Lessons from the Good and The Bad

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Introduction - BBA

The British Board of Agrément is one of the UK's leading notified bodies offering approval, certification and test services to manufacturers of products and systems supplying the construction industry

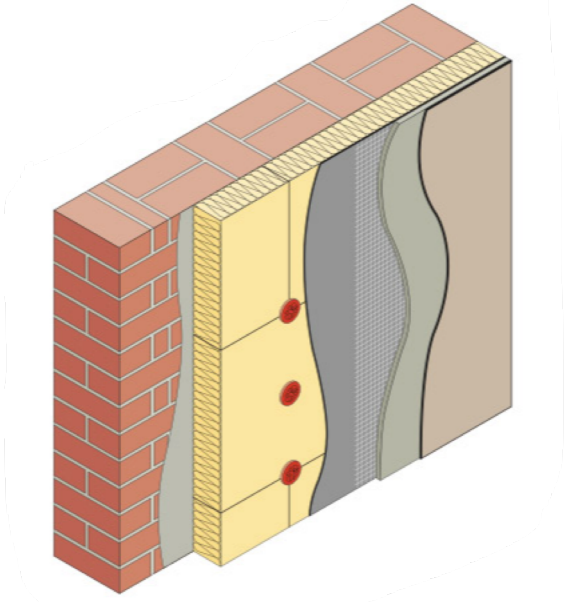
With over **50 years** of experience, we have led the way in testing and certification and issued over 5000 BBA Agrément, HAPAS and ISO certificates.

We have and continue to lead the way with our **Product Approval and Certification** unit, and have now expanded our scope to include standalone units of **Testing and Audit and Inspection**.

Our mission: we are committed to helping businesses and organisations supply the construction industry with products, systems and installers of the highest quality.

Good Retro-fit Technologies covered by the BBA

External Technologies



External Thermal Insulation Composite Systems (ETICS) – Solid Wall

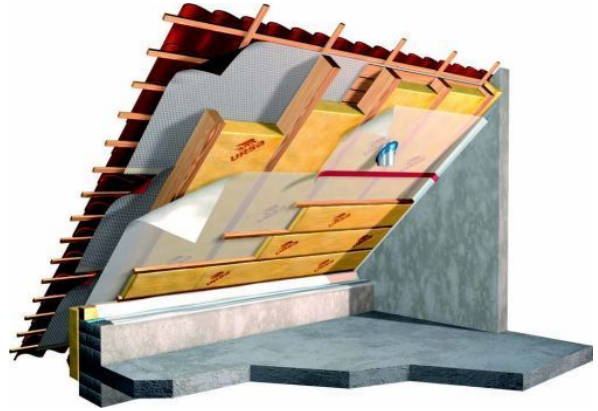
Rainscreen Cladding Solutions

Good Retro-fit Technologies covered by the BBA

Integral Technologies

Cavity Wall Insulation (CWI)

Internal Wall Insulation (IWI)



Loft Insulation

Goals of Good Systems

To Improve energy efficiency of the building by reducing the amount of heat energy transmitted through the external enclosure.

- Contributes to the governments Energy Company Obligation scheme (ECO)
- Helps with the Carbon Emissions Reduction Obligation (CERO)
- Helps with the Home Heating Costs Reduction Obligation (HHCRO)

To reduce condensation potential by shifting dew point temperature within the construction and regulating temperature

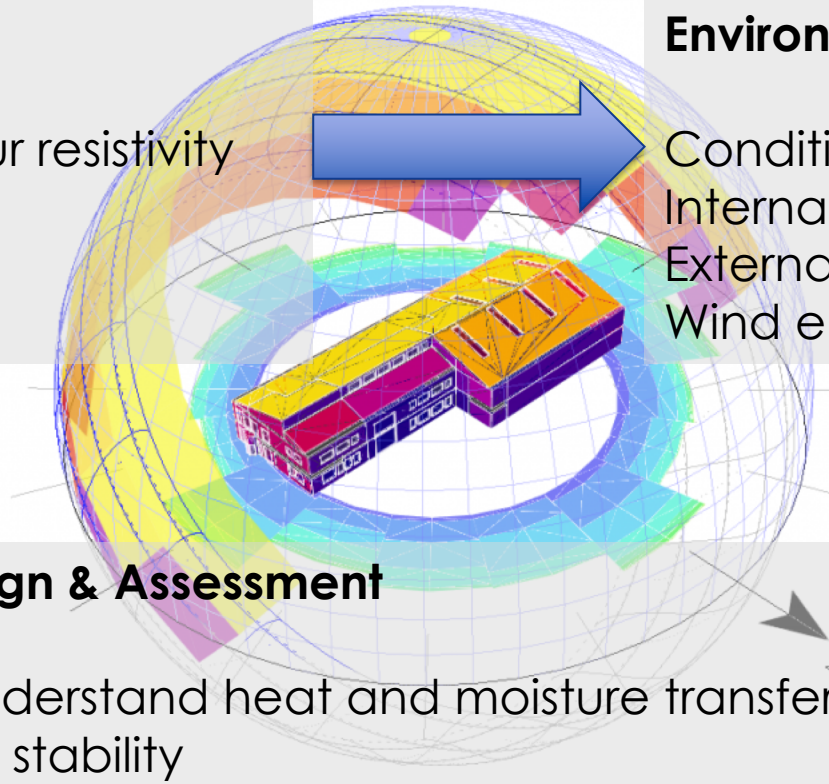
- Improves thermal comfort
- Prevent mould growth
- Can improve material durability

Delivering Good means can be modelled using physics

Successful application of these technologies in retro-fit solutions requires an understand of the pre-installation and post installation building physics & engineering to delivery real performance

An accurate understanding of material properties

Thermal conductance, vapour resistivity
Sorptivity
Mechanical strength
Performance in fire conditions



An understanding of the Installed Environment

Condition of existing structure and fabric
Internal heat and moisture conditions
External Solar Gains, Ventilation
Wind environment

Modelling Capabilities in Design & Assessment

Hygrothermal modelling to understand heat and moisture transfer through the structure
Structural modelling to ensure stability

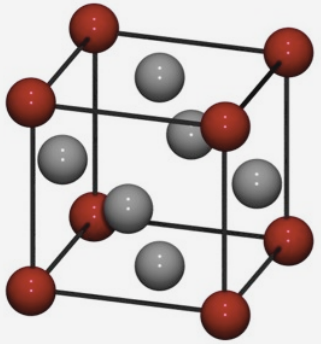
Delivering Good means understanding the detailing

Some of the key factors to consider

Thermal

Provision for thermal movement in the system

Provision for thermal movement in the base structure



Junctions

Preventing water penetration into the system

Understanding hard to treat zones

Maintaining and providing ventilation

Respecting service penetrations and fixtures

Delivering Good means quality installation

Systems must be installed in accordance with the specification such

- Installation can be verified by inspection
- Product substitution must be avoided

Systems must be compatible with the existing building condition:

- Systems should have a pre-installation inspection by a competent person
- Existing building must be free of applicable defects

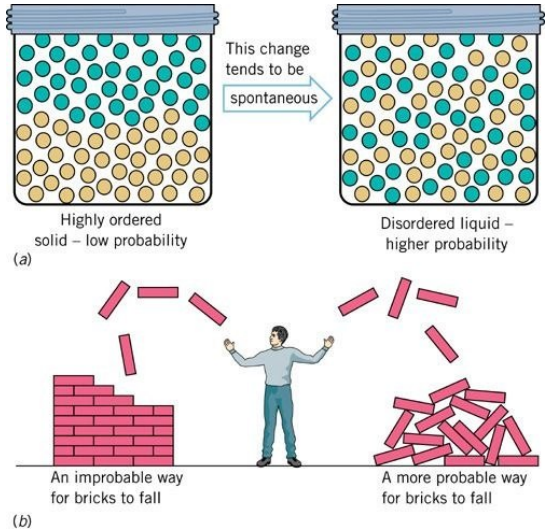
Operatives should be adequately trained in the system installation

The system must be buildable

But …..

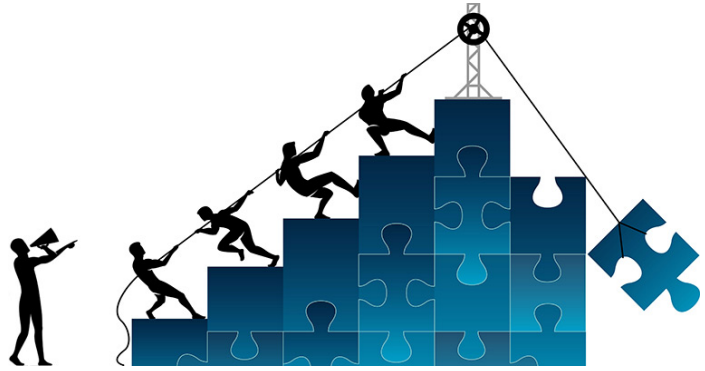
With such complex considerations the environment in which the technology exists can resist ***The Good***

An Engineer or Physicist might say expect disarray from an ordered state as the system evolves without an **input of effort**



An Economist might suggest that competition fuelled value engineering supports a **race to the bottom signaling reduced quality**

The industry might say that a **lack of skilled workers** and investment in developing standards is a key piece of the puzzle to understanding why defects occur



So what is ….. ***The Bad ??***

The Bad in design & detailing

External Wall Insulation

Current guidance does not cover the **structural design** of these systems though they are covered by **Part A of the Building Regulations** but not by a recognised standard.

Some standard tests are not directly compatible with current design principles that cover design assisted by testing requiring. The application of such tests requires interpretation.

Partial Factors to be applied to establish system safety (safety factors) are not well established.

DCLG Advice Note 14 issued in November 2017 refers designer to manufacturer. Manufacturers cannot provide this information. Guidance is presented in BBA certificates.

Bond failure mechanisms require interpretation to apply correct design principles

The Bad in design & detailing

External wall insulation Cont ….

Interaction failure patterns for fixings are not well documented

Excessive number of fixings can produce **cold bridges**

Vapour resistivity of render can lead to be **interstitial condensation issues**

Incorrect specification of materials can lead to inadequate **fire performance**

In the case of rain screen cladding, inadequate back ventilation to rain-screen systems can lead to **moisture reducing thermal efficiency**

Substandard ancillary components can lead to a **reduced service life** of the system.

Inadequate provision for **thermal movement** can induce cracking and **buckling within the render system** leading to the render **debonding**

The Bad in design & detailing

Internal Wall Insulation (IWI)

Hygrothermal modelling not adequately performed leading to incorrect system specification resulting in **condensation.**

Cold bridging at existing floor junctions not detailed adequately resulting in **condensation promoting deterioration of timber elements**

The Bad from construction procedures

Externally Wall Insulation Systems

Construction sequencing and exposure of sensitive elements can **degrade material performance** in unsuitable weather conditions

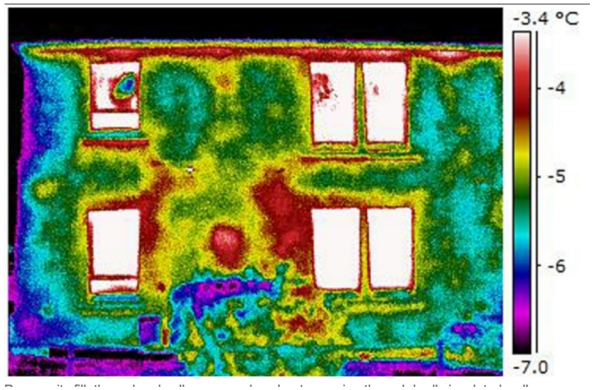
Inadequate fixings in symmetrical patterns can induce **structural failure**

Failure to administer water **exclusion details** correctly

Failure to consider **environmental deposition** on bond strengths

The Bad from construction Issues

Cavity Wall Insulation (CWI):



Lack of **clear cavity** prevents a full fill of the cavity and promotes **damp penetration** and reduced thermal performance.

If **Poor fill / density** variations in the installation lead to reduce thermal performance and interstitial **condensation**

Unprotected mild steel **cavity ties** can suffer **accelerated corrosion** in unventilated conditions were condensation is occurring

The condition of the **masonry and mortar joints** can promote **water penetration** and factor in the corrosion of wall ties.

Lack of maintenance of **ventilation bricks** can inhibit internal ventilation and ventilation around timber floor elements leading to **deterioration of the timber fabric**

What we do …..

To achieve

And avoid

.. truth is that we have to embrace independent quality assurance, continuous training and supervision as the key ingredients for delivering Good

So how is the BBA promoting the Good ?

Lesson 1 – You need to be sure of Product / System Suitability & Performance

To ensure that the Good design and detailing is achieved, when designing or specifying a product or system it **is essential to obtain third party verification** of:

- The performance claims
- The suitability of a system in its intended use
- The compliance of the system or product with national regulations

BBA Solution - Agrément Certificates

Agrément Certificates assess the Good performance of a system or product by:

- Independently assessing and providing test data for the intended use
- Independently assessing the compliance of products with national regulations
- Issuing a concise document recognised by the UK construction industry in testament to the rigorous assessment that has been applied

Lesson 2 – You need to be assured of continued manufacturing quality

It is essential that the verified properties of the system are repeatable and are maintained over time. The solution is to **adopt independent verification of factory production control**.

- To ensure performance is as stated in the original verification
- To avoid product substitution in the manufacturing process

BBA Solution - Factory Surveillance

From the certification process a BBA Quality Plan is developed that charts the material specifications and continued testing requirements.

Factory surveillance is performed to ensure compliance with the quality plan (typically twice per year).

Actions to remedy non-conformities are agreed.

Lesson 3 – You need to obtain verification of installation quality

Independent verification of the correctness of installation and the suitability of the contractor is essential to ensure:

- The system or product performs in situ as it did in the assessment process
- That a record of installation is maintained as evidence of compliance

BBA Solution - Approved Installer Schemes

The BBA offers an Approved Installer Scheme that naturally follows from the certification process.

The contractors processes and compliance with the installation requirements of the product or system are assessed.

A percentage of actual site installations are inspected during construction.

Lesson 4 – The industry needs confidential reporting mechanisms when things go wrong

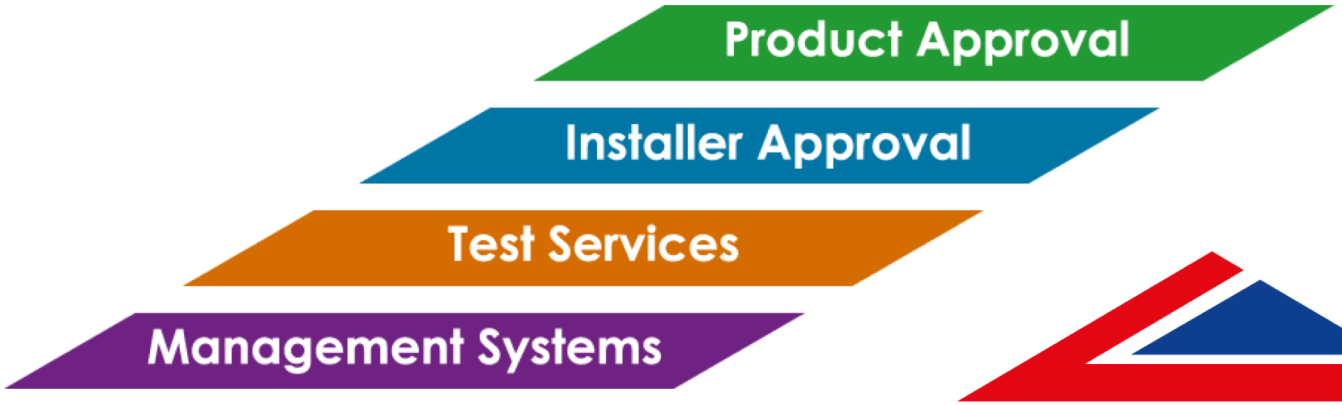
Independent verification cannot be omnipresent.

It is essential that workers within the construction industry have a mechanism to report wrongdoing which is in the public interest to allow rectification of processes and potential defects.

BBA Solution - Whistleblower Scheme

Where the wrongdoing relates to a BBA Certificate or other BBA Approved schemes a Whistleblower may speak confidentially with the BBA who may investigate the disclosure and if appropriate take action by suspending or withdrawing certification.

Thank you



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