


APPENDIX


Fourth Progress Report



December 2013

APPENDIX WORK PACKAGE 1

IDENTIFICATION OF THE QUALITY SIGN			
Name	ETICS installers		
Subject	Competence		
Country	Czech Republic		
Scheme Owner	TZUS www.tzus.cz		
Scheme operator(s)	- TZUS www.tzus.cz		
SCOPE OF THE QUALITY SIGN			
Concerned activity		Concerned Competence(s):	
External Thermal Insulation Composite Systems (ETICS).		Certification is designed to be guaranteed that certificate holders will carry out work impartially during the whole performance process.	
ORGANISATION OF THE CERTIFICATION SCHEME			
Specifications for Certification Scheme		- According to existing standards - Defined by a certification body	
Type of evaluation	Third Party	Validity Period	1
Initial type examination performed by		An independent examination/certification body	
Surveillance type examination			
Is there a surveillance type examination	No	Frequency	-
Surveillance type examination performed by			
Accreditation			
Links with associated certifications			
OTHER KEY INFORMATION			
Scheme requirements availability		On request	
Availability of certificates		On request	
Use of Quality Signs by Insurers		No	-
Other Uses		No	-
Number of valid quality signs to date 2013		-	
Number of quality signs registered in 2012		30	Number of quality signs withdrawn in 2012 10
Number of quality signs registered in 2011		-	Number of quality signs withdrawn in 2011 -

IDENTIFICATION OF THE QUALITY SIGN			
Name	certification NF HQE™ Bâtiments tertiaires neufs ou rénovation		 
Subject	Work		
Country	France		
Scheme Owner	- CERTIVEA www.certivea.fr		
Scheme operator(s)	- CERTIVEA www.certivea.fr		-
SCOPE OF THE QUALITY SIGN			
Use:	Concerned Characteristics:		
Non-Residential	14 environmental targets http://www.certivea.com/assets/download/certification_HQE/en/9da1a-PEB_INTERNATIONAL_V1-EN-finalisee2.pdf		
Type Of Works:			
New, Existing			
ORGANISATION OF THE CERTIFICATION SCHEME			
Specifications for Certification Scheme	- Defined by a college involving independent experts representing the concerned parties/stakeholders		
Type of evaluation	Third Party	Validity Period	3
Initial performance assessment performed	The certification body or a duly mandated body		
Initial audit of or control on, performed by an independent body under certification body responsibility			
The running process	Yes	The implemented quality system	Yes
Surveillance audit of or control on, performed by an independent body under certification body responsibility			
Is there an audit or control	No	Frequency	-
The running process	-	The implemented quality system	-
Accreditation	COFRAC EN 45012		
Links with associated certifications			
OTHER KEY INFORMATION			
Scheme requirements availability	Publicly available (Internet)		
Availability of certificates	Publicly available (Internet)		
Use of Quality Signs by insurers	Yes	see "Offres partenaires" on www.certivea.fr	
Other Uses	No	-	
Number of valid quality signs to date 2013	-		
Number of quality signs registered in 2012	-	Number of quality signs withdrawn in 2012	-
Number of quality signs registered in 2011	-	Number of quality signs withdrawn in 2011	-

IDENTIFICATION OF THE QUALITY SIGN		
Name	Appréciation Technique d'Expérimentation (ATEX)	
Subject	System	
Country	France	
Scheme Owner	CSTB (CHAMPS) www.cstb.fr	
Scheme operator(s)	- CSTB with concerned technical control company -	
		
SCOPE OF THE QUALITY SIGN		
Concerned System(s):	Concerned Characteristics:	
implemented innovative construction systems	safety feasibility probable operation of the innovation in service probability and severity of any foreseeable disorders the possibility of making repairs if necessary	
ORGANISATION OF THE CERTIFICATION SCHEME		
Technical assessment performed by	A college of independent experts representing the stakeholders interests	
Type of evaluation	Third Party	
Period of validity (in years)	1	
Accreditation		
Links with associated certifications		
OTHER KEY INFORMATION		
Scheme requirements availability	Publicly available (Internet)	
Availability of certificates	Private (to applicant only)	
Use of Quality Signs by Insurers	Yes	risk assessment
Other Uses	No	-
Number of valid quality signs to date 2013	-	
Number of quality signs registered in 2012	81	Number of quality signs withdrawn in 2012 -
Number of quality signs registered in 2011	81	Number of quality signs withdrawn in 2011 -

IDENTIFICATION OF THE QUALITY SIGN			
Name	Certification ACERMI		
Subject	Product		
Country	France		
Scheme Owner	Association ACERMI www.acermi.fr		
Scheme operator(s)	- CSTB www.cstb.fr	- LNE www.lne.fr	
SCOPE OF THE QUALITY SIGN			
Concerned Product(s): Thermal insulation products for building and industry		Concerned Characteristics: Thermal resistance Thermal conductivity Emissivity Reaction to fire Dimensional characteristics (depending on the standard) Settlement (when applicable) Mechanical characteristic (depending on the standard) Hygroscopic characteristics (depending on the standard) Acoustic characteristic (depending on the standard)	
ORGANISATION OF THE CERTIFICATION SCHEME			
Specifications for Certification Scheme	- According to existing standards		
Type of evaluation	Third Party	Validity Period	2
Initial type testing			
Performed by:	Samples selected by:		Sample selected from:
The applicant under the responsibility of the certification organism	The applicant		The supplier's stock
Surveillance type testing			
Is there a surveillance	Yes	Frequency	once a month
Performed by:	Samples selected by:		Sample selected from:
The applicant under the responsibility of the certification organism	The applicant under the responsibility of the certification organism		The supplier's stock
Initial audit of or control on, performed by an independent body under certification body responsibility			
The running process	Yes	The implemented quality system	Yes
Surveillance audit of or control on, performed by an independent body under certification body responsibility			
Is there an audit or control	Yes	Frequency	once a month
The running process	Yes	The implemented quality system	Yes
Accreditation	COFRAC		
Links with associated certifications			
OTHER KEY INFORMATION			
Scheme requirements availability	Publicly available (Internet)		
Availability of certificates	Publicly available (Internet)		
Use of Quality Signs by Insurers	No		
Other Uses	Yes	Technical designers use this information.	

Number of valid quality signs to date 2013	650		
Number of quality signs registered in 2012	40	Number of quality signs withdrawn in 2012	-
Number of quality signs registered in 2011	40	Number of quality signs withdrawn in 2011	-

DRAFT DOCUMENT

APPENDIX WORK PACKAGE 2

Appendix 2.1 : Specifications for the pathology database and EQEO Technical and Functional analysis

1. Introduction

This document provides the technical and functional analysis for the design of the platform of the website for the EQEO and in particular the building pathology database.

2. Functionalities of the pathology tool to be developed

2.1 Functionalities of the EQEO

The required functionalities of the tool to be developed, from the viewpoint of insurers, have been outlined already in the 2nd Progress Report, and can be summarized as follows:

- For innovative construction products, like eco-technologies, there is a lack of statistical data and claim history available. A quantitative risk assessment is thereby difficult for these technologies. Since there is not enough pathology feedback to be able to extract a statistical law regarding its failure, risk evaluation of innovation has to be made upon specific technical inherent risk assessment. The analyst will have to focus on a predictive failure analysis based on his knowledge of the technology, through a qualitative approach.

But also for those products/technologies where an extensive claim history exists, insurers are not interested in contributing to a pure statistical database, reporting numbers of claims, since it touches their confidential internal pricing.

- Besides, the technical classification of claims for eco-technologies (or for other innovative products or technologies) by the insurer is a problem: it has to be done by experienced staff that can classify the claims, but it is unlikely that most insurers have this expertise or the computational systems to differentiate 'eco-technological' claims from other claims.
- If insurers are not willing or able to provide statistical information on claims, who else can provide it? There are only a few public organisations who collect pathology information in a systematic way, like AQC (France) and the Danish Building Defects Fund (Denmark). But the number of pathology cases for innovative products like eco-technologies collected by these organisations has been very limited up till now.
- Reviewing these problems with the delivery and collection of quantitative pathology data for eco-technologies, preliminary discussions with insurers indicate that they seem to be content with a database that provides pure qualitative technical information on failures/defects of eco-technologies. They can use this information for improving their internal technical knowledge on particular products/technologies, and for formulating strategies for conditions for the acceptance of these products/technologies for insurance coverage.

That means: a database with only qualitative technical data, and no information on the number of contracts underwritten, and no statistical data disclosure.

- Such a 'qualitative' database could be filled with pathology information from various sources: not only individual pathology cases collected by (semi-) public organisations like AQC or Danish Building Defects Fund, but also information at an aggregated level in the form of Defect Information Sheets, Prevention brochures, papers etc., provided by numerous organisations. Such data, as well as the information from the 10 case studies could be used for the pilot database, to be developed within Elios 2.
- Furthermore, the discussions with insurers also indicate that they would be interested in another form of exchange of information, namely the creation of an 'eco-technologies Warning procedure' (Procedure d'alerte) for some specific eco-technologies. The idea is to be able to gather and communicate the existing information 'rapidly', for a short list of eco-technologies that are commonly used and that have shown some issues during their life-cycle, according to the literature review or to what is known from the building practice. The description of a defect or failure can be very simple.
- Finally, insurers would be interested in a simple directory of quality signs for eco-technologies.

Thus, it becomes clear that the insurance industry would be interested to have a tool with the following functionalities:

1. A database with pathology records, that provides qualitative technical information on the pathology of eco-technologies (without any statistical data disclosure of claims).
2. A 'Warning procedure' (or hazard notification procedure), where interlocutors in each country can report issues/defects.
3. An overview of quality signs for eco-technologies (as an extract from the quality signs directory to be developed within WP1).

The tool to be developed should at least have these three functionalities. We will call this tool: Eco-technologies Quality European Observatory (EQEO).

2.2 Organisation of the pilot EQEO during Elios 2

The set-up and organisation of a possible future EQEO of course very much depends on the outcome of the pilot database tool that we have to develop within Elios 2.

For this pilot version we propose the following organisation structure.

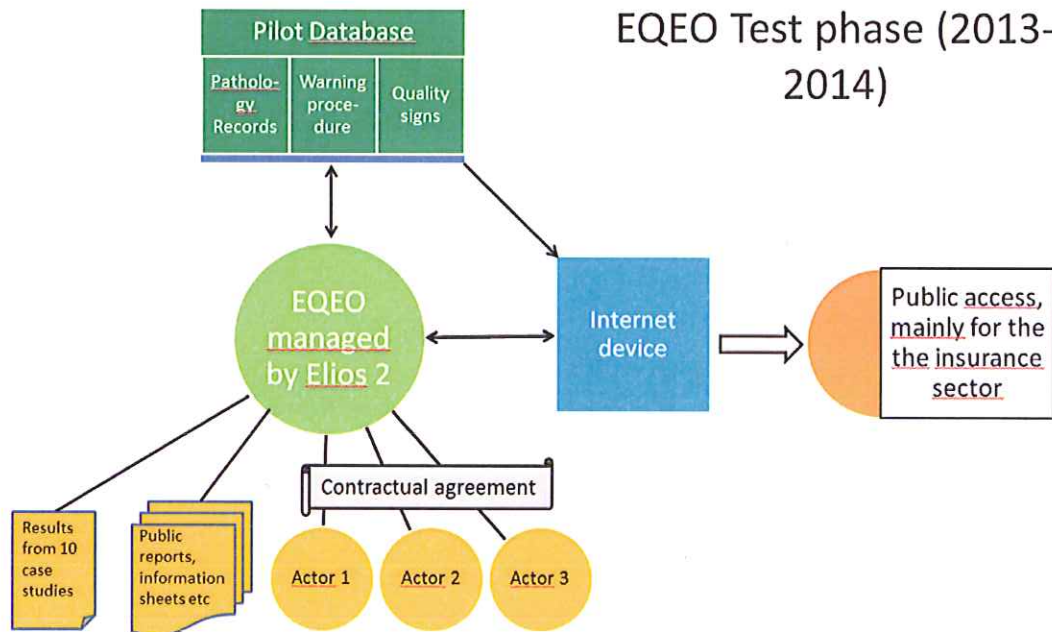


Figure: Proposed organisation structure of the EQEO test phase (2013-2014).

The EQEO would be composed of three parts, corresponding to three functionalities, as described above:

1. Pathology Records (assessment a posteriori): recording of the known/existing claims or information on defects/failures (and their causes and consequences);
2. Warning procedure data: early warnings on defective products/technologies/systems or claims under examination;
3. Quality Signs (assessment a priori): an extract from the quality signs directory (WP1).

IT-development scope

Since contractual IT-resources are only available to develop the pathology database, only the first part of the EQEO will be developed. But in order to show how the other two parts of the EQEO might look like when it is developed in future, a ‘mock-up’ (maquette) will be prepared. This ‘mock-up’ is not a full IT development similar to the pathology database. It is just a ‘light IT environment’ which provides an overview of how the future EQEO could perform. It is closer to a ‘dumb’ interface than to a fully operational interface giving access to a complex information structure.

For the ‘warning procedure’ this means that links will be included in the mock-up to show that users will have the possibility in the future to access such information. This link can open a window where the future information is described. A link can be included to show that documents (i.e. public reports, report on 10 eco technologies, ...) can be accessed and opened from the ‘mock-up’.

For the ‘quality signs extract’ it means that there will be a front page showing how the different categories of users can access/exchange information can be created. This front page (and associated pages opened by clicking on active links) still has to be specified.

Populating the pathology database

From our point of view, the role of pathology database is not to develop its own analysis of the different risks, but rather to gather, select and manage existing data. Our objective is to organize an exchange and a dissemination of data essentially held at a national level by national actors, or known from public reports, Defects Information sheets and other papers. Of course, also the results from the questionnaire survey for the 10 eco-technologies (executed in 2012) will be exploited for populating the database. In order to be efficient, the scope of this pilot database has to be limited. We have to focus our attention on some selected eco-technologies (10 being the absolute maximum).

In first instance the WP2-2 partners (NHBC, SBi, BBRI, Arcadis) will be responsible for filling the database with pathology cases. But also other organisations will be invited to contribute on a voluntary basis.

2.3 Description of a pathology case

The description of a pathology case is structured according to the following cause-defect-failure/effect chain:

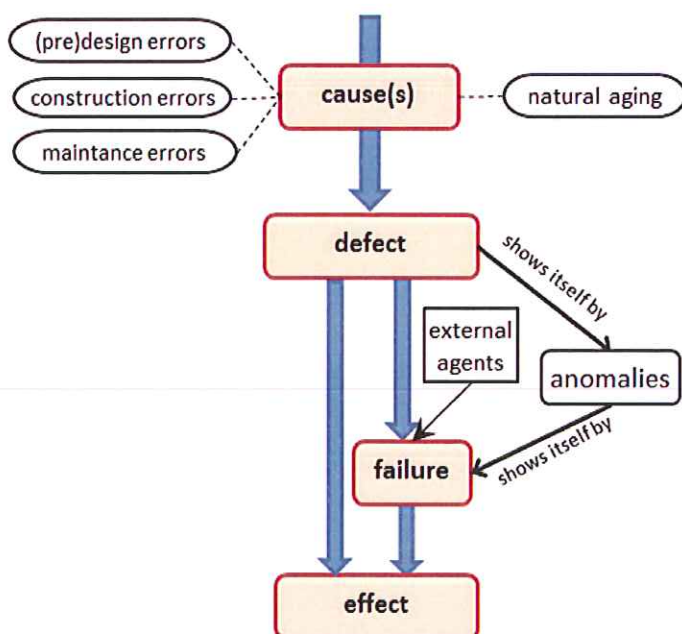


Figure 1: Source: adapted from CIB Report

The core elements in this description are 'defect' and 'failure'.

A defect is a situation where one or more building components do not perform its/their intended function(s); it implies a shortcoming in respect of some normative or perceived standard or requirement. For example: a crack in a partition wall. The type of defect may vary widely; from a minor crack to a major crack. Defects are caused either by natural ageing or by errors or omissions (arising from imperfect human activities) during different stages of the building process.

A failure is a situation in which a specific required function cannot be fulfilled any longer. For example: a minor crack in the wall may lead to loss of an aesthetic function, a major crack may imply the collapse of the wall and so the termination of the required use.

The defects can either remain in a latent form, or manifest themselves by the action of external agents. Interaction between external agents and defects is the necessary condition for the manifestation of the decay as failure. The failure of building components can be structural, i.e. loss of certain physical, chemical and technological characteristics. Or it can be performance failure, i.e. the drop of the initial performance level below an established acceptable limit. Or – most commonly – it may concern both aspects.

As a consequence of the failure, the effect (damage, injuries, non-functioning etc.) appears at the end of the process. But also a defect without a failure can lead directly to an undesirable effect.

The defective building component can be the same as the failed building component (like in the example of the crack in the partition wall leading to collapse of the same wall), but they can also be different. For example: a crack in a facade wall, leading to water leakage entering in the electrical system behind the wall, causing a failure of the electricity system.

Ideally, all these elements are known from a certain pathology case, and can be specified in the input fields. But in many cases, only a general description of the pathology is known. Therefore, also a field ‘general description of the pathology case’ is included.

The diagram can also be depicted as follows (combining defect and failure, and adding the typical insurance effects):

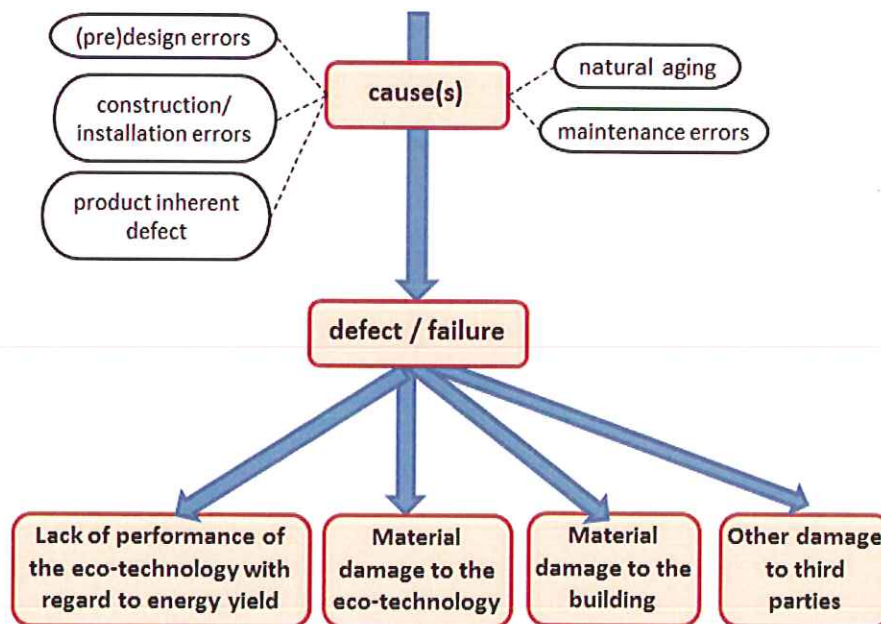


Figure 2: Source: adapted from CIB Report

3. Technical description of the platform for part 1 of the EQEO: The building pathology database

This technical description for the pathology database is similar to the one for quality signs directory of WP1. Both parts of the website will be hosting in the same platform.

3.1 Language, Database and Framework

We recommend only to use open source technologies:

Linux (SUSE / DEBIAN) with:

- Server Apache 2
- PHP 5.2.x
- Mysql 5.0x
- ZEND Framework with a release ≥ 1.8 embedded in project sources.

3.2 Architecture

Architecture 3 tiers:

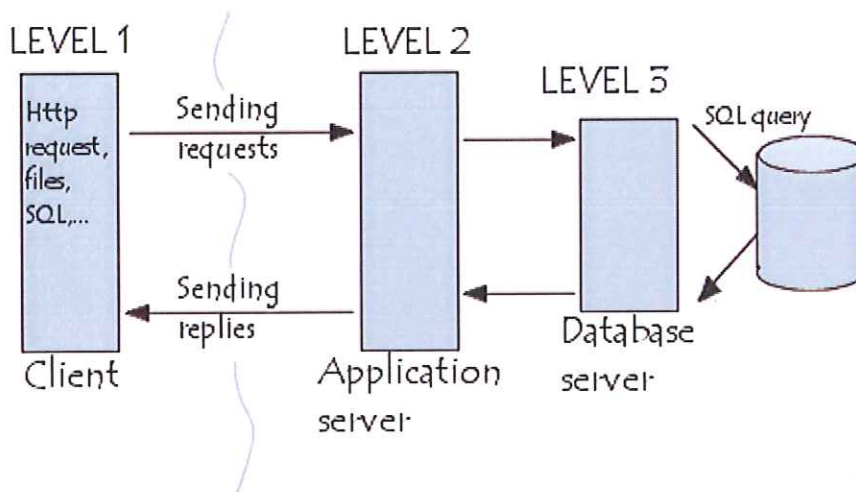
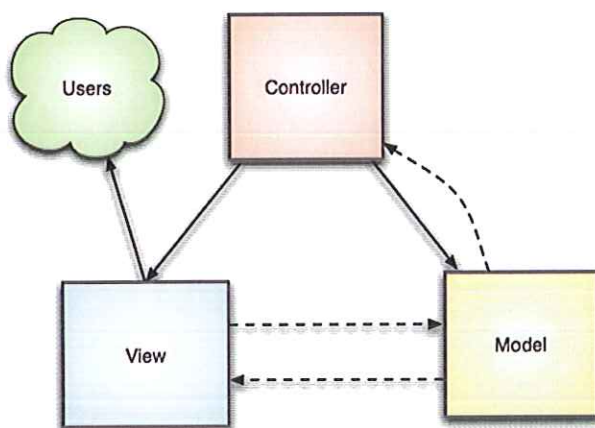


Figure 3: Architecture 3 tiers

'Model - View - Controller'- pattern:



- **Model:** This is the part of the application that defines its basic functionality behind a set of abstractions. Data access routines and some business logic can be defined in the model.

- **View:** Views define exactly what is presented to the user. Usually controllers pass data to each view to render in the format. Views will often collect data from the user, as well.
- **Controller:** Controllers bind the whole pattern together. They manipulate models, decide which view to display based on the user's request and other factors, pass along the data that each view will need, or hand off control to another controller entirely.

3.3 User-friendliness of the human-computer interface (HCI)

HCI has to be to be intuitive and easy to pick up.

Graphical charter

Graphical charter defined for the general website of Elios II will be applied to the WP2 database, including logo and fonts colours.

Language

The Building pathologies database website will be presented in English.

3.4 Navigators compliancy

The Building pathologies directory website has to be compliant with the following navigators:

- Internet Explorer >=8.0
- Firefox Version >=19

4. Profiles of users

The following users of the tool are distinguished:

- The *internet user*, as an anonymous visitor, accesses the public part where building pathology forms are available.
- The *contributors*, they are people who are going to fill a Building Pathology Form (BPF); in first instance the WP2 partners (NHBC, SBi, BBRI, Arcadis) will be responsible for filling the database with pathology cases.
- The *administrator* who is in charge to create contributors' access. In first instance, the administrator will be the WP2 leader and CSTB (IT section)

The internet users

Everybody can access the public part, but target groups are preferentially:

- Construction insurers and (re)insurers,
- Experts of construction.

The internet users will have only access to the consultation of the database, without need to connect by means of an account.

The contributors

The main role of this profile is to populate the database with building pathology data. During the pilot phase, the WP2-2 partners (NHBC, SBi, BBRI, Arcadis, TSUS) will be in charge to fill the building pathology forms.

The contributors have access to the module of edition, and create and update the pathology forms that they are responsible for.

The administrators

The administrators oversee the whole website, they have to create and update the contributor's accounts. The administrators can publish or unpublish the building pathology forms, but cannot modify the ones they didn't create.

The administrator role will be given to the leader of the WP2, technically assisted by CSTB (IT). The number of administrator is unlimited, it depends the maturity of the system. For the first instance, two administrators seem to be suitable to share the work.

Public part of the Building Pathologies directory

Internet users will have access to the list of all published building pathology sheets. They can get a detail view of each sheet and make an advanced search using their own criteria. They can as well export their result in an excel file containing the main data of the sheets.

5. Management of the contributor accounts

Only an administrator can create a contributor account.

5.1 Menus

Users' management

- User's list (Contributors + Administrators)
- Add a new user

5.2 The list of referenced users (Contributors + Administrators)

The users list displays all the contributors and the administrators of the pathology database. For each contributor, data displayed are the following:

- Country
- Organism
- Profile
- Name [family_name + first_name]
- Email
- Phone

From this list, possible actions allowed for an administrator are:

- The view of the detail sheet of the selected user;
- The modification of the data for the selected (0);
- The deletion of the selected user (0);
- The sending of the login and password of the user by email (6.1.6).

The user's list has to be paginated; by default ten users are displayed by page. Whereas this number can be changed by the user and be adapted to its screen size.

Links « Next » and « Previous » are available at the end of the list. On the same line below the list of users, the total number of elements is given.

All the columns of the list have to be sortable.

5.3 Create a « New user »

The form for a new user creation gathers the following fields (* for mandatory field):

- Family name*
- First name*
- Email*
- Country* (unique choice among the European countries)
- Phone number
- Profile (select 1 among proposed value : Administrator / Contributor)
- Password* (encrypted)
- Password confirmation* (encrypted)

A « **Submit** » button triggers the account creation for the user. A « **Cancel** » button cancels the action of creation.

Here are the tests for the account creation:

- All the mandatory fields are filled (*)
- Field value for password = field value for password confirmation
- Check that the user does not already exist in the WP2 user database: the test are based on Family name and Email field values

If the user already exists:

The following message is displayed:

« The creation has been aborted; this user is already referenced in Elios Database.

If the tests are OK, the following message « ***Account has been successfully created*** » ends the account creation procedure.

If errors are detected, the message displayed has to highlight the wrong fields.

5.4 Modification of users

The form for the modification of a user and the check functions are the same that for creation.

5.5 Deletion of users

The deletion of a user is a physical deletion. Only an administrator can delete users (contributor or another administrator). That means that at the end of the deletion procedure the user won't exist anymore in the pathology database. A connected administrator can't delete its own account.

5.6 Sending of connection parameters

This function is available from the user list and triggers an email to the user containing the login and password for the connection.

6. Edition of building pathologies cases

The data of building pathologies can be input and updated by contributors who have an account into the WP2 database, and administrators.

6.1 Menu

My cases

- View list of cases
- Add a case

Help

- Handbook

6.2 Creation of Building Pathology Sheet

Creation form

See below the fields necessary to fill in, to provide a complete description of a pathology case. An additional excel table gives some information on the description fields: applicability of question in relation to another question, or explanation on the field to provide to the contributor, etc.

In the form, fields need to have a “help” text to make clearly understand what kind of data is expected. For instance a “?” that provides a bubble with explanation at user click.

Most of the fields are optional. For many pathology records, not all data is available (or it would be too time-consuming to gather the data to fill in all the fields). The most essential fields for insurers are written in bold **UPPERCASE**. The following fields are mandatory to fill in, since these are considered essential to get a good understanding of a pathology case:

- Name of information provider (name of the organisation);
- Type of source for the description of the pathology case (inspection report, claim, literature etc.), and the reference name of the source (i.e. the name of the report, website link etc);
- Country or countries where the construction work or project is executed;
- Type of eco-technology (material/product/ system) that was involved in the defect/failure;
- Type of defect/failure;
- Type of consequence/effects of the defect/failure (4 categories multiple list);
- Cause of the defect/failure (if known).

No.	Field name	Type of field	Example
1	System serial number	Numerical (automatically generated)	1
2	Name of the information provider	Text	NHBC
3	Dossier code (internal code) of the information provider.	Numerical	P3462
4	Date of filling in this pathology record	Date (automatically generated)	
5	WHAT IS THE TYPE OF SOURCE OF THE DESCRIPTION OF THE PATHOLOGY CASE?	Predefined categories (multiple answers possible) Based on an <u>inspection report</u> of a particular case/building; Based on a sample of or an <u>existing database</u> with pathology cases; Based on a <u>claim</u> ; Based on <u>literature</u> , research papers, defect information sheets, etc., website Based on <u>general knowledge</u> /experience <u>Other</u>	Inspection report
6	NAME/TITLE OF THE SOURCE FOR THE PATHOLOGY CASE (titles of the sources, references, website link etc.)	www.thegreentower.fi

7	Name of construction work or project	Free memo text	The Green Office Tower
8	COUNTRY OR COUNTRIES WHERE THE CONSTRUCTION WORK OF PROJECT IS EXECUTED	Predefined with names of EU28 countries in alphabetical order (multiple answers possible): Austria Belgium Bulgaria Croatia Cyprus Czech Republic Denmark Estonia Finland France Germany Greece Hungary Ireland Italy Latvia Lithuania Luxembourg Malta Netherlands Poland Portugal Romania Slovakia Spain Sweden United Kingdom Don't know	UK
9a	Do you know the town where the construction work or project where the defect/failure has occurred?	yes no	
9b	Town where the construction work or project is executed (if 9a is answered 'yes')	Text (please fill in the town)	London
10a	Geo-climatic character of the location of the construction work of project <i>Notes: In some countries, a zip code + altitude, or click on a map, gives the climatic zone.</i>	Predefined categories, plus empty field for free memo text (multiple answers possible): Near the coast Rainy area Windy area Arctic/polar/cold Tempered climate Subtropics climate Oceanic climate Continental climate Mediterranean climate Earthquake area	Near the coast

		Other Don't know	
10b	Other geo-climatic character, namely... (if 10a is answered with 'other')	Text (please fill in the town)	
11a	Type of construction work – New or existing building?	Predefined categories plus 'don't know' (multiple answers possible) New Existing Don't know <i>Type of work:</i> Individual housing/dwellings Collective housing, apartment buildings Buildings with public access Office buildings Industrial buildings Other buildings	New / office building / with high intrinsic risks
11b	Type of construction work - function of the building	Individual housing/dwellings Collective housing, apartment buildings Buildings with public access Office buildings Industrial buildings Other building Don't know	
11c	Type of construction work – technical risks	Buildings having extrinsic technical risks (e.g. near railway track) Buildings having intrinsic technical risks (e.g. high-rise buildings) Building without or with minor extrinsic/intrinsic risks Don't know	
12	Starting date of the work	Date fixed format ...-.- (yyyy-mm-dd) (please fill in) Don't know	2010-01-01
13	End date of the work	Date fixed format ...-.- (yyyy-mm-dd) (please fill in) Don't know	2012-01-01
14a	Has the construction work or project been completed?	Boolean yes/no Yes No Don't know	Yes
14b	Was there a completion survey for the handover of the construction work/project to the client? (only if 14a is answered 'yes')	Boolean yes/no Yes No Don't know	Yes
14c	If yes, what was the date of the completion survey? (only if 14a is answered 'yes')	Date, plus 'don't now' ...-.- (yyyy-mm-dd) (please fill in) Don't know	2011-30-12
15	Was a Technical Inspection Service (TIS) contracted for this project?	Boolean yes/no Yes	

		No Don't know	
	Date of the defect/failure/damage	Date, plus 'don't know' ...-.- (day-month-year) (please fill in) Don't know	01-07-2012
Eco-technology			
16	<p>CATEGORY</p> <p><i>Note: 'eco-technologies' are defined as: 'technologies which are (supposed to) contribute to the environmental performance of buildings (and whose use is less environmentally harmful than relevant alternatives)'. The following topics are considered to make up environmental performance:</i></p> <ul style="list-style-type: none"> - Energy; - Water; - Waste and pollution; - Protection of biodiversity and natural environment; - Minimization of the use of resources, <p><i>Within each topic we have identified one or more typical examples of technologies.</i></p>	<p>Predefined categories (based on the usual topics of the environmental performance of a building), plus empty fields for free memo text (multiple answers possible)</p> <p>ENERGY</p> <p><i>Use of renewable energy:</i></p> <ul style="list-style-type: none"> photovoltaic panels (PV's) wind turbine solar hot water (SHW) other technology with use of renewable energy <p><i>Energy efficiency techniques:</i></p> <ul style="list-style-type: none"> mechanical ventilation with heat recovery (MVHR) heat pump active daylighting domotics, e.g. controls of space heating other energy efficiency technique <p><i>Thermal insulation:</i></p> <ul style="list-style-type: none"> insulation made of bio-materials, like natural fibers (hemp) cavity wall insulation (CWI) solid wall insulation (SWI) double skin curtain wall/façade EPS (expanded polystyrene) panels vacuum-insulated panels (VIP's) glazed windows other thermal insulation technique <p><i>Other energy conservation or efficiency techniques</i></p> <ul style="list-style-type: none"> passive shading devices (e.g. brises soleils) grey water heat recovery other energy conservation of efficiency technique <p>WATER</p> <p><i>Water conservation techniques:</i></p> <ul style="list-style-type: none"> green roof/ brown roof in house water-treatment system rainwater catchment basins, grey water harvesting Other water conservation technique <p><i>Water efficiency/management techniques:</i></p> <ul style="list-style-type: none"> low-water use appliances, like spray taps, flush toilets other water efficiency/management 	<p>Energy conservation or efficiency techniques</p>

		<p>technique</p> <p><i>Water metering:</i></p> <p>water leakage detection systems</p> <p>other water metering technique</p> <p>WASTE, POLLUTION, AND INDOOR ENVIRONMENTAL QUALITY</p> <p><i>Minimize pollution during construction:</i></p> <p>biological waste treatment systems to treat waste on-site</p> <p>separate/recycle waste</p> <p>other technique to reduce waste, pollution</p> <p><i>Enhancing indoor environmental quality</i></p> <p>low VOC materials (paints, kits, glues)</p> <p>other technique to enhance indoor environmental quality</p> <p><i>Limitation of emission of CO₂, ozone depleting gasses, greenhouse gasses</i></p> <p>Technique/product/material for limitation of emission of CO₂, ozone depleting gasses of greenhouse gasses</p> <p>PROTECTION OF BIO DIVERSITY AND NATURAL ENVIRONMENT</p> <p>roof garden</p> <p>other technique for protection of bio diversity and natural environment</p> <p>MINIMIZE THE USE OF RESOURCES</p> <p><i>Re-use or recyclability of construction works, their materials and parts after demolition</i></p> <p>recycled materials, for example aluminium or steel frame components/systems (up to 90% recyclable)</p> <p>other technique or material for minimizing the use of resources</p> <p><i>Usage of renewable materials:</i></p> <p>wood, bamboo</p> <p>paper-based</p> <p>other renewable material</p> <p><i>Minimize materials</i></p> <p>Biaxial hollow deck floors</p> <p>Other technique that minimizes materials</p> <p>OTHER CATEGORY OF ECO-TECHNOLOGY</p> <p>Other type of eco-technology</p>	
17	Specific type (if known)	<p>Free memo text</p> <p>..... (please fill in the type of eco-technology, for example 'polycrystalline superimposed photovoltaic panels', or: 'acryl paints')</p>	Photovoltaic panels
Description of the defect/failure			

18	Date of the defect/failure/damage	Date, plus 'don't know' ...- (yyyy-mm-dd) Don't know	2012-07-01
19	GENERAL DESCRIPTION OF THE PATHOLOGY (including the defect/failure, the defective part, the consequences/ effects and the causes)	Text (please fill in the general description of the pathology)	Defective power supply of PV-panel...etc.
20	TYPE OF DEFECT/FAILURE <i>Notes:</i> <i>A <u>defect</u> is a situation where one or more building components do not perform its/their intended function(s); it implies a shortcoming in respect of some normative or perceived standard or requirement. For example: a crack in a partition wall. The type of defect may vary widely; from a minor crack to a major crack. Defects are caused either by natural ageing or by errors or omissions (arising from imperfect human activities) during different stages of the building process.</i> <i>A <u>failure</u> is a situation in which a specific required function cannot be fulfilled any longer. For example: a minor crack in the wall may lead to loss of an aesthetic function, a major crack may imply the collapse of the wall and so the termination of the required use .</i>	Predefined categories, plus empty field for free memo text Aesthetic defect/failure (i.e. Cracking or shrinkage cracking of concrete) Functional failure (i.e. Leaks in elements such as roofs, walls and floors ; malfunctioning of installations) Defect or failure of materials (i.e. Corrosion of metals) System failure of components and elements (i.e. Carbonation of concrete, leading to corrosion of reinforcement and subsequent cracking and spalling of concrete members) Structural defect or failure (i.e. Subsidence - a downward movement of a building caused by below ground factors – such as desiccation of clay soil). Non-structural defect/failure (i.e. Delamination of roof tiles and slates) Reversible defect/failure (i.e. Jamming of doors and windows as a result of moisture intake by these components – usually in winter; in the summer the wood dries out and the windows and doors become unstuck) Irreversible defect/failure (i.e. Chemical reactions such as sulphate attack on mortar or rendering) Other defect/failure	System failure of components
21a	Defective building component <i>Note: predefined categories according to SfB classification of building elements</i>	Predefined categories, based on the SfB classification of building elements, plus free memo text (multiple answers possible) 1.Substructure 2.Superstructure 2A.External wall 2B.Internal wall 2C.Floors and galleries 2D.Stairs, balustrades, ramps 2E.Roof 2F.Frames 2G.Windows and external doors	Other: Power supply

		<p>2H.Internal doors</p> <p>3.Finishes</p> <p>3A.Wall finishes</p> <p>3B.Floor finishes</p> <p>3C.Roof finishes</p> <p>3D.Ceiling finishes</p> <p>4.Services</p> <p>4A Refuse disposal</p> <p>4B.Drainage</p> <p>4C.Hot and cold water</p> <p>4D.Gases</p> <p>4E.Refrigeration</p> <p>4F.Space heating</p> <p>4G.Ventilation and air conditioning</p> <p>4H.Power</p> <p>4I.Lighting</p> <p>4J.Communications installations</p> <p>4K.Transport (lift and conveyor installations)</p> <p>4L.Security (protective installations)</p> <p>5.Furnishings (fittings and loose equipment)</p> <p>6.External works and services</p> <p>Other</p>	
21b	Other type of defective component (only if you choose 'other' on 21a)	Text (please fill in)	
22a	Failed building component	Predefined categories Same is defective component Other component Don't know	
22b	Other failed component, namely.... (only if you choose 'other' with 22a)	Text (please fill in)	
23	<p>DESCRIPTION OF THE CONSEQUENCES/ EFFECTS OF THE DEFECT/FAILURE</p> <p><i>Note: here the most relevant types of consequences/effects for insurers are categorized.</i></p>	<p>Predefined categories:</p> <p>Lack of performance of the eco-technology with regard to energy yield</p> <p>Material damage to the eco-technology itself</p> <p>Material damage to the building (for instance, leak caused by a PV panel)</p> <p>Other damage to third parties (including situations with a risk for health and safety).</p> <p>Other consequences/effects</p> <p>Don't know</p>	Material damage to the building
24	Was the defected product repaired or replaced?	Predefined: Repaired Replaced Not yet No Don't know	Not yet
25a	HAS THE CAUSE OF THE DEFECT/FAILURE BEEN	Boolean yes/no, plus empty field for free	Yes

	ANALYSED, OR IS IT KNOWN?	memo text Yes No Don't know	
25b	IF YES, WHAT HAS BEEN THE CAUSE (GLOBAL OR IN DETAIL)? <i>Note: The categories are based on typical categories of failures in construction. We do not ask for who is responsible for the defect/failure. But if the responsibility has been determined (for example by arbitrage, by the court or otherwise), this can be mentioned in 'other'. You can choose also to indicate the type of actor who is held responsible (installer, designer, manufacturer, user, etc.)</i>	Predefined categories (multiple answers possible) Requirements management (change in clients' requirements, misunderstanding of the effectiveness of the technology, poor project management, inaccurate engineering or architectural data) (Pre)design errors Product manufacture and delivery issues (faulty manufacture, late delivery, storage issues, awkward packaging, poor transport of product) Construction/installation problems (incorrect installation documentation, failure in installation, poor workmanship, misuse of products, inadequate supervision, commissioning failure, vandalism) Operational failure (product failure once installed, incorrect user documentation) Maintenance errors Ageing and degradation (biological, chemical, physical, mechanical) Other cause for defect/failure Cause not yet known Don't know	Construction/in stallation problems
25c	Other, namely	Text (please describe the cause)	
Quality signs and qualifications			
26a	Were there quality signs in place at time of construction, related to the eco-technology?	Yes No Don't know	Yes
26b	Type of quality sign related to the defect/failure for the product/ material/ system in place at time of construction (if 26a answered with 'yes')	Predefined categories (multiple answers possible) Quality sign(s) for works in place (or whole buildings) Quality sign(s) for product(s) in place Quality sign(s) for systems in place Quality sign(s) for competence(s) of construction actors in place Don't know	Products and competences
26c	Name of quality sign (if known) (if 26a answered with 'yes')	Text (please enter the name(s) of the quality sign(s) in place at time of construction)	Qualibat, Avis Technique
27	Is the contractor/installer specialized in that technology?	Predefined categories (multiple answers possible)	5-10 years of experience

		<p>Yes, <5 years experience</p> <p>Yes, 5-10 years experience</p> <p>Yes, >10 years experience</p> <p>The installer/contractor is certified or recognized by an independent organisation for this technology or activity.</p> <p>No or hardly any experience</p> <p>Don't know</p>	
28	How to avoid or prevent the defect/failure (lessons learned, prevention measures)	Free memotext (please fill in)	Don't know
29	Here you can add any other comments or remarks you want to make.	Free memotext	

	fieldnr	name of the field	Input screen			output screen		
			applicability of question in relation to another question	mandatory to fill in on input screen	explanation needed (by means popup)	complete description of a pathology case	visible in output screen after selection of criteria	sorting possible?
unique record key	1	System serial number		autom. generated		x		
	2	Name of information provider (name of the organisation)		yes		x		
	3	Dossier code (internal code) of the information provider for this pathology case.		no		x		
	4	Date of filing in this pathology record		autom. generated		x		
source	5	Type of source for the description of the pathology case		yes		x	x	yes
	6	Name/title of the source for the description of the pathology case (title of report, website link, etc.)	only if you choose 'inspection report' or 'literature' on 5	yes		x		
Details of the construction work where the eco-technology is installed and the defect/failure occurred	7	Name of construction work or project, where the defect/failure occurred		no		x		
	8	Country or countries where the construction work or project is executed		yes		x		
	9 a	Do you know the town where the construction work or project where the defect/failure has occurred?		no		x		
	b	Town where the construction work or project is executed	only if you choose yes on 9a	no		x		
	10 a	Geo-climatic character of the location of the construction work of project		no		x		
	b	other, namely	only if you choose 'other' with 10a	no		x		
	11 a	Type of construction work - New or existing building?		no		x		
	b	Type of construction work (function/other building / don't know)		no		x		
	c	Presence of risk (intrinsic/extrinsic/no special risks/don't know)		no		x		
	12	Starting date of the work		no		x		
	13	End date of the work		no		x		
	14 a	Has the construction work or project been completed? (yes/no/don't know)		no		x		
	b	Was there a completion survey for the handover of the construction work/project to the client?	only if you choose 'yes' on 14a	no		x		
	c	If yes, what was the date of the completion survey?						
	Eco-technology	15	Was a Technical Inspection Service (TIS) contracted for this project? (yes/know/don't know)		no		x	
16		Type of eco-technology (material/product/ system) that was involved in the defect/failure		yes		x	x	yes
	17	Specific type of eco-technology (if known)		no		x		
Description of the defect/failure	18	Date of the defect/failure/damage (year)		no		x		
	19	General description of the pathology, including the defect/failure, the defective part, the consequences/ effects and the causes		yes		x		
	20	Type of defect/failure		yes		x	x	yes
	21 a	Defective building component		no		x		
	b	Other type of defective component, namely	only if you choose 'other' on 21a	no		x		
	22 a	Failed building component		no		x		
	b	Other failed building component, namely ...	only if you choose 'other'	no				
	23	Type of consequence/effects of the defect/failure (4 categories multiple list)		yes		x	x	yes
	24	Was the defected product repaired or replaced?		no		x		
	25 a	Has the cause of the defect/failure been analysed, or is it known? (yes/no/don't know)		yes		x		
	b	If yes, what has been the cause (global or in detail)?	only if you choose 'yes' on 25a	yes 'under condition'		x	x	yes
	c	Other, please describe the cause	only if you choose 'other' on 25b	yes 'under condition'		x		
Quality signs and qualifications	26 a	Were there quality signs in place at time of construction? (yes/no/don't know)		no		x		
	b	Type of quality sign related to the defect/failure for the product/material/system in place at time of construction	only if you choose 'yes' on 26a	no		x		
	c	Name of quality sign if known	only if you choose 'yes' on 26a	no		x		
	27	Is the contractor/installer specialized in that technology?		no		x		
Lessons learned	28	Lessons learned: How to avoid or prevent the defect/failure (lessons learned, prevention measures)		no		x		
Other comments/remarks	29	Other comments or remarks		no		x		

6.3 Management of building pathologies cases

Once the contributor is logged in, he can access all the cases he made before in a list. He can as well create a new case.

An administrator can see all the building pathology cases made by contributors and himself.

List view of cases

A contributor can only manage his own cases, and the list is composed of his cases.

The list of cases displays the following data:

- Type of eco-technology
- Type of defect/failure
- Cause(s)
- Effect/consequences
- Type of source

The list has to be paginated; by default ten cases are displayed by page. Whereas this number can be changed by the user and be adapted to its screen size.

Links « Next » and « Previous » are available at the end of the list. On the same line below the list of cases, the total number of elements is given.

All the columns of the list have to be sortable.

Data entered into the search section have to be kept by the system till the press of the button Reset.

Number of results displayed (by default: 10):

RESULTS OF THE SELECTION CRITERIA					
Type of eco-technology ▲▼ (sorting)	Type of defect/failure ▲▼	Cause(s) ▲▼	Effect/consequences ▲▼	Type of source ▲▼	
heat pump	functional failure	product manufacture	Lack of performance with regard to energy yield	literature	▲
heat pump	system failure of components	other	Material damage of the building	claim	▼
Total number of hits: 2					

EXPORT

when you click on a line you get a pdf with the complete description of the pathology case

From this list, possible actions allowed for contributors (only on their own cases) or administrators are:

- The view of the detail sheet of the selected case
- The modification of the data for the selected case
- The publication or the unpublication of a case
- The deletion of the selected case
- The PDF export of a case

All those actions are represented by icons supplied by an indicative bubble. All icons are gathered in a toolbox provided at the end of each line of case.

A button « EXPORT » triggers an export in Excel format of the displayed cases. The cases may be the result of a search.

Important search functionality is provided, see section *Search function*.

Search functionality

The search section will be available on the public part of the WP2 website, but also to contributors and administrators. The search is multi criterion and there is no criteria mandatory. All the criteria are provided with a default value (see **Figure 4: search form**) and this default value can be easily set by user. For the request to the database, all criteria are separated with a “AND” close.

PRINT
FREE SEARCH

In the following table you can specify the criteria for selecting the pathology cases:			
items	= / ≥ ≤	selection criteria	remark
Type of eco-technology - category	=	predefined categories, plus empty field for free search text	all eco-technologies by default
Specific type of eco-technology		<input style="width: 100%;" type="text" value="free search text, for example *insulation*"/>	
Countries where the construction work of project were executed	=	predefined categories	all countries by default
Geo-climatic character of the location of the construction work or project	=	predefined categories, plus empty field for free search text	all geo-climatic characters by default
		<input style="width: 100%;" type="text" value="free search text, for example *facade*"/>	
Type of construction work	=	predefined categories, plus empty field for free search text	all construction works by default
		<input style="width: 100%;" type="text" value="free search text, for example *office*"/>	
Works/projects executed between and	≥ ≤	<input style="width: 20%;" type="text" value="≥ 01-05-2010"/> <input style="width: 20%;" type="text" value="≤ 01-07-2012"/>	default selection: ≥ 01-01-1970 ≤ present
Date of the defect/failure	≥ ≤	<input style="width: 20%;" type="text" value="≥ 01-01-2011"/> <input style="width: 20%;" type="text" value="≤ 01-12-2011"/>	default selection: ≥ 01-01-1970 ≤ present
Type of defect/failure	=	predefined categories, plus empty field for free search text	all defects/failures by default
		<input style="width: 100%;" type="text" value="free search text, for example *warranty*"/>	
Defective/failed building component	=	Predefined categories	all components by default
Consequences/effects of the defect/failure	=	Predefined categories	all conseq. by default
Cause of the failure/defect	=	predefined categories, plus empty field for free search text	all causes by default
		<input style="width: 100%;" type="text" value="free search text, for example *installation*"/>	
Quality signs involved	=	Predefined categories	all signs by default
		selection on specific type of quality sign: <input style="width: 100%;" type="text" value="name of the sign"/>	
Lessons learned	=	<input style="width: 100%;" type="text" value="free search text, for example *control*"/>	

OK

Figure 4: search form

Detail view of a pathology case

Detail of a pathology case is open to all and it is the same view as the one provided in the public part of the website. This view lists all the data of a building pathology case. From this detail view a link allows to export the sheet into PDF format.

Pathology sheet (as pdf, when you click on a line in the results-screen)

Name of information provider: NHBC
Date of filling in this pathology record: 2013-12-13
Source
Type of source for the description of the pathology case: Inspection report
Name/title of the source: www.greentower.uk
Construction work where the eco-technology is installed and the defect/failure occurred
Name of construction work or project: The Green Office Tower
Country or countries: UK
Town: London
Geo-climatic character: Near the coast
Type of construction work : New / Office building / high intrinsic technical risks
Starting date of the work : 2010-01-01
End date of the work : 2012-01-01
Has the construction work or project been completed? : yes
Was there a completion survey: yes
If yes, what was the date of the completion survey? 2011-12-30
Technical Inspection Service (TIS) contracted?: no
Eco-technology
Type of eco-technology involved in the defect/failure: PV-panels
Specific type of eco-technology: Superimposed PV panels
Description of the defect/failure
General description of the pathology: defective power supply caused fire
Type of defect/failure: System failure of components
Defective building component: Other: power supply
Failed building component: Other: PV-panel
Type of consequence/effect: Material damage to the building
Was the defected product repaired or replaced?: Not yet
Has the cause of the defect/failure been analysed, or is it known?: Yes
If yes, what has been the cause (global or in detail)?: Construction/installation problems
Other, please describe the cause:
Quality signs and qualifications
Were there quality signs in place at time of construction?: yes
Type of quality sign related to the ecotechnology: Products and competences
Name of quality sign: Qualibat, Avis Technique
Is the contractor/installer specialized in that technology?: 5-10 years of experience
Lessons learned: Don't know
Other comments or remarks:

Figure 5: Example of a PDF export of a building pathology sheet

PDF export of cases

This function allows all the data contained by a building pathology case into one PF sheet. This functionality will be provided by the public part of WP2 website. The sheet has to follow the given template at **Figure 5: Example of a PDF export of a building pathology sheet**.

Modification of a case

This function is allowed for a contributor on for its own cases. The same screen that the input screen is displayed populates with the original data of the case to modify.

Publish / unpublish cases

This function is allowed for a contributor for its own cases. Only a published sheet appears among the list of available cases in the front-office (public part of the website). This function allows contributors to only publish a sheet when it is completed. This function is especially useful during testing period to not make available hazardous data.

Deletion of cases

This function is allowed for a contributor for its own cases. This function removes a case from the database. An Alert window has to pop up asking confirmation before the deletion process is launched.

« EXPORT »

Export button allowed (all) user to export some data (to define) of building pathologies sheets in an Excel table.

7. Specifications for part 2 of the EQEO: 'Warning procedure'

Regarding the Warning Procedure, the idea is being able to gather and communicate the existing information ('rapidly'). The form has really no importance.

For the warning a very simple database structure is proposed:

- Name of the organisation / person who is doing the warning;
- Description of the eco-technology for which the warning is given;
- Description of the warning;
- Indication of the risk:
 - there is a clear and immediate risk for health and safety;
 - there is a clear and immediate risk for severe economic damages (one such case may lead to significant direct or indirect damages);
 - at this moment there is no clear and immediate risk for health and safety and/or severe economic damages, but maybe in future with widespread use.
- Possibility to add attachments.

8. Specifications for part 3 of the EQEO: the extract of the Quality Signs inventory

When quality signs associated to the pathology record are available, they will be recorded as well. These signs may concern construction products, construction systems, qualifications, performances of works. Quality signs that are also recorded in the ELIOS2 quality signs directory will be indicated.

Appendix 2.2 - Results of the validation of the proposed database architecture by BBRI

BBRI has tested the pathology database architecture, by filling it with information from two pathology cases. The resulting 'pathology sheets' are given hereunder.

Pathology sheet for case 1: solar panels with a fire risk

Name of information provider:	BBRI
Date of filling in this pathology record:	2013-09-10
Source	
<i>Type of source for the description of the pathology case:</i>	Based on literature, research papers, defect information sheets, website
<i>Name/title of the source:</i>	www.vwa.nl "NVWA warns for flammable solar panels"
Construction work where the eco-technology is installed and the defect/failure occurred	
<i>Name of construction work or project:</i>	15 known cases in EU
<i>Country or countries:</i>	several European countries
<i>Town:</i>	15,000 installations placed in Netherlands
<i>Geo-climatic character:</i>	Don't know
<i>Type of construction work:</i>	New and existing Individual housing/dwellings
<i>Starting date of the work:</i>	Don't know
<i>End date of the work:</i>	Don't know
<i>Has the construction work or project been completed?:</i>	Yes
<i>Was there a completion survey:</i>	Don't know
<i>If yes, what was the date of the completion survey?</i>	
<i>Technical Inspection Service (TIS) contracted?:</i>	Don't know
Eco-technology	
<i>Type of eco-technology involved in the defect/failure:</i>	Photovoltaic panels (PV's)
<i>Specific type of eco-technology:</i>	Polycrystalline Superimposed PV panels, Types Multisol P6-48, P6-54, P6-60 and P6-66', supplied in the period August 2009 to February 2012 by Scheuten Solar Systems.
Description of the defect/failure	
<i>General description of the pathology:</i>	In these solar panels there is a faulty electrical connection that is flammable. These solar panels have caused 15 roof fires in several EU countries. A cable in the junction box behind the solar panel makes a poor contact with the PCB. This may cause sparks and can make the housing of the terminal box damage, melt and smolder. Then sparks can skip to the roof and cause fire. This risk increases as the

	sun gets stronger and as the solar panels age.
<i>Type of defect/failure:</i>	Defect or failure of materials
<i>Defective building component:</i>	Power supply of PV-panel
<i>Failed building component:</i>	PV-panel
<i>Type of consequence/effect:</i>	Material damage to the eco-technology itself / Material damage to the building
<i>Was the defected product repaired or replaced?:</i>	Not yet
<i>Has the cause of the defect/failure been analysed, or is it known?:</i>	Yes
<i>If yes, what has been the cause (global or in detail)?:</i>	Other
<i>Other, please describe the cause:</i>	Faulty electrical connection in the junction box behind the PV-panels causes sparkes and makes the housing of the terminal box melt and smolder. The risk increases as the sun gets stronger or as the PV-panels age.
Quality signs and qualifications	
<i>Were there quality signs in place at time of construction?:</i>	Yes
<i>Type of quality sign related to the ecotechnology:</i>	Don't know
<i>Name of quality sign:</i>	Don't know
<i>Is the contractor/installer specialized in that technology?:</i>	Don't know
Lessons learned:	For now a good solution hasn't been found. When a save method is available the NVWA will post it on its website www.nvwa.nl . Owners of the PVinstallations are to be advised to contact a installer and to have their installation safely turned off by an installer (risk for electroshock!).
Other comments or remarks:	The manufacturer went bankrupt and neglects to take appropriate measures and/or responsibility in this case.

Pathology sheet for case 2: Cellulose insulation waddings

Name of information provider:	BBRI
Date of filling in this pathology record:	2013-09-10
Source	
<i>Type of source for the description of the pathology case:</i>	Literature, research papers, defect information sheets, website
<i>Name/title of the source:</i>	AQC and authority information www.qualiteconstruction.com "Procedures for thermal cellulose wadding insulation" (January 2013); www.sante.gouv.fr "Isolants à base de ouate de cellulose adjuvants d'ammonium" (July 2013)
Construction work where the eco-technology is installed and the defect/failure occurred	
<i>Name of construction work or project:</i>	General information
<i>Country or countries:</i>	France

<i>Town:</i>	Don't know
<i>Geo-climatic character:</i>	Don't know
<i>Type of construction work:</i>	New and existing Individual housing/dwellings
<i>Starting date of the work:</i>	Don't know
<i>End date of the work:</i>	Don't know
<i>Has the construction work or project been completed?:</i>	Don't know
<i>Was there a completion survey:</i>	Don't know
<i>If yes, what was the date of the completion survey?</i>	
<i>Technical Inspection Service (TIS) contracted?:</i>	Don't know
Eco-technology	
<i>Type of eco-technology involved in the defect/failure:</i>	Insulation made of biomaterials
<i>Specific type of eco-technology:</i>	Cellulose insulation waddings (with addition of ammonium salts), used as thermal insulation in homes that can be blown in lost roofs , blown into walls or projected by flocking. (Ammonium salts are chemical substances. They are used to reduce the risk of fire by making the treated materials more fire resistant. In the case of insulation based an adjuvanted cellulose wadding with ammonium salts , they represent 5 to 10% of the total mass of the wadding.)
Description of the defect/failure	
<i>General description of the pathology:</i>	As such , the ammonium salts are not toxic. However , in humid weather conditions , such salts can react with water molecules and produce ammonia, which is in the gaseous state under normal ambient conditions (temperature and pressure). Ammonia is an irritant gas. Inhalation of ammonia has a health risk. After a short exposure , ammonia can cause irritation or burns to the eyes and respiratory mucosa . Exposure to ammonia can cause coughing , shortness of breath or bronchiolitis . At high concentrations , the inhalation of ammonia may be characterized by severe respiratory effects, for example respiratory distress. Due to the high volatility of ammonia , it spreads preferentially in the attic rather than residential premises, however it is possible that it enters the living room. Moreover, the ammonium salts are used for their flame retardancy (either flame retardant), their degradation - and thus their loss of efficiency - may increase the risk of fire.
<i>Type of defect/failure:</i>	Irreversible defect/failure
<i>Defective building component:</i>	External Wall / Internal Wall / Floors and galleries / Roof
<i>Failed building component:</i>	Same as defective component
<i>Type of consequence/effect:</i>	Other damage to third parties (including situations with a risk for health and safety).
<i>Was the defected product repaired or replaced?:</i>	Don't know

<i>Has the cause of the defect/failure been analysed, or is it known?:</i>	Yes
<i>If yes, what has been the cause (global or in detail)?:</i>	Other
<i>Other, please describe the cause:</i>	Construction/installation problems. Ageing and degradation (biological, chemical, physical, mechanical)
Quality signs and qualifications	
<i>Were there quality signs in place at time of construction?:</i>	Yes
<i>Type of quality sign related to the ecotechnology:</i>	Products / competences
<i>Name of quality sign:</i>	Don't know
<i>Is the contractor/installer specialized in that technology?:</i>	Don't know
Lessons learned:	<p>www.qualiteconstruction.com. Prescribers and installers are invited to contact their insurance company if they want to install this type of insulation.</p> <p>www.sante.gouv.fr. The use of cellulose insulation with addition of ammonium salts is prohibited as of June 21st 2013. If you want to remove the cellulose insulation from your building, please contact the manufacturer or the French syndicate of manufacturers.</p>
Other comments or remarks:	