DRAFT FINAL REPORT

36 MONTH DELIVERABLE

September 2014

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APPENDICES WP2

APPENDIX 2.5: Overview of existing pathology databases

1 Pathology databases – general aspects

1.1 The use of pathology databases in general

The CIB Report (1993) states the following:

> "A general need for more systematic feedback from experiences and pathology knowledge exists. Such feedback should preferably be an element of a broader system that encounters several types of defects (figure 6). This leads to the necessity of collecting, recording and evaluating data, to cost/benefit analysis and to providing information to involved bodies like: regulations and code makers, designers, contractors, implementers of quality assurance systems, insurance companies, planners, etc. Such output can be quite different for different users of the information. It mainly comprises: number and/or frequency of several specific defects, actual causes, characteristics of the degradation process, losses or costs involved and appropriate remedial and/or preventive measures."

The basis of such a system is formed by a databank. And in fact, several countries have one or more databanks which records cases of defects. But very often these banks have limitations with respect to accessibility and the amount and types of recorded cases."

Such a database is a kind of 'fault catalogue', or lexicon of failures in connection with building constructions. The defects/failures (examined in every possible relation) are stored under the name of building types or related building parts. Until recently, neither the catalogue nor its frame are established, but the CIB Committee W086 stated the position of in their 1993 report (see figure 6).

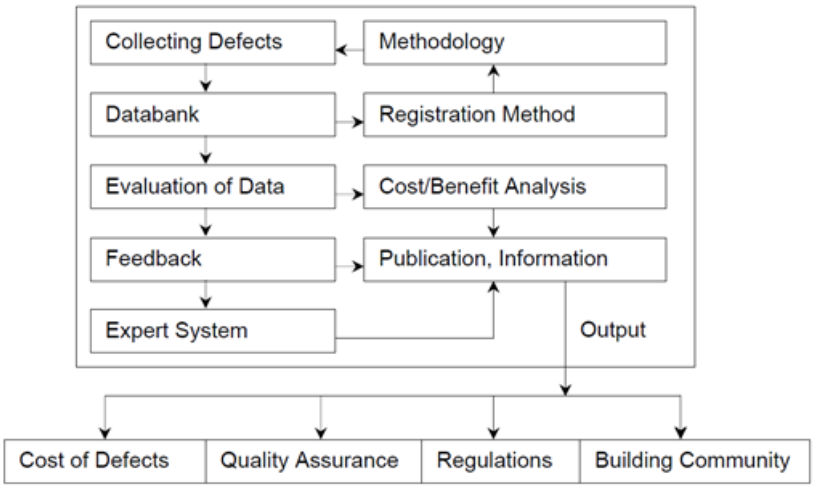


Figure 1: The method of application of experiences from building pathology in a database (from CIB report 1993)

1.2 Advantages and disadvantages

The advantages of a pathology database are evident. Potential users could profit from the database with a view on their interests like: better understanding of mechnisms and avoidance of defects, improved maintenance policies, better justification of investments, more practical education, etc. This should lead to a decrease in the amount of defects and their eventual losses. It should at least diminish making the same mistakes and errors.
The disadvantages originate mainly from practical problems in operating a database. CIB W086 mentions the following disadvantages:

- It has to be financed, or there should be a business model behind it;
- The collection an systematic registration of defects is costly;
- Recording and registration has to be done by experts, with due regard to the desired output in order to avoid irrelevant and ambiguous data;
- Reliable reports are hard to get: reporting on a voluntary basis might give inadequate or insufficient information; on the other hand: compulsory reporting by involved persons could lack objectivity;
- Updating and upgrading of stored information is needed.

1.3 Conditions

Individual organisations in the building sector (like building owners, building control bureaus, insurance companies, contractors etc.) can design their own database in a way that is efficient for their own needs. But when speaking about more general databases with access to any interested organisation of person, some conditions ought to be fulfilled in order for it to be successful as an information centre. Such conditions (according to CIB W086) are:

- A sound business model or financing system must form the basis;
- Some kind of compulsory reporting should exist;
- Reporting and registration must be done by independent experts;
- Reporting and registration must be based on a clear view of the use that will be made of the processed information (or in other words: 'input' and 'output' conditions must be clearly related); this condition is emphasized to avoid costly activities only for the sake of collecting data;
- A format for the minimum information on individual defects/failures.

1.4 Registration methods for pathology cases

Registration methods may differ according to the aims set. Several formats used by international organisations operating, directly or indirectly, in the field of building diagnostics, are known. For example Sycodés in France, BRE's Defect Action Sheets in the UK, the Building Defects Fund in Denmark, …. Etc.

1.5 Format by CIB for a registration of pathology cases

The sixth chapter of the CIB W086 publication (1993) was entirely devoted to a format for pathology records, pointing out the need for systematization of knowledge in the area and the importance of learning from mistakes.

CIB W086 suggests a structure for the general format for the preparation of pathology records, and structures for 4 sub formats. The general format contains all the information that has to be gathered and organised in case of high complexity. Sub formats can be used in cases of lower degree of complexity, or with less information available.

Registration items	*General format*	*Subformat 1*	*Subformat 2*	*Subformat 3*	*Subformat 4*
Component concerned;	X	X	X	X	X
Failure description;	X	X	X	X	X
Description of evident anomalies;	X	X	X	X	
Description of anomalies which can be monitored through instruments;	X	X	X	X	
Graphic representation (photo, drawing, draft);	X	X	X	X	X
Defect description;	X	X	X	X	X
Identification of the agents which caused the defect;	X	X	X		
Errors;	X	X			
Specific fault tree and diagnostic report.	X				

***Figure 7*: Formats for the registration of pathology records**

2. Existing pathology databases

2.1 Introduction

In the following Sections, a number of existing databases are described, divided into

- databases with pathology data, accessible on the web;
- websites with publically available expertise reports, info sheets, etc., with an aggregated analyses of pathology experiences.

Databases with pathology data/cases, accessible on the web;

- NBD Bouwgebreken of SDU Publishers (Netherlands),http://bouwgebreken.sdu.nl/bouwgebreken
- Technische ABC-lijst, Woningborg (Netherlands), http://www.technische-abc.nl/
- REX BBC (France)
- Danish Building Defects Fund (Denmark)
- "Schadis – Die Datenbank zu Bauschäden" of "Fraunhofer Institut IRB", www.irb.fraunhofer.de/schadis/
- The Building Pathology Study Group – PATORREB www.patorreb.com (Portugal),

Websites with publically available expertise reports, info sheets, etc., with an aggregated analyses of pathology experiences.

- The “Commission Prévention Produit” of the AQC (http://www.qualiteconstruction.com/c2p/role-et-missions.html) publishes twice a year a list of products that are likely to create damages and building pathology. These products are identified through the pathology collection procedure Sycodes.

- Publications on the NHBC-Foundation website www.nhbcfoundation.org/Researchpublications/Buildingsustainablehomesatspeed(NF48)/tabid/534/Default.aspx
- Building Research Establishment (BRE), Defect Action Sheets (1982-1990), and publications such as “Digests”, “Information Papers”, “Good Building Guides” and “Good Repair Guides”.
- http://www.structural-safety.org/reports/ where you can search for research reports, alert items etc. with all kinds of classifications.
- Summary data on pathology on the websites of BLP Insurance and Good Homes Alliance (UK)
- "Imparare dagli Errori", Italian pathology catalogue, developed by Prof. Enrico de Angelis of the Department of Science and Technology of the Constructed Heritage (BEST) at the Milan Polytechnic, http://wiki.pato.metid.polimi.it/@api/deki/files/1583/=impararedaglierrori.pdf
- “Cases of Failure Information Sheet”, in June 1993, the “Building Pathology” group of the CIB – W086 published a document entitled “Building Pathology: A State of the Art Report” (Beukel, A. et al, 1993), with a suggestion for a format for the preparation of pathology records
- The Building Pathology Study Group – PATORREB has created a website – www.patorreb.com, where a Pathology Catalogue compiled by seven Portuguese Universities has been posted). The website has been running since June 2004 and 98 Pathology
- “Handboek Bouwgebreken” (Belgium), issued by Kluwer and in which the BBRI co-operates. This cannot be consulted on-line.
- In France something similar exists: « La Pathologie des ouvrages de bâtiment : Fiches techniques pour l'établissement du diagnostic, la mise en oeuvre des solutions appropriées, la prévention et la résolution des litiges » issued by WEKA.
- Some of the research projects undertaken by "Institut für Bauforschung e.V.". www.bauforschung.de/index.php?c=wirueberuns deal with pathologies and how to avoid them www.bauforschung.de/index.php?c=forschung&u=aktuelle_projekte#140
- The "Bauschadensportal", www.bauschadensportal.de/ ; this website is the sales channel for the publications produced by the editing company FORUM VERLAG HERKERT GMBH

2.2 Agence Qualité Construction (France)

2.2.1 AQC and pathology context

The Agence Qualité Construction (AQC) is a French non-profit association that aims to prevent building defects and promote quality in construction (www.qualiteconstruction.com). The members of AQC are professional organisations

AQC activities are based on return of experiences. Since 1982 (date of creation of the AQC) AQC has developed tools on building defects and pathology knowledge.

AQC proposes several publically accessible tools from its web site.

REX BBC service is targeted to recent low energy buildings, which are not yet numerous. The existing data-gathering devices can’t meet properly requirements inherent to this new type of buildings. Moreover, AQC wishes to get a better knowledge and a qualitative approach concerning risks associated to Low energy buildings. Therefore AQC launched in 2010 this specific study on Return of EXperiences for Low energy buildings (REX BBC).

The aim of REX BBC is to:

- Avoid the emergence of a new generation of pathologies specific to Low energy buildings,
- Accompany construction actors who face these new technologies.

The CRAC-SYCODES data-gathering tool is fed by construction experts thanks to conclusions of their claim reports which are entered through a private access website.

The RPOPC directory is intended to professional for checking products requirements according to a given construction work. It includes links with pathology information handled by AQC.

2.2.2 REX BBC

Introduction

The REX BBC study takes form of a field investigation aimed to capitalise the "no quality" and the "opportunities of quality" met on each selected building operation. Data have been gathered *in-situ* during visits of Low energy buildings and thanks to meetings with actors who take part in their design, construction or use.

In 2011 AQC continued studying and involved partners who have got direct information sources (USH, CEQUAMI, CERQUAL...). Today, approximately 300 buildings cases are recorded in the REX BBC database.

REXBBC phases till end of 2011

- A first phase of investigation (May 2010 -> August 2010) takes into account 31 operations and lead to validate the modus operandi by the AQC.
- A second phase (November 2010 -> March 2011) allows increasing the panel: 19 additional operations.
- A third phase (Mai 2011->December 2011) allows visiting 161 additional operations thanks to AQC partners (CEQUAMI, CERQUAL, CERTIVEA, PACT, PROMOTELEC, USH). Most of these partners are involved in energy certification of buildings.

At the end of this investigation (end of 2011), the database contains 211 operations and 1 398 observations.

« Modus Operandi »

Low energy buildings panel selection

All buildings announced as Low energy buildings can be selected, even if they are not in a certification process.
Buildings are selected regarding to:

- The nature of works (renovation, new)
- The age of building
- The geographic zone

The panel must be as representative as possible of construction in France.

Interviews

Site visits are necessary to allow investigators understanding the context and taking pictures in order to illustrate observations. The interview is a one to one meeting and the investigator may meet more than one actor to get a more objective interpretation of origins of defects. The interview lasts between 1 and 3 hours according to the operation characteristics.

23 investigators have carried out visits and interviews; they are all buildings specialists with various profiles.

Investigators have been mandated by AQC partners (CEQUAMI, CERQUAL, CERTIVEA, PACT, PROMOTELEC, USH).

Database

The defects and pathology directory is filled by means of forms accessible through a private access website.

Recorded data are:
- Operation characteristics,
- Interview(s) (actor + visit) information,
- Defect(s) information.

An operation can gather one, or more than one interview, and zero or more than one defect.

The origins and impacts of recorded difficulties, dysfunctions, damages and defects are described. Corrective solutions and good practices are described too; they represent enhancement tracks for all construction actors.

The REXBBC database offers many functionality levels:
- An input interface to enter the return of experiences
- A search interface allowing data extraction:
  - By technical lots or elements,
  - By origins of defect,
  - By impacts.
- An administration interface allowing an administrative and technical management of gathering partner accounts and a real time access to statistical description of the operations panel.

Data consolidation

Specialists and experts are associated to the data restitution in order to give a feedback concerning the interpretation of trouble-shooting and criticality (risk level) that represents each new “non quality”.

REX BBC results will be compared with data providing of studies launched by European neighbours as Germany, Switzerland and Austria.

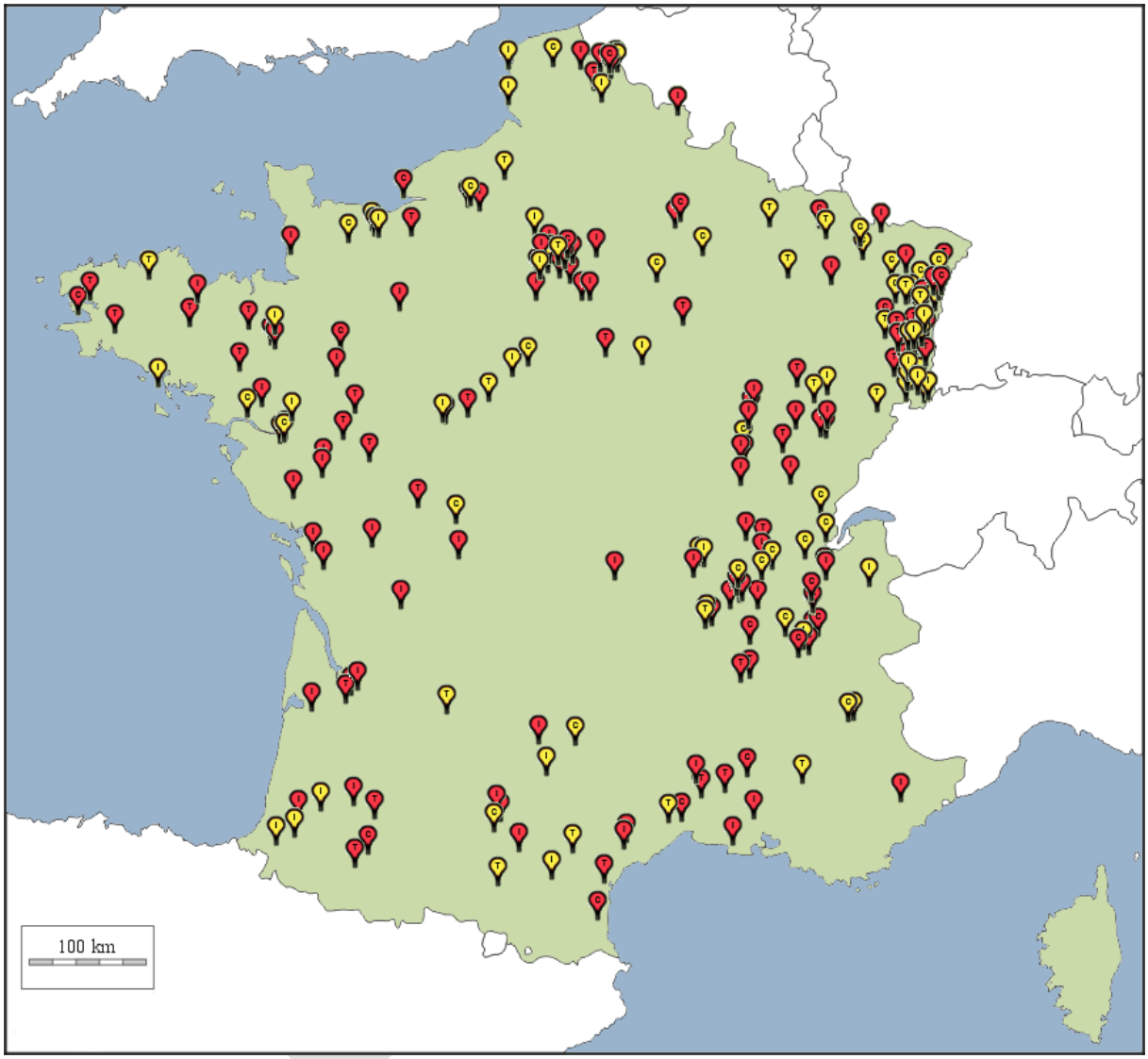
Recap of the “Modus operandi”

STEP 1	In situ interview with Low energy buildings actors. Data collection of “non quality” and “opportunities of quality”
STEP 2	Capitalisation of information in the database using a predefined nomenclature
STEP 3	Search and extraction in database according to defined requests
STEP 4	Results consolidation by experts and work group

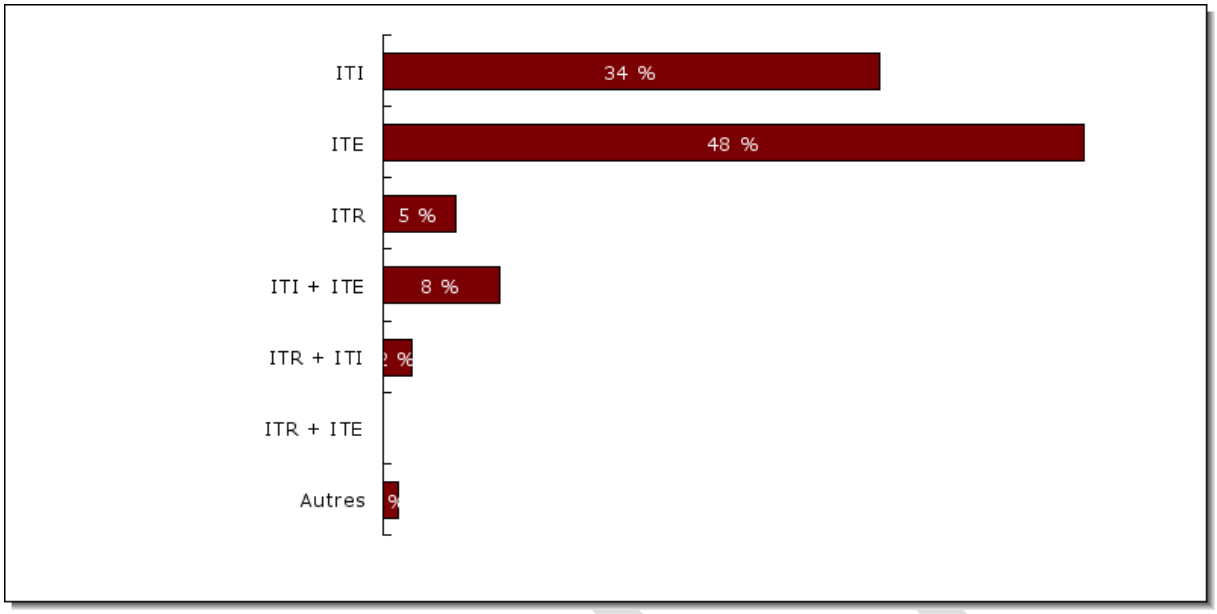
STEP 5	Dissemination and optimization of the results

Graph examples

These graphs are generated in real time by REXBBC website.



LEGEND	New	Existing
Dwelling house		
Collective accommodation		
Tertiary		



2.2.3 SYCODES

Since 1984, AQC has settled the project "SYCODES" (System of data collection for defects) that gives a picture of pathology in construction.
The aim is to offer to construction professionals a statistical feedback on technical causes of defects. Recently this dispositive was used too to assess the evolution of quality of construction.

Sycodes panel

Defects collected by SYCODES are the ones that lead to an insurance claim. Data collected are:

- Simplified Technical conclusions of construction experts reports
- Promoters' identification
- Operations destination
- Construction prices
- Dates
- Repair costs
- ...

Contributors

Contributors are the construction experts who establish declaration to insurance. Experts are pay between 4 and 8 € by declaration recorded in the SYCODES data base.

Database

SYCODES has gathered 340 000 average defects since 1995.

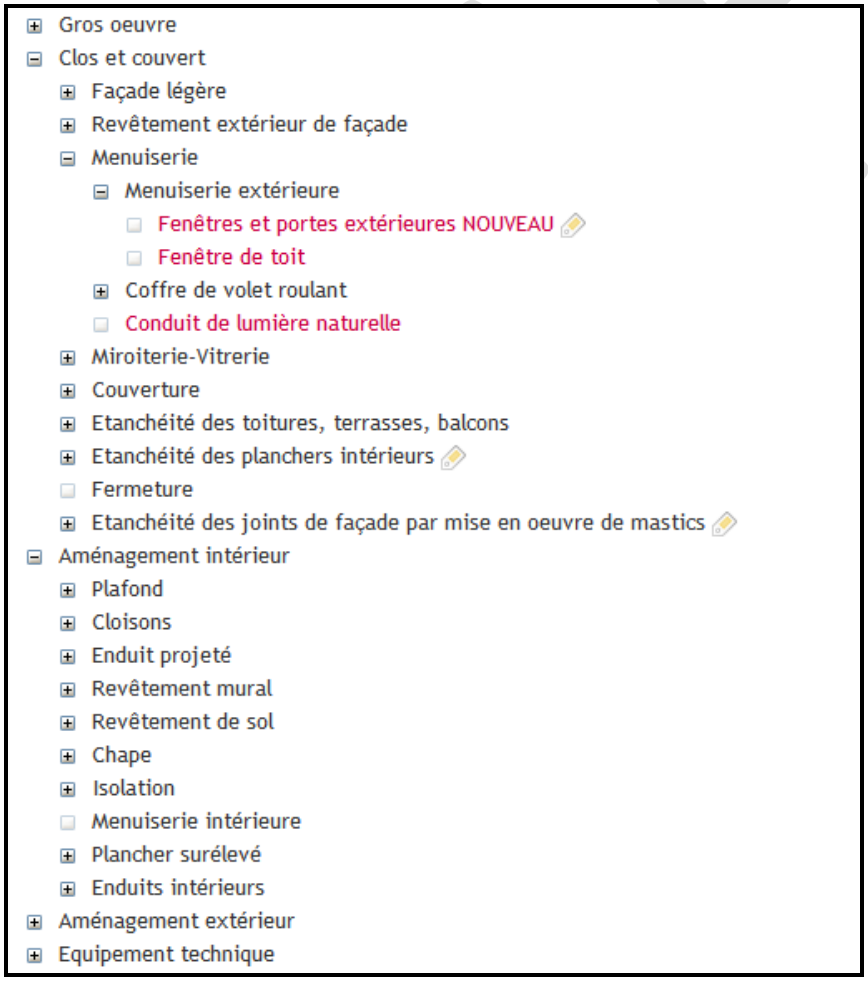
2.2.4 Répertoire permanent des ouvrages et produits de construction (RPOPC)

RPOPC principle

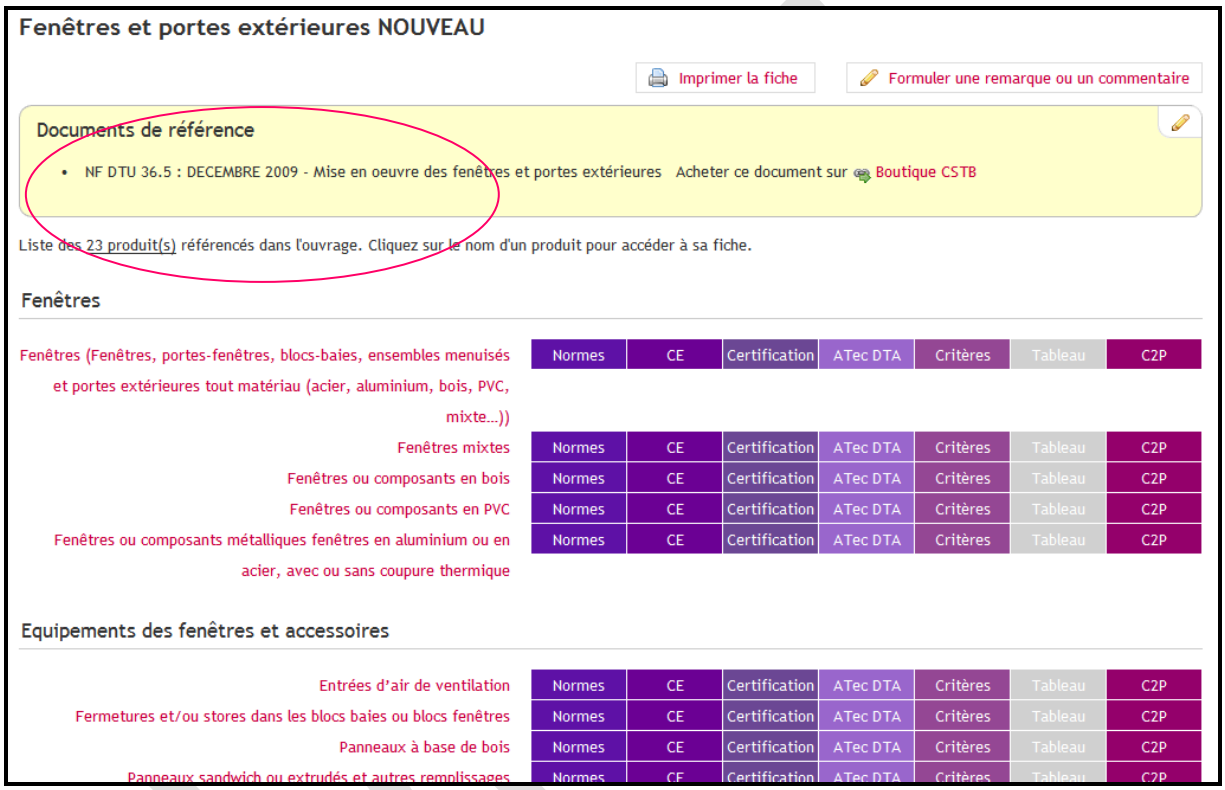
The "*Repertoire Permanent des Ouvrages et Produits de Construction*" (RPOPC stands for Permanent directory on construction works and products) was first launched in 2008. AQC is responsible for the website and CSTB brings its expertise for updating the content. The objective is to provide professionals with indications about the proper use and requirements of construction products, for a given work. Though, it combines information on both construction works and construction products. The added value is on the relationship between a construction task and the appropriate products to achieve this task. RPOPC doesn't provide links with commercial products, but it summarizes the main qualities required on the products, with reference to standards, technical approvals, CE marks, insurance, etc.

RPOPC content and use

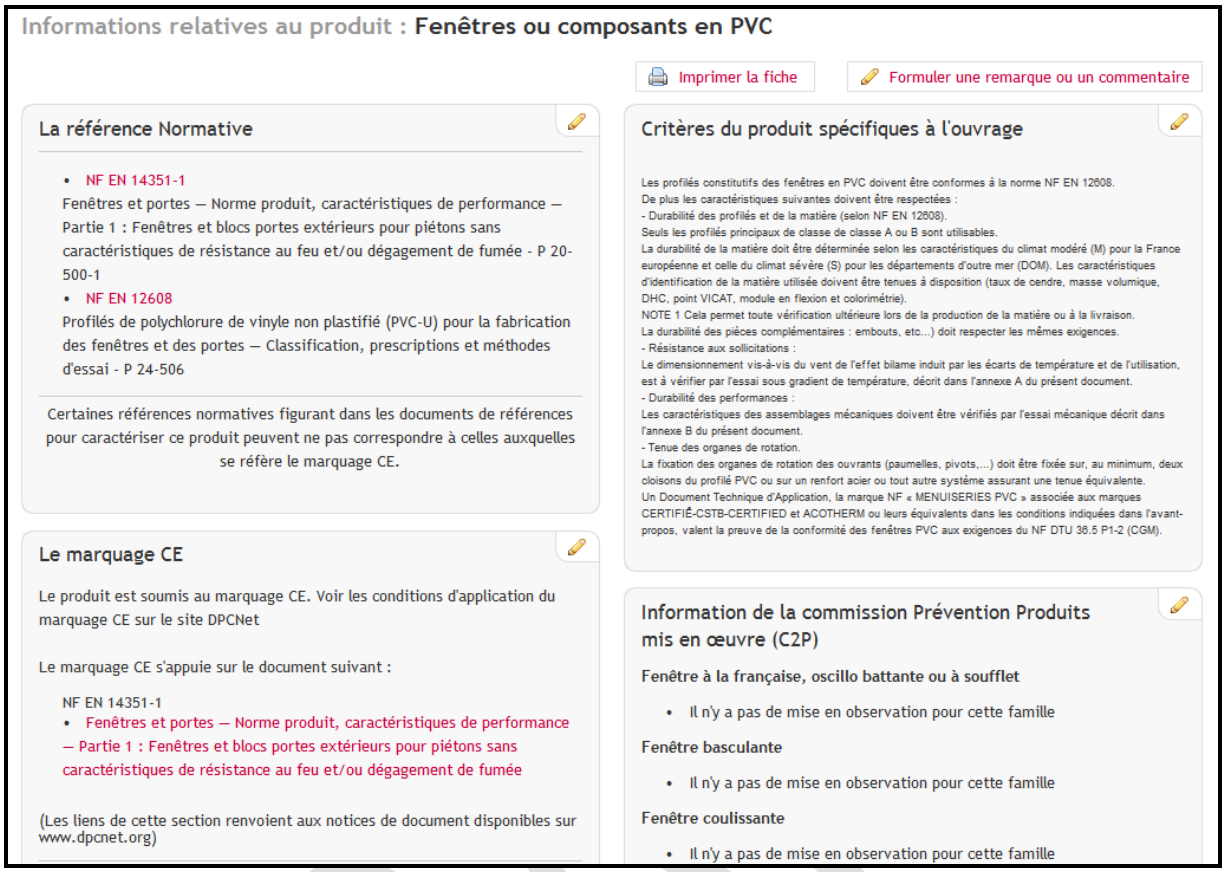
It starts with a classification of construction works, with several level and details. A user has first to reach and select the right construction works for his activity. The "construction works" tree is presented below, until the last level (i.e. "Fenêtres et portes extérieure").



After selecting the desired construction work, a work detail page is displayed, listing generic products that are likely to be used for this construction work. In most cases, this list includes one or several main products and also the associated useful accessories such as fixing devices, fittings, components, etc.
The list is build from the reference document which specifies and describes this particular construction work. All generic products mentioned in the reference document are listed in the RPOPC table.
The corresponding coloured box indicates the kinds of requirements which are relevant for each product (standards, CE mark, agreement, technical approval, specific criteria or pathology warning). The last column “C2P” refers to the pathology index managed by AQC.



The last step is the product information page
This final page gathers information split in different blocks. Each block contains detail on the above requirement, gives minimum reference and provides a link toward dedicated public website for further information.



Informations relatives au produit : **Fenêtres ou composants en PVC**

Imprimer la fiche | Formuler une remarque ou un commentaire

La référence Normative

- NF EN 14351-1

Fenêtres et portes — Norme produit, caractéristiques de performance — Partie 1 : Fenêtres et blocs portes extérieurs pour piétons sans caractéristiques de résistance au feu et/ou dégagement de fumée - P 20-500-1

- NF EN 12608

Profilés de polychlorure de vinyle non plastifié (PVC-U) pour la fabrication des fenêtres et des portes — Classification, prescriptions et méthodes d'essai - P 24-506

Certaines références normatives figurant dans les documents de références pour caractériser ce produit peuvent ne pas correspondre à celles auxquelles se réfère le marquage CE.

Le marquage CE

Le produit est soumis au marquage CE. Voir les conditions d'application du marquage CE sur le site DPCNet

Le marquage CE s'appuie sur le document suivant :

NF EN 14351-1

- Fenêtres et portes — Norme produit, caractéristiques de performance — Partie 1 : Fenêtres et blocs portes extérieurs pour piétons sans caractéristiques de résistance au feu et/ou dégagement de fumée

(Les liens de cette section renvoient aux notices de document disponibles sur www.dpcnet.org)

Critères du produit spécifiques à l'ouvrage

Les profilés constitutifs des fenêtres en PVC doivent être conformes à la norme NF EN 12608.
De plus les caractéristiques suivantes doivent être respectées :
- Durabilité des profilés et de la matière (selon NF EN 12608).
Seuls les profilés principaux de classe de classe A ou B sont utilisables.
La durabilité de la matière doit être déterminée selon les caractéristiques du climat modéré (M) pour la France européenne et celle du climat sévère (S) pour les départements d'outre mer (DOM). Les caractéristiques d'identification de la matière utilisée doivent être tenues à disposition (taux de cendre, masse volumique, DHC, point VICAT, module en flexion et colorimétrie).
NOTE 1 Cela permet toute vérification ultérieure lors de la production de la matière ou à la livraison.
La durabilité des pièces complémentaires : embouts, etc...) doit respecter les mêmes exigences.
- Résistance aux sollicitations :
Le dimensionnement vis-à-vis du vent de l'effet bilame induit par les écarts de température et de l'utilisation, est à vérifier par l'essai sous gradient de température, décrit dans l'annexe A du présent document.
- Durabilité des performances :
Les caractéristiques des assemblages mécaniques doivent être vérifiés par l'essai mécanique décrit dans l'annexe B du présent document.
- Tenue des organes de rotation.
La fixation des organes de rotation des ouvrants (paumelles, pivots,...) doit être fixée sur, au minimum, deux cloisons du profilé PVC ou sur un renfort acier ou tout autre système assurant une tenue équivalente.
Un Document Technique d'Application, la marque NF « MENUISERIES PVC » associée aux marques CERTIFIÉ-CSTB-CERTIFIED et ACOTHERM ou leurs équivalents dans les conditions indiquées dans l'avant-propos, valent la preuve de la conformité des fenêtres PVC aux exigences du NF DTU 36.5 P1-2 (CGM).

Information de la commission Prévention Produits mis en œuvre (C2P)

Fenêtre à la française, oscillo battante ou à soufflet

- Il n'y a pas de mise en observation pour cette famille

Fenêtre basculante

- Il n'y a pas de mise en observation pour cette famille

Fenêtre coulissante

- Il n'y a pas de mise en observation pour cette famille

Database and update

The RPOPC database contains cross references between documents and index. No full text document is stored in the database.
RPOPC update is performed mainly by CSTB, using a private back-office software developed on purpose.

The updating process consists in:

- evolution of the construction work classification
- input documents and attached them to the right item of the classification
- create the list of products related to a construction work
- edit information block contents for the product (standards, CE mark, agreement, ...)
- control external links
- ...

2.3 Danish Building Defects Fund

2.3.1 Description

The Danish Building Defects Fund (BDF) is a privately owned institution, as a kind of insurance arrangement for building defects in publicly subsidized housing. It was established by law in 1986 (The Law on Public Housing), as part of a quality and liability reform that same year. Since July 1st 1986, 1% of the initial construction expenses for all publicly subsidized housing schemes have been paid to the Fund.

The Building Defects Fund (BDF) comprises approximately 210.000 publicly subsidised housing estates, youth housing, and housing for the elderly, privately owned co-operative housing associations, and co-operative house shares. The Fund covers all building defects claims for the first twenty years and, as such, the oldest buildings comprised by the Fund are no longer covered by the Fund.

The buildings, which are covered by The Building Defects Fund, comprise some 40% of all construction of residential housing schemes since 1987. Measured in square footage, the buildings covered by the Fund, make up less than 20% of all building since 1987, be it business, public, or social housing schemes.

The database covers all 1- and 5-year inspections made since 1997.
They are available at www.byggeskadefonden.dk; however only in Danish. The content of the database is based on the 1- and 5-year inspections. The evaluation of the inspections, i.e. the placement of a specific building defect or building damage on a scale from 1 to 5, according to the description of levels below, is made by experts at the Building Defects Fund.

2.3.2 Description of levels of building defects and building damage

The Building Defects Fund operates with 5 levels of building defects and building damage

- Level 1: The building element is intact or has less significant building defects or building damage of insignificant extent. Sufficient information was present for all building elements. Regular service is sufficient.
- Level 2: The building element has less significant building defects or building damage of very modest extent. And/or information on less significant building elements is missing. Missing information should be provided. Recorded and eventual non-visible defects should be corrected or prevented by increased service.
- Level 3: The building element has significant building defects or building damage but with little extent. And/or information on significant building element s is missing. Missing information must be provided. Recorded and eventual non-visible defects must be corrected.
- Level 4: The building element has building defects or building damage to a great extent. It is likely that a building damage will develop or that a present building damage will develop further. Repairing is needed in continuation of the inspection.
- Level 5: The building element has serious building defects or damage that is of importance for the safety of persons. Immediate intervention is required.

It is considered a *building defect* when project documentation, a building material, a structure or a part of a structure lacks abilities which can be expected according to the construction contract, public requirements or good building practice. This means that a defect is seen as a technical

problem independently of the cause for the defect and independently of when the defect is observed. *Building damage* is used to describe unacceptable consequences of building defects.

2.3.3 Execution of building inspections

The Building Defects Fund has made guidelines (only in Danish) for the building inspector about how and what to look for.
http://www.byggeskadefonden.dk/media/29181/1-års_eftersyn_180413_low%20(2).pdf

When reporting the results of the 1- or 5-year inspection, the building inspector gets access to online tables where all building elements are listed. The Building Defects Fund focuses on building defects that can have significance for the service life of the building element and the indoor climate. This means that for instance neither the appearance nor the function of the building element is included. For instance is imperfect thermal insulation is only to be reported if it can result in thermal bridges, condensation or mould growth. The important building elements are accentuated in the online tables.

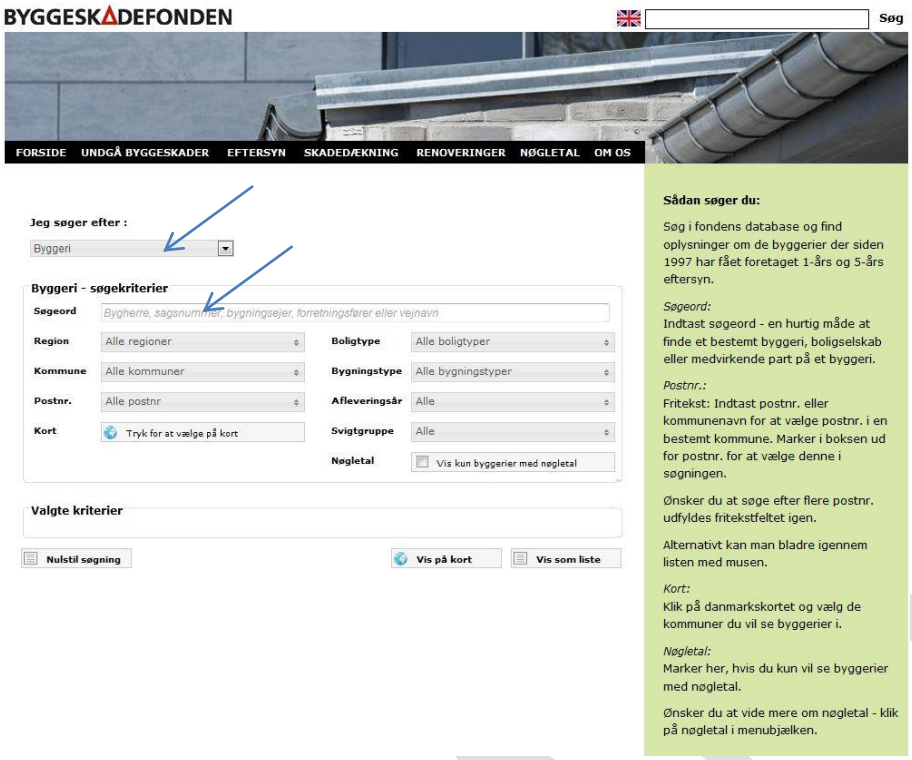
The building inspection is made as a random check in an extent that makes it representative for the specific housing estate. The building inspector chooses how to perform the building inspection based in his experiences. However, he should focus on building elements where the probability of building defects is largest and where the extent of building damage could be crucial.

2.3.4 Search for data from 1- and 5-year inspections in the database

The entrance to the database is placed at the right hand side of the webpage:

No kind of Login is needed.

When clicking on “Byggerier, eftersynsrapporter …” you meet this picture:



As search criteria for limiting the number of output one of the following parameters must be chosen:

- Building projects
- Client
- Manager
- Consulting engineer
- Contractor
- Cases with

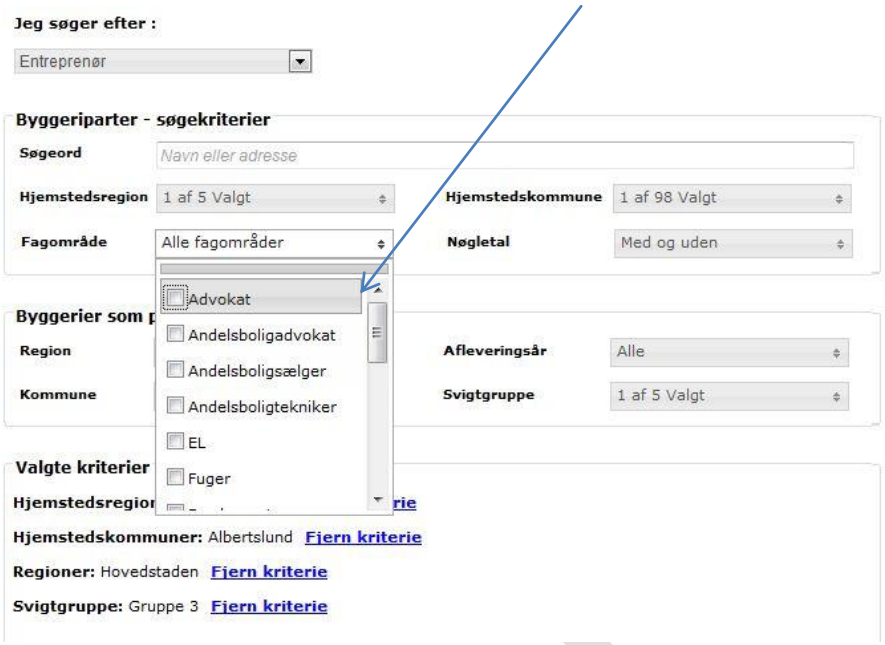
In most cases it is also possible to limit the search geographically by regions and municipalities by using the fields “Region”, “Kommune” or by zooming on a map by selecting “Kort”. It is also possible to search for a specific building project, a specific manager etc. by free text search.

Depending on whether “building projects” or one of the other parameters in the list above is chosen, a number of fields appear helping to define the search. If “building projects” is chosen, the following possibilities appear:

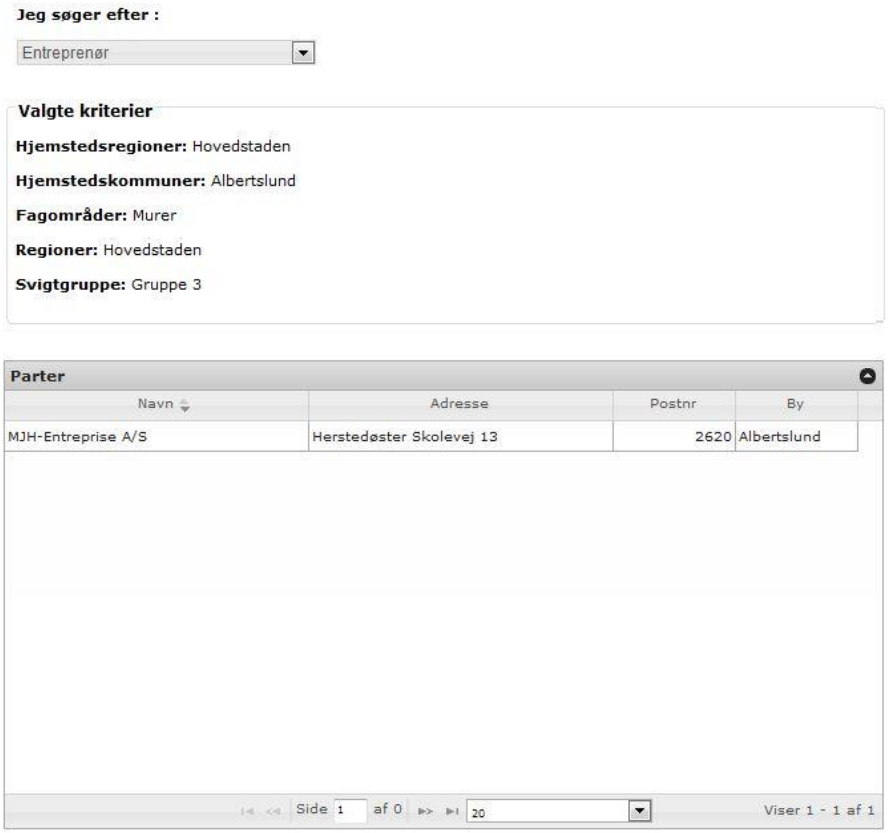
- Type of housing
- Type of building
- Year of delivery
- Severity of defects (5 levels)

as shown in “Byggeri – søgekriterier” above.

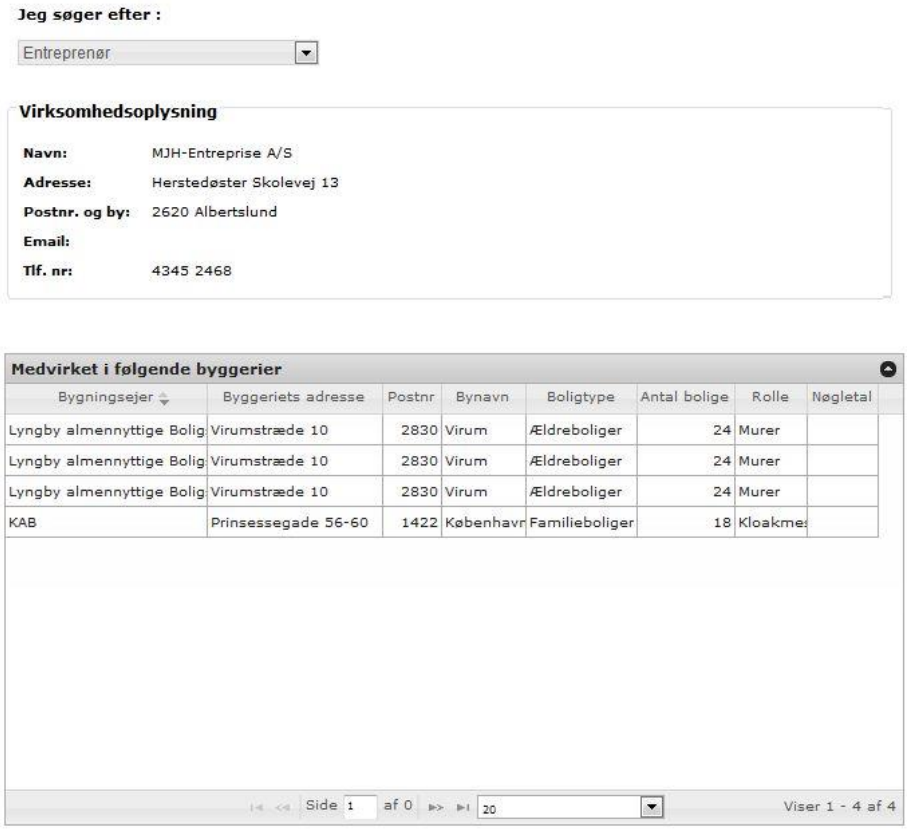
If “contractor” is chosen the type of contractor can be specified (19 types):



Further it is possible to specify the region and municipality where the contractor is located and the year of delivery. Then a list of contractors appears:



By clicking on one of the contractors in the list (in this case only one) a list of the building project he has been involved in in the specific year and geographical region appears:



By clicking on one of the building projects all details about this specific building project appears:

Jeg søger efter :

Entreprenør

Bebyggelseskort | 1- års eftersyn | 5- års eftersyn | Skadesager

Bebyggelse

24 1560 2004

Afdeling:	Solgården
Adresse:	Virumstræde 10
Kommune:	Lyngby-Taarbæk
J.nr.:	173-S028
Bygningstype:	Tæt-lav
Boligtype:	Ældreboliger

Bygherre

Navn:	Lyngby almennyttige Boligselskab
Ved:	DAB Dansk almennyttigt Boligselskab
Adresse:	Finsensvej 33
Postnr. og by:	2000 Frederiksberg

Forretningsfører

Navn:	DAB Dansk almennyttigt Boligselskab
Adresse:	Finsensvej 33
Postnr. og by:	2000 Frederiksberg

Rådgivere

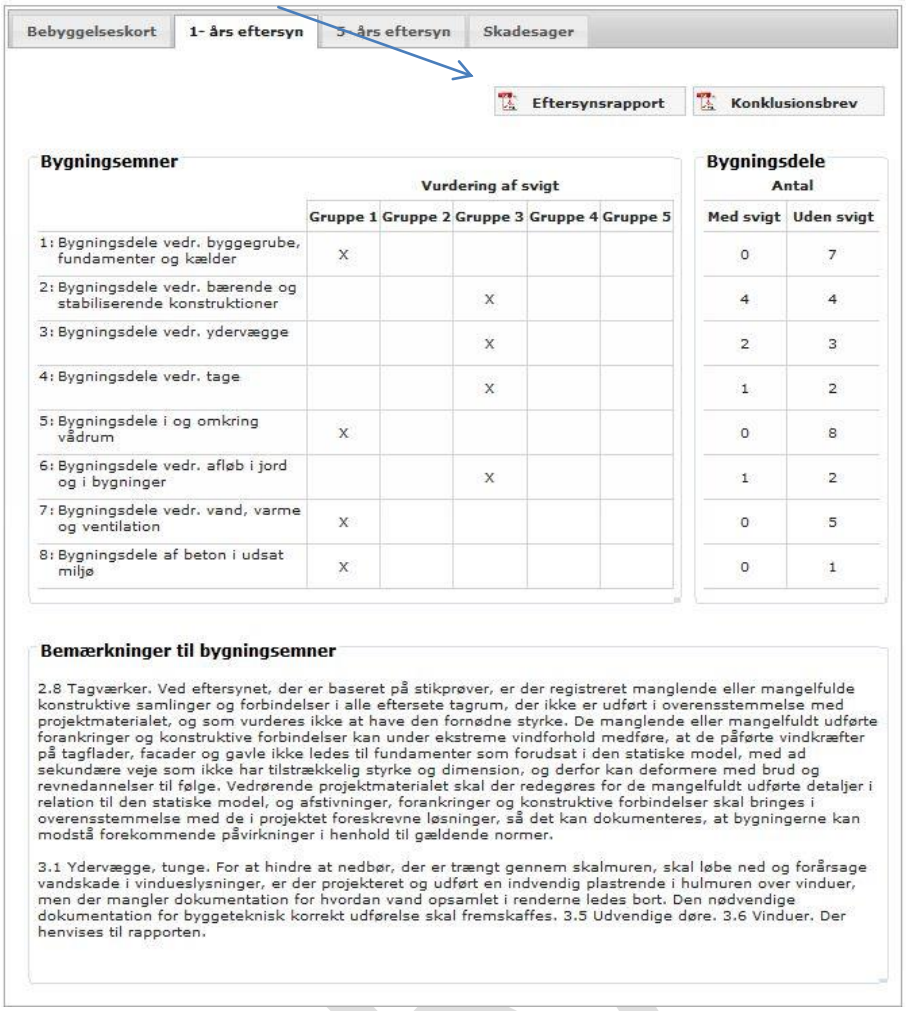
Installationsingeniør:	Dominia AS, Rådgivende ingeniører
Landskabsarkitekt:	Pia Stets Landskabsarkitekt M.D.L.

Entreprenører

Hov:	ELINDCO Byggefirma A/S
Murer:	MJH-Entreprise A/S
Fundament:	MJH-Entreprise A/S
Råhus:	Contiga Tinglev A/S
VVS:	John Jensen A/S, VVS-installationer
EL:	L. & C.-El, Larsen & Christensen A/S
Maler:	Gundsø Malerforretning af 1987 A/S
Kloakmester:	MJH-Entreprise A/S
Øvrige entreprenører:	Kecon A/S
Tagdækker:	Hetag Tagdækning A/S

"Bebyggelseskort" (shown above) summarizes the building project including the involved partners.

"1-års eftersyn" and "5-års eftersyn" summarizes the results of the 1- and 5-year inspection expressed as the severity of defects and the number of building elements in the specific case with and with defects. The summary is made by the Building Defects Fund. Notes to specific building elements are placed at the bottom of the page.



Bebyggelseskort | 1- års eftersyn | 5- års eftersyn | Skadesager

Eftersynsrapport | Konklusionsbrev

Bygningsemner

	Vurdering af svigt				
	Gruppe 1	Gruppe 2	Gruppe 3	Gruppe 4	Gruppe 5
1: Bygningsdele vedr. byggegrube, fundamenter og kælder	X				
2: Bygningsdele vedr. bærende og stabiliserende konstruktioner			X		
3: Bygningsdele vedr. ydervægge			X		
4: Bygningsdele vedr. tage			X		
5: Bygningsdele i og omkring vådrum	X				
6: Bygningsdele vedr. afløb i jord og i bygninger			X		
7: Bygningsdele vedr. vand, varme og ventilation	X				
8: Bygningsdele af beton i udsat miljø	X				

Bygningsdele

Antal	
Med svigt	Uden svigt
0	7
4	4
2	3
1	2
0	8
1	2
0	5
0	1

Bemærkninger til bygningsemner

2.8 Tagværker. Ved eftersynet, der er baseret på stikprøver, er der registreret manglende eller mangelfulde konstruktive samlinger og forbindelser i alle eftersete tagrum, der ikke er udført i overensstemmelse med projektmaterialet, og som vurderes ikke at have den fornødne styrke. De manglende eller mangelfuldt udførte forankringer og konstruktive forbindelser kan under ekstreme vindforhold medføre, at de påførte vindkræfter på tagflader, facader og gavle ikke ledes til fundamenter som forudsat i den statiske model, med ad sekundære veje som ikke har tilstrækkelig styrke og dimension, og derfor kan deformere med brud og revnedannelser til følge. Vedrørende projektmaterialet skal der redegøres for de mangelfuldt udførte detaljer i relation til den statiske model, og afstivninger, forankringer og konstruktive forbindelser skal bringes i overensstemmelse med de i projektet foreskrevne løsninger, så det kan dokumenteres, at bygningerne kan modstå forekommende påvirkninger i henhold til gældende normer.

3.1 Ydervægge, tunge. For at hindre at nedbør, der er trængt gennem skalmuren, skal løbe ned og forårsage vandskade i vindueslysninger, er der projekteret og udført en indvendig plastrende i hulmuren over vinduer, men der mangler dokumentation for hvordan vand opsamlet i renderne ledes bort. Den nødvendige dokumentation for byggeteknisk korrekt udførelse skal fremskaffes. 3.5 Udvendige døre. 3.6 Vinduer. Der henvises til rapporten.

"Eftersynsrapport" (indicated by arrow above) contains the observations made by the company performing the inspection, including photographs.

Emne 3
Bygningsdele vedr. ydervægge

Bygningsejer	Boligforeningen af 1983 Finlandsgade 2 8200 Aarhus N.	Komm. lbnr.: 751-S358-K BOSSID: 751 0300 11-10-2000 01	Bygningsdel: 3.6 Vinduer		
Afdeling	Silkeborgvej Herningvej 1 8000 Aarhus C	E-firmanummer: 779-E001 Tidl. eftersynsdato: 14-04-2006	Bilag nr.: 3.6.1		

Bilag

Lydrude med revnedannelser

Electronic filing of reports was introduced in 2003/2004. Older cases contain no link to the reports ("Eftersynsrapport").

A page in a report is shown here:

Emne 1

Bygningsdele vedr. byggegrube, fundamenter og kælder

			A eftersyn			B eftersyn		
Bygningsejer	Lyngby almennyttige Boligselskab v/DAB Dansk almennyttigt Boligselskab Finsensvej 33 2000 Frederiksberg	Komnr. lbnr.: 173-S028-S BOSSID: 173 0040 28-10-2002 01	Ingen registrerede svigt	Byggeteknisk svigt	Eftersyn ikke muligt	Ingen registrerede svigt	Byggeteknisk svigt	Eftersyn ikke muligt
Afdeling	Solgården Virumstræde 10 2830 Virum	E-firmanr.: 189-E001 Tidl. Eftersynsdato: 25-10-2004						

Eftersete bygningsdele

1.1	Forberedt grund Almindelig afgravning, tilfyldning og terrænregulering	☐	☐	☒	☒	☐	☐
1.2	Liniefundamenter Beton afsluttet med blokke af letklinkerbeton	☐	☐	☒	☒	☐	☐
1.3	Punktfundamenter - -	☐	☐	☐	☐	☐	☐
1.4	Terrændæk i terrænniveau Direkte funderet terrændæk med kapillarbrydende isolering, beton, gulvopbygning	☐	☐	☒	☒	☐	☐
1.5	Terrændæk i kældre Kapillarbrydende isolering, beton, gulvopbygning	☐	☐	☒	☒	☐	☐
1.6	Kælderydervægge In situ beton, vandtætning, drænende isolering	☐	☐	☒	☒	☐	☐
1.7	Kælderindervægge Letklinkerbetonelementer	☒	☐	☐	☐	☐	☐
1.8	Dæk over kældre, krybekældre m.v. In situ betondæk, isolering, gulvopbygning	☒	☐	☐	☐	☐	☐
1.9	- -	☐	☐	☐	☐	☐	☐
1.10	- -	☐	☐	☐	☐	☐	☐
1.11	- -	☐	☐	☐	☐	☐	☐
1.12	- -	☐	☐	☐	☐	☐	☐

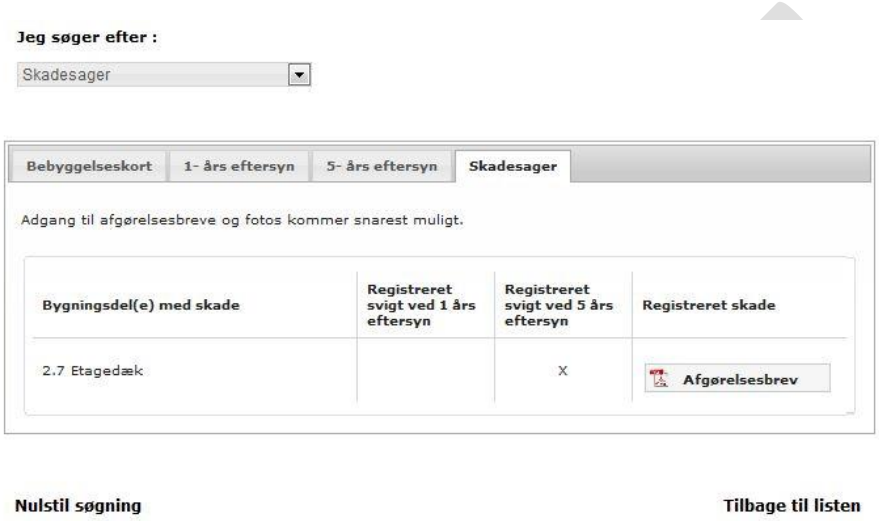
The inspection covers the following 9 building elements:

- Excavation foundations and basement
- Structural and stabilizing elements
- Outer walls
- Roof constructions
- Wet room
- Drainage in ground and buildings
- Water, heat and ventilation
- Concrete in aggressive environment
- Other elements

Each of these is subdivided resulting in 65 different building elements. For the relevant building elements it is noted whether there is a building defect or not or whether it was impossible to get access to the building element.

Prepared tables are used by the inspector as exemplified above, but the database does not contain a predefined catalogue of defects.

"Skadesager" contains the most severe defects (level 4 and 5) and the handling of these ("Afgørelsesbrev" on the print screen below). Only those defects are covered by the Building Defects Fund.



The building project is the main entrance to the data. This means that only when searching on "Skadesager" it is possible to use building elements as search criteria.

2.3.5 Repair costs and liability

For each case the repair costs related to level 4 or 5 building damage is calculated at different stages:

- based on the inspection report (estimate)
- based on further investigations afterwards (more precise estimate)
- based on the real costs

These data are not included in the database but only presented as generic data in the annual report from the Building Defects Fund.

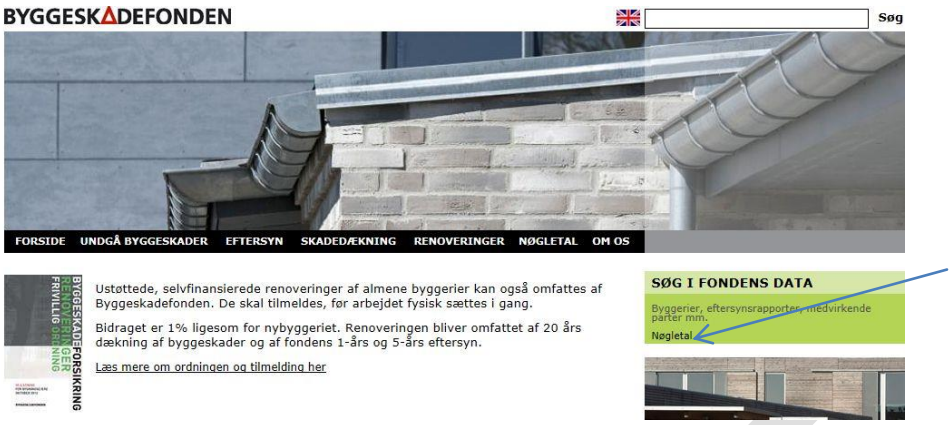
The question of who is liable is not included in the database.

2.3.6 Search for key performance indicators

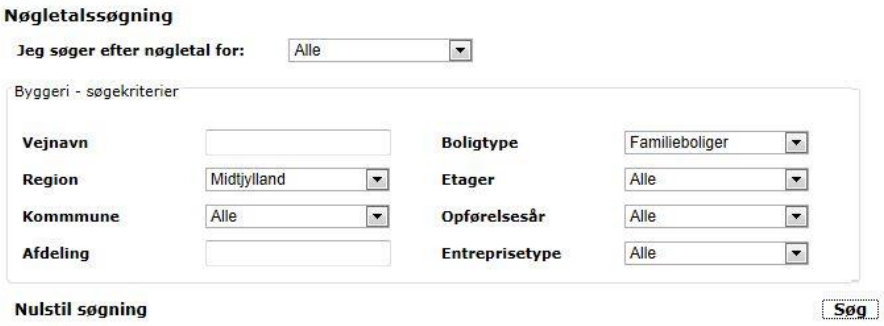
The database also gives the opportunity to search for

- building projects where the involved partners have delivered key performance indicators
- key performance indicators for specific clients, consulting engineers or contractors.

This includes all building projects that have received subsidy from the municipality after March 1, 2007.



By clicking on "Nøgletal" (see above) the following picture appears:



In this example a specific region and type of housing ("Boligtype") is chosen. The result if this search is presented as a list of clients, consulting engineers and contractors:

Nøgletalssøgning

vis søgekriterier

Søgeresultat

Der blev fundet nøgletal for 117 opgaver, der matchede dine søgekriterier:

Type	Navn	Fagområde	Ved byggeriet	Postnr.	By
Entreprenør	Jorton A/S	Hovedentreprenør	Andr Steenbergs Plads 2	8700	Horsens
Rådgiver	D.A.I. Arkitekter Ingeniører A/S	, Arkitekt, ...	Andr Steenbergs Plads 2	8700	Horsens
Entreprenør	Hjem A/S	Totalentreprenør	Blæsenborgparken 11 - 30	6950	Ringkøbing
Rådgiver	Bay Arch - Ringkøbing V/Christian Bay-Jørgensen	Arkitekt, By ...	Blæsenborgparken 11 - 30	6950	Ringkøbing
Entreprenør	Chr. Johannsen´S Eftf. Østjylland A/S	Totalentreprenør	Buskelundhøjen 33	8600	Silkeborg
Rådgiver	D.A.I. Arkitekter Ingeniører A/S	Totalrådgiver	Buskelundhøjen 33	8600	Silkeborg
Entreprenør	Benth's Tømrerforretning Aps	Tømrer	Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Bl - Klima V/Benny Lyngbak		Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Gudenå Elservice Aps	EL	Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Hans Ikjær Entreprenørforretning Aps	, Kloakmester	Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Bravida Danmark A/S	, VVS	Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Morten Friis A/S	Murer	Bygaden 60 A, B, C og D	8700	Horsens
Rådgiver	Rambøll Danmark A/S	Byggeledelse ...	Bygaden 60 A, B, C og D	8700	Horsens
Entreprenør	Aaskov Vvs V/D A Eriksen	, , VVS	Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Godthaab Entreprenørforretning Aps	, , Kloakmester	Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Tømrermester Theodor Søgård	Tømrer	Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Dauding Smede- & Maskinfabrik Aps		Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Isenvad Tømmerfirma V/Teddi Jakobsen	Tømrer	Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Murerfirmaet Leif Dag Nielsen Aps	Murer	Byhaven 2, st. dør 3 & 4, 1. dør 3 & 4, 2. dør 3 & 4	7480	Vildbjerg
Entreprenør	Dansk Boligbyg A/S	Totalentreprenør	Damgårdstoften 59	8320	Mårslet
Rådgiver	Årstiderne Arkitekter Herning A/S	Byggeledelse ...	Emil Ernsts Vej 128 - 146	7442	Engesvang
Entreprenør	Jørgen Friis Poulsen A/S	Murer	Emil Ernsts Vej 128 - 146	7442	Engesvang
Entreprenør	Isenvad Tømmerfirma V/Teddi Jakobsen	Tømrer	Emil Ernsts Vej 128 - 146	7442	Engesvang
Entreprenør	Designa A/S	Øvrige entre ...	Emil Ernsts Vej 128 - 146	7442	Engesvang
Entreprenør	Engesvang Entreprenørservice V/Johnny Nielsen	Kloakmester	Emil Ernsts Vej 128 - 146	7442	Engesvang

By selecting one of these companies the key performance indicators for this company is shown:

Nøgletalssøgning

vis søgekriterier

Entreprisenøgletal

Isenvad Tømmerfirma V/Teddi Jakobsen, Tyvkærvej 33, 7430 Ikast
Email: mrtjacobsen@live.dk **Web:** www.isenvadtømrerfirma.dk
Fagområde: Tømrer- og snedkerarbejde
Entreprisetype: Fagentreprise

Byggeriinformation		
Afdeling: 640		
Emil Ernsts Vej 128 - 146	7442	Engesvang
Bygherre: Bomidtvest		Byggeritype: Familieboliger

Område	Nøgletal	Virksomhedens resultat[1]
Tidsfrister[2]	Faktisk udførelsestid i forhold til planlagt udførelsestid korrigeret for tidsfristforlængelser.	100 %
Mangler[3]	1. Antal kosmetiske mangler	4,8 pr. mio. kr.
	2. Antal mindre alvorlige mangler	0 pr. mio. kr.
	3. Antal alvorlige og kritiske mangler	0 pr. mio. kr.
	4. Antal forhold, der skal undersøges nærmere	0 pr. mio. kr.
	Økonomisk værdiansættelse af mangler	0 %
	Var der mangler, som vanskeliggjorde eller forhindrede den forudsatte brug af væsentlige dele af byggeriet?	Nej
Arbejdsulykker	Ulykkesfrekvens udtrykt som antal anmeldte arbejdsulykker sat i forhold til entreprisesummen opgjort pr. mia. kr.	0 ulykker pr. mia. kr.
	Bygherrens tilfredshed med byggeprocessen[4]	3,8

The key performance indicators focuses on the ability to comply with time schedules, the number of deficiencies and the related cost, the number of accidents at work and the customer satisfaction.

2.4 Pathology handling system of NHBC (UK)

NHBC is a standard setting body, not solely an insurance company.

Standards
NHBC Standards are the 'bible' for the registered house builder and provide a benchmark for acceptable levels of design, materials specification and workmanship. They are also an essential part of NHBC's risk management, having the right standards for, say, foundations helps us to keep foundation-related problems to a minimum.

Inspection
NHBC inspects all homes during construction at defined stages which focus on key areas of risk. Where, through assessment, additional risk is identified (e.g. due to the type of construction or the experience of the builder), we undertake additional inspections

NHBC inspection staff on site are able to provide support to house builders and to discuss any particular concerns or issues. However, where defects or items are identified that require further attention, these are recorded and the builder must verify that appropriate remedial action has been taken. Data gathered during inspections is reported back to builders and this allows them to change practice in order to improve future performance to avoid similar issues arising.

Reducing the number of defects through inspection is clearly of benefit to the homeowner and the house-builder and is a key tool in the management of NHBC's insurance risk.

Claims
If a homeowner has a problem with their property and their home has an NHBC's warranty, NHBC Claims may be able to help them. The type of service offered depends on when the defect was noticed and reported.

The Resolution Service
If a home is less than two years old, the builder is responsible for putting right any defects that the homeowner reports to them during that time.

If a dispute arises between the builder and homeowner, we may be able to offer our Resolution Service to try and resolve that dispute, initially by liaising between both parties. If necessary, an NHBC Claims Investigator will make recommendations as to whether the builder should take action. If the builder does not, or cannot, carry out the Claims Investigator's recommendations, we may deal with the matter as an insurance claim, and arrange the work to be carried out.

Insurance cover
The insurance cover provided by NHBC will depend on the type of policy issued, and the age of the home. Where appropriate, a Claims Investigator will meet with the homeowner (and sometimes the builder) at the property. If we consider that the damage or defect is covered by the policy, we will accept the claim and arrange for repairs to be carried out. The repairs may be carried out by the original builder, by one of our approved Remedial Work Contractors, or we may make a payment to the homeowner so that they can arrange the works themselves.

Collecting information

The handling system is NHBC standards. All claims, defeats etc are recorded against the standards. These are the input fields: NHBC standards. The claim is registered against a standard which gives us the information we need about the defect.

Inspection and Claims use defect coding systems that are based upon the Chapter and Clause numbers contained within NHBC's Standards, thus enabling easy reference to the area of work affected, which could relate to design, materials or workmanship. The codes are input to a comprehensive computer based systems which enable a wide range of detailed interrogation and reporting.

Audit and feedback

On a regular basis we review overall information arising from inspection and claims experience and other feedback, analysing data and providing statistical summaries and identifying trends. This information is fed back to the industry and is also used by NHBC to continue to raise standards through, for example, amendments to the NHBC Standards, arranging training or providing guidance as appropriate.

2.5 Structural-Safety database, combining CROSS reports and SCOSS documents

The database

The Structural-Safety database contains all the CROSS reports that have been published and SCOSS documents including Alerts, Biennial Reports, Bulletins, Topic Papers and others.

SCOSS

The Standing Committee on Structural Safety (SCOSS) is the independent body established in 1976 to maintain a continuing review of building and civil engineering matters affecting the safety of structures. SCOSS aims to identify in advance those trends and developments which might contribute to an increasing risk to structural safety.

The prime function of SCOSS is to identify in advance those trends and developments which might contribute to an increasing risk to structural safety. To that end, SCOSS interacts with the professions, industry and government on all matters concerned with design, construction and use of building and civil engineering structures.

SCOSS reports directly to the Presidents of the Institutions of Structural Engineers and Civil Engineers and liaises with the respective Directors of Engineering. Its Reports are published biennially whilst Bulletins, Alerts and Topic Papers are published from time to time to draw attention to SCOSS's recommendations and to encourage the collection and dissemination of experiences likely to foster the avoidance of structural failures and a greater measure of structural reliability.

CROSS

Confidential Reporting on Structural Safety is the scheme established by SCOSS in 2005 to improve structural safety and reduce failures by using confidential reports to highlight lessons that have been learnt, to generate feedback and to influence change. Reports sent to CROSS are completely confidential and neither personal details nor information that could be used to identify a project or product are seen by anyone other than the CROSS director. CROSS has established a successful confidential reporting system based on those used by the aviation industry and publishes Newsletters containing de-identified reports with comments from a panel of experts. Published reports are held on the data base.

Support has been given by several UK government departments, including Department for Communities and Local Government, the Highways Agency and the Scottish Building Standards Agency. The Local Authority Building Control organisation which represents all building control departments in England is also a supporter as are major firms and representative organisations.

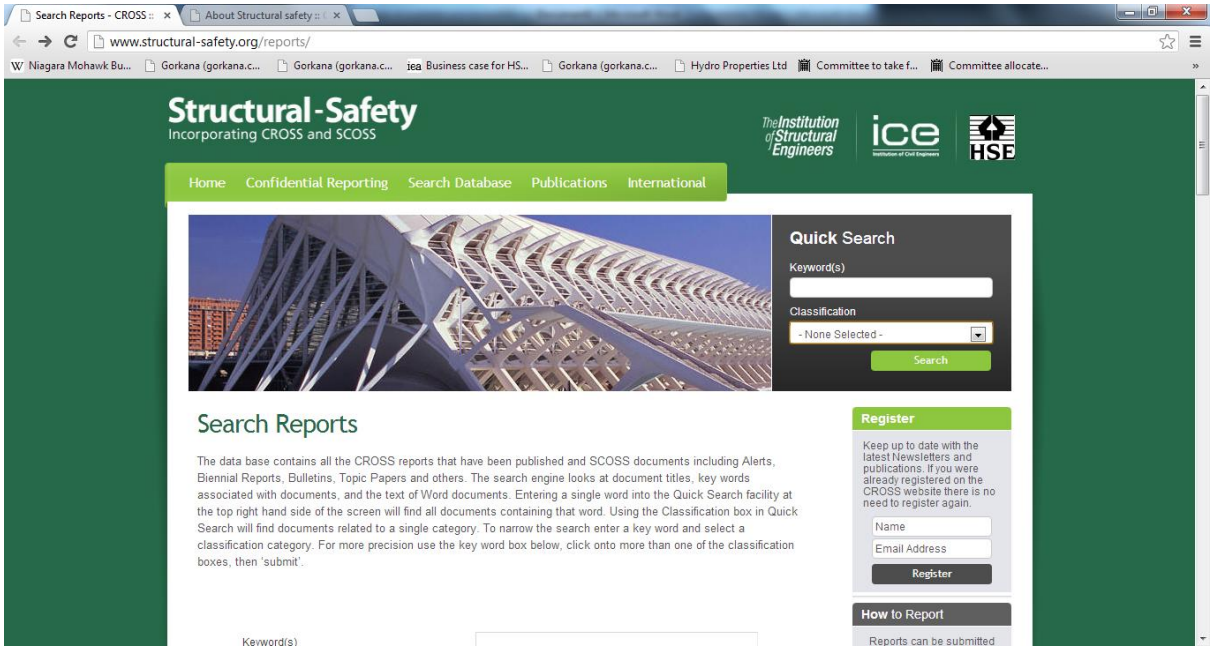
Anyone involved in the building and civil engineering professions, but especially civil engineers and structural engineers, can report to the scheme. Complete confidentiality is maintained and there are procedures to ensure that this is strictly complied with. Anonymous reports will not be accepted because the contents cannot be verified. and advice cannot be provided on urgent matters.

Financing of the database

The funding by CROSS comes from a range of sources, including several UK government departments (Department for Communities and Local Government, the Highways Agency and the Scottish Building Standards Agency and Local Authority Building Control), major firms and representative organisations.

Using the database

No login is required.
The data base is navigated via the search engine, which looks at document titles, key words associated with documents, and the text of Word documents.
Search terms can be inputted at the top right, in the quick search box:



When using the quick search box you can also allocate the search term to a category from the classification list.

The full breakdown of classifications is as follows:

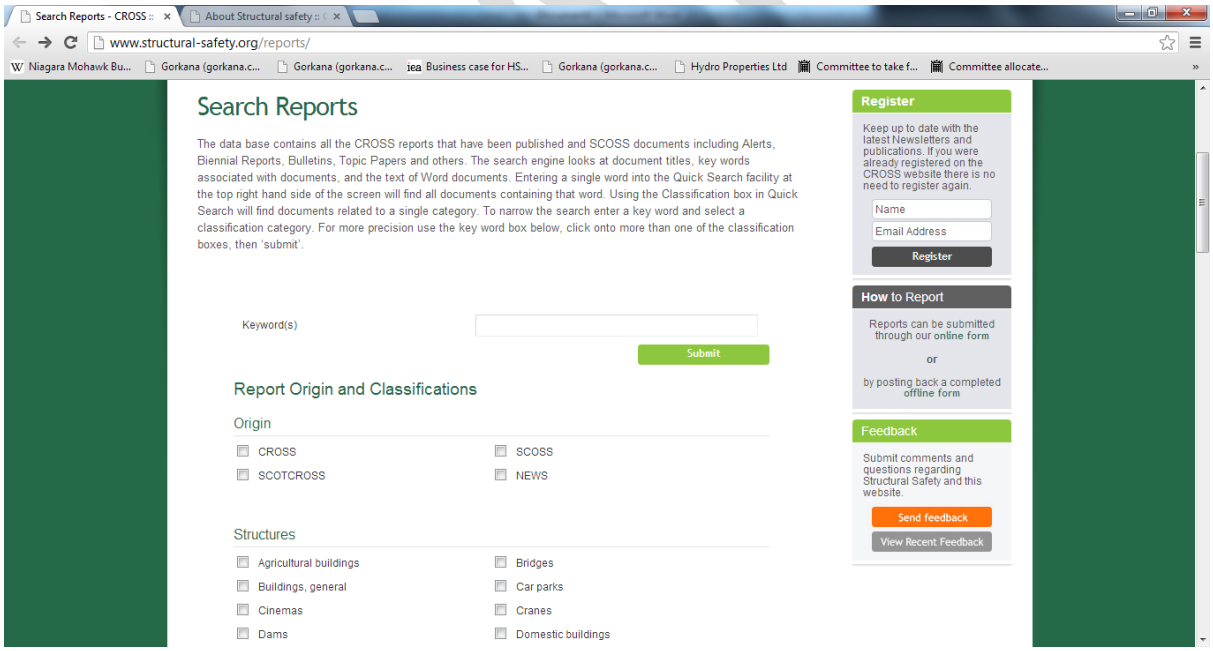
Structures	Materials	Building Elements	Concern	Process	Failure
-Agricultural Buildings -Bridges -Buildings, general -Car parks -Cinemas -Cranes -Dams -Domestic buildings -Earthworks -Factories -Freestanding walls -Highways -Marine -Masts and towers -Multi purpose structures -Multi storey buildings -Other -Power stations -Railways -Retaining walls -Scaffolding -Schools -Sewers -Shopping areas -Stadia -Swimming pools -Temporary structures -Temporary works -Theatres and other entertainment	-Aluminium -Brickwork and blockwork -Composites -Concrete -Glass -Masonry (Unclassified) -Other -Resin -Shotcrete -Steel -Stone -Timber	-Balconies -Barriers and handrails -Basements -Beams -Bearing -Ceilings -Chimneys -Cladding -Columns -Connections -Equipment -Facades -Fixings -Floors -Foundations -Frames -Ground anchors -Joists -Other -Piles -Roofs -Slabs -Stairs -Trusses -Walls	-Appointment -Building Control -Building regulations -Checking -Climate change -Codes and standards -Communications -Compliance -Contracts -Corrosion -Deformation -Design -Deterioration -Disproportionate collapse -Documentation -Drainage -Dynamics -Education and training -Equipment -Explosions -Extreme weather -Fees -Fire -Gas -Groundwater -Impact -Loadings (vertical) -Materials -Near hits and near misses -Other -Products -Quality -Reinforcement -Responsibility -Risk -Robustness -Safety reporting -Seismic -Software	-Change of use -Construction -Demolition -Design -Erection -Excavations -Falsework -Form work -In use -Inspections -Maintenance -Other -Refurb /Alterations -Repair -Scaffolding -Temporary works -Underpinning -Workmanship	-Collapse -Component failure -Falling items -other

-Towers -Tunnels -Underpasses -Underwater -Walkways			-Soils -Stability -Supervision -Techniques -Temperature -Welding -Wind loading -Workmanship		

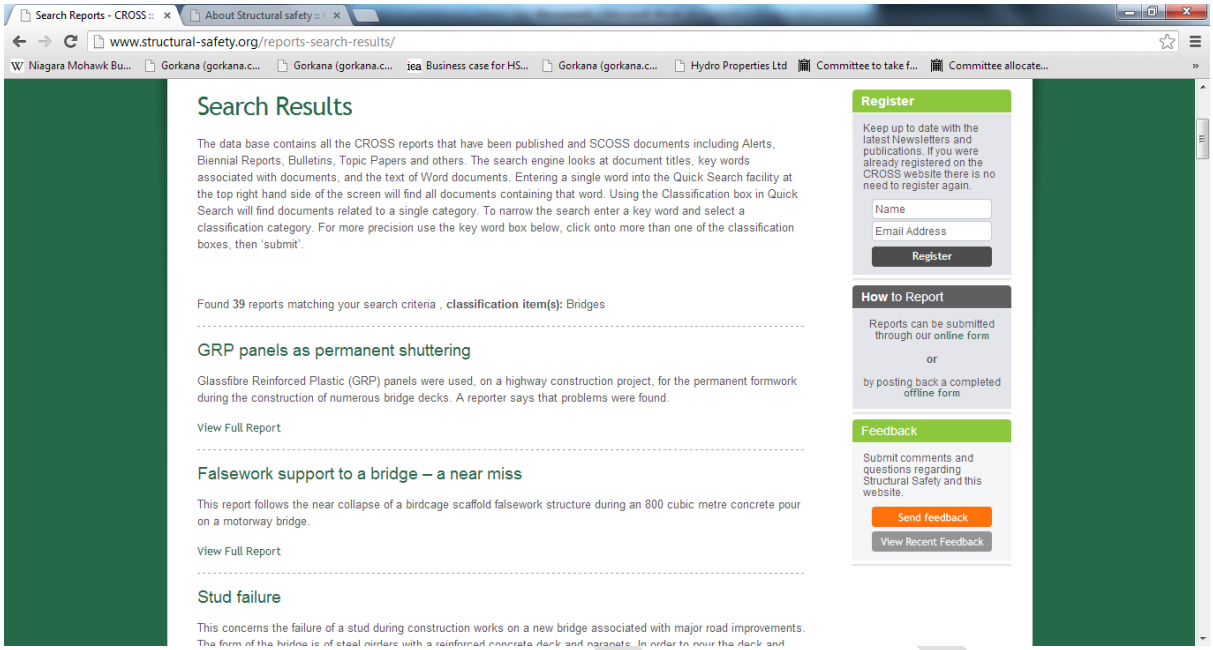
In order to execute a more precise search you can also narrow the search using more than one classification box in the main Search Reports function.

This option also allows you to narrow the search by report origin.

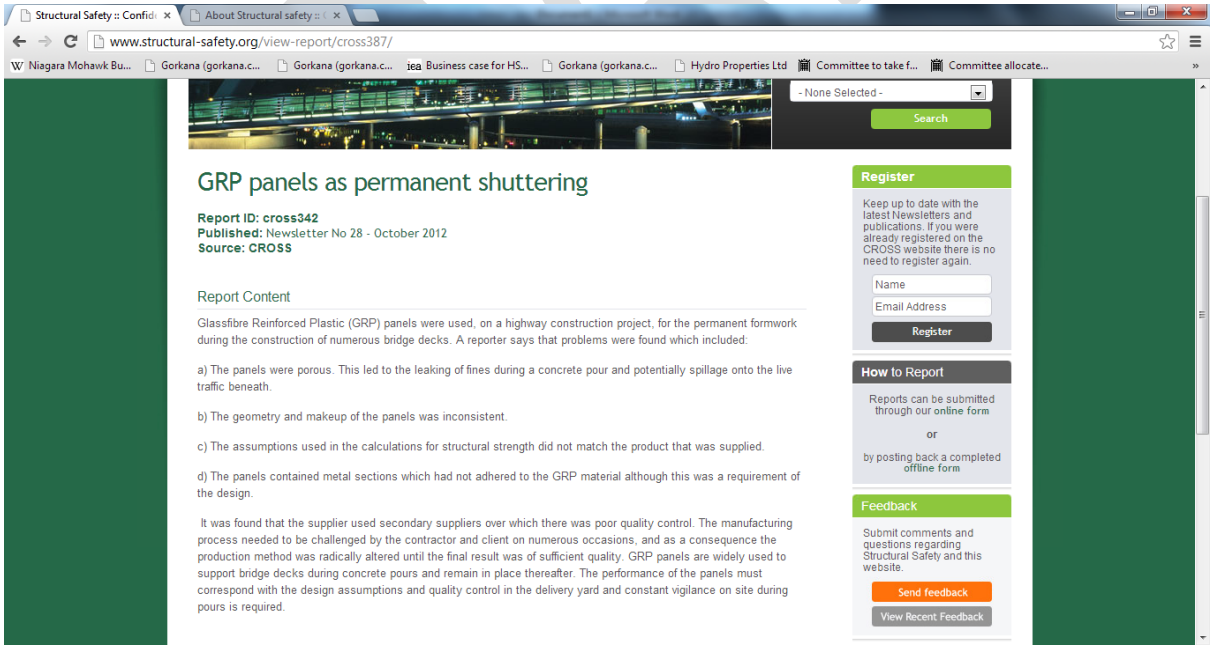
The report origin classifications are:
1. CROSS
2. SCOSS
3. SCOTCROSS (Scottish Confidential Reporting on Structural Safety
4. NEWS



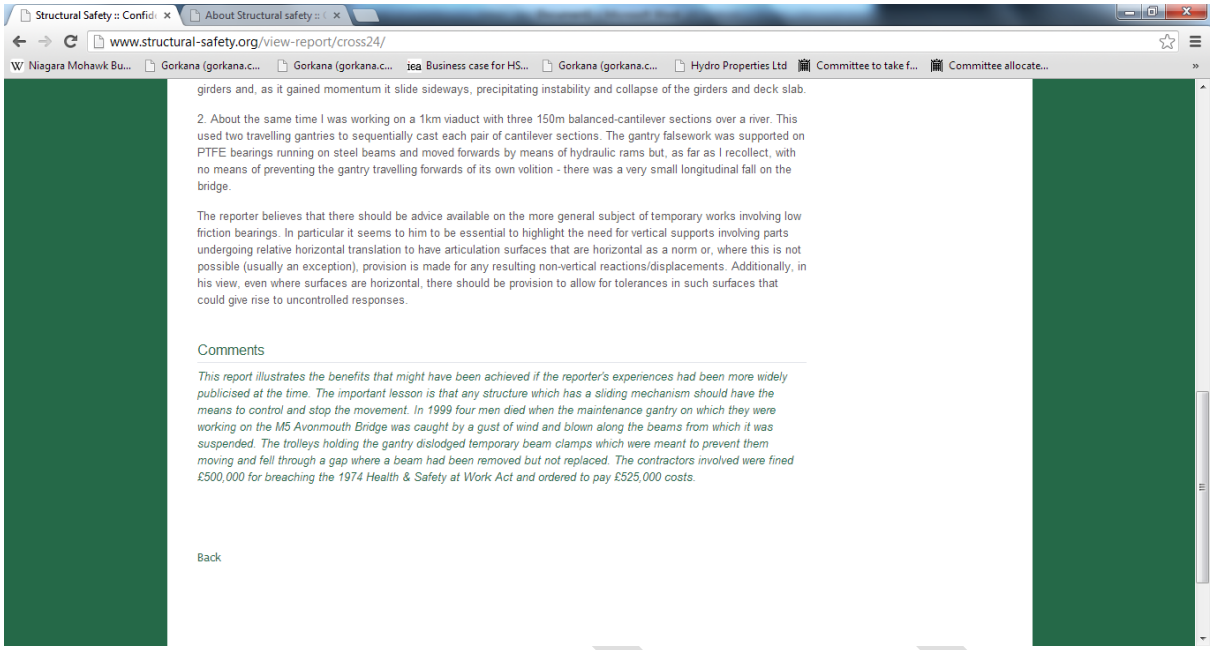
Once you execute a search, either using a classification or combination of classifications you are directed to the results page, which lists the number of reports identified by the search criteria



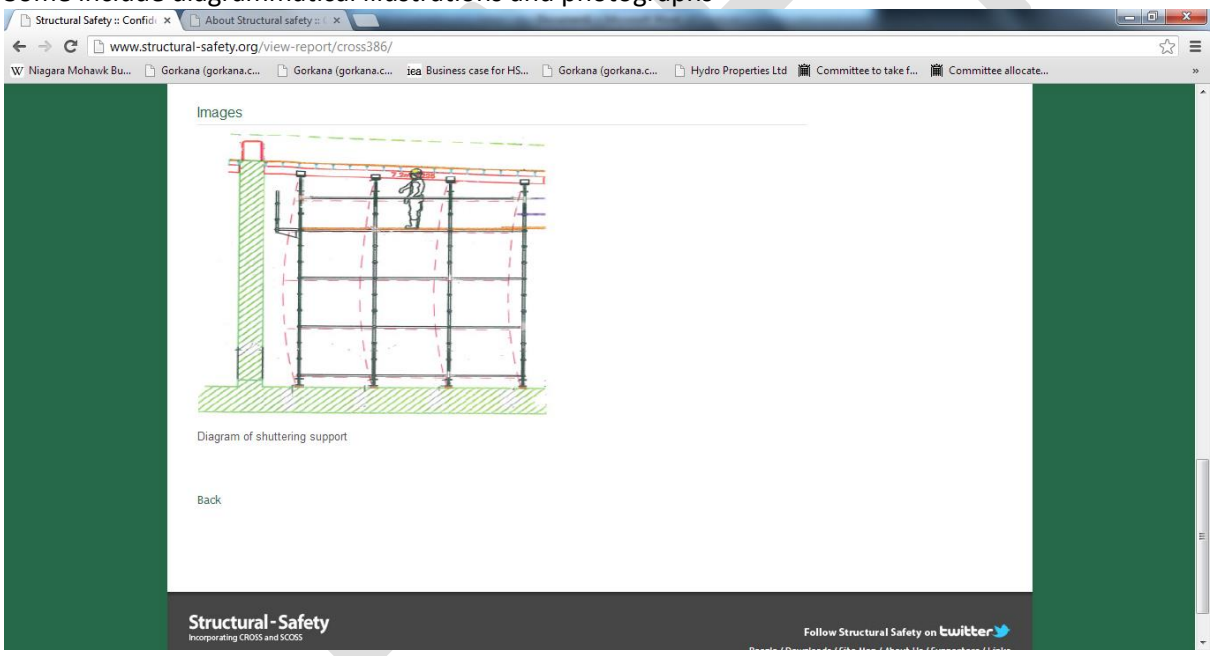
From the results page you can click through to the full reports, which gives the information on
-source
-publication date
-report ID number
-the report content

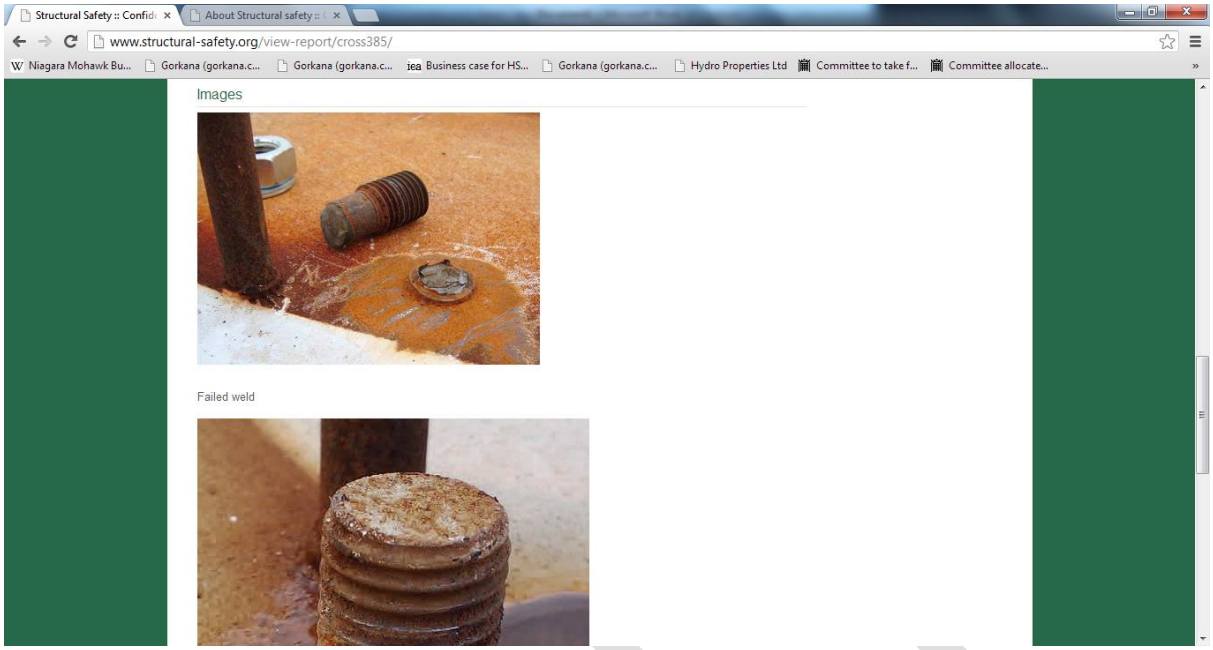


Several of the reports contain editorial comments below them from CROSS

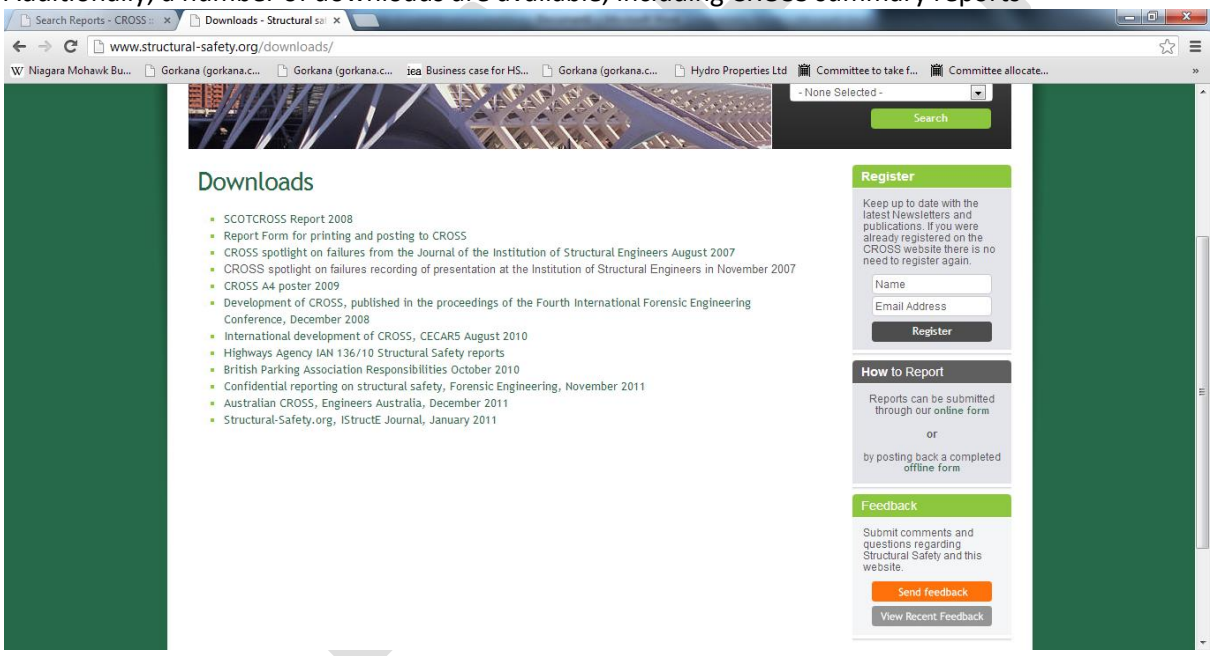


Some include diagrammatical illustrations and photographs





Additionally, a number of downloads are available, including CROSS summary reports



2.7 'Technische ABC-lijst' of Woningborg (Netherlands)

General description

Woningborg (www.woningborggroep.nl) is market leader in the Netherlands for issuing guarantee certificates for new dwellings, comparable with NHBC in the UK. They assess building plans, perform risk assessment of the building plans, and do site control during construction.

Their experiences with the assessment of building plans, the inspection of construction sites, the repairing of defects/damage and the insights derived from various Binding Advices and Arbitration Verdicts are collected and laid down in their publication 'Technische ABC-lijst' (Technical ABC-list).

The Technical ABC-list is a kind of indispensable reference for everyday practice for building companies, developers, architects and technical consultants. By learning what goes wrong in practice, errors and failure costs can be prevented in the future.

The database contains mainly attention points and recommendations for the designer and the building company, and not many descriptions of typical pathology cases.

Login screen

A digital version of the Technische ABC-lijst is available on www.technische-abc.nl/ . It is a very simple database, where you can search only on predefined articles (construction products, regulatory aspects, design features, quality marks demands).
You have to buy a licence to get a login name and a password for access.

Entrance screen

Once you are logged in, you see the following screen:

Searching in the database

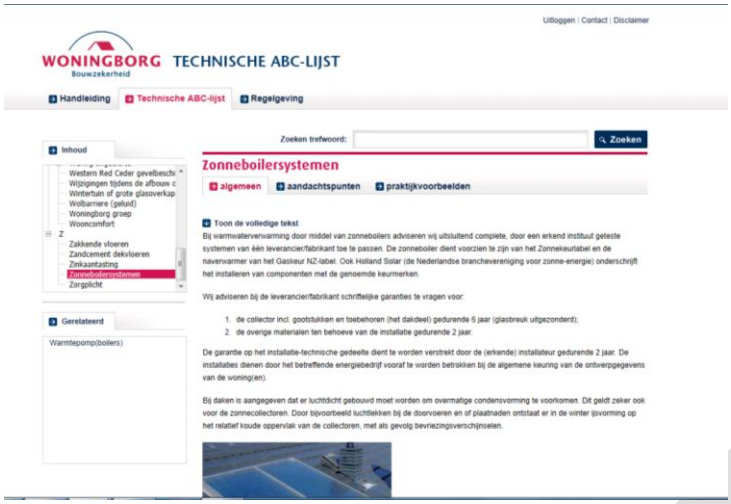
There are two possibilities to search in the database:

- By means of 'Zoeken trefwoord' (search on key word) at the top of the page
- Alfabetical search through a tree format on the left page (A, B, C etc.)

Searching using the key word field allows you to combine search terms, namely article name, keywords and free text. Once a search action is performed using one of the search entries, you can navigate directly, or via an intermediate step in the form of the search result, to an article.

Example

If you search for example on 'Zonneboilersysteem' (solar water heater system), you see the following screen:



For this technology there are three tabs, where the information is distributed, namely:

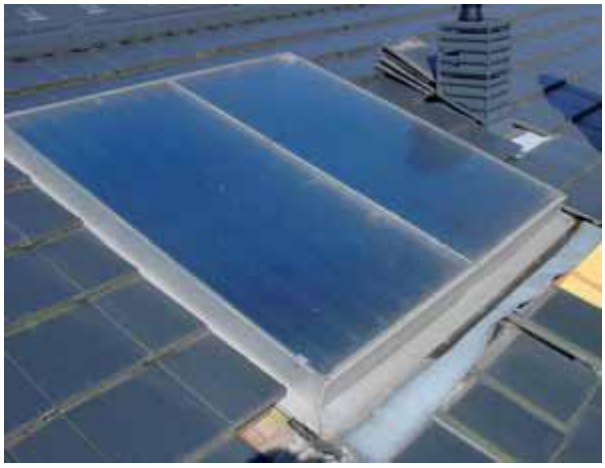
1. 'Algemeen' (General): a brief or full description of the technology.
2. 'Aandachtspunten' (Attention points): a collection of the major attention points associated with this technology. This is to determine what one should keep in mind with this technology. The attention points are divided into several categories. Once you click on a category, it opens a window with all the attention points from this category, which are then arranged by article.
3. 'Praktijkvoorbeelden' (Examples from practice). Here, information for this technology is visually supported, possibly accompanied by a brief explanation.

Hereunder follows some translated excerpts from the General Description of the solar hot water system.

"For hot water heating by means of solar heaters we recommend only to apply complete systems, tested by a recognized institute of one supplier / manufacturer. The heater must have the 'Zonnekeurlabel' ('Sun test quality label') and the heating coil must have the 'Gaskeur NZ-label'. Also Holland Solar (the Dutch association for solar energy) endorses installing components with the labels mentioned.

We recommend that you seek written warranties from the supplier / manufacturer for:
1. the collector including flashings and accessories (the roof part) during 6 years (except glass breakage);
2. the other materials for the purpose of the installation during 2 years.
The warranty on the installation-technical part shall be provided by the (recognized or certified) installer for 2 years. The energy company should be involved beforehand in the general examination of the design data of the dwelling(s).

With the article on roofs it is stated that the roof should be built airtight to avoid excessive condensation. This certainly also applies to the solar collectors. For example, air leaks in the conduits and or plate seams could induce ice formation in the winter on the relatively cold surface of the collectors, with freezing phenomena as a consequence.



Also leakages due to faulty installation regularly occur. The collector in the picture is embedded too deeply. The water in the gutter thus created was disposed laterally on the roof deck.

The installation normally used consists of a collector with a storage vessel and a reheater. This installation must comply with the GIW / ISSO publication 2007 or the requirements of good and sound installation work concerning the waiting times 45 °C after 30 seconds and 55 °C (the minimum temperature at a tap point) after 120 seconds.
Energetically, this is an efficient system, because a certain amount of water is not being kept warm constantly. However, if there are complaints about the waiting time, then there is often question of not adhering to the ease of use desired by the buyer; the installation is described in correspondence as 'minimal'. Practical problems in relation to the waiting time may be resolved by the mounting of a Hot-fill boiler coupled to the existing installation.
(. ….)
For the installation we refer to the standard NVN 7250:2007 of 01-08-2007 "Solar energy systems - Integration in roofs and facades - Structural aspects".

This Dutch standard concerns the application of solar energy systems (or complete parts with photovoltaic (PV) or solar thermal systems) as an integral part of, or as a separate element, on external facades and includes the structural, architectural and building physics aspects.

Also note any shading of the collectors by existing buildings, trees or project-related structural facilities (like dormer). This may reduce the yield of the installation.

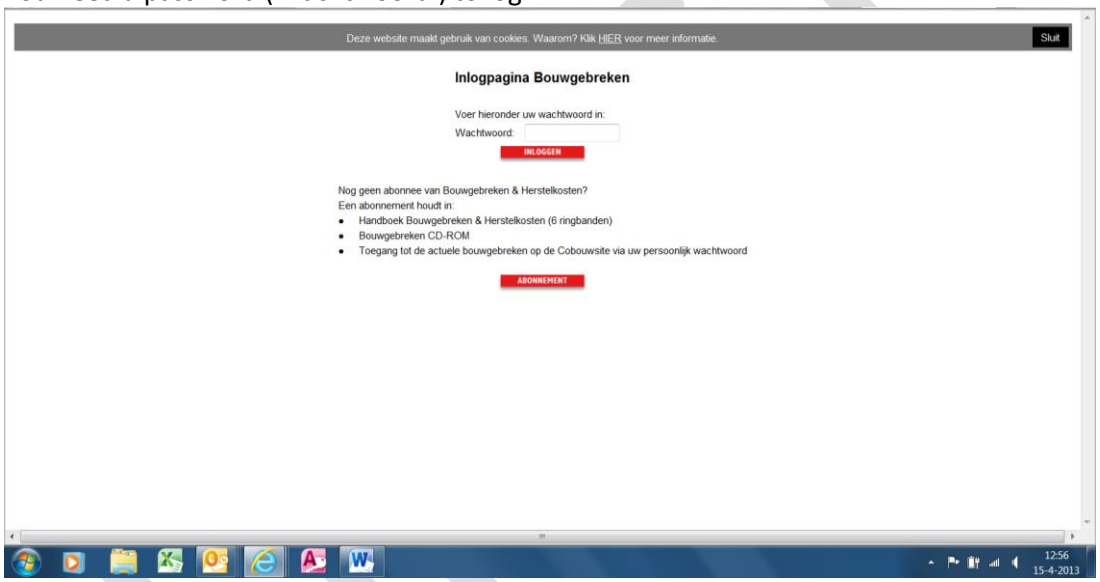
The collectors should be positioned in such a way that a yield of at least 80% can be achieved, oriented on the south and at an angle of inclination between 36 ° and 41 °. See also ISSO Publication 14 - Solar water heaters, design, implementation and consultancy.
To avoid extra costs after delivery of the installation, you need to ask the installer or manufacturer for written guaranties

2.8 'NBD Bouwgebreken' of SDU Publishers (Netherlands)

Description

NBD Bouwgebreken (NBD Building Defects) is a database of SDU Publishers (Netherlands), see http://bouwgebreken.sdu.nl/bouwgebreken
In NBD Bouwgebreken you will find approx. 900 building defects that occur in practice, connected to the building components (foundations, floor, facades etc.) and building physics. The publication offers support for recognizing, signalling, prevention and repair of building defects. You will also find the repair costs of the defects. NBD Bouwgebreken exists since 1995.
The database is managed by SDU publishers in the Netherlands, on a commerical basis. The pathology cases are delivered by a number of expert bureaus who receive a fee for each case. SDU get their revenues by subscriptions for entrance to the database.

Login
You need a password ('wachtwoord') to log in.



Pathology records
After login you see a screen, where you can select or search for pathology records.
Each pathology record is identified by the following fields:

- A code number
- Main division, which can be either: a predefined building component (foundation, floor, installations etc.), or a predefined category of building physics (moisture, sound, vibrations, ventilation, heat, frost/coldness, fire, biological).
- Sub division
- Title of the building defect, for example: cracks in masonry
- SfB code (building element, construction, material)
- Location: (for example: with buildings)
- Characteristics fo the defect (for example: cracks …)
- Cause
- Repair (how to repair the defect) and repair costs

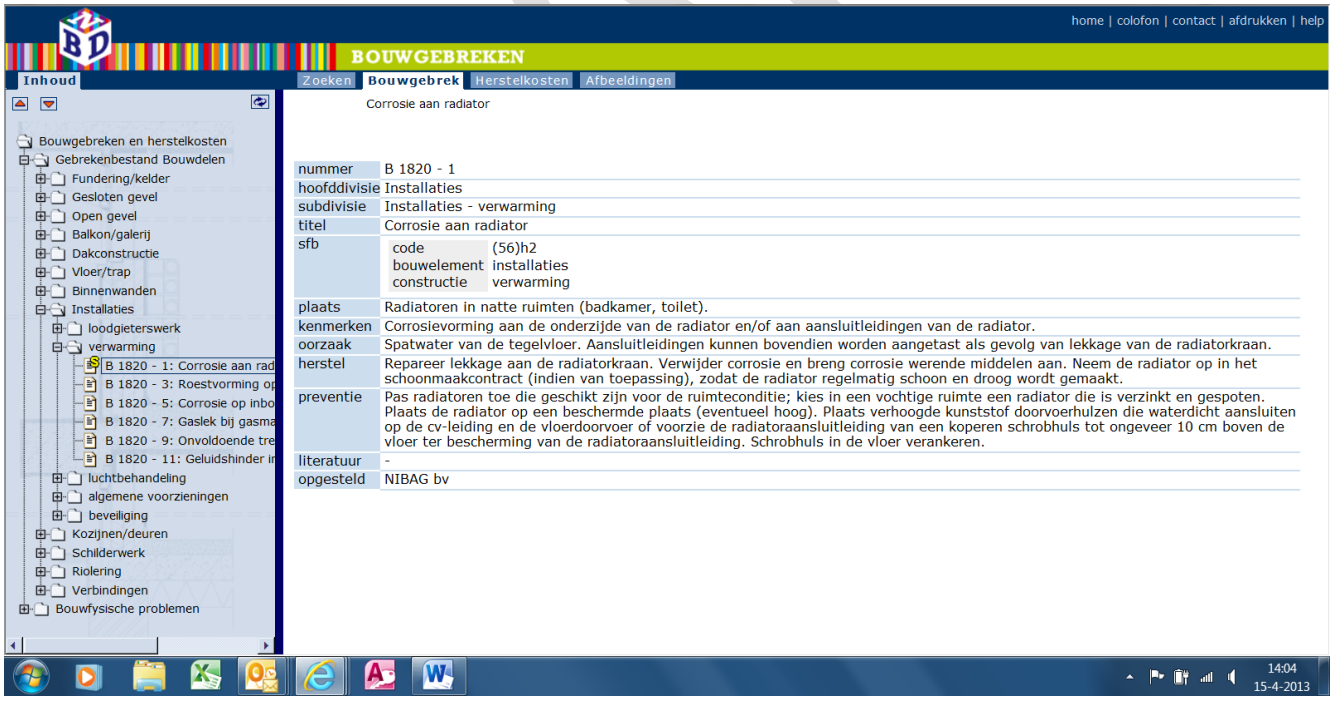
- Prevention (how to prevent the defect)
- Literature
- Name of organisation who drafted this pathology case
- Photographs illustrating the defect

Search function in the database

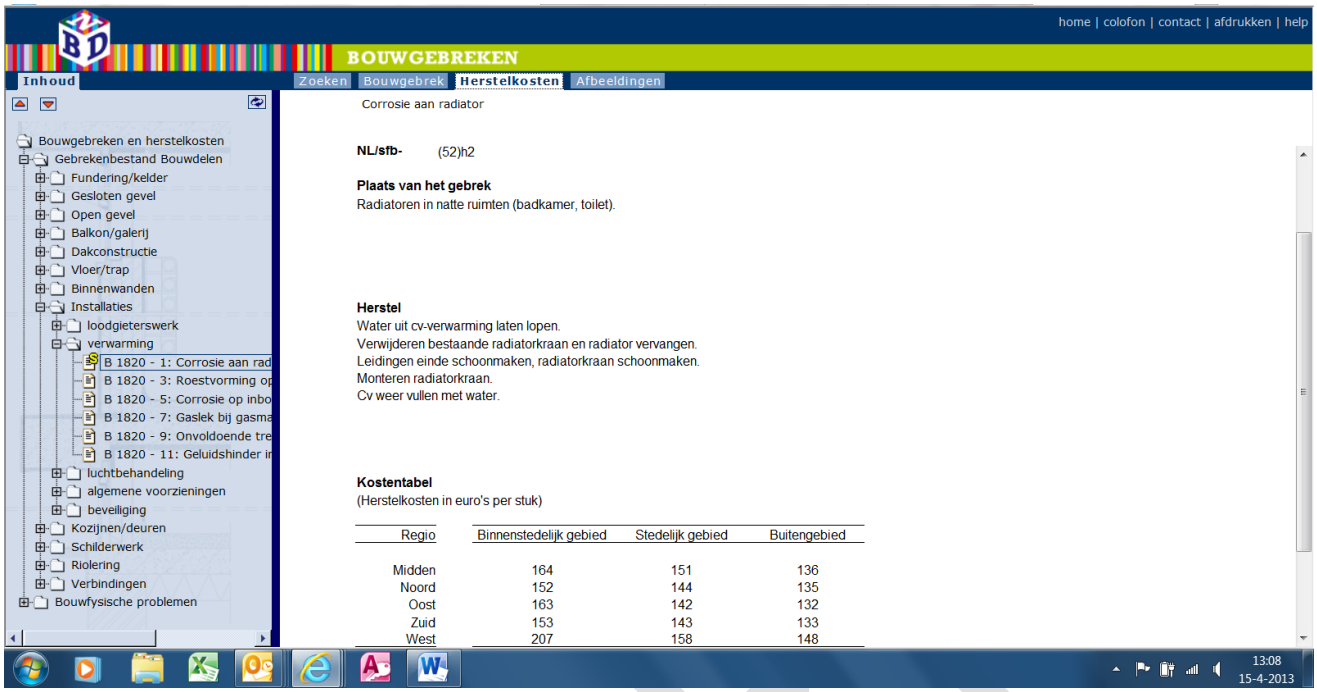
You can search for defects in the database in two ways:

- By selection of a predefined building component in the left part of the screen.
- By selection of a predefined category of building physics (moisture, sound, vibrations, ventilation, heat, frost/coldness, fire, biological), in the left part of the screen.
- By means of a 'search form', in which you can search:
  - with a free memo text in all the fields of the database
  - with a free memo text in one of the selected fields of the database (title, characteristics, building defects, cause, location, repair cost)
  - it is also possible to select several search criteria

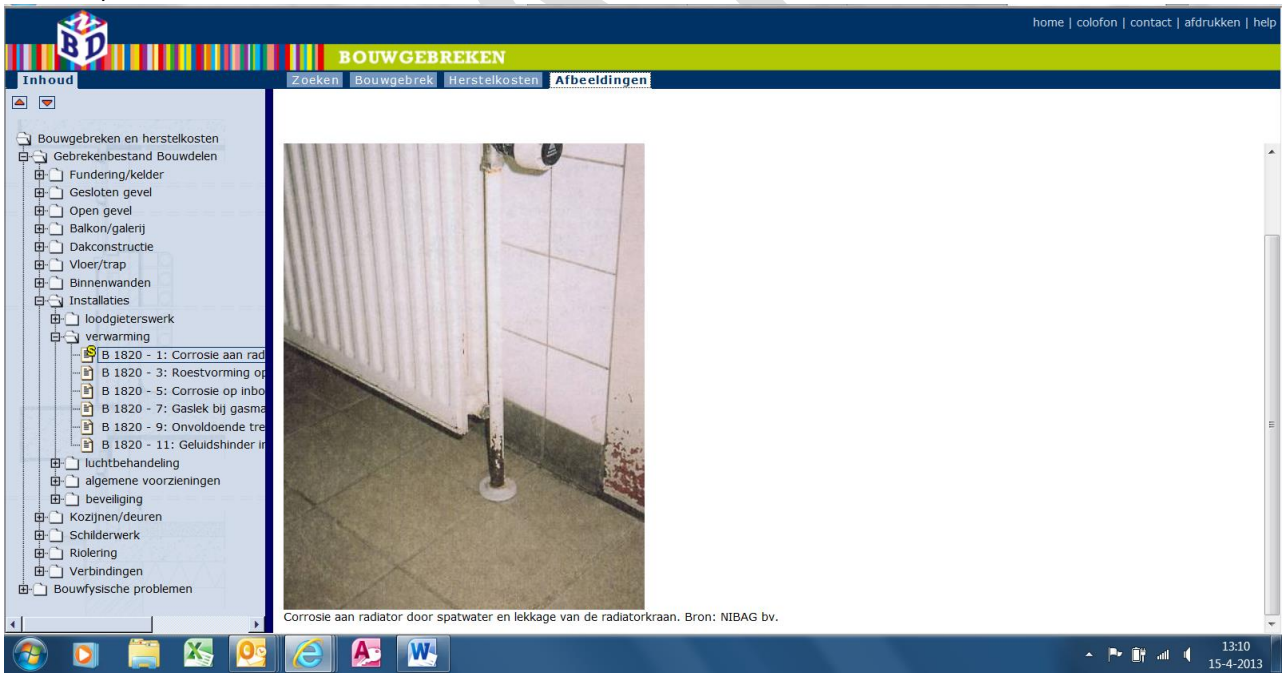
Searching by means of selection of a predefined building component:
For example (see the 'printscreen' above), you can select 'Installaties' (installations) → 'Verwarming' (Heating) → B1820 – 'Corrosie to radiator'. Then, in the right part of the screen you will see the description of the pathology record by clicking in the menu tabs on 'bouwgebreken'.



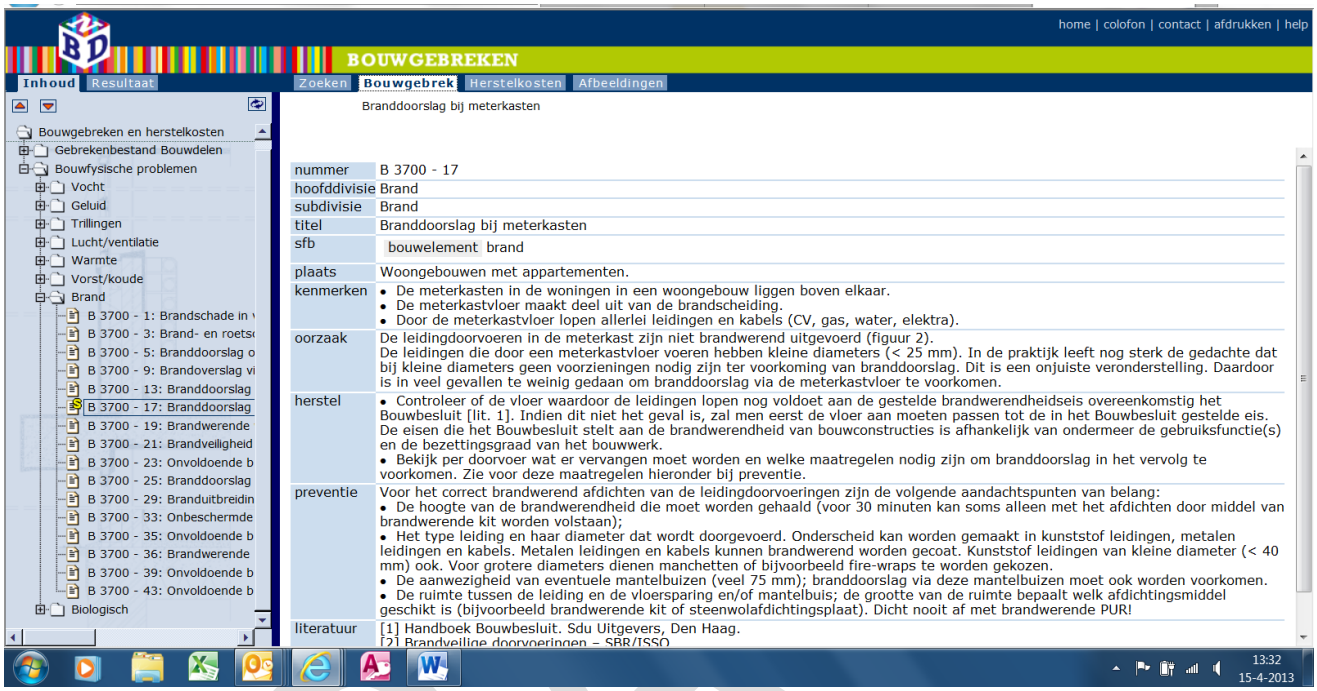
If you click on the tab 'Herstelkosten', you will see the cost for repair of the defect.

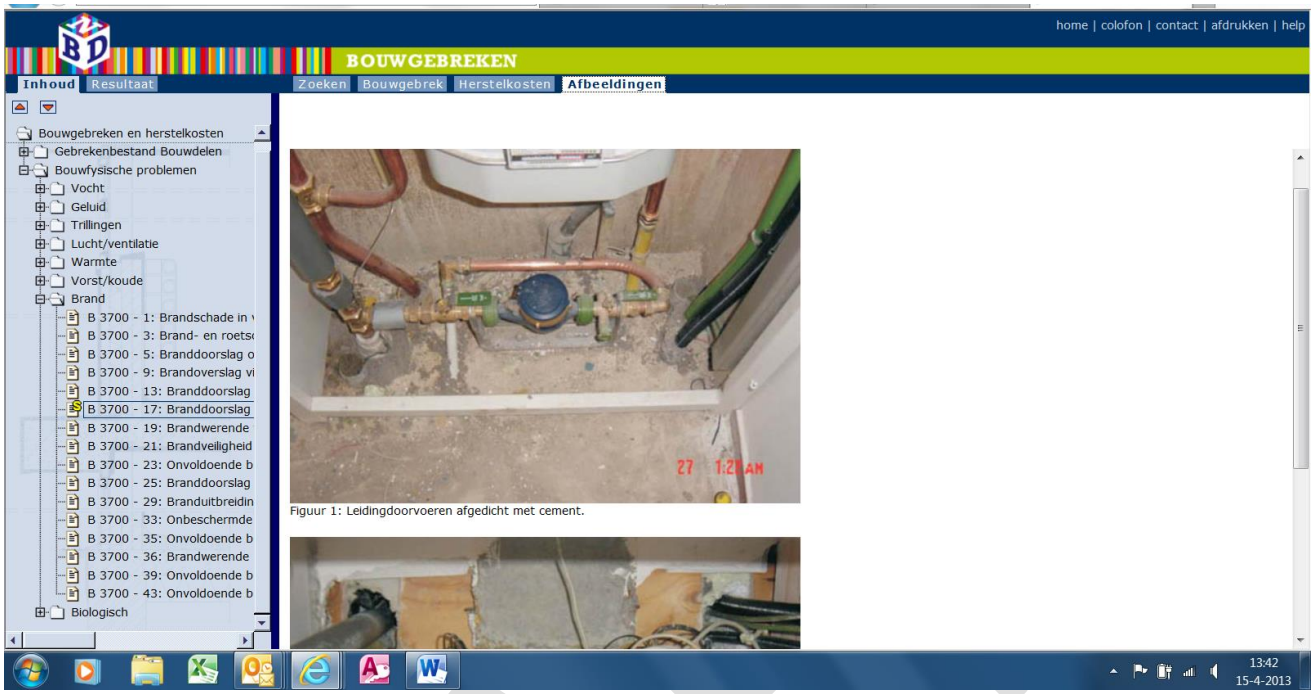


Then, if you click on 'Afbeeldingen' (Pictures), you will see a picture of the pathology (corrosion of radiator):

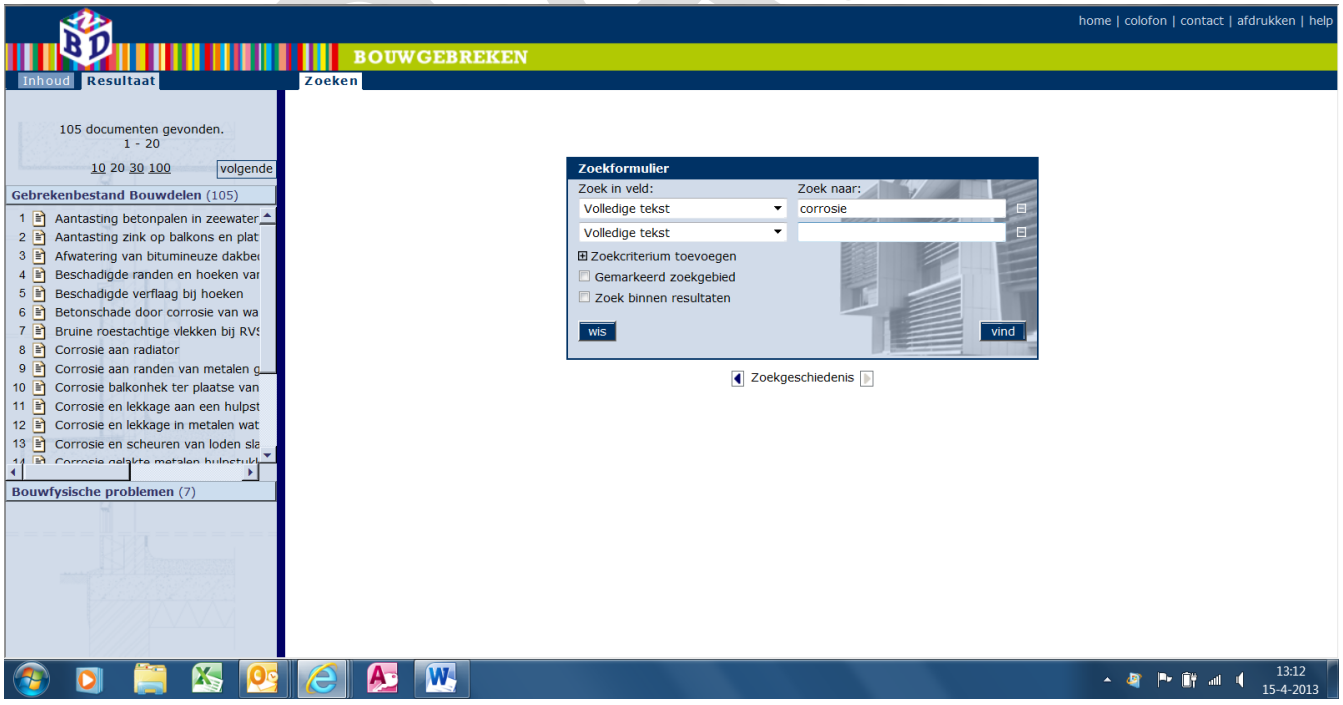


Searching by means of selection of predefined category of building physics
For example: by clicking on 'Brand' (fire) you will see in the left screen all the pathology cases on fire. For example,B3700-17, 'branddoorslag bij meterkast' (fire penetration at electrical meter box), with a again a description and a picture.





Searching by means of a 'search form'.
In the middle of the screen you will see 'Zoekformulier' (search form), where you fill in for example 'corrosie'. Then, in the left part of the screen the pathology cases with this search word are shown. Number 8 is 'corrosion to radiator' that we found earlier.

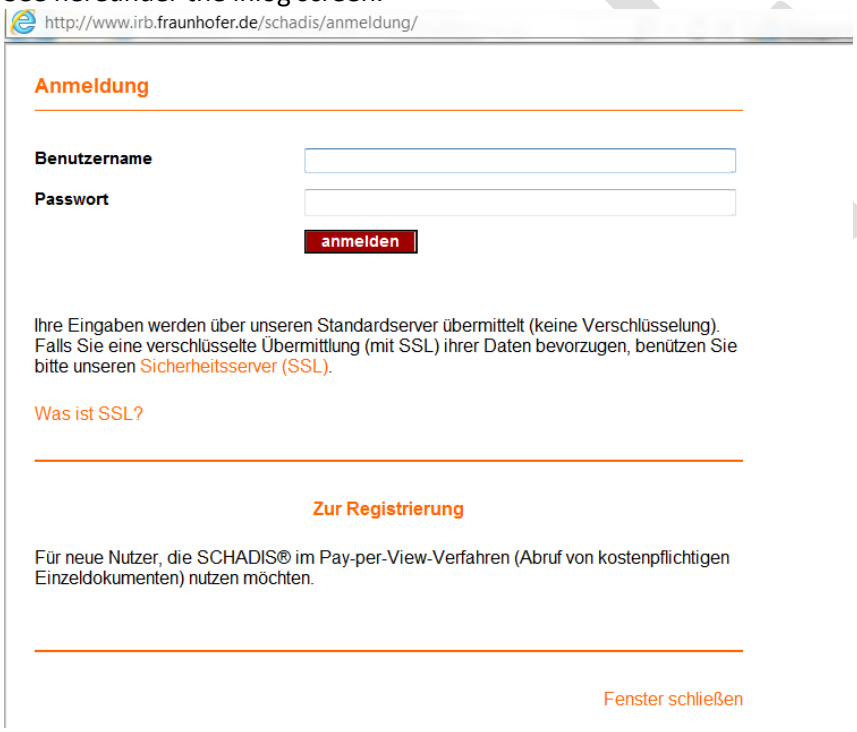


2.9 SCHADIS® (Germany)

Description

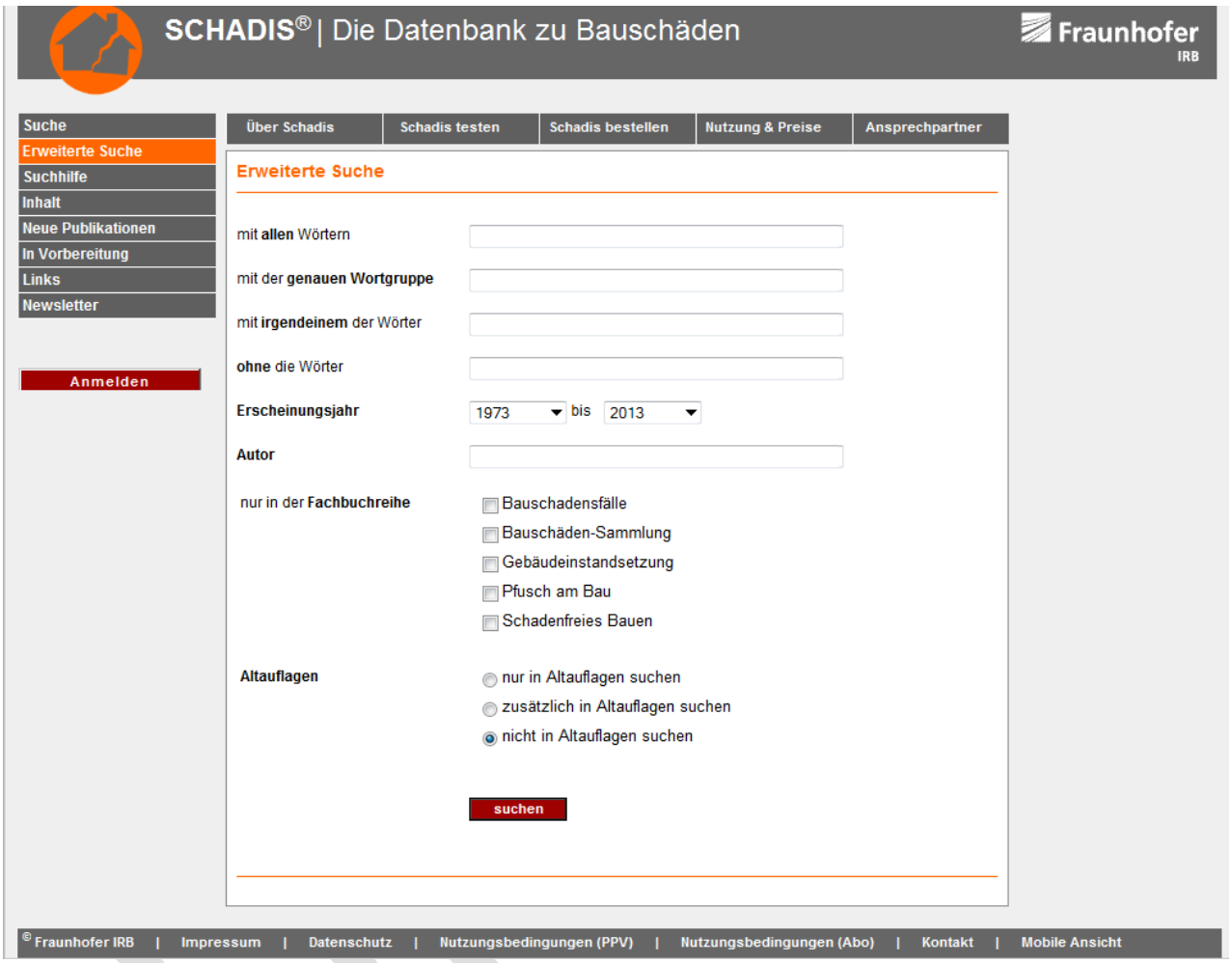
SCHADIS® is the largest German-language collection of recognized information source for building practioners and researcher on the field of building pathology, offered by Fraunhofer-Informationszentrum Raum und Bau IRB (Stuttgart). SCHADIS ® deals with the full spectrum of damages to structures and building parts. Specific cases are extensively analyzed based on the then-current rules. It contains over 700 books, journal articles and research reports in full text with system and detail drawings, photographs and tables. The Publications are divided into separate documents for SCHADIS ®. A document can be a full magazine article, a major chapter or a subchapter. SCHADIS® is published in paper/book form, but is also accessible with an online database (www.irb.fraunhofer.de/schadis). A license to consult the database costs € 400 per year. If you have this license you receive a username and password for access.
In addition, for downloading certain articles you need to pay per view.

Login
See hereunder the inlog screen.



Search possibilities

The search screen looks as follows:



The publications, from 1973-2013, are searchable with free search terms. You can select the text book series ('Fachbuchreihe') in which you want to search: Bauschadensfälle, Bauschäden-Sammlung etc.
Example: solar panels

Schäden an und durch moderne Anlagen zur Wärme- und Stromerzeugung

Teil 2: Schadensverhütung an Photovoltaikanlagen durch funktionstüchtigen Blitzschutz

Artikelserie zu Schäden an und durch moderne Anlagen zur Wärme- und Stromerzeugung
Teil 1: Einleitung und thermische Solaranlagen
Teil 3: Festbrennstoffkessel
Teil 4: Wärmepumpen
Teil 5: Blockheizkraftwerke

Dipl.-Ing. (FH) Stefan Groß, Lebach
Dr.-Ing. habil. Stefan Wirth, Karlsruhe
Beratende Ingenieure für Technische Gebäudeausrüstung, ö.b.u.v. Sachverständige

Der Einbau von Photovoltaikanlagen wird umfassend in Printmedien, in Radiowerbespots etc. beworben. Mit Solarmodulen gepflasterte Dächer bestimmen in vielen Fällen mittlerweile das Bild unserer Dörfer und Gemeinden.

Photovoltaikanlagen sind ein Segen für unser Gewissen gegenüber der geplagten Umwelt. Sie wandeln die Sonnenstrahlung mittels Solarzellen in elektrische Energie um, d. h. ein auf Siliziumbasis hergestellter Halbleiter wandelt das einstrahlende Sonnenlicht in Gleichstrom um. Die so gewonnene Energie wird bei so genannten Insel- oder Kleinlösungen direkt zum Betrieb elektrischer Geräte genutzt oder in Batterien gespeichert.

Anlagen, die auf den Dächern oder Fassaden unserer Häuser installiert werden, formen den Gleichstrom in Wechselstrom um und speisen ihn in das öffentliche Stromnetz ein.

Nach Angaben des Bundesverbandes für Solarwirtschaft waren Ende 2009 in Deutschland Photovoltaikanlagen mit einer Leistung von rund 9 800 MW elektrischer Leistung installiert. Mit dieser Leistung lässt sich der Strombedarf von etwa 1,5 Millionen Drei-Personen-Haushalten decken.

Jeden Tag werden in Deutschland neue Photovoltaikanlagen errichtet. Hieran werden wohl auch die von der Koalition aus CDU/CSU und FDP geplanten Einschnitte bei der Förderung von Photovoltaik mittelfristig nichts ändern. Von den Herstellern werden hohe Renditen versprochen. Ein gutes Gewissen der Umwelt gegenüber ist im Preis inbegriffen.

Damit die Investitionen für eine Photovoltaikanlage sich im Laufe der Jahre rechnen, müssen die Anlagen Energie erzeugen und in die Stromversorgungsnetze einspeisen. Die Anlagen müssen also möglichst unterbrechungsfrei arbeiten.

Stillstandszeiten bedeuten Verluste

Die Finanzierung derartiger Projekte erstreckt sich in der Regel über mehr als 10 Jahre. Der Betreiber erwartet eine entsprechend längere Betriebsdauer zur Erzielung von finanziellen Gewinnen. Es besteht also für jeden Investor ein Zusammenhang zwischen der Funktion der Anlage und der Amortisationszeit.

Den Schutz der am öffentlichen Stromversorgungsnetz angeschlossenen Anlagen sollte man daher nicht vernachlässigen. Aber die Veröffentlichungen des Gesamtverbandes der Deutschen Versicherungswirtschaft (GDV) belegen eine Vielzahl von Schäden an solchen Anlagen. So wurden zum Beispiel 2008 rund 4 200 Solarstromanlagen von den deutschen Versicherern reguliert - ein Anstieg um 40 Prozent im Vergleich zum Jahr 2007. Ein Großteil dieser Schäden wird der mangelnden Ausführungsqualität der installierten Anlagen zugeordnet. Firmen und Unternehmen unterschiedlichster Fachrichtungen bieten die Errichtung photovoltaischer Anlagen an. Hierzu gehören sowohl Fachbetriebe der Elektrotechnik, zunehmend aber auch Unternehmen aus angrenzenden technischen Bereichen wie zum Beispiel Heizungs- und Sanitärfirmen oder auch fachfremde Unternehmen, die sich vornehmlich mit Fassaden oder Dachaufbauten beschäftigen, wie z. B. Dachdecker.

Diese Entwicklungen enthalten Risiken, die eine Solarstromanlage schnell zu einem Zuschussgeschäft machen. Grundsätzlich sollte die Planung, Montage, Inbetriebnahme und Wartung einer PV-Anlage nur von ausgebildeten Fachkräften unter Berücksichtigung der gültigen Normen und Richtlinien durchgeführt werden.

Aus der Sicht des Autors wird vor allem der Schutz der Anlagen im Hinblick auf Blitzereignisse oder Überspannungsschäden bei »fachfremden« Firmen, aber auch bei so genannten Fachfirmen häufig vernachlässigt oder falsch ausgeführt. Die Erfahrung zeigt auch, dass es notwendig ist, dass der Anlagenbetreiber die Wohngebäudeversicherer über die Installation einer Solarstromanlage informiert.Klassische Wohngebäudeversicherungen schließen solche Anlagen nicht ein.

Wer die Sonnenenergie nicht nur für sich nutzt, sondern ins öffentliche Netz einspeist, handelt aus Sicht des Gesetzgebers als Unternehmer. Und als Unternehmer haftet er für alle Schäden, die er anderen Menschen und seiner Umwelt zufügt. Die private Haftpflichtversicherung reicht hier unter Umständen nicht mehr aus. Der Anlagenbetreiber sollte sich daher über eine Betreiberhaftpflichtversicherung informieren.

2.10 The Belgian Building Research Institute's Technical Advice department (ATA)

Activities

Shortly after its establishment, the BBRI established its Technical Advisory Division - simply referred to as ATA - to translate the results of applied research into practice.
Therefore ATA ensures the availability of versatile staff available to assist construction professionals (and in particular the contractors) with advice and support for difficulties encountered on-site. Technical assistance is provided by telephone, written advice (letters, fax, e-mail) and through site visits
The main objective of these activities is to improve the quality of the built environment, and this in the broadest sense of the word.

ATA continuously converses research into personalized, technical services in various technical sub-sectors of the construction industry. Its scope of activities is very broad given the many partners that operate in the construction sector, their uses and traditions, the various and often unique install, incorporation and execution techniques and the individual differences in maintenance and living habits of users.
ATA interventions concern providing assistance in making a thoughtful choice of materials, products and/or systems, the design of buildings and their detailing, the quality and assessment of structures, the terms of use and manner and frequency of maintenance, evaluation of defects or failures in case of technical disputes and/or damage, the provision of technical information so that a settlement can be achieved more easily in the event of construction pathology, the finalization of effective rehabilitation or renovation, providing direct technical assistance at the request of experts acting on behalf of the courts and contributing to preventive initiatives such as the development of technical publications, participation in seminars and construction fairs, ... ATA does not act as an engineering office and does not treat legal or financial questions.

The technical advice should be valuable for all parties involved. To this end, the advice is as complete as possible, which is why gathering the maximum amount of relevant information and findings is very important, is based on sound scientific arguments and evidence (measurements, tests as well as technical, scientific literature) and is objective, sticking as far as possible to state-of-the-art reference documents. The opinion of ATA is for information only and is not binding, but obviously it may serve as a solid technical foundation for the purpose of a reconciliation between the parties or in case of a court expertise.

If in situ observations are required to provide sound advice there is the possibility - at the request of a member contractor, executive contractor or a court expert appointed by the court to investigate the problem on site. The ATA engineers may provide material for a number of measurements and tests (sampling, determining the moisture content of building materials, carrying out immediate and long-term climate measurements, verification of flatness, straightness, verticality, levelness, ..., checking of performances, colour and sound measurements, …). If more specialized tests are appropriate, ATA calls on the services of various laboratories of the BBRI's experimental station in Limelette (Belgium). After a site visit – at the cost and at the express request of a member, executive contractor - a technical report may be prepared. Such reports contain the information obtained, a description of the problem, the findings and present a detailed technical discussion of the problem and suggestions for a possible cure or repair and a conclusion.

Pathology database

ATA's pathology database is solely aimed at contributing to ATA's main objectives as referred to above and at the dissemination of technical information through the BBRI's publications, mainly codes of good practice, but also brief digests attributed to a specific technical problem or solution, and to contribute to general interest activities, such as standardization and the establishment of technical approvals.
As such, the ATA database is not publicly available, but where relevant, its content may be used by ATA for documents intended to be publicly available.