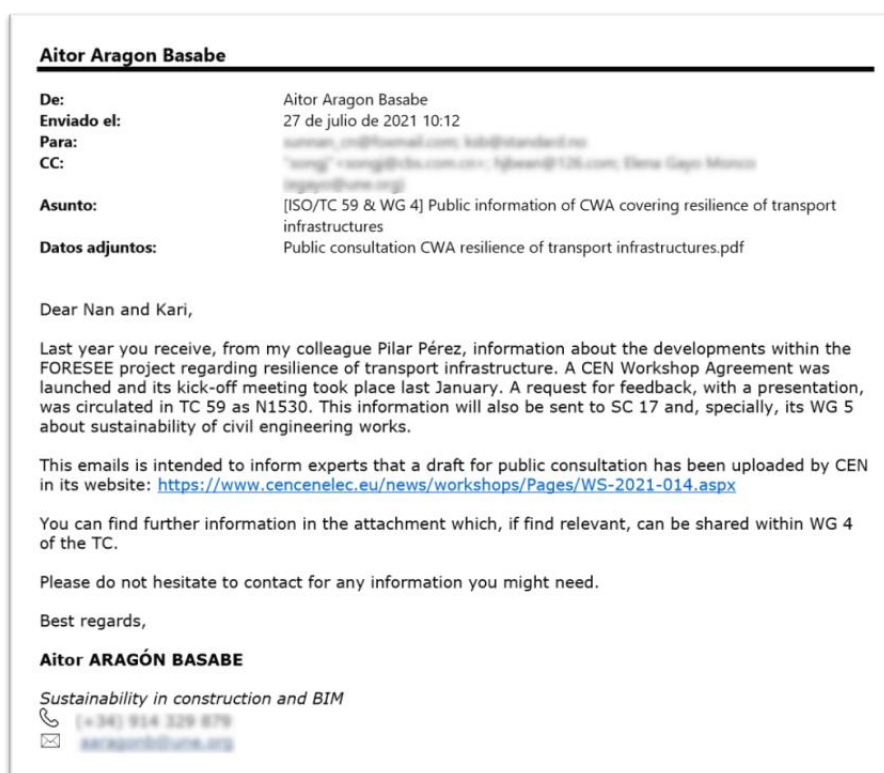


Figure 24. Example of email sent to CEN and ISO Technical Committees about the public consultation of the draft

Some technical bodies circulated it to all members, uploading it in CEN server, or sending an email to their members. The example below is from CEN/TC 350:



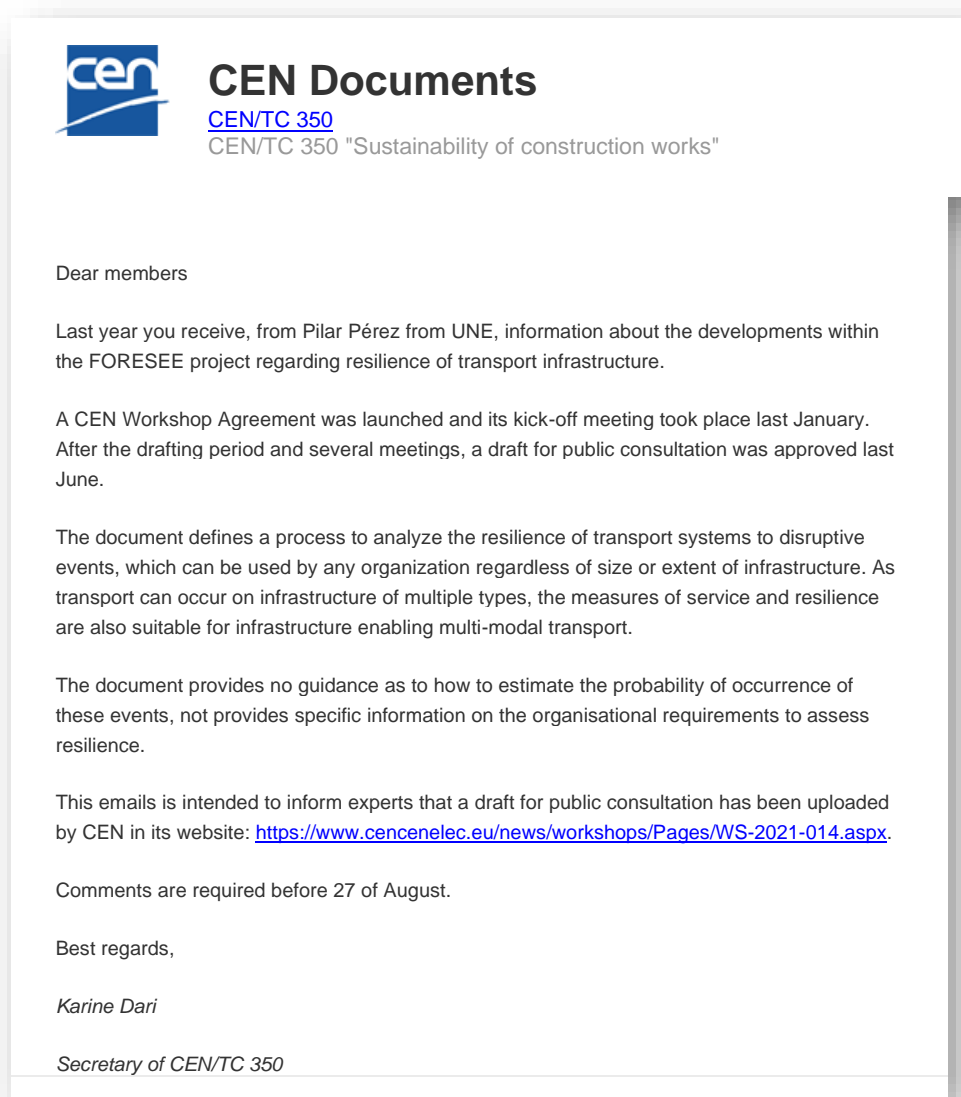


Figure 25. Example of email sent by a CEN Technical Committee to their members about the public consultation of the draft

The figures below show the document sent by UNE with a summary covering the public consultation of the CWA.



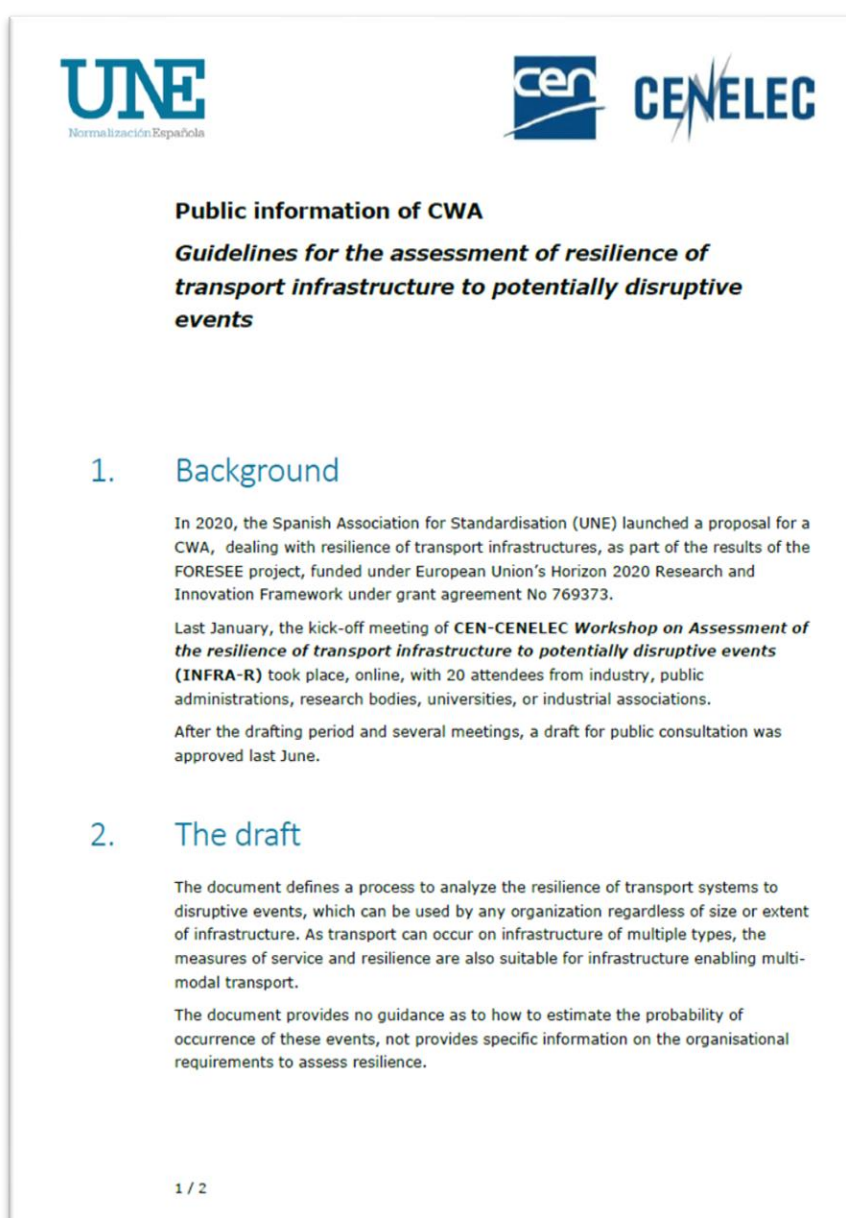


Figure 26. Document circulated to ISO and CEN Committees – first page

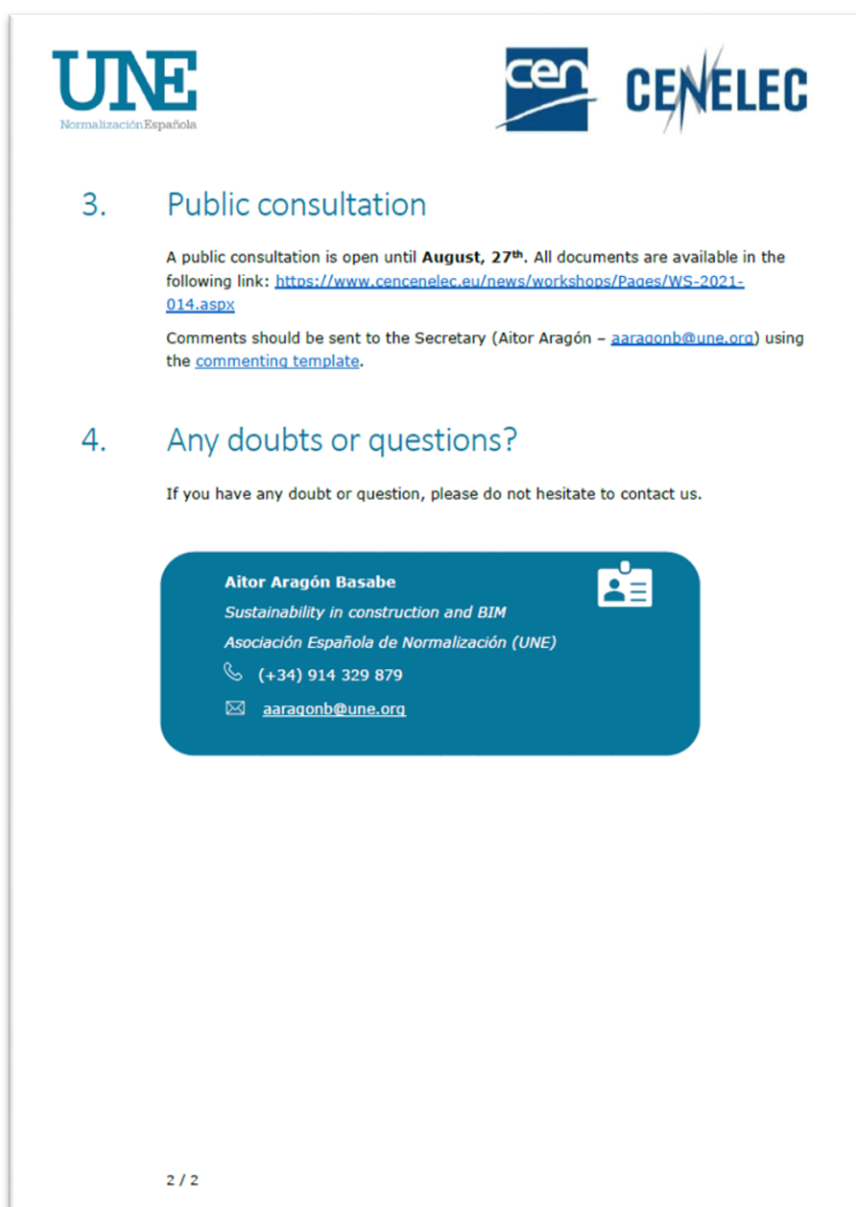


Figure 27. Document circulated to ISO and CEN Committees – second page

During the public consultation period, comments were received from organizations which were not members of the Workshop. The figure below shows the comments in the template.

D8.7 Report on the contribution to Standardization

Template for comments and secretariat observations					Date:	Document:	Project:
MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.2, 2.5		Ge	The term of 'resilience' is simplified due to measure the ability to continue to provide service of infrastructure. In reason of this simplification aspects are neglected. In the frame of a general resilience management concept the aspects of preparation, prevention, protection during disruptive events, respond and recover are received attention.	Add to the consideration of resilience more aspects beside constructive and intervention aspects.	
		3.2	Figure 1	ge	The graph is not easily understood. In the vertical axis, the maximum points downwards, when usually it points upwards.	Change the vertical axis so that maximum is upwards.	
		3.2	Figure 2	ge	The graph is not easily understood. In the vertical axis, the maximum points downwards, when usually it points upwards.	Change the vertical axis so that maximum is upwards.	
		3.2	Figure 3	ge	The graph is not easily understood. In the vertical axis, the maximum points downwards, when usually it points upwards.	Change the vertical axis so that maximum is upwards.	
		3.2	Figure 4	ge	The graph is not easily understood. In the vertical axis, the maximum points downwards, when usually it points upwards.	Change the vertical axis so that maximum is upwards.	
		3.2	Figure 4	te	The gray point 'Beginning of the disruptive event' does not match the beginning of restoration time.	Move the gray point to match the start of restoration time.	
	Page 9	3.2	Towards end of page 9	ge	Resilience is not very clear on how it is measured. At the same time, in Figures 1, 2, 3 and 4 is inferred that resilience is the area coloured in red and blue. Larger blue and green areas mean less resilient while smaller mean more resilient. If the graphs were pointing upwards it could be easier. Service time and costs are both necessary for resilience or one of them can cover the term resilience?	Make simpler the definition. It could be used something such as the "Area under curve". Make more clear if both service time and cost are necessary to characterize resilience. It is logic to need both but somehow it is not that clear when reading the document.	
		6.5.2	Table 3		The different scaling of the indicators is not that good option. One indicator is presented with a 5 point scale, the other is presented with 3 point	Since Table 3 is an example, maybe use a 5 - point scale to all indicators. Also, according to the guidelines of EU for risk assessment, the 5-point	

1 MB = Member body / NC = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China, comments from the ISO/ICS editing unit are identified by **)

2 Type of comment: ge = general te = technical ed = editorial

ISO/IEC/JTC1/SC41/EWG/1 electronic balloting commenting template version 2012-03

page 1 of 2

Figure 28. First page of the template with the comments received

This document was sent to the experts registered in the Workshop, to be considered in the next meeting.

5.4.LAST MEETING AND PUBLICATION

In the meeting convened September, 14th, 2021, the comments received were assessed and, some of them, incorporated in the draft.



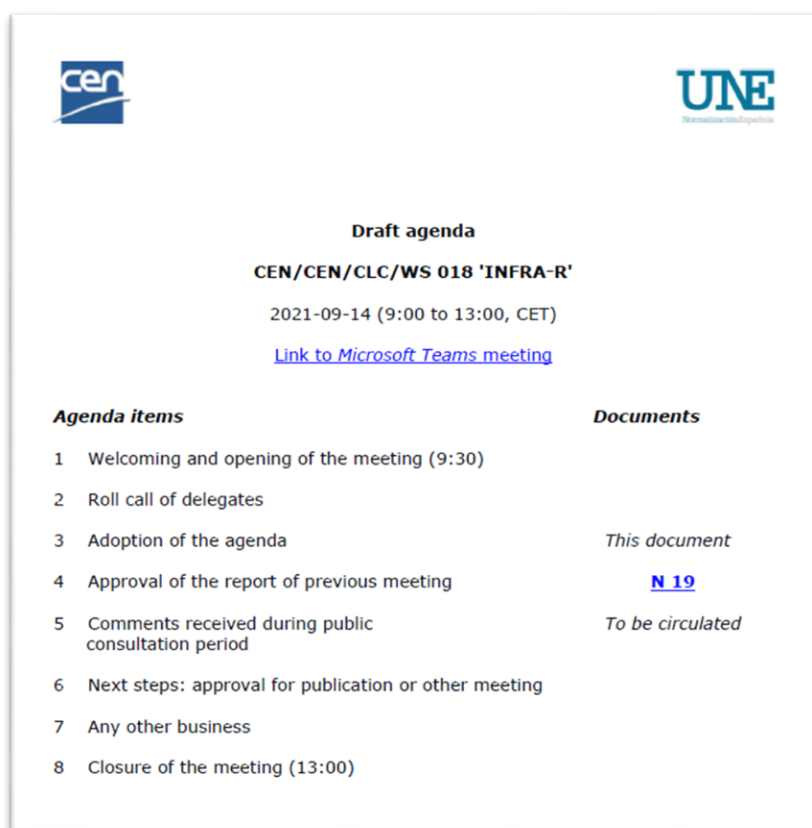


Figure 29. Agenda of the last meeting

The publication of the CWA was approved, once some editorial topics (for example, with the figures) were solved. A period to check the final draft for editorial issues were also given.

It was agreed to ask experts to explicitly confirm if they want to be listed, as organizations, in the Foreword of the document. The final list is included in the published CWA.

The CWA was published in November, 10th, 2021.

The CWA has a validity of 3 years. After this period, CEN/CENELEC will launch a consultation, in which the CWA can be:

- Confirmed for another 3 years period.
- Used as basis for a different document (EN, TR or TS).
- Superseded.

5.5.PUBLICATION AND DISSEMINATION



Figure 30. Main page of the CWA 17819:2021

The publication of the CWA was disseminated by FORESEE members and also by other organizations, like CEN, which published their news site: [A new Workshop Agreement contributes to enhancing the resilience of transport infrastructure.](#)

In addition, it was shared via social media. Some examples below.

D8.7 Report on the contribution to Standardization

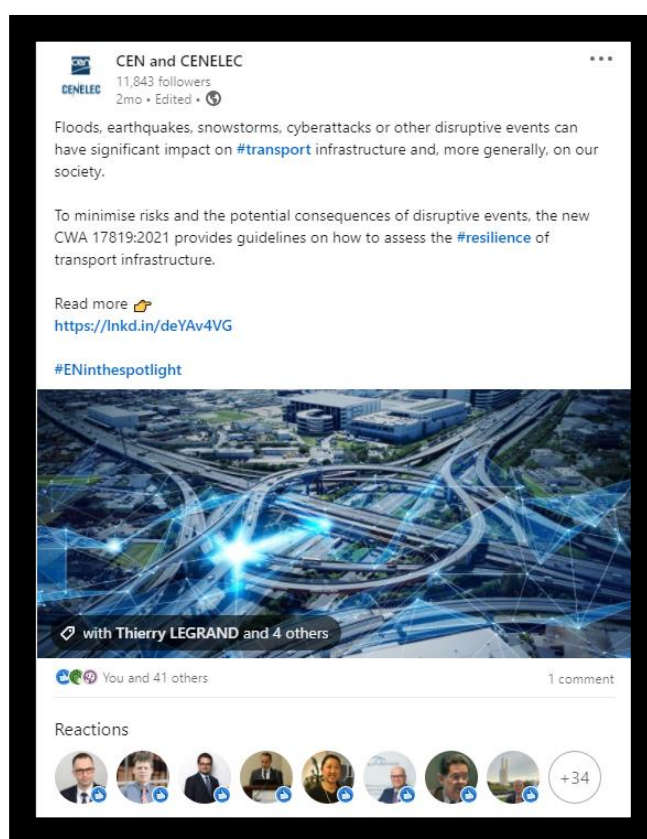


Figure 31. CEN information in Twitter about the publication of CWA 17819:2021

D8.7 Report on the contribution to Standardization

The article published in CEN website is shown in the figure below.



The screenshot shows the CEN News website. At the top, there is a navigation bar with the CEN logo and the text "CENELEC". To the right of the logo, there are links: "EUROPEAN STANDARDIZATION", "GET INVOLVED", "AREAS OF WORK", and "NEWS AND EVENTS". Below the navigation bar, there is a section for "ALL NEWS" and a "SHARE" button. The main content area features a post titled "A new Workshop Agreement contributes to enhancing the resilience of transport infrastructure". The post is dated "POSTED: 2021-11-22". Below the title, there are three tags: "Transport and Packaging", "EN in the spotlight", and "CEN". The post text discusses the importance of transport infrastructure resilience and mentions the publication of CWA 17819:2021. A contact box on the right side of the post lists "Contact: Thierry LEGRAND" with the email "tlegrand@cencenelec.eu". At the bottom of the post, there are tags: "TAGS: Transport | CWA | Transport infrastructure".

cen CENELEC

EUROPEAN STANDARDIZATION GET INVOLVED AREAS OF WORK NEWS AND EVENTS

← ALL NEWS SHARE

POSTED: 2021-11-22

A new Workshop Agreement contributes to enhancing the resilience of transport infrastructure

Transport and Packaging EN in the spotlight CEN

The functioning of society depends on the transportation of goods and persons. The infrastructure required to enable transportation is built to ensure that this can happen safely and smoothly, providing specified high levels of service.

As Europe has already experienced on many occasions, reductions in service due to potentially disruptive events, such as floods, earthquakes, heavy snow falls, fog, high winds, or cyberattacks can have significant societal consequences.

In this context, transport infrastructure managers must minimise the impact and potential consequences of these disruptive events. To do so, objective information on the service provided by their transport infrastructure and its resilience to external adverse events is necessary.

In order to help them acquire this information, in November CEN and CENELEC published new **CWA 17819:2021 'Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events'**. This document provides managers with guidance to proceed a complete and systematic definition of service and measure resilience, in all situations with which the manager is confronted, and to help identify the suitable interventions to enhance such resilience.

This work was initiated through the FORESEE Project, 'Future proofing strategies FOR RESilient transport networks against Extreme Events', which is an EU collaborative research project funded by Horizon 2020. For further details on FORESEE, please visit the website <https://foreseeproject.eu/>.

CWA 17819:2021 is freely available for download [here](#). It was developed by **CEN/CLC/WS 018 'Assessment of the resilience of transport infrastructure to potentially disruptive events'**, whose Secretariat is held by UNE, Spain's National Standardization Institute.

Contact:

Thierry LEGRAND
tlegrand@cencenelec.eu

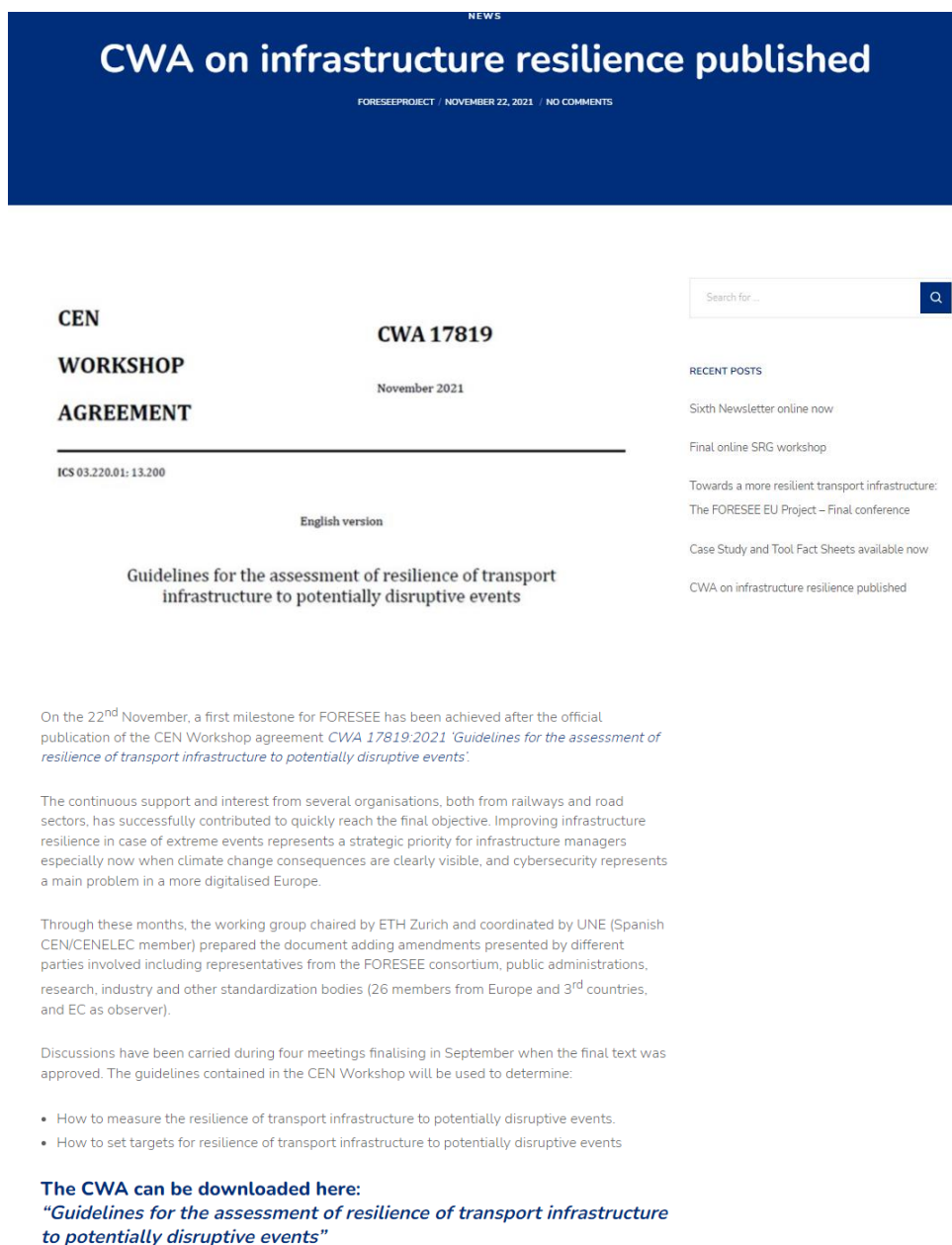
TAGS: Transport | CWA | Transport infrastructure

Figure 32. CEN News website, with a post about the publication of CWA 17819:2021



D8.7 Report on the contribution to Standardization

FORESEE also published information in social media, in [FORESEE website](#) and by partners.



NEWS

CWA on infrastructure resilience published

FORESEEPROJECT / NOVEMBER 22, 2021 / NO COMMENTS

CEN

WORKSHOP

AGREEMENT

ICS 03.220.01: 13.200

CWA 17819

November 2021

English version

Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events

On the 22nd November, a first milestone for FORESEE has been achieved after the official publication of the CEN Workshop agreement *CWA 17819:2021 'Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events'*.

The continuous support and interest from several organisations, both from railways and road sectors, has successfully contributed to quickly reach the final objective. Improving infrastructure resilience in case of extreme events represents a strategic priority for infrastructure managers especially now when climate change consequences are clearly visible, and cybersecurity represents a main problem in a more digitalised Europe.

Through these months, the working group chaired by ETH Zurich and coordinated by UNE (Spanish CEN/CENELEC member) prepared the document adding amendments presented by different parties involved including representatives from the FORESEE consortium, public administrations, research, industry and other standardization bodies (26 members from Europe and 3rd countries, and EC as observer).

Discussions have been carried during four meetings finalising in September when the final text was approved. The guidelines contained in the CEN Workshop will be used to determine:

- How to measure the resilience of transport infrastructure to potentially disruptive events.
- How to set targets for resilience of transport infrastructure to potentially disruptive events

The CWA can be downloaded here:
"Guidelines for the assessment of resilience of transport infrastructure to potentially disruptive events"

Figure 33. FORESEE website, with a post about the publication of CWA 17819:2021

D8.7 Report on the contribution to Standardization

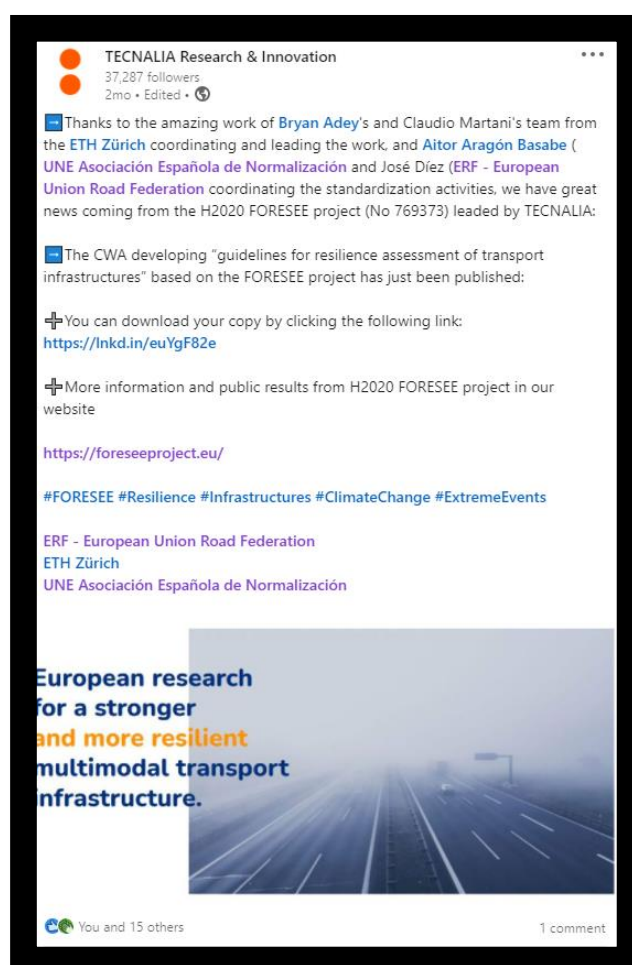


Figure 34. Example of dissemination of the publication of CWA 17819 in LinkedIn

D8.7 Report on the contribution to Standardization

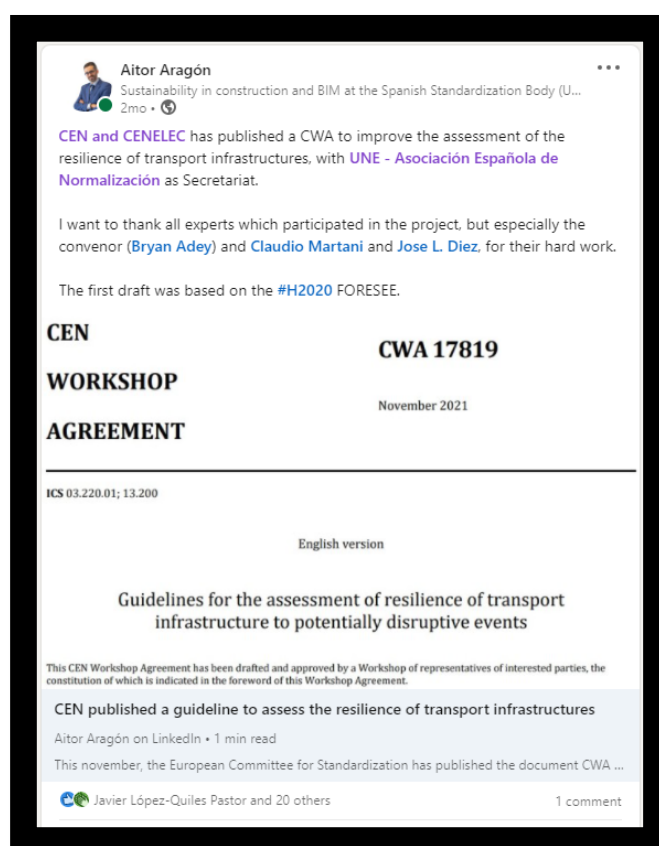


Figure 35. Example of dissemination of the publication of CWA 17819 in LinkedIn

6. OTHER DISSEMINATION ACTIVITIES

The CWA was presented also in organizations external to CEN/CENELEC or ISO. For example, a presentation was made by the Convener, Dr. Bryan Adey, in **UNECE**. The examples below show the dissemination in social media.

More information is available in [this link](#).

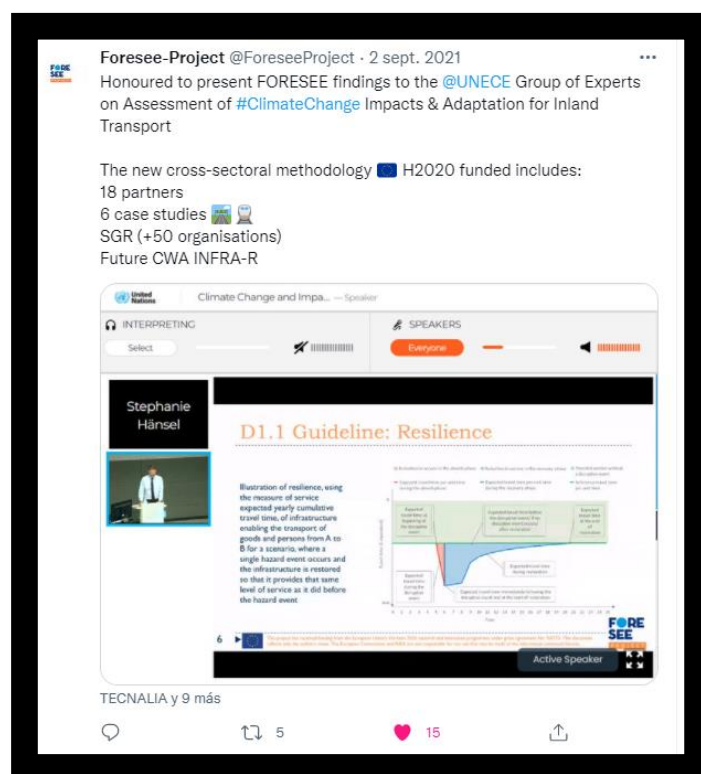


Figure 36. Example of dissemination of the participation in the UNECE meeting

D8.7 Report on the contribution to Standardization

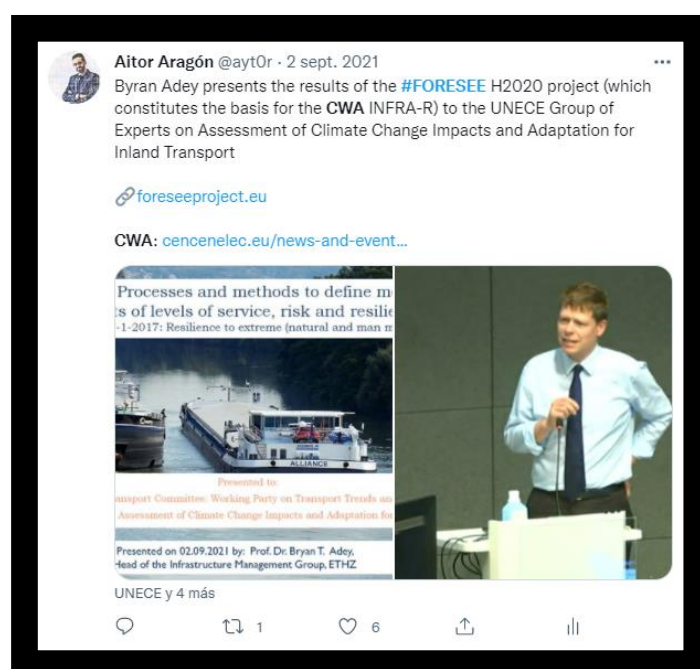


Figure 37. Example of dissemination of the participation in the UNECE meeting

In addition, it was also presented in the WG “climate change in road infrastructures” of ATC (Spanish Road Technical Association), during a meeting convened the 26 of May, 2021.

The public consultation period (see 5.3) was also sent to this group, inviting them to participate in the consultation period and, if relevant, in the Workshop process.

7. CONCLUSIONS AND FURTHER STEPS

FORESEE has successfully used the European and International standardisation system to:

- **Gather information** about the *state of the art* of the resilience assessment for transport infrastructures. This task was made by monitoring the documents issued by relevant technical bodies, participating in their meetings and sending requests for feedback (see 0).
- **Disseminate the results** of FORESEE to the standardisation community, which includes industry, public administrations and research bodies. This task has been made via presentations in standardisation bodies, distribution of documentation and the publication of a CEN Workshop Agreement (CWA) (see 0), and was based on the assessment of the information gathered before. This dissemination should facilitate the acceptance and utilisation by the market of the solutions developed by FORESEE.

The availability of a European standardisation document, such as the **CWA 17819:2021**, is a success of the FORESEE providing the roadmap for future harmonization in the field of resilience of transport infrastructure towards extreme manmade and nature events. It makes publicly available part of the results of the project and can be used in by private and public organizations.

A CEN/CENELEC reference ensures trust by the market and dissemination via its 34 National Members (see the list in 3.1) and facilitates the citation in private or public procurement in line with the current regulatory framework and its future revision (TEN-T Regulation and Public Procurement Directive).

A common methodology to assess resilience in Europe will provide several advantages, including the comparability and the cost reduction of the assessment. To achieve this goal, the next step is the actual use of the methodology gathered in CWA 17819 by industry and transport infrastructure owners. Based on that experience, a different type of standardisation document can be made. As first step, a Technical Specification can be considered or, if the use of the methodology covers enough countries and is considered "the standard process", a EN standard can be developed.

The broad approach of the FORESEE EU Project and its Stakeholders Reference Group gathering relevant organisations from private sector and public transport authorities representing both roads and railways will facilitate a further promotion of the new CWA 17819:2021 in terms of dissemination and future market deployment in actual transport infrastructures.

To conclude, the new CWA 17819:2021 has proven to be a successful story stressing the importance of R&I funding programmes at EU level to overcome current challenges in a critical sector (i.e. transport infrastructure) that will be key for the economic recovery and social cohesion while promoting competitiveness of industrial solutions made in Europe in the world.

