RETROFITTING TRADITIONAL BUILDINGS – ‘Look before you Leap’

Kilkenny City & County Council

22 October 2019

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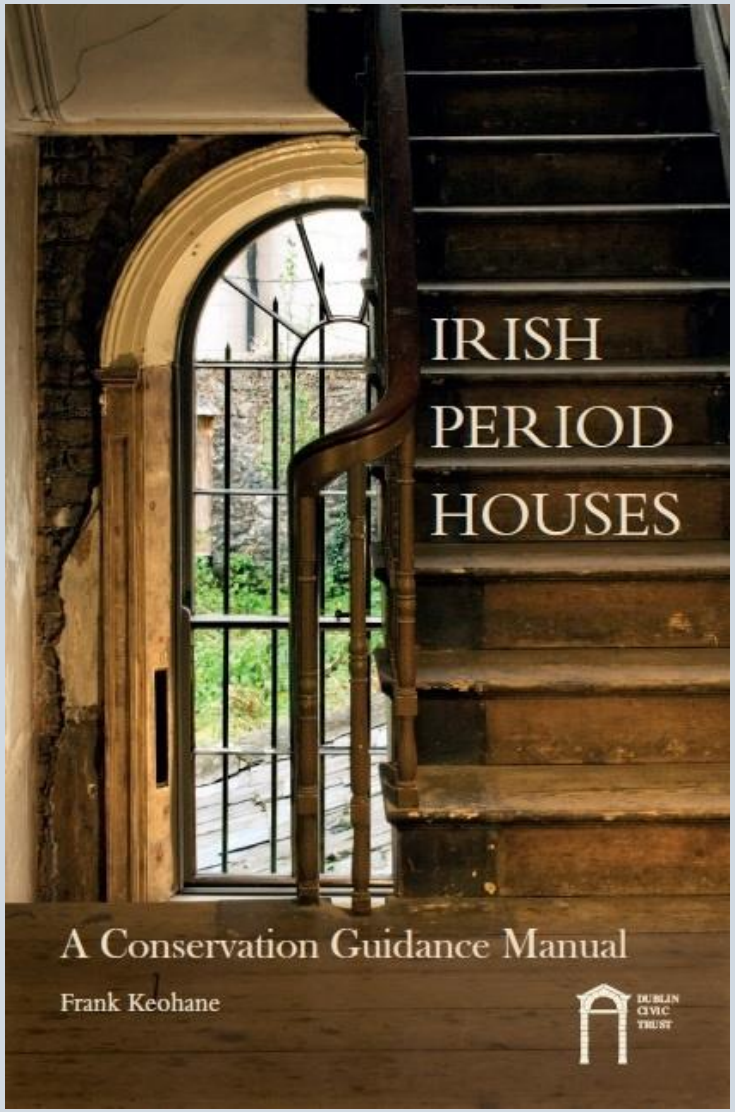


ENERGY IN THE HOME

Average householder uses 40% MORE ELECTRICITY today than in 1990. Why should we be surprised then that we are spending so much more on energy.

On average HEATING accounts on average for 58% of domestic energy consumption, HOT WATER 24%, LIGHTING 16% and APPLIANCES AND COOKING 3%. What ever happened to turning off lights!

According to the SEAI (Sustainable Energy Authority Ireland), today we heat our houses to an average temperature of 16ºC in comparison to an average of 12ºC in 1970. BYE BYE JUMPERS!

PUTTING IT SIMPLY WE ARE SPENDING MORE BECAUSE WE ARE USING MORE.

FOOLS RUSH IN

Throwing MONEY at the problem isn't the solution.

There are no QUICK FIX solutions.

MISINFORMATION and misconceptions.

What and who to BELIEVE.

Changing our own BEHAVIOUR is often the first step.

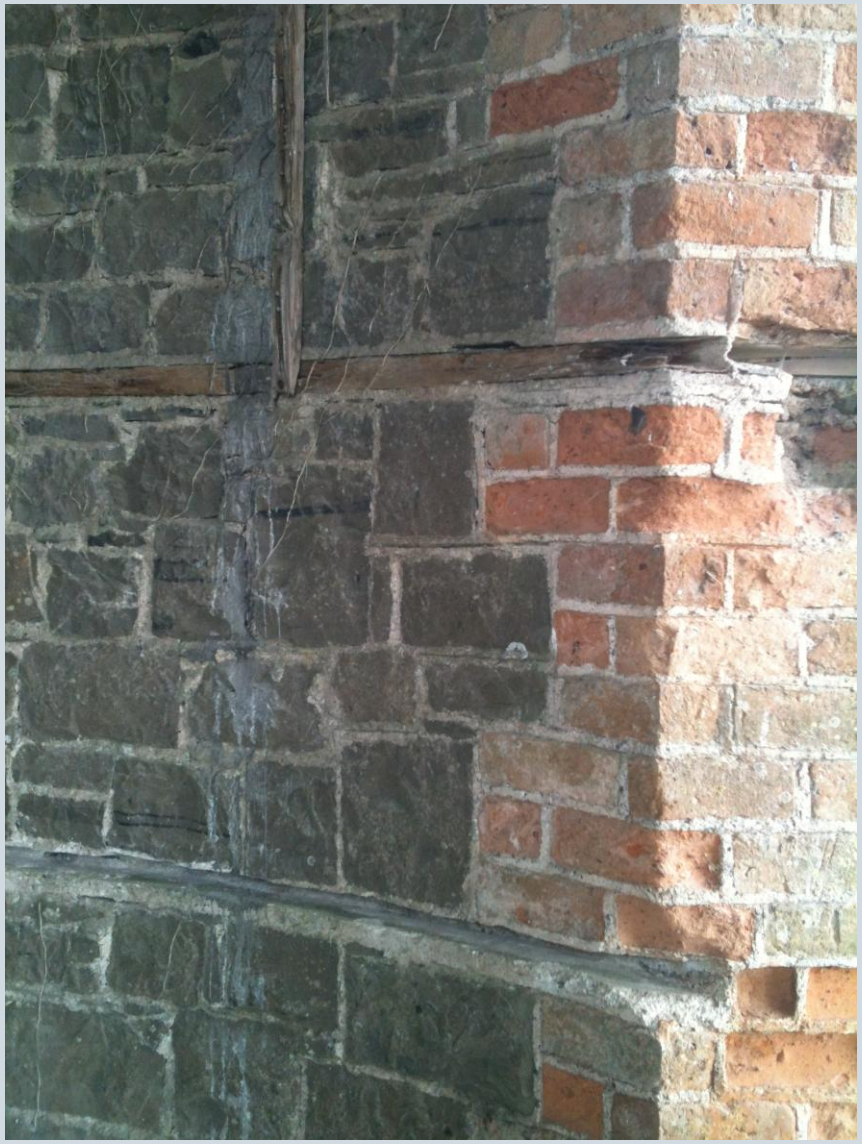
CONSIDERATIONS IN UPGRADING

An informed, holistic approach must always be taken when planning upgrade works. The following elements need to be considered:

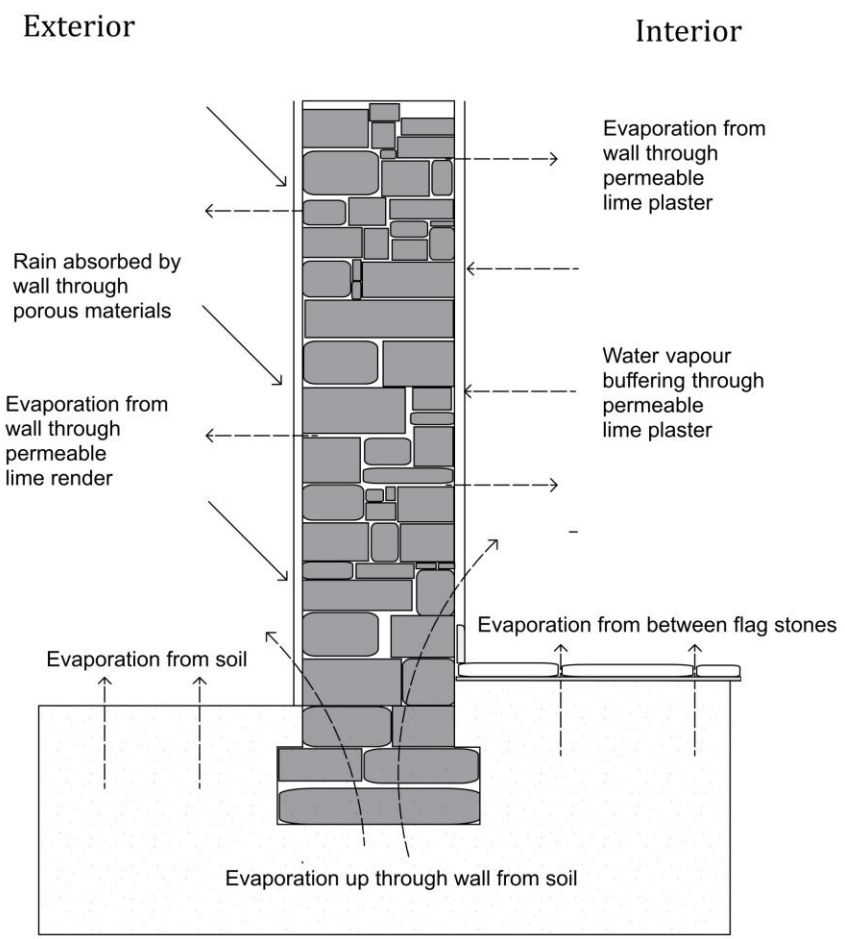
- the CHARACTER and significance of a building,
- its type of CONSTRUCTION,
- the CONDITION of the building fabric,
- the existing HEATING systems,
- the physical impact and DISRUPTION of upgrade works,
- the lifespan of any proposed upgrade works, and the PAYBACK period.

STRUCTURE & STABILITY

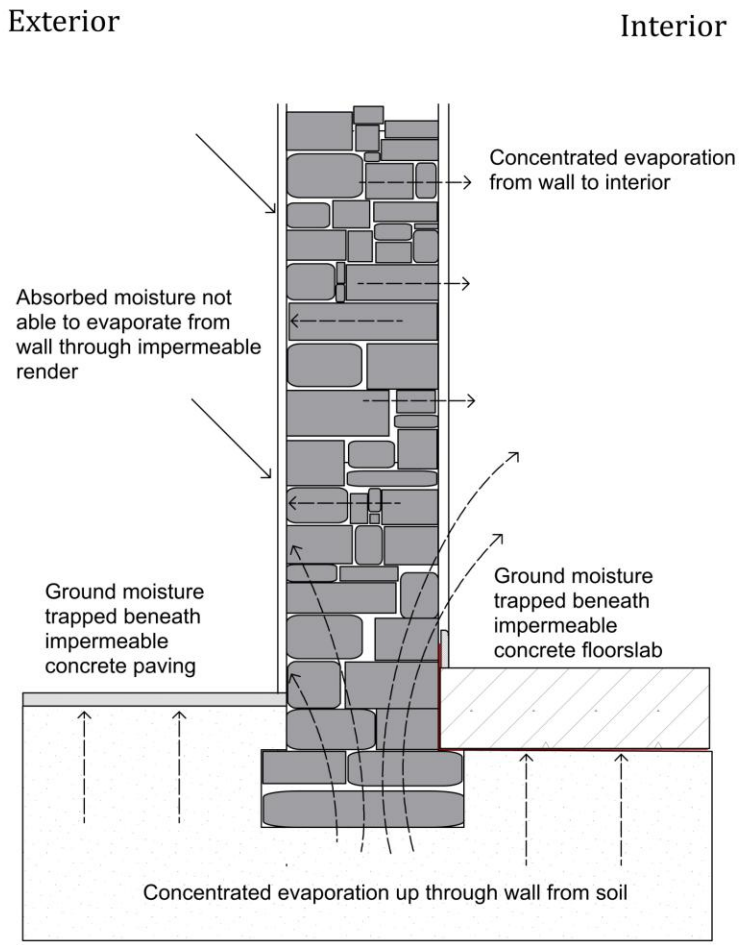
When planning and executing upgrade works it is essential that a designer or specifier understands the construction techniques of the past and the characteristics of traditional building materials.



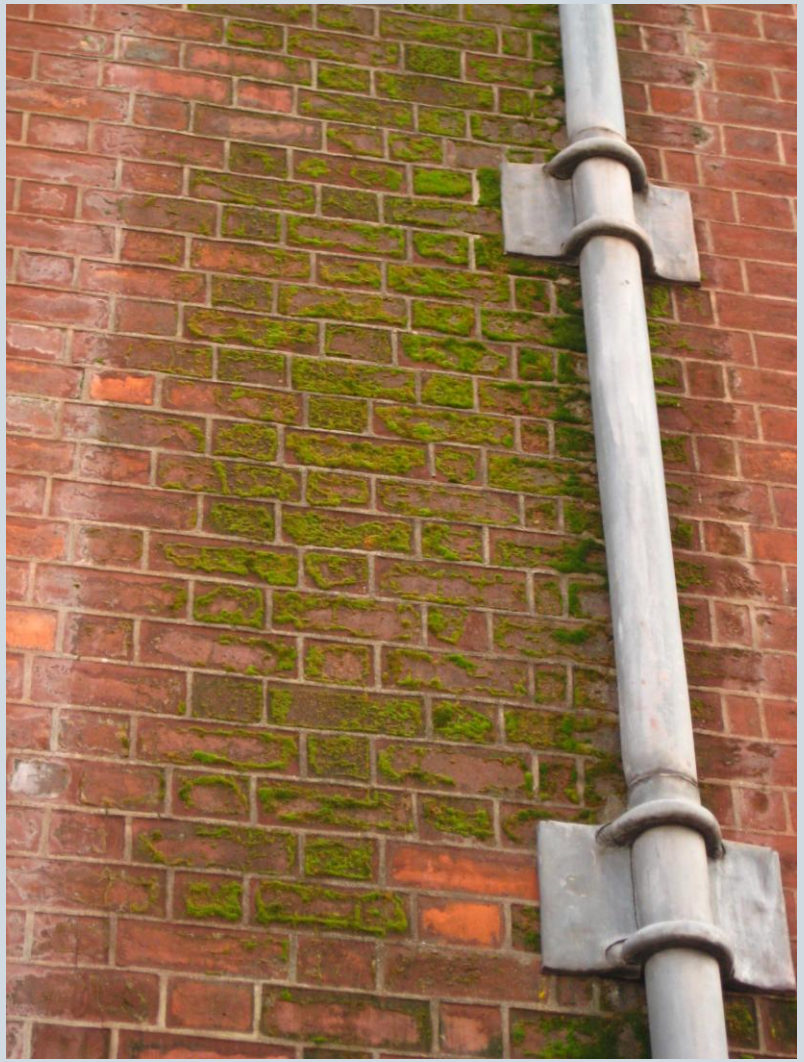
Traditional Wall



Modernised Wall



A DAMP HOUSE IS A COLD HOUSE



A First Step Is To Ensure The Building Is In Good Repair.

- Overhaul windows
- Repair leaking downpipes
- Repoint walls to ensure they are dry and can breath
- No point in exploring other options until this has been done

GETTING STARTED

KEEPING IT SIMPLE IS OFTEN THE BEST APPROACH

Level 1 Works: Use Less and Spend Less

Buy a thermometer so you know HOW WARM your house actually is!

Turn down the thermostat. TURNING IT DOWN BY 1ºC CAN REDUCE ENERGY BILLS BY AS MUCH AS 10%.

Have shorter running times for heating – for instance in the morning or in the evening before bed. OCCUPANTS MAY NOT EVEN NOTICE THE CHANGE.

Reduce heating in underused rooms and circulation areas such as corridors and stairs – JUST TURN DOWN THE RADIATORS

Install thermostatic controls on radiators which will turn the radiator off when the room has reached the preset temperature. DON'T JUST TAKE OFF YOUR JUMPER BECAUSE YOU ARE GETTING TOO WARM!

Fit ENERGY-EFFICIENT lightbulbs.

Have your boiler SERVICED so that it operates correctly.

GETTING STARTED

Level 1 Works: Use Less and Spend Less

Ensure that your ATTIC has at least 200mm of INSULATION.

Close SHUTTERS AND CURTAINS as soon as it starts to get dark.

DRAUGHT-PROOF windows and doors.

Fit LAGGING JACKETS to hot water tanks.

Fit reflective foil sheeting behind and shelves over radiators so HEAT IS REFLECTED into the room.

Consider installing a solid fuel STOVE in place of an open fire.

OH AND DON’T FORGET TO >>>>>

SWITCH AND SAVE – ITS FREE!!!

NOW THAT YOU HAVE STARTED, WHY NOT KEEP GOING

Level 2 Works: Be more economical and efficient

Replace an old boiler with a new, A-RATED CONDENSING BOILER.

Ensure all hot water pipes are FULLY INSULATED/LAGGED so heat is not lost in areas where heat is not required such as in floors.

Consider fitting SECONDARY GLAZING to windows.

Replace impermeable cement mortars and renders with LIME-BASED MATERIALS to help keep walls dry.

Lay INSULATION over existing solid floors.

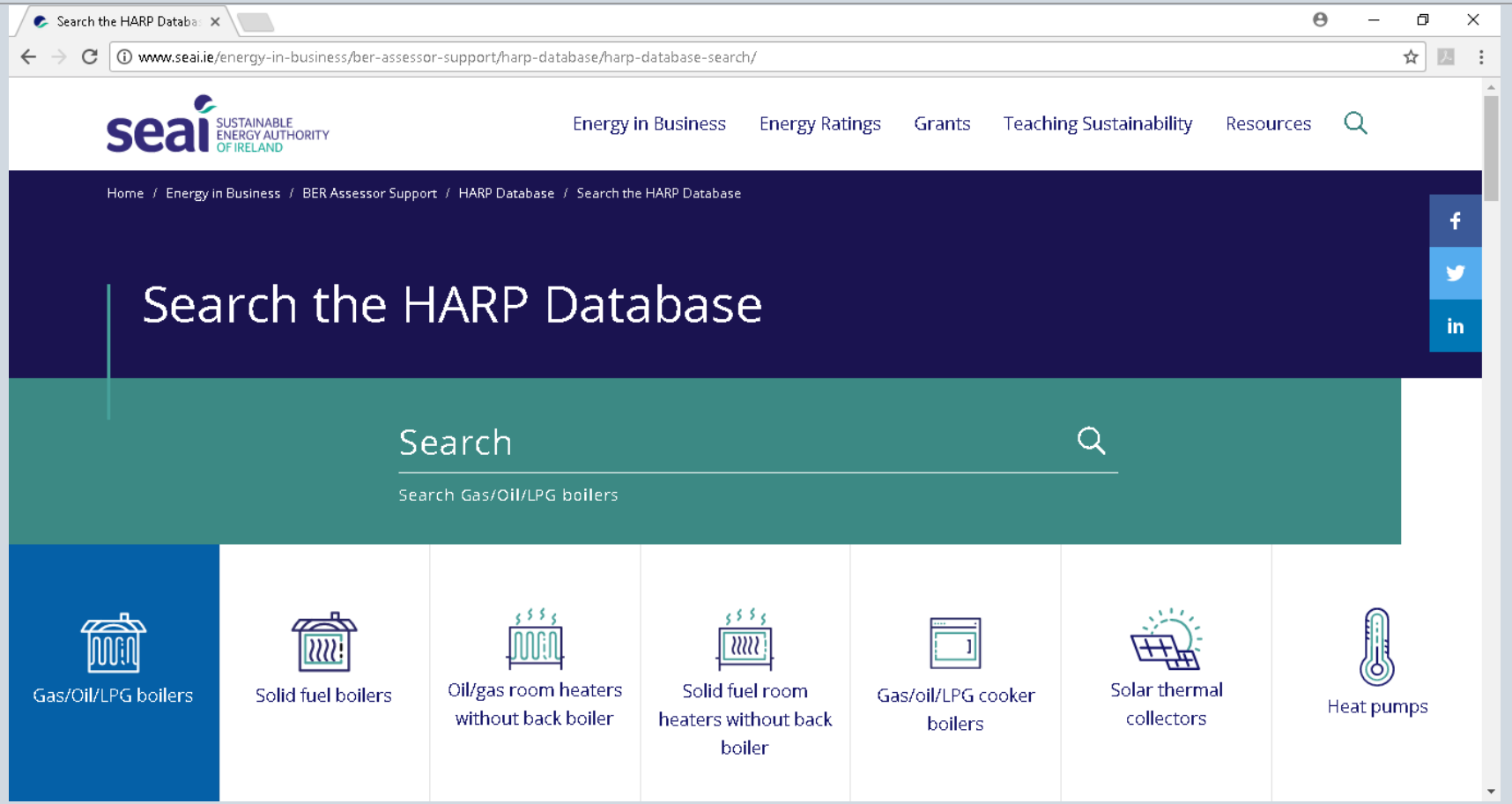
INSULATE suspended timber floors.

HEATING SYSTEMS

Old boilers are often inefficient in the way they convert fuel into heat. Replacing an old boiler with a new energy efficient boiler is one of the best ways of reducing energy bills

Boiler type	Typical seasonal efficiency	Energy input rate required to meet 100kW* heating demand
Standard, old, poor condition	45%	222kW
Standard, good condition	70%	143kW
High-efficiency	82%	122kW
Condensing (used with fixed temperature radiators)	85%	118kW
Condensing (used with variable temperature radiators)	87%	115kW
Condensing (used with under floor heating)	90% or more	111kW or less

HEATING SYSTEMS



IF ENOUGH JUST ISNT ENOUGH

Level 3 Works: Where money is no object

Fit DOUBLE-GLAZING where appropriate.

Lift and replace solid floors with NEW, INSULATED FLOOR SLABS.

Install UNDERFLOOR HEATING.

Insulate EXTERNAL WALLS.

Consider installation of SOLAR PANELS AND PHOTOVOLTAIC PANELS.

Consider installing THERMAL HEAT PUMPS

UPGRADING IN PRACTICE

WINDOWS

ROOF

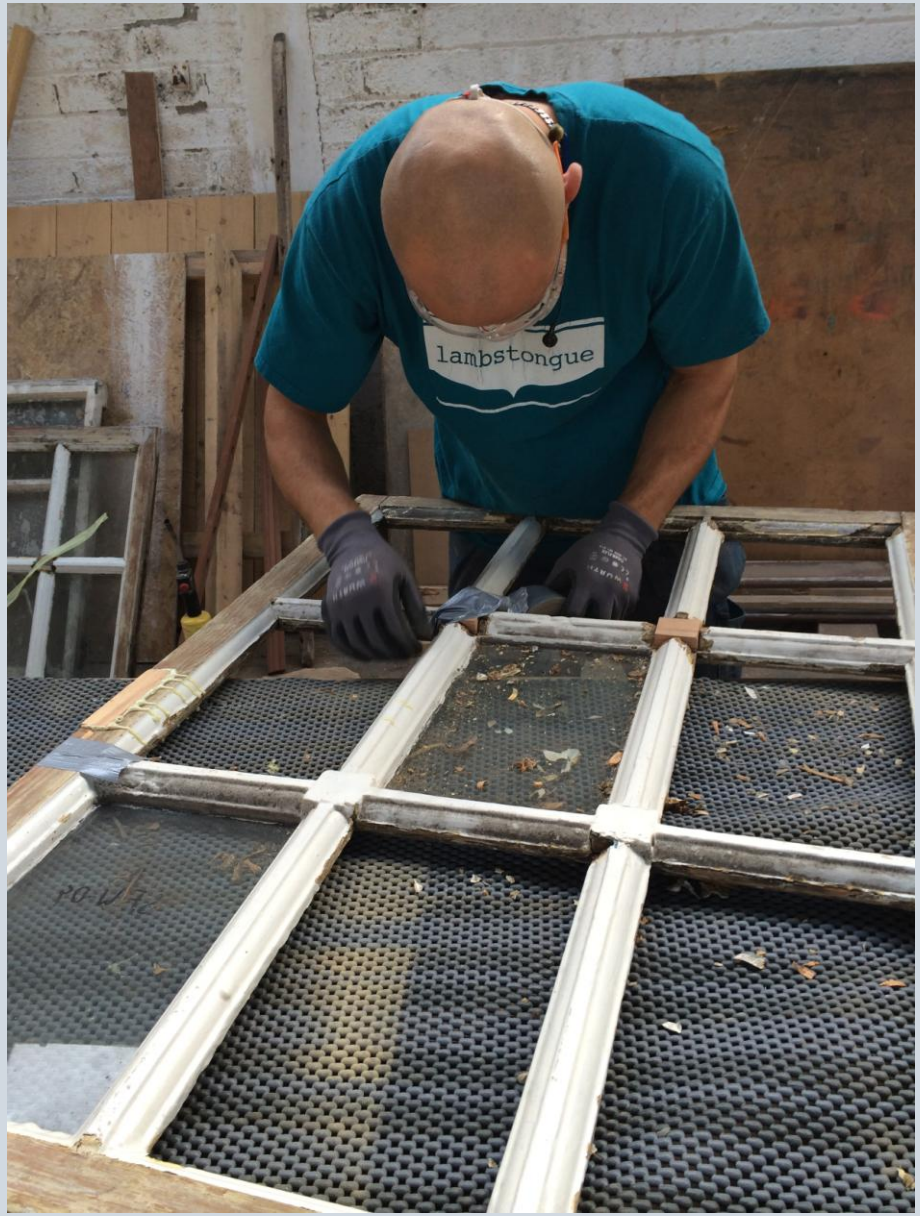
FLOORS

WALLS

OLD WINDOWS - DRAUGHTS & DILEMMAS!

The first thing to go or the first thing to keep?

Ah sure it would be easier (and cheaper?) to just make a lovely new one


lambstongue

THERMAL UPGRADE ISSUES

Single glazed sash window - 4.3U

Closing curtains - 2.5U

Closing shutters - 1.7U

Double glazing – 3U - 1.3U

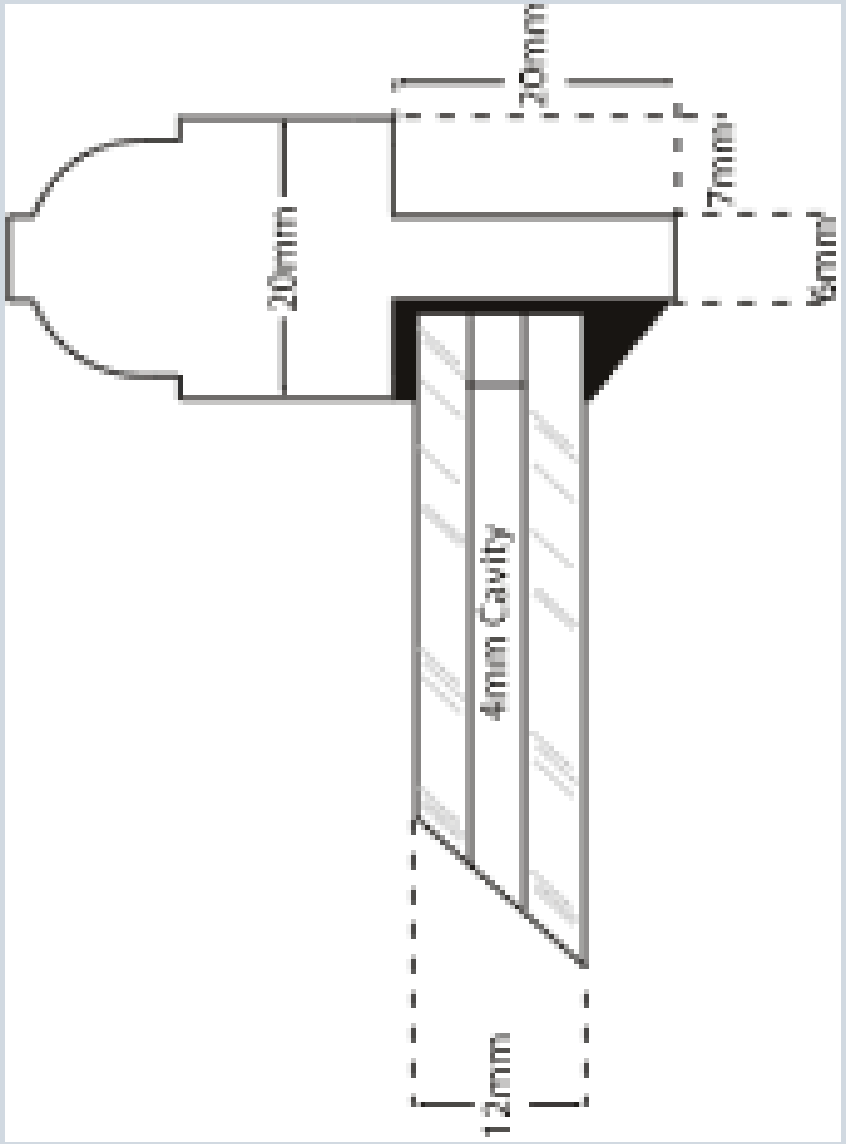
Secondary Glazing –1.8U

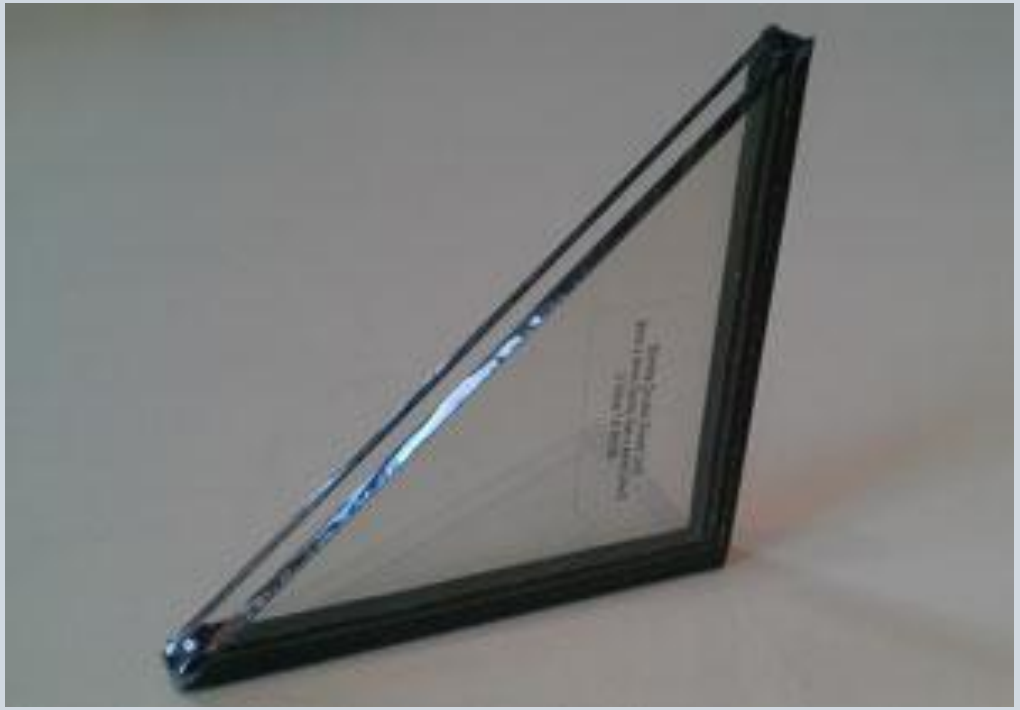
Source - English Heritage Research Into the Thermal Performance of Traditional Windows: Timber Sash Windows (2009)

DOUBLE GLAZING

- Optimum thermal performance?
- Invasive
- Can overload an old sash window
- Complex technology
- Loss of thermal performance with escape of gas
- Limited guarantees - lifespan
- Relatively expansive

SLIM-PROFILE DOUBLE GLAZING


20mm
7mm
6mm
20mm
4mm Cavity
12mm



SECONDARY GLAZING

- Easy to install
- Easy to uninstall
- No impact on historic window
- Simple technology
- Little that can go wrong
- Unlimited lifespan
- Relatively inexpensive

POLYCARBONATE SECONDARY GLAZING

In-situ test readings 5.4U before – 2.4U after

INSULATION - WHERE

Roofs

Floors

Walls

INSULATION - MATERIALS

Natural and man-made materials

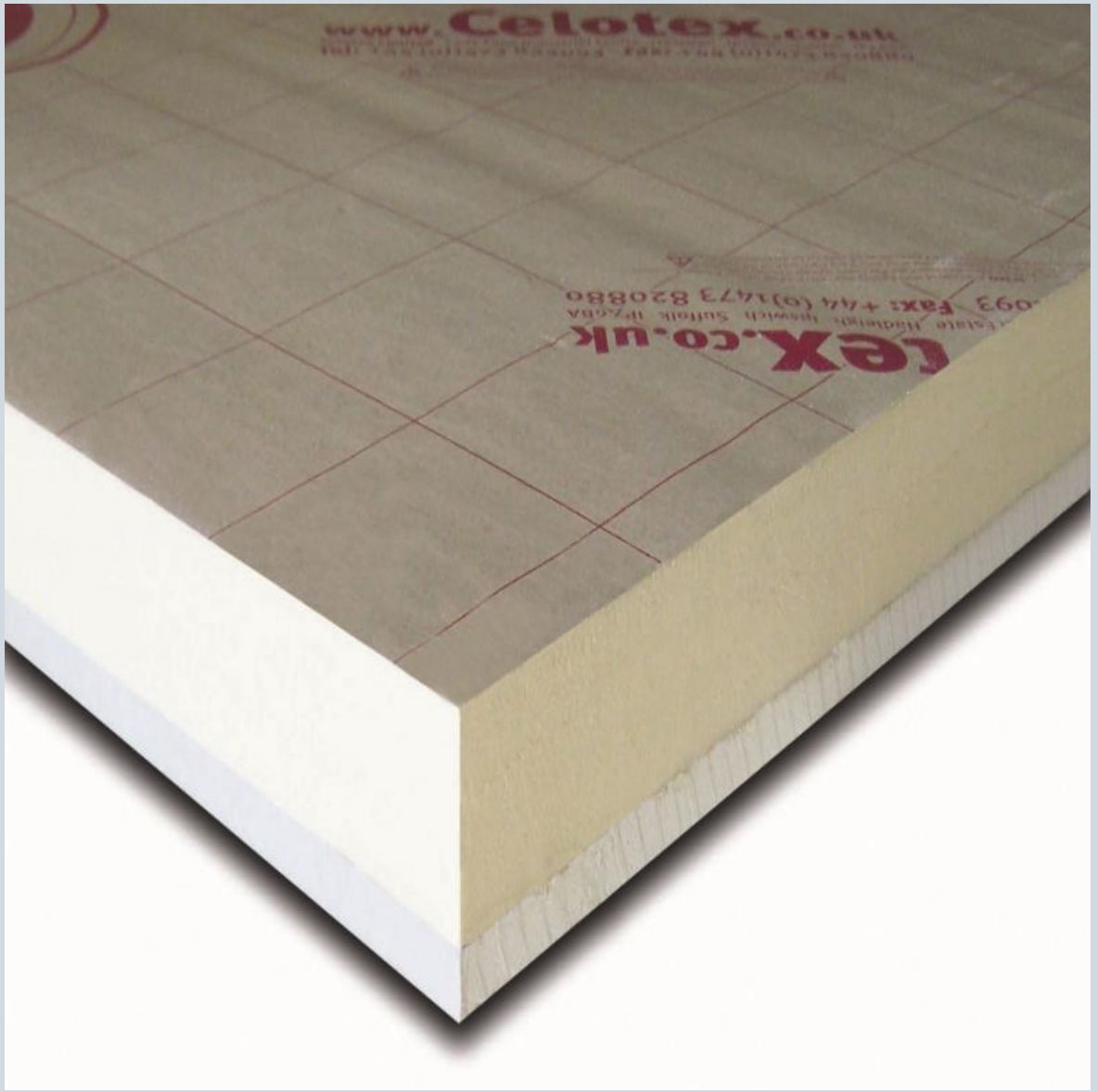
Breathable and non-breathable

Recyclable and non recyclable


CALSITHERM® KLIMAPLA
Abmessungen
Länge mm 1250 ± 3
Breite mm 500, 1000 ± 3
Dicke mm 25, 30, 50 ± 2
Sonderformate und Formteile auf Anfrage.


emp Building & Insulation: the raw materic
Hemp Wool
ives for
ncrete
shives & fibre
for plaster
shives & fibre
for fininshing plaster
hemp wool
in rolls or panel
hemp m
for floori


SheepWool
INSULATION
PREMIUM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INSULATING ROOFS


QUINN THERM

Ventilation

INSULATING FLOORS

SUSPENDED TIMBER FLOORS

Much more straightforward

Insulating a suspended ground floor will be quicker and less disruptive than laying a new concrete floor.

Deals with draughts

Important to maintain ventilation

SOLID FLOORS

Can be a messy and disruptive job

Can incorporate underfloor heating and a damp proof course

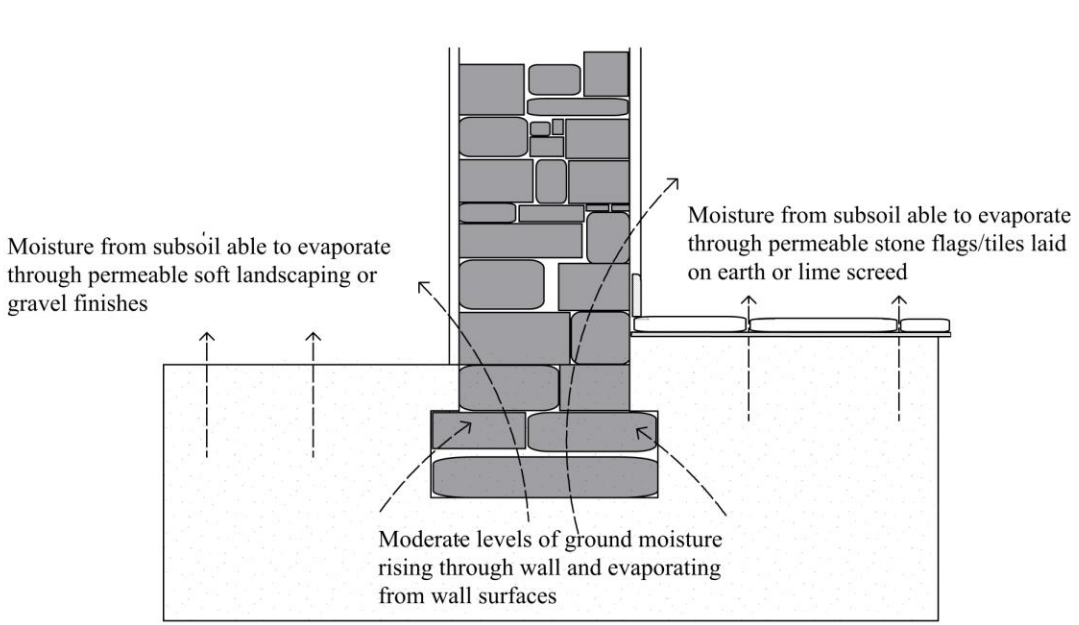
A CASE OF DIGGING TOO DEEP

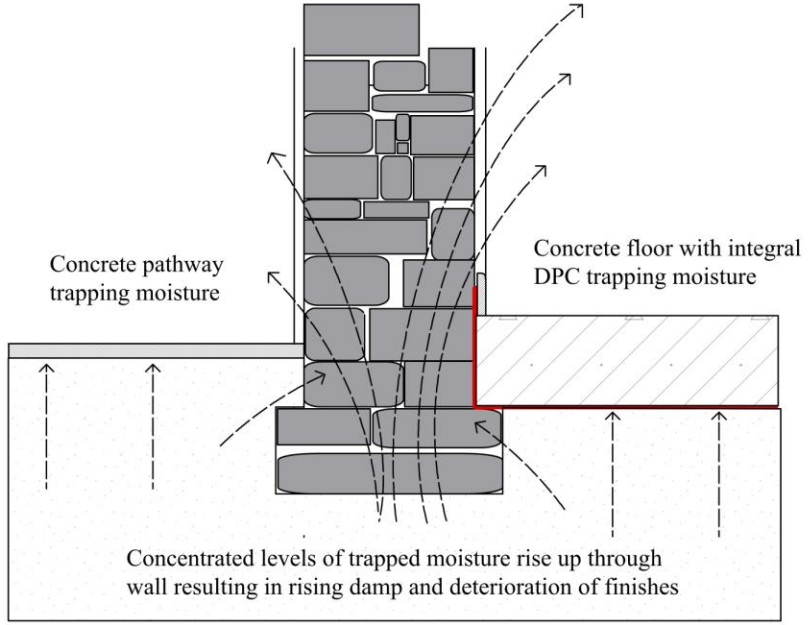
TRIAL PITS

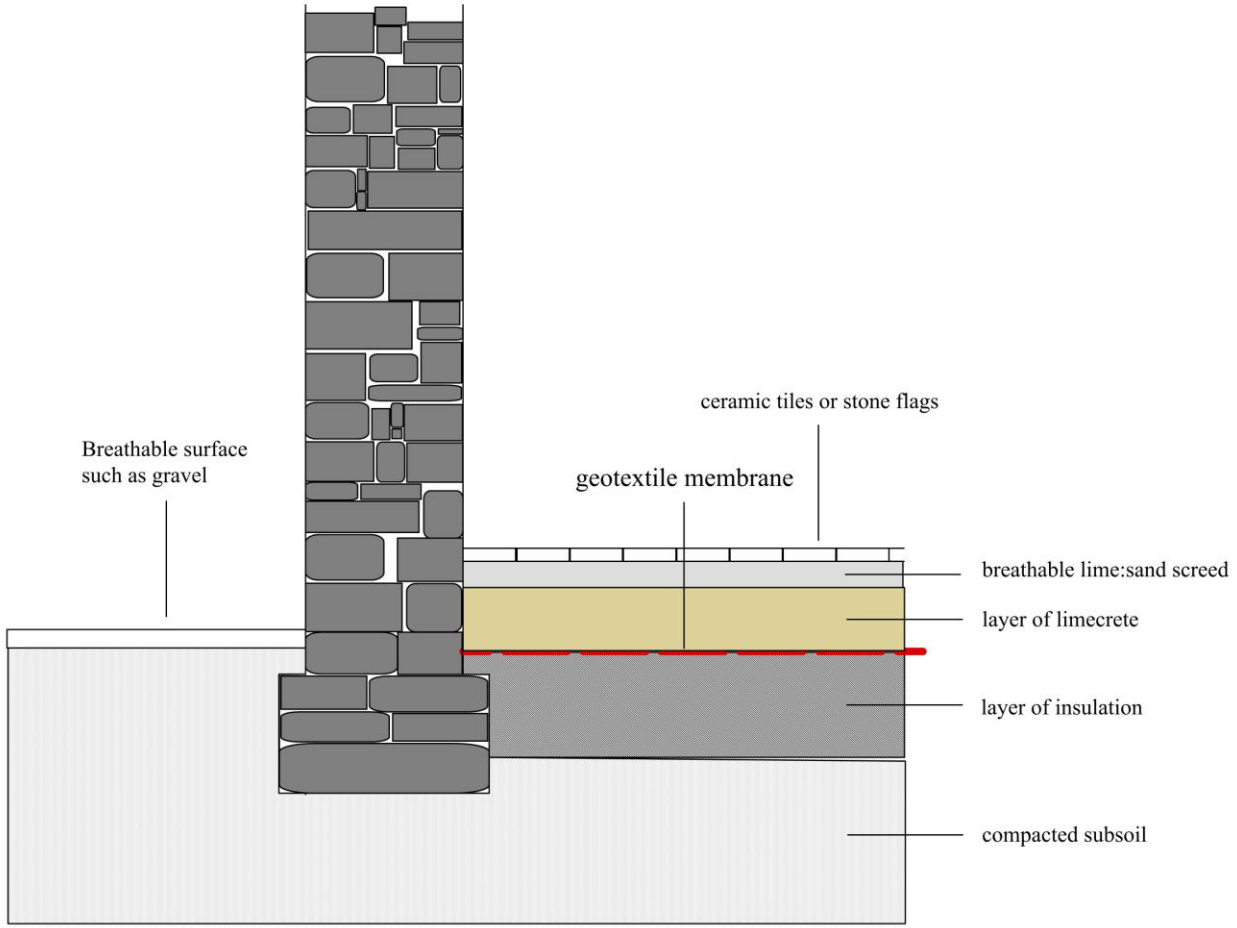
Condition of an existing floor slab

Presence of a DPC and insulation

Depth of foundations and footings


Moisture from subsoil able to evaporate through permeable soft landscaping or gravel finishes
Moisture from subsoil able to evaporate through permeable stone flags/tiles laid on earth or lime screed
Moderate levels of ground moisture rising through wall and evaporating from wall surfaces


Concrete pathway trapping moisture
Concrete floor with integral DPC trapping moisture
Concentrated levels of trapped moisture rise up through wall resulting in rising damp and deterioration of finishes


ceramic tiles or stone flags
Breathable surface
such as gravel
geotextile membrane
breathable lime:sand screed
layer of limecrete
layer of insulation
compacted subsoil


Stove
Tel: 042
Mob: 087

INSULATING WALLS

EXTERNAL WALL INSULATION

EXTERNAL WALL INSULATION

Breathable or non-breathable

Reliance on mechanical fixings – screws, washers, wire mesh & adhesives

New technology v lifespan

Potential risk of failure of fixings

Potential to create new problems

Guarantees

EXTERNAL WALL INSULATION

INTERNAL WALL INSULATION

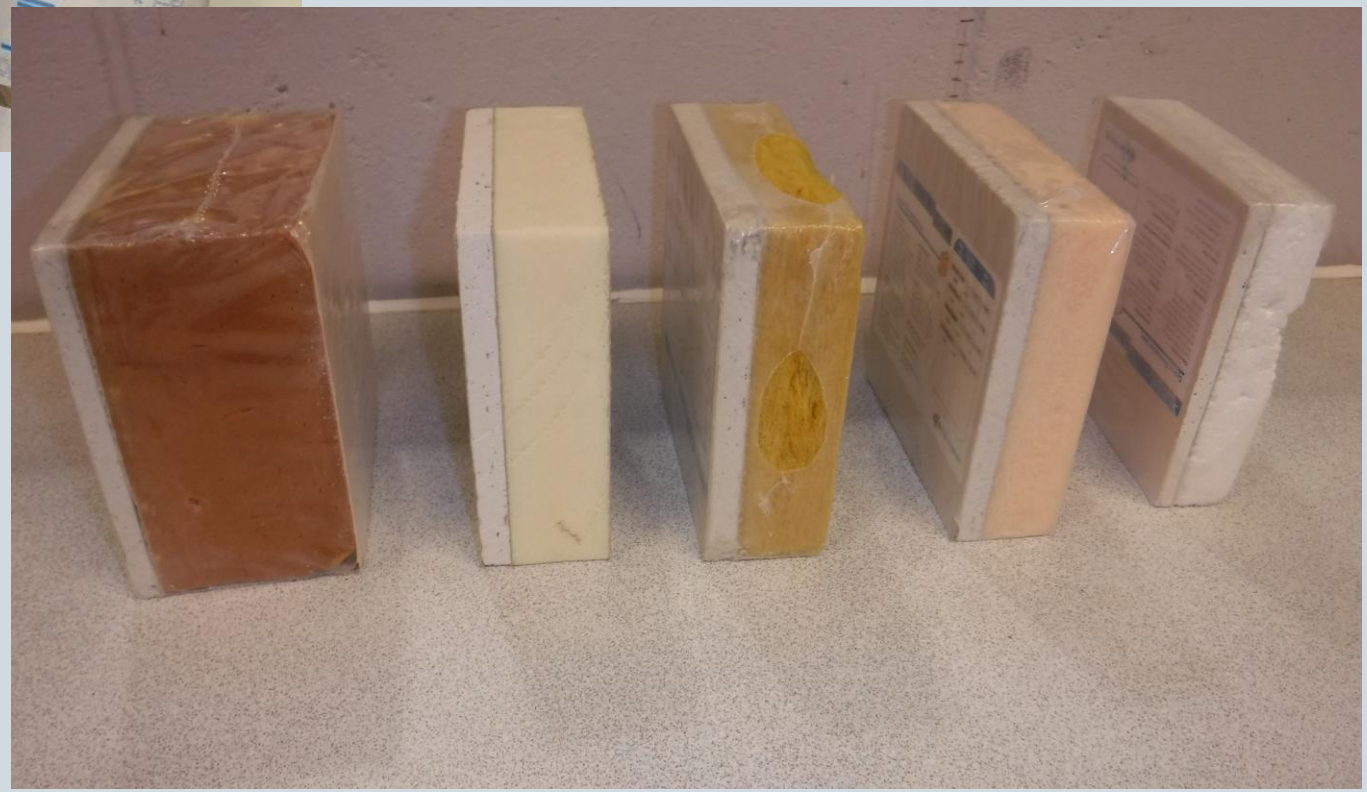
Various materials - calcium silicate board, wood fibre board and hemp plaster

Insulated plaster board is not suitable as it is not breathable

Takes up internal space

Requires full re-plastering of a room - disruption and cost

Disruptive - have to lift and re-set all joinery and sockets and switches



IN CONCLUSION

- It is possible to improve the thermal performance of old houses and make them more energy efficient.

- All it takes is planning, attention to detail, common sense and a dose of reality.

- Always remember that old houses need to breathe.

- For starters keep it simple and low-tech

- Use natural, breathable and recyclable materials as far as possible