Forum 3

WP2: Building Pathology - Progress

Date: 24 January 2013

Program

Morning session (10:15 – 12:30)

- Review of existing data sources and results of questionnaire on the availability of data for building pathology – by Henk Vermande, ARCADIS
- Results of case studies for pathology of 10 selected eco-technologies – by Graham Perrior, NHBC
- Discussion of three selected WP2 themes – moderated by Henk Vermande, ARCADIS

Afternoon session (14:00 – 16:00)

- Continued discussion of selected WP2 themes
- Progress reports on other Work Packages - by other WP-leaders
- Summary – by the European Commission
- Closing

Overview presentation

- Short reminder of objectives
- Program of work and planning
- Database – input / output, relation with the themes
- Some results of the questionnaire survey
  - Availability of data on pathology
  - Examples of large publically accessible databases
  - Opinions about a EU-wide database
  - Remarks by respondents
  - Overall conclusion

Overall objectives of WP2 (reminder)

- Development of an EU-wide knowledge base on quality indicators in construction and building pathology which could support (re)insurers in their risk appraisal of new innovative technologies, especially eco-technologies.
- To make collected information available in a *pilot* database.

‘Building pathology’

Building Pathology : the study and diagnosis of defects and damages of a building

- Provides a detailed knowledge of how buildings are constructed, used, occupied and maintained, and the various mechanisms by which their structural, material and environmental conditions can be affected.

Program of work

1. State of the art on building pathology
   - Definition of ‘building pathology’;
   - Review of existing research work and data sources;
   - Developing a questionnaire;
   - Collection of information on availability of data sources and pathology data for 10 selected eco-technologies;
   - Assessment of the value of the existing research work, data sources
2. Needs and criteria to develop an EU knowledge base
   - Analysis of the needs and the criteria of insurers;
   - Program of requirements for the pilot database;
3. Format and informatics requirements for the database
4. Developing, testing, validating the database
5. Updating the database

Planning

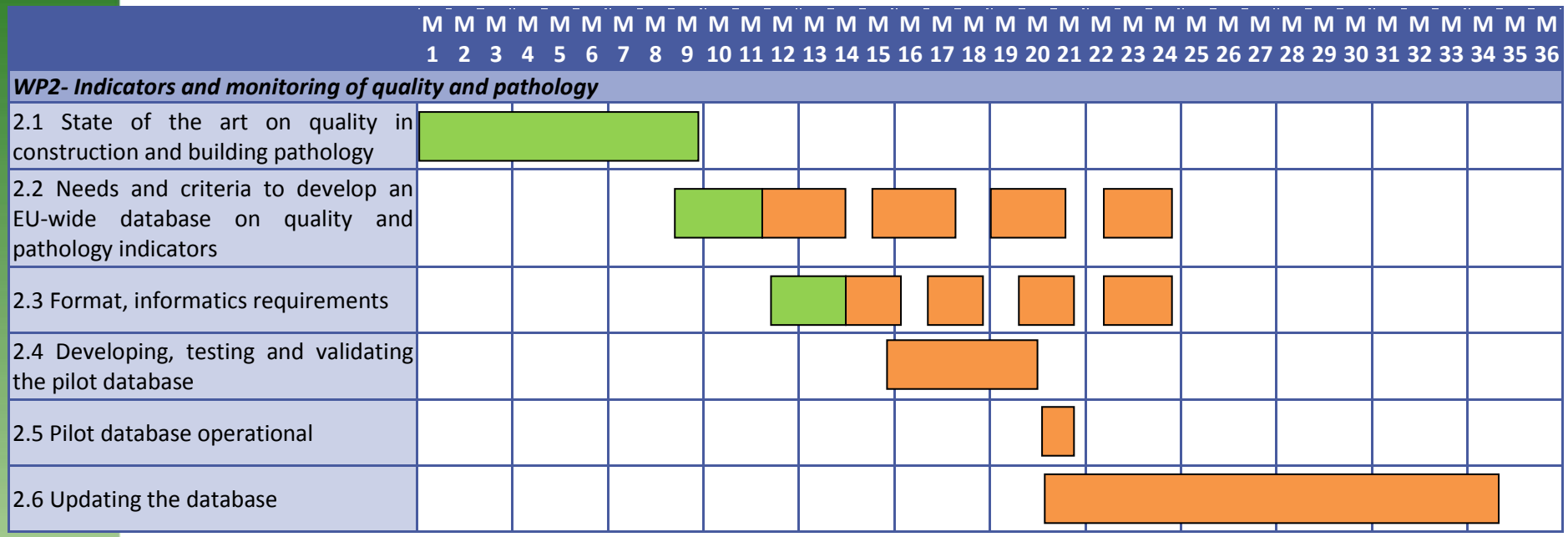

Figure 2.1: Work programme

= finished

= in progress


Input
Pilot database
Output

Required information by insurers

Required information by insurers

- qualitatively
- quantitatively

- Available information/ data sources/databases

Required information by insurers

- qualitatively
- quantitatively

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Required information by insurers

- qualitatively
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- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Q'naire

Required information by insurers

- qualitatively
- quantitatively

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Q'naire

Themes 1 and 2

Required information by insurers

- qualitatively
- quantitatively

‘Framework’

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Q’naire

Themes 1 and 2

Required information by insurers

- qualitatively
- quantitatively

‘Framework’

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Q’naire

Themes 1 and 2

Required information by insurers
- qualitatively
- quantitatively

- *‘Pathology platform’*
- *Contractual agreement between parties*
- *Organisation*
- *Financing*

‘Framework’ Theme 3

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

Q’naire

Themes 1 and 2

Required information by insurers
- qualitatively
- quantitatively

- *‘Pathology platform’*
- *Contractual agreement between parties*
- *Organisation*
- *Financing*

Questionnaire

The questionnaire is specifically aimed at the following topics:

- To what extent are data on building pathology, especially with regard to eco-technologies, available in Europe; which organisations have databases on defects, damages and their causes?
- Are these data publically available, and/or the are organisations willing to share these data in a European database?
- What is their opinion about an EU-wide knowledge base?
- Pathology data for the 10 eco-technologies

Availability of data on pathology

- Many organisations collect information on damages, defects, mostly for their own use (low key)
- Focus on damage during construction, and mostly ‘traditional’ pathology.
- Collected by own inspectors or external experts.
- Sometimes publication on the web (newsletters, experience sheets).
- A broad range of organisations seem to have some kind of database for storing the data, but most of them are confidential.

Examples of large publically accessible databases

- France (Agence Qualité de Construction, AQC):
  - REX BBC (for Low Energy Buildings)
  - SYCODES (building pathology)
- Denmark
  - Danish Building Defects fund - Social housing and refurbishment
  - The Building Damage Fund for Urban Renewal – buildings that have received subsidy to urban renewal
  - The Benchmark Centre for the Danish Construction Sector (Byggeriets Evaluerings Center, BEC) - performance of contractors, consultants and clients in relation with the execution of construction works
- Netherlands
  - Technical ABC-list of Woningborg

Opinion about a EU-wide database

General support for a detailed pathology database for eco-technologies.

However, certain doubts and provisions are expressed:

- Hard to gather information on claims and quantitative data on pathology, since the information is often confidential.
- Only few sources/organisations collect data on building defects on a systematic manner, and information on defects of eco-technologies is scarce anyway.
- How to feed the database? How to keep the database up-to-date? Who should do it?

Some remarks

- It will be difficult to transfer knowledge on pathology from one country to another, or even to make the information on pathology comparable. → it would be necessary with each technology to describe the specific constructive and climatic issues, national building regulatory issues, building practices.
- The reasons behind failures of technologies should accurately be reported to enable evidence based decisions to be made.
- Advantage of an EU-database is that the transnational joint pathologies can be quickly spreaded throughout Europe and investigated by research institutes.
- Insurers seem to be especially interested in some kind of warning system on defective technologies →exchange on technical qualitative information on defects/failures.
- A significant value in training by eco-technology → a link with the European Build Up Skills initiative (www.buildupskills.eu/).

Overall conclusion

- The survey has identified details of who holds databases and the type of information collected.
- Further work is now required to describe the detail of these databases in detail and perhaps call on this information to help design the Elios 2 database.

THEME 1

The role of building pathology for risk assessment by insurers during the underwriting process of innovative building products.

‘Framework’ Theme 3

- Available information/ data sources/databases
- Collection information for 10 eco-technologies

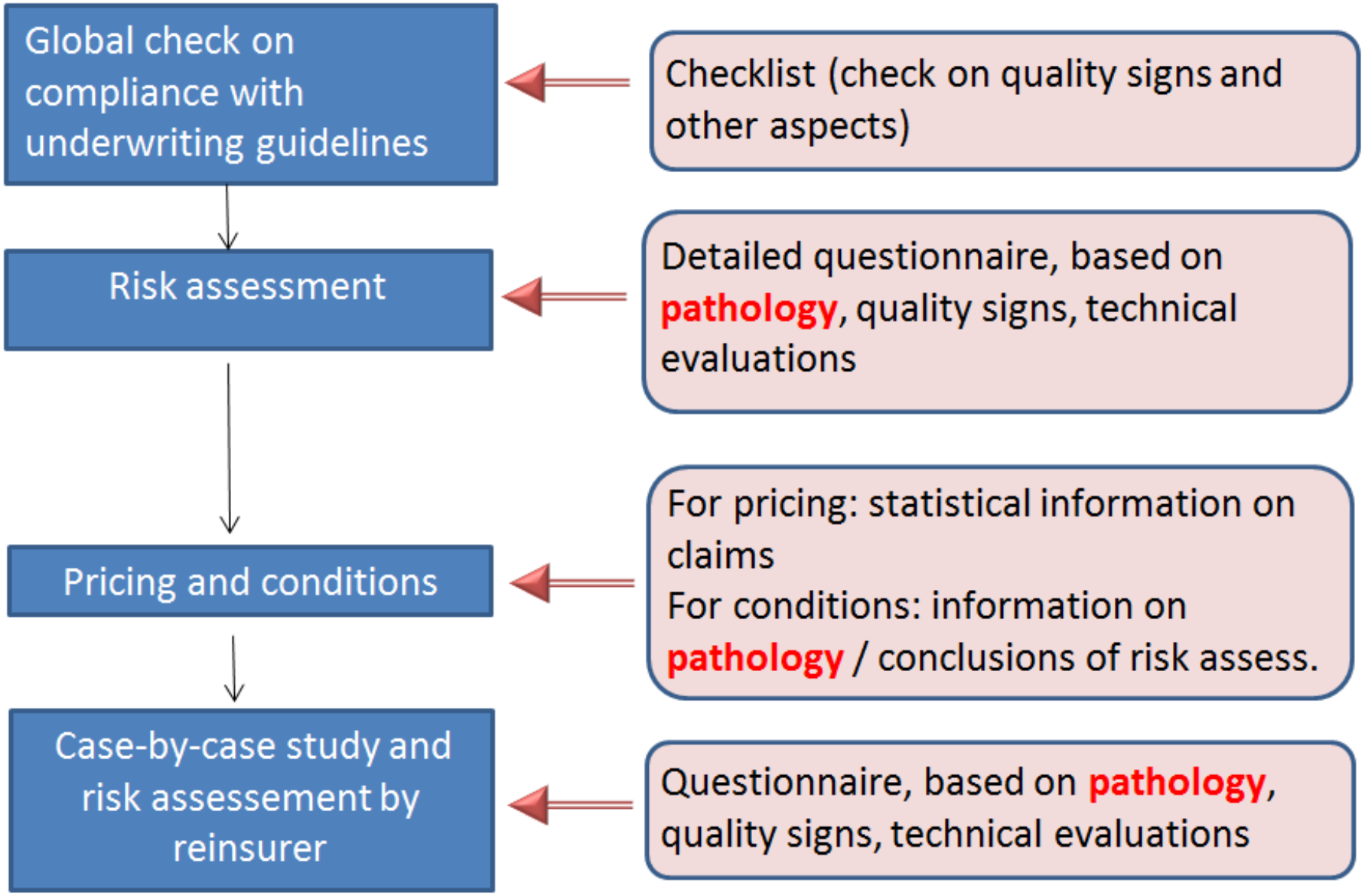
Q’naire

Themes 1 and 2

Required information by insurers
- qualitatively
- quantitatively

- *‘Pathology platform’*
- *Contractual agreement between parties*
- *Organisation*
- *Financing*

Underwriting process



Use of pathology information by insurers for *innovative products*

- Information on pathology of new technologies is mainly used qualitatively for risk assessment by the insurer (and reinsurer), and can also be used for formulating conditions.
- For innovative products like eco-technologies, statistical data on claims of defects/loss are in most cases not available, so information on pathology cannot be used quantitatively for Pricing.
- For technical risk assessment the information from claims is usually not very useful.
- Information on pathology is, generally speaking, useful for the staff of the insurance company to raise the level of knowledge on the technologies.

Available information

- Qualitatively
- ~~Quantitatively~~

Usage of information by insurers

- Qualitatively
- ~~Quantitatively~~

THEME 2

Analysis of the needs and criteria from insurers for the format (structure) of the EU-wide database on pathology indicators of eco-technologies.

Required information from the database

- Information provider
- Name / location of the construction work or project
- Type of construction work
- Starting date and end date of the work
- Date of the loss/failure/damage
- Type of eco-technology
- Loss/failure/damage type
- Defective/damaged part
- Cause of the loss
- Description of the loss
- Who was responsible for the loss
- Severity of the loss: the cost of repair (can it be repaired easily?).

Required information from the database

If possible, the database should also give information on:

- How to avoid the loss/failure/damage (lessons learned)
- Is the installer specialized in that technology (is it his normal and main activity)?
- Level of innovation involved
- New product on the market?
- Geographical use of the product
- Adaptation to the climate
- Is the failure due to local construction practices, national technical rules, or non-compliance with standards?

Information provider	Name of construction work project	Location of construction work: Address	Location of construction work: Country	Type of construction work project	Starting date of works	End date of works	Date of loss	Type of eco-technology object: Main category	Type of eco-technology object: Sub category	Loss / damage type	Defective part	Cause of failure: Global cause	Cause of failure: Detailed cause	Description of the loss/failure	Who was responsible?	Severity of the failure/ cost of repair
Insurer A	The Green office tower	1 Fenchuch - London	UK	Highrise building	1-1-2010	1-1-2012	1-7-2012	Photovoltaic panel	Polycrystalline superimposed photovoltaic panel	Fire	Power-supply	Installation		Total loss of the building after a fire caused by the power supply of the photovoltaic pannels. The power supply wasn't protected as requested by manufacturer.		
				Airport				Photovoltaic panels	"Thick film" superimposed pannels	Fire		Design	Design of defective part			
				Convention / Exhibition center				Photovoltaic panels	"Thin film" incorporated pannels	Collapse		Workmanship	Workmanship / installation of defective part			
				Court / government / parliament buildings				Heat pumps	Air / air	Cracking		Manufacturing	Non compliance of manufactured product properties with required objectives			
				Farm				Heat pumps	Soil / air	Deterioration		Materials	Non compliance of base materials with standards / regulations			
				Holiday resort				Heat pumps	Water / air	Energy performance		External cause	Exceptional loads, outstanding standards' loads			
				Hospital				Double skin curtain wall		Unusability		Improper choice	Adequacy of type of product with objectives / Choice of system			
				Hotel				Mechanical ventilation with heat recovery (MVHR)		Malfunctioning		Use	Improper use of technology			
				Industrial infrastructure / Plant				Vacuum-insulated panels (VIPs)		Watertightness		Maintenance	Defective maintenance			
				Office / commercial building				Bio-materials insulation	Straw, hemp, sheep's wool	Airtightness		Combined cause				
				Gas / Hydro Power plant				Bio-materials insulation	Paper based insulation, e.g. warmcell							
				Religious building				Rainwater harvesting	Catchment basins							
				Residential / apartment building				Rainwater harvesting	Grey water re-cycling							
				School / University				Rainwater harvesting	Green or brown roofs							
				Shopping center				Low VOC materials	paints, kits & glue							

Example of a pathology record

- Type of construction work: Highrise building
- Type of technology: PV panel / Polycrystalline superimposed PV panel;
- Loss/damage type: fire
- Defective part: power-supply
- Cause of failure: wrong installation of power supply (not protected as requested by manufacturer)
- Description of the loss/failure: Total loss of the building after a fire caused by the power supply of a PV panel.

THEME 3

Conditions and modalities to gather, exploit and disseminate relevant data and information to all parties concerned as well as the maintenance and the exploitation of the database after the termination of the pilot project.

Questions to be answered

- Who are the users?
  - Insurers, Building research institutes, Certification institutes, construction sector
  - European Commission?
- Who should maintain and manage the database?
  - Universities? CIB Working Group? ENBRI?
- What are the conditions for sharing?
- What kind of information?

‘Quality observatory’

- For exchange of qualitative technical information on pathology of eco-technologies;
- Decide together on the systems to be assessed;
- Create together a simple typology of claims regarding eco-technologies;
- No exchange of information on the number of claims or number of contracts underwritten in order to get rid of any strategic statistical data disclosure.

‘Quality Observatory’

Why?

- Multiplicity of actors implied by pathology → creation of a network
- Difficulty collecting and exchanging information → definition of a clear and defined framework
- Diversity of the national regimes → act locally

How?

- A contractual agreement defining the purpose and the rules of the exchange of information.
- A pilot database in order to manage this exchange of information.

‘Quality Observatory’

Targets:

- A state of the art of the pathology affecting some eco-technologies and an analysis of their causes
- The elaboration of prevention measures
- A ‘hazard notification procedure’

Next steps

- Continuation of the q'naire survey, especially in France and Belgium.
- Investigating the characteristics and functionalities of existing pathology databases.
- Further exploring the information needs by insurers for the database, in collaboration with WP3.
- Defining the provisional format and informatics requirements.