NHBC

Raising Standards. Protecting Homeowners

External Walls Seminar

Working together to get it right

Welcome and introduction

“The penetration of water into the fabric of a building has serious consequences for the health of the occupants and for the long term serviceability of the structure... By their nature, masonry walls are not waterproof.”

BS 5628: Part 3: 2001, section 5.5

Agenda

- **Claims statistics**
- **Areas of concern**
  - Cavity trays and DPC’s
  - Insulation
  - Render
  - Structure
- **Managing out the problem**

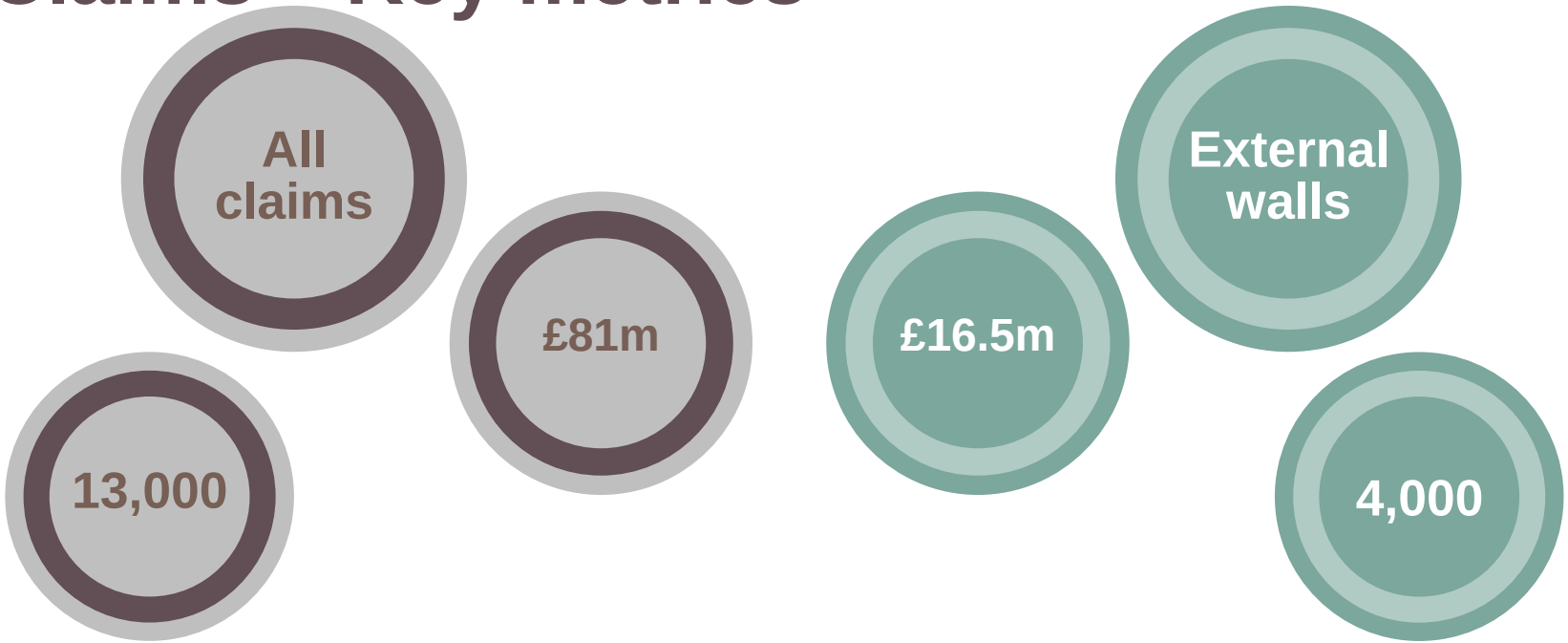
After this presentation you should

- Know what the common defects are
- Understand their root cause
- Be clear on the consequences
- Be better equipped to get it right first time

Claims statistics

- Areas of concern
  - Cavity trays and DPC’s
  - Insulation
  - Render
  - Structure
- Managing out the problem

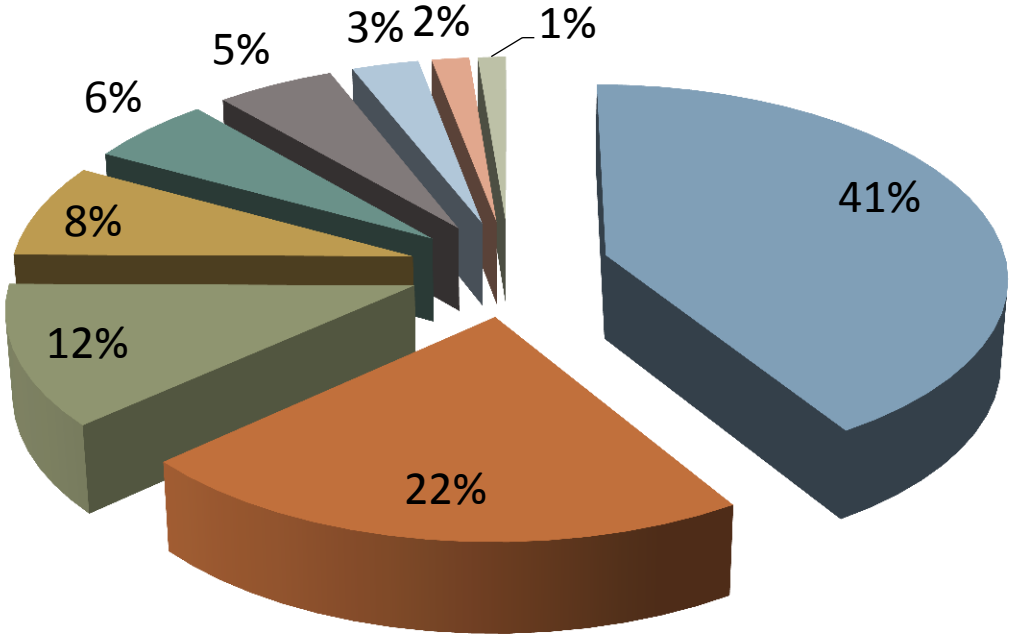
Claims – Key metrics



Claims - External Walls

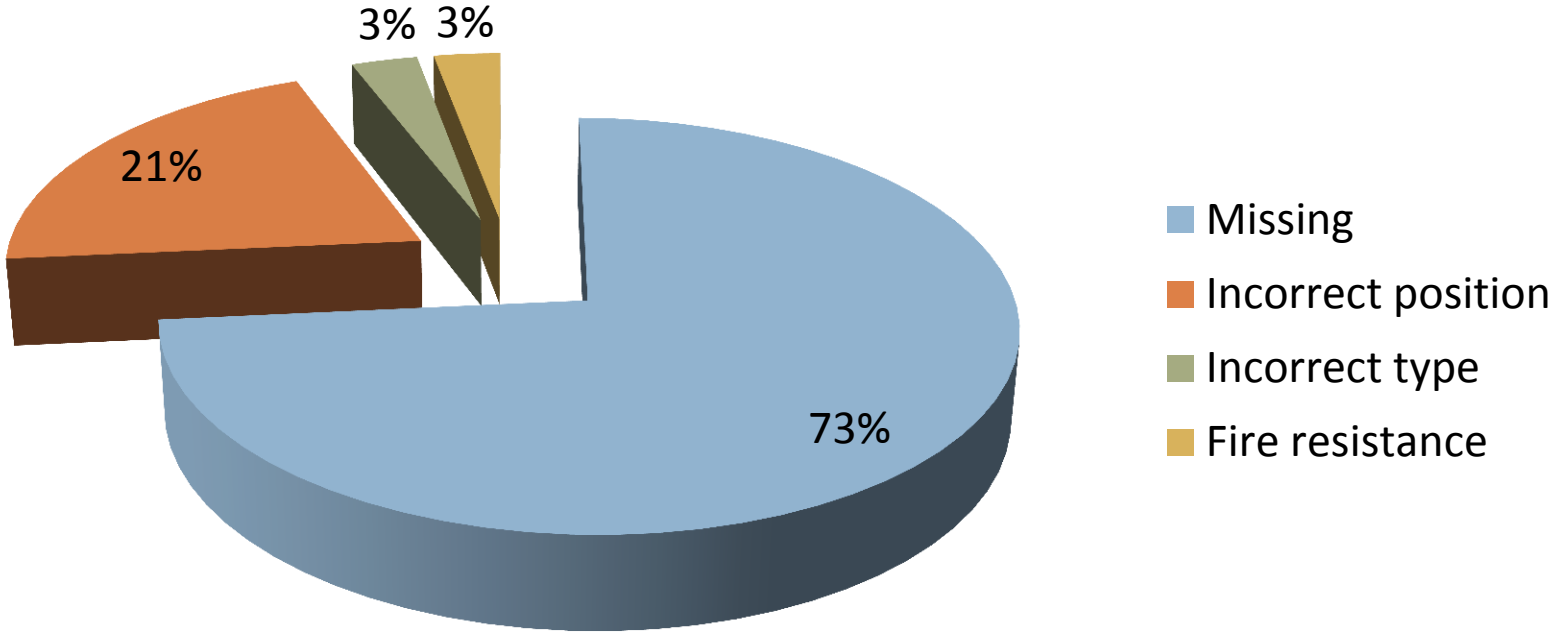
- Cavity trays & DPC’s
- Insulation
- Render
- Structure

Claim statistics – Cavity trays & DPC's

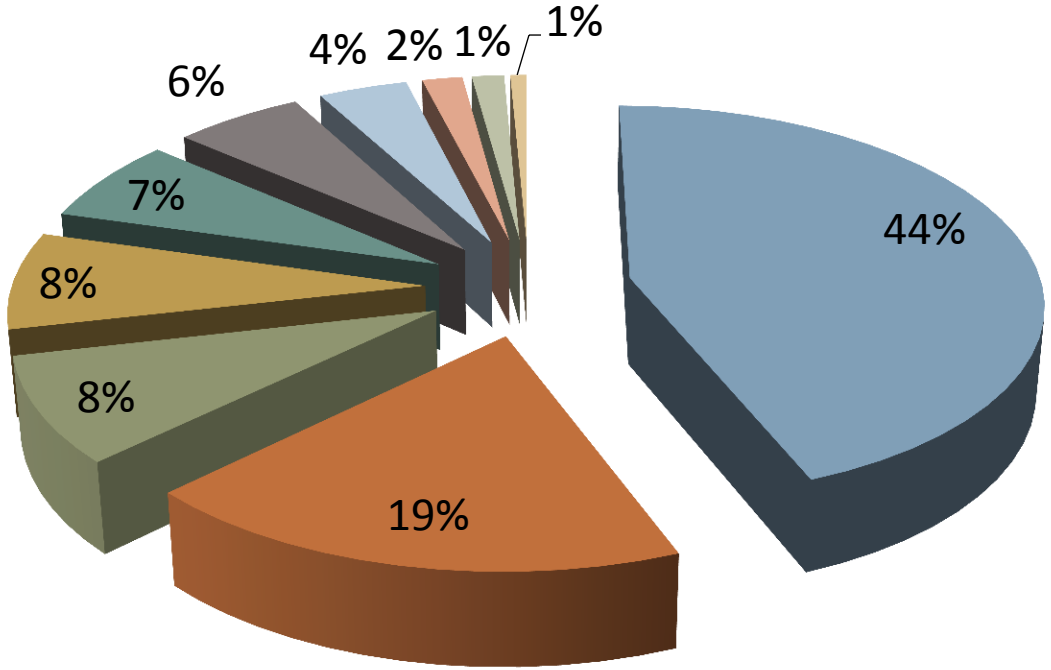


- Cavity tray incorrect position
- Cavity tray missing
- Cavity tray inadequate joins
- Cavity tray incorrect end detail
- Cavity tray incorrect type
- Vertical/horizontal dpc incorrect position
- Vertical/horizontal dpc missing
- Cavity tray no weep vents
- Vertical/horizontal dpc incorrect type

Claim statistics – Insulation

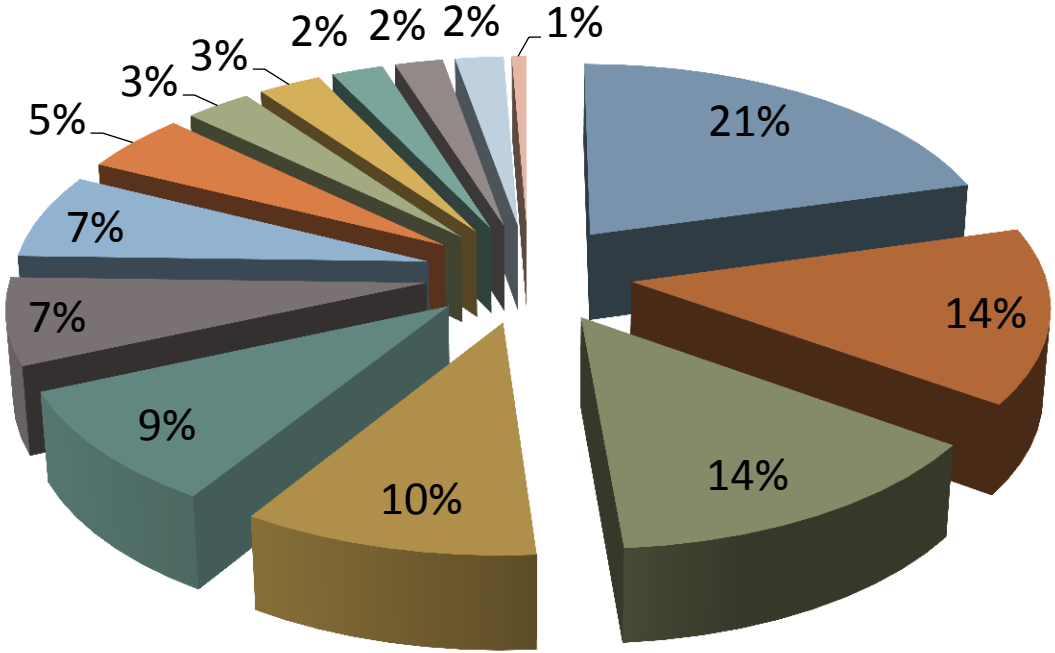


Claim statistics – Render



- Debonding from substrate
- Coats or thickness
- Shrinkage in substrate
- Render shrinkage
- Perimeter details
- Mix strength
- Laths and reinforcement
- Timber abutments
- Frost damage
- Sulfate attack

Claim statistics – Structure



- Parapets/copings inadequately fixed
- Bridged cavity
- Poor pointing
- Mortar
- Bonding irregular/inadequate
- Unfilled joints
- Cladding to timber frame
- Movement joints missing/incorrect position
- Lintels
- Not plumb/level
- Frost damage
- Appearance
- Thermal movement/shrinkage
- Wall ties

The customer experience - Claims

The customer experience - Claims

The customer experience - Claims

- Claims statistics
- **Areas of concern**
  - **Cavity trays and DPC's**
  - Insulation
  - Render
  - Structure
- Managing out the problem

Do horizontal cavity trays need stop ends?

a) Yes

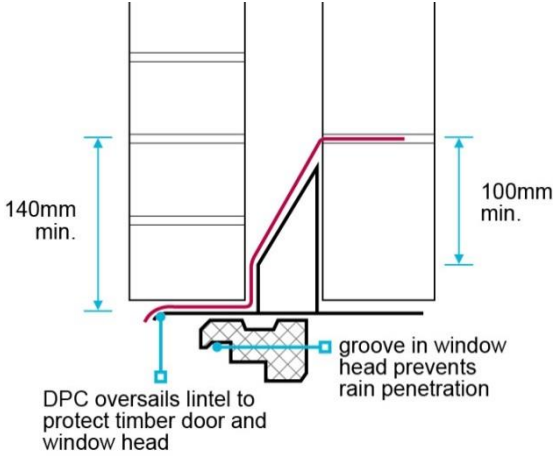
b) No

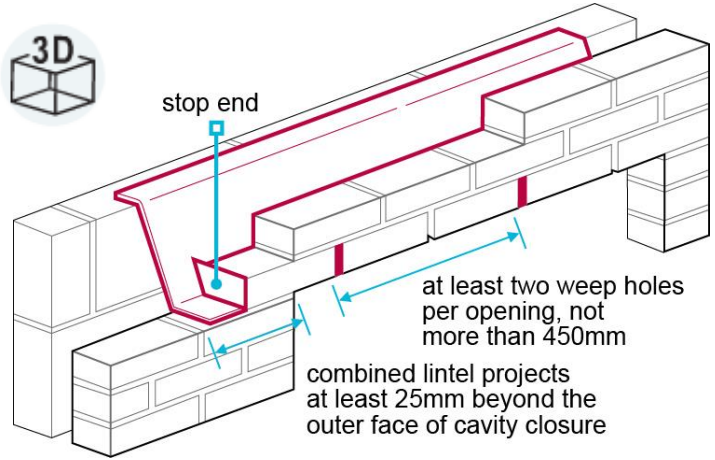
Do horizontal cavity trays need stop ends?

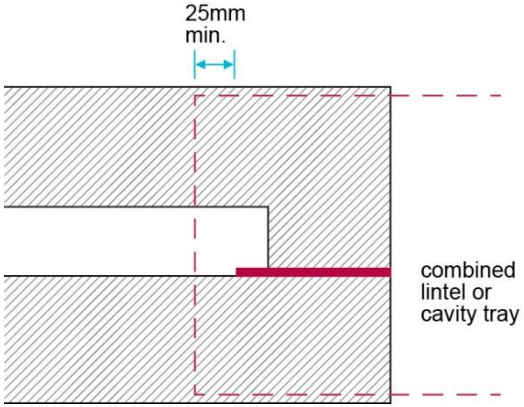
a) **Yes**

b) No

Horizontal trays - Good practice



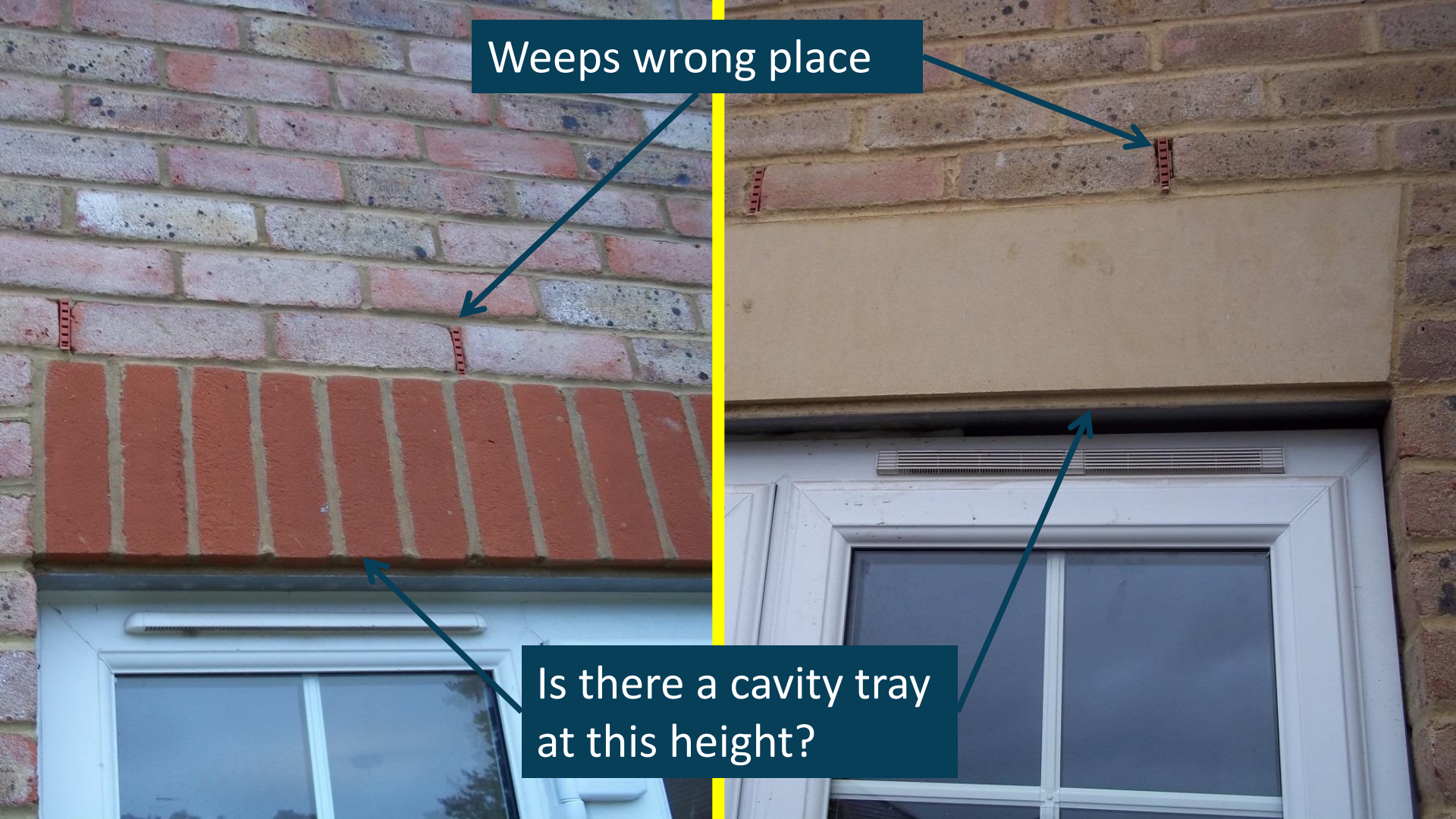





Correct spacing and number of weep holes. Shame about location
Is there a cavity tray at this height?

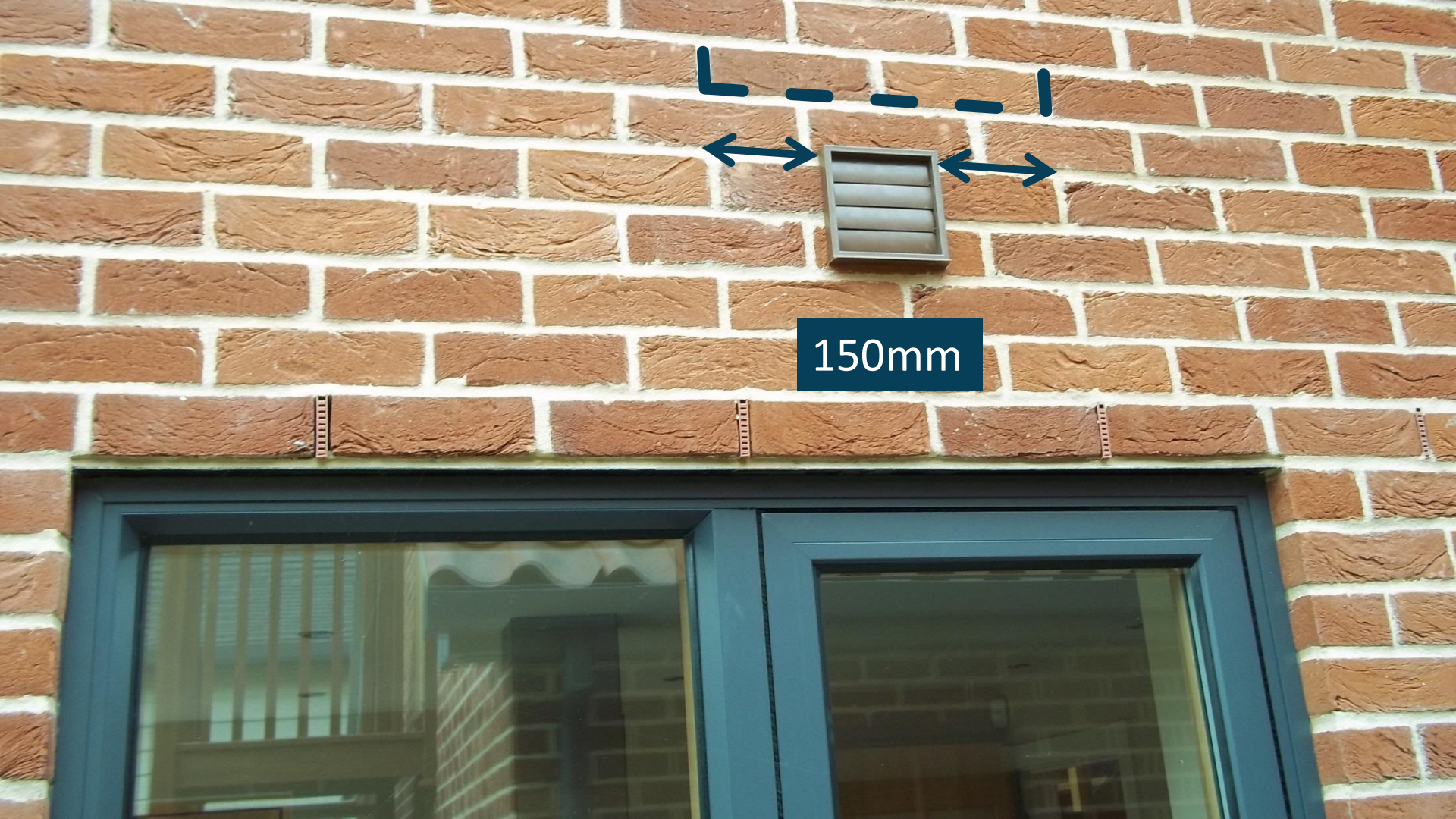

Weep holes installed, but at the wrong height
Vent gone through tray??
Is there a cavity tray at this height?


Cavity tray cut short - at least 25mm past closer or to cover the lintel (whichever is greater)
No stop end

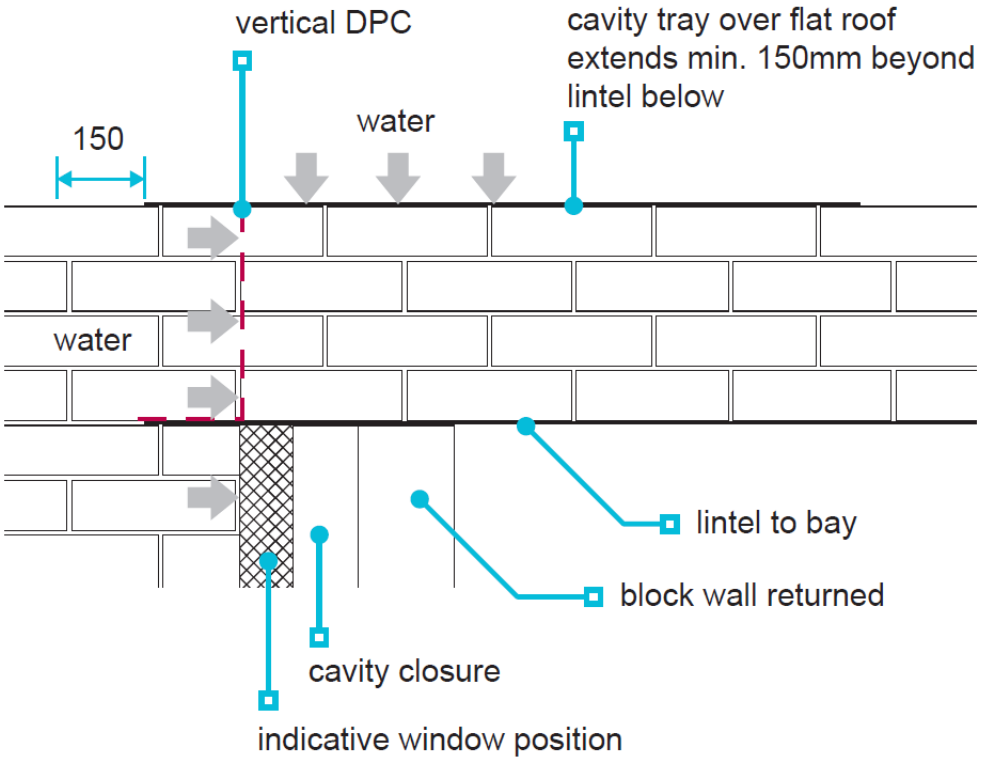

Weeps wrong place
Is there a cavity tray at this height?

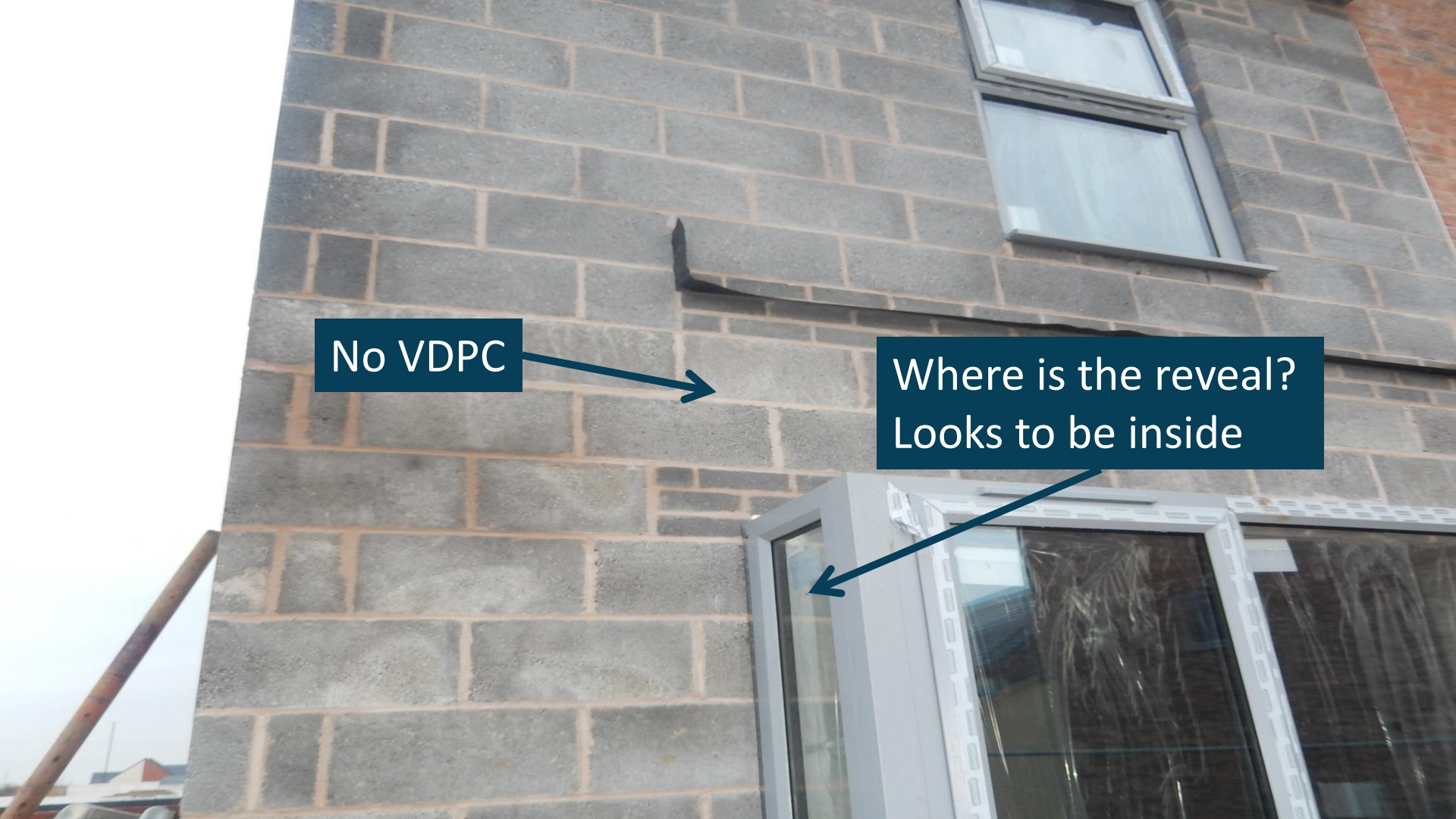

Is this stop end satisfactory?
Full of mortar. Weep blocked if there is one


Missing weep holes


150mm


Tray / DPC at roof flashing intersection level
Lintel level supporting house wall


vertical DPC
cavity tray over flat roof extends min. 150mm beyond lintel below
150
water
water
lintel to bay
block wall returned
cavity closure
indicative window position

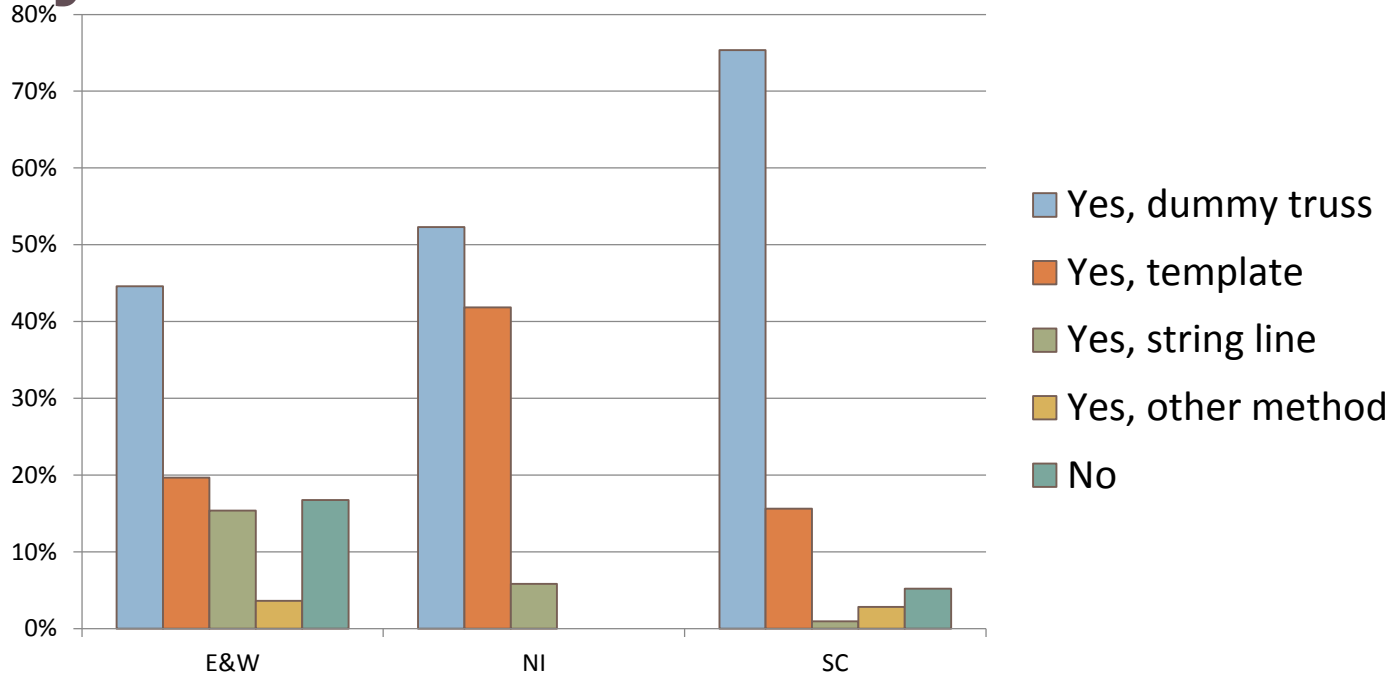

No VDPC
Where is the reveal?
Looks to be inside

Stepped cavity trays

Factors to consider when installing stepped cavity trays?

- Roof pitch
- Roof build-up
- Profile of tile/slate
- Tray material
- Wall plate height

Survey results - Profiles

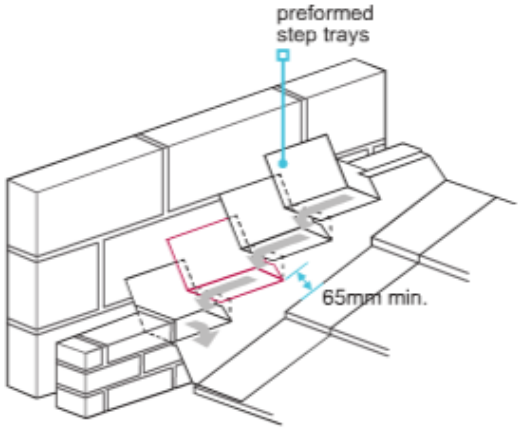



Good coordination and pre-planning


Weeps here.
Tray too high?
No sign of broken bond. Indicates missing or incorrectly located trays/stop ends

Stepped cavity trays

Where the roof abuts at an angle with the wall, preformed stepped cavity trays should be provided.



To minimise the risk of water ingress below the abutment, preformed stepped cavity trays:

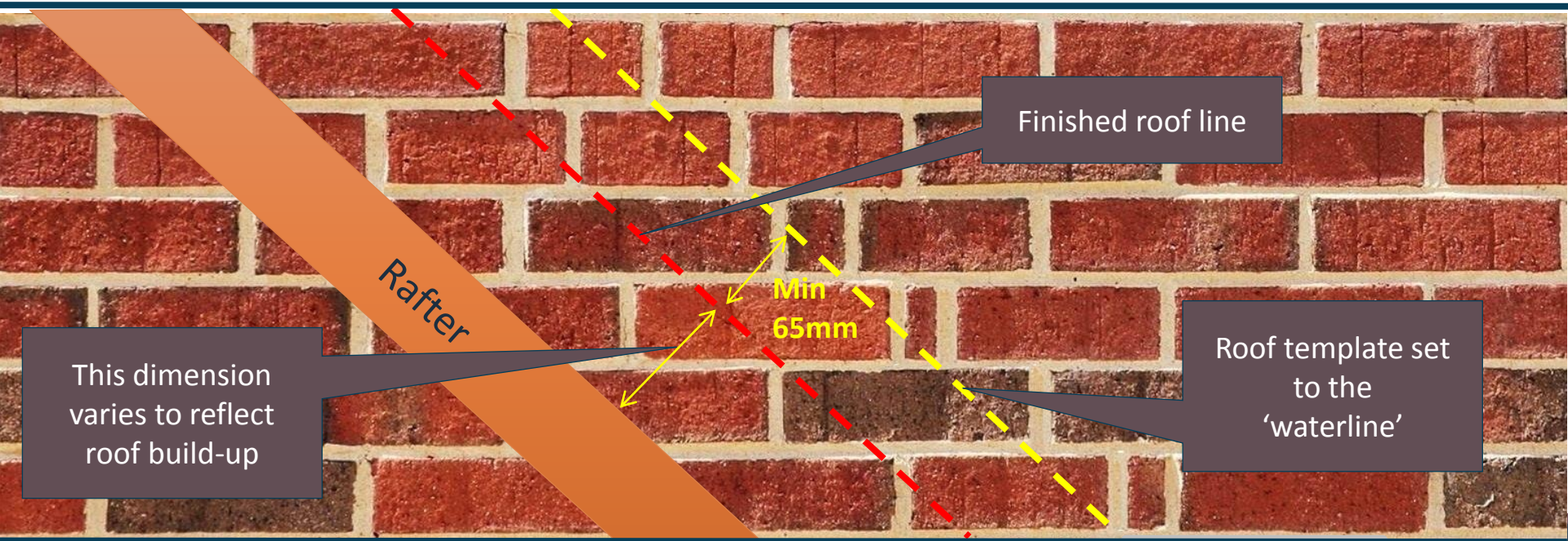
- should be provided where a roof abuts a cavity wall above an enclosed area, e.g. an attached garage
- should have two stop ends at the lowest cavity tray and a weep hole to allow water to drain from the cavity
- are not necessary where the roof is not over an enclosed area, e.g. open car ports and open porches.

Preformed stepped cavity trays should be installed in accordance with the manufacturer's recommendations and positioned:

- to suit the dimension of the flashing (which should be in accordance with the manufacturer's recommendations or a minimum width of 65mm)
- so that the stepped cavity tray cannot discharge behind flashing (where it is necessary to cut bricks or blocks, the bond should be maintained in the following joint).

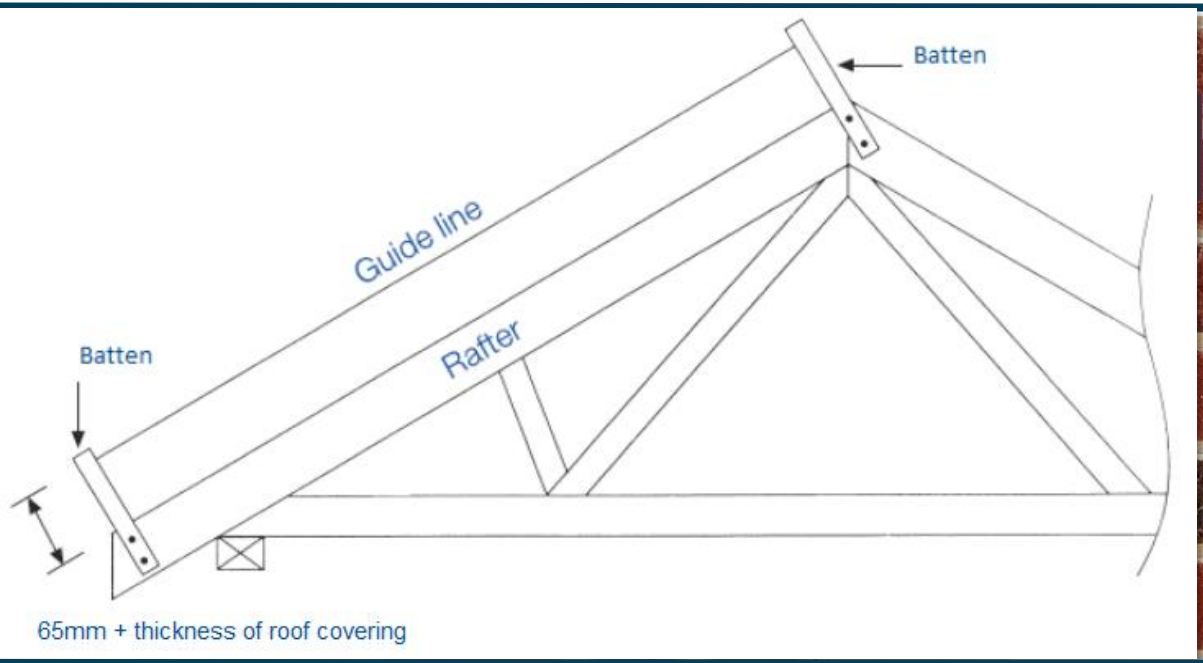
Stepped cavity trays - Proprietary

'Getting it right first time'



Stepped cavity trays - Proprietary

'Getting it right first time'



Stepped cavity trays - Proprietary

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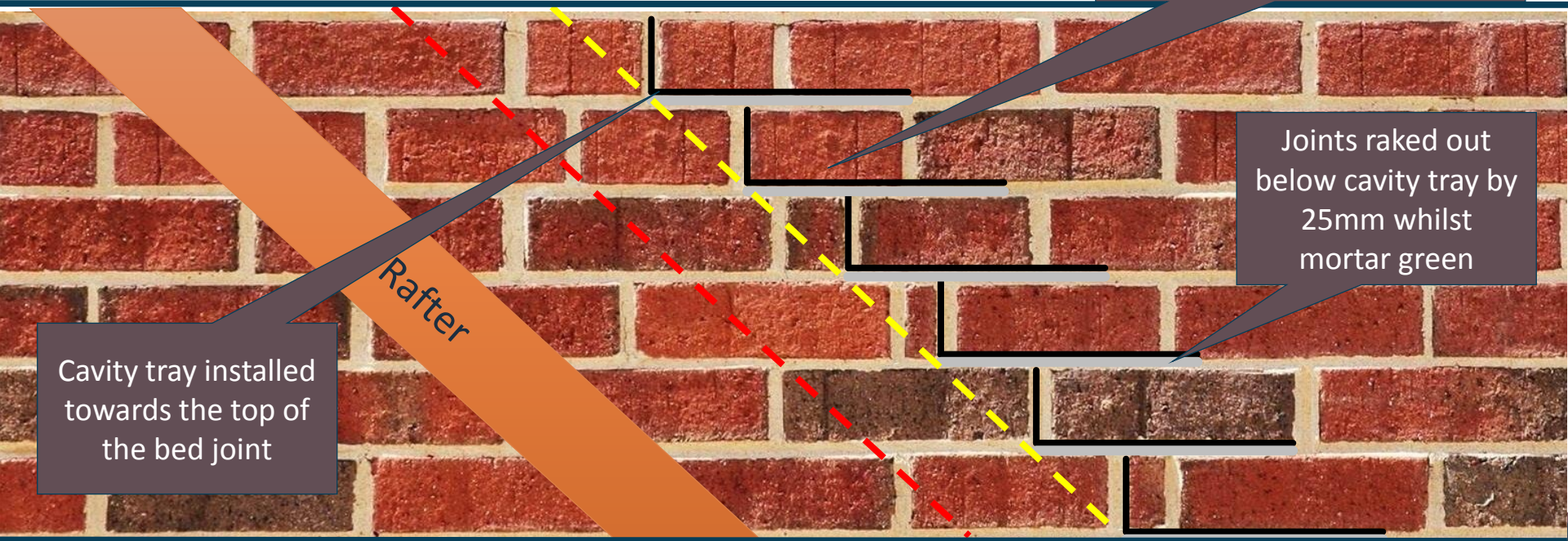

Stepped cavity trays - Proprietary

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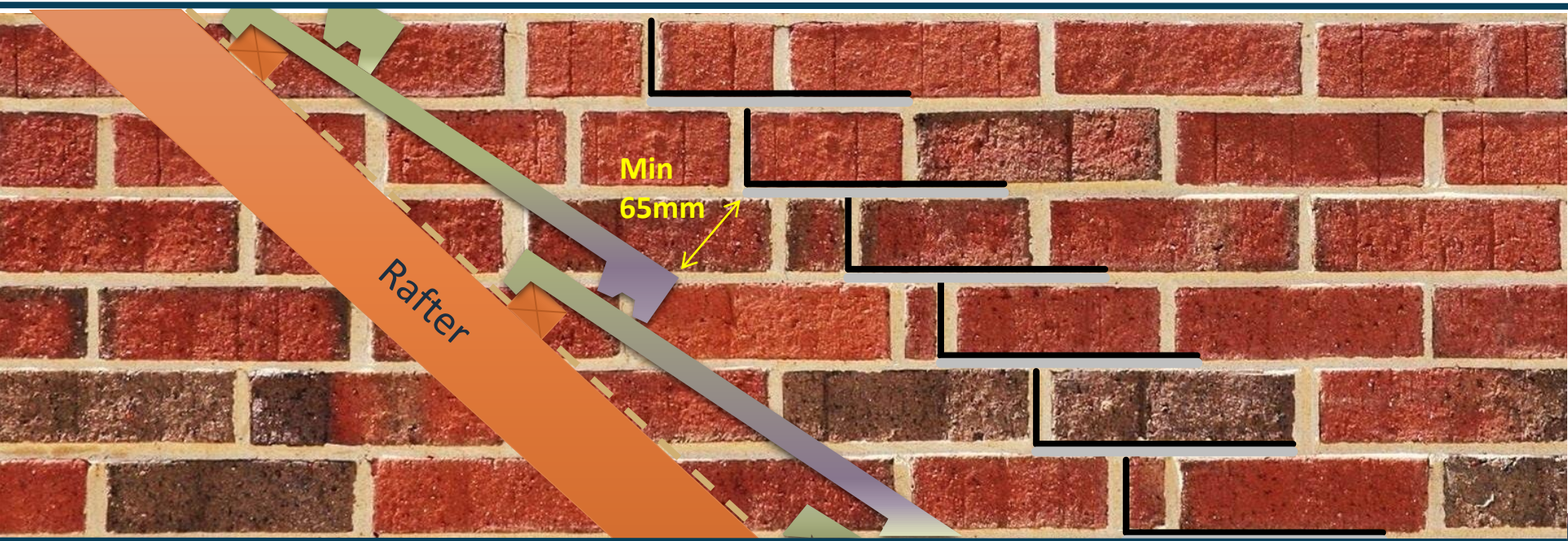
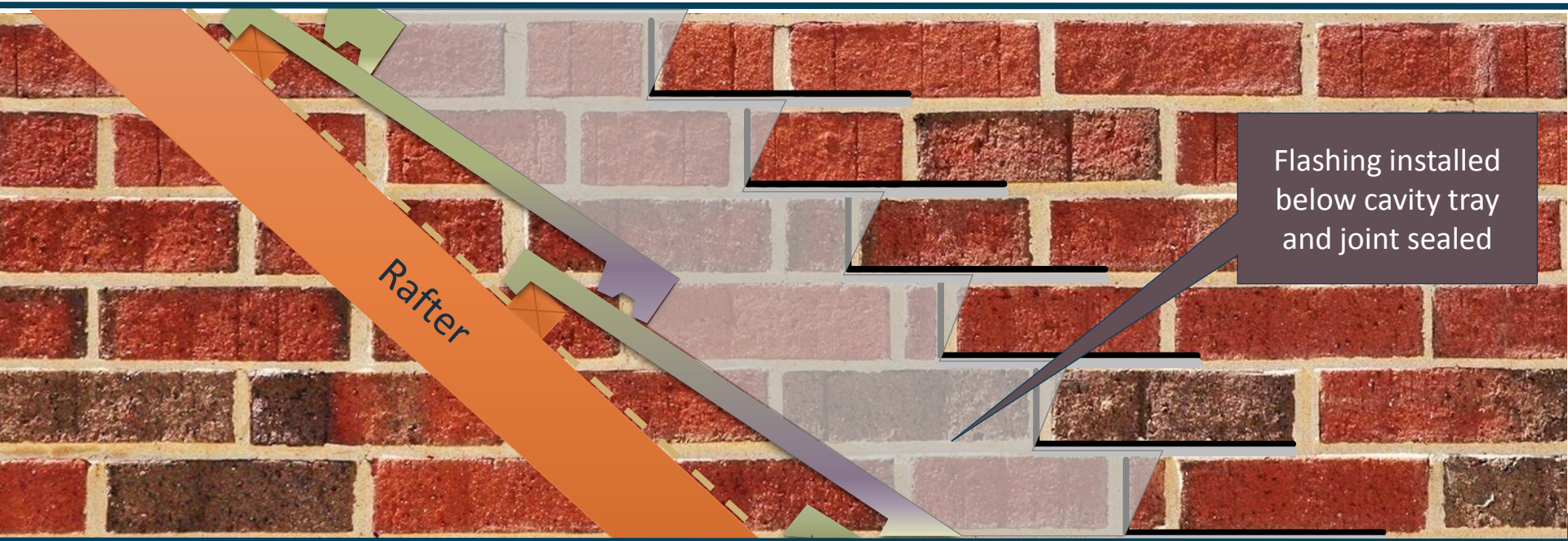


Stepped cavity trays - Proprietary

'Getting it right first time'

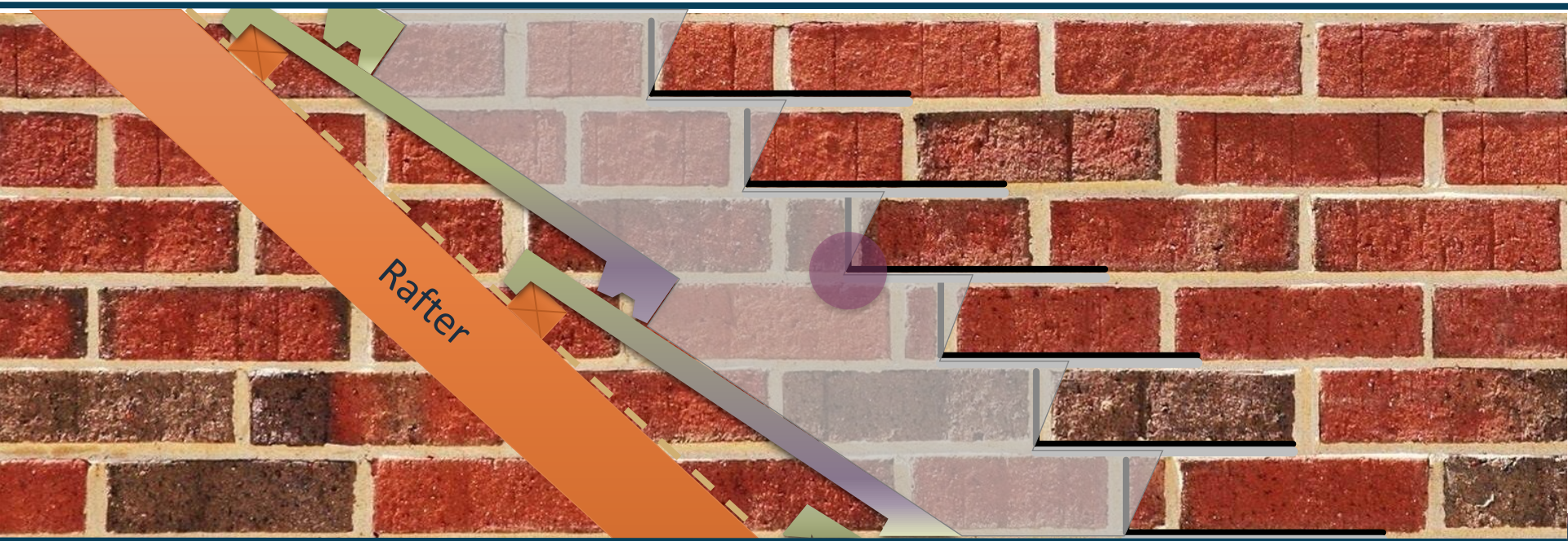
Soakers/secret gutter omitted for clarity



Stepped cavity trays - Proprietary

'Getting it right first time'

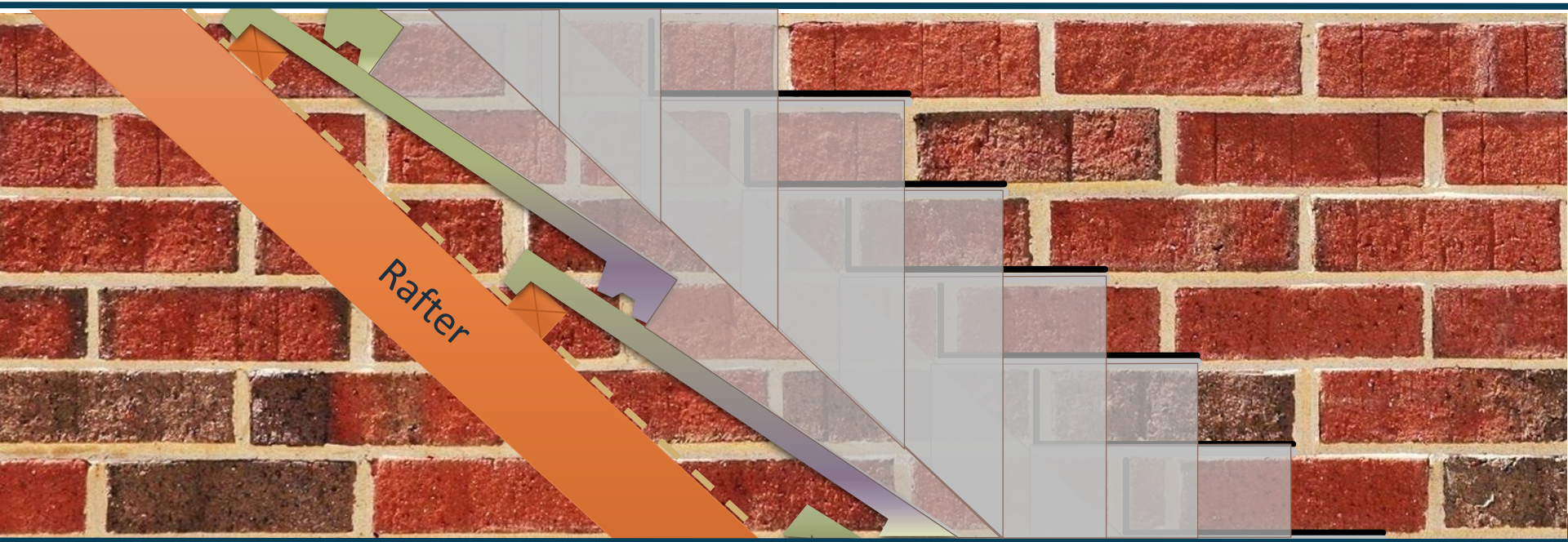
Soakers/secret gutter omitted for clarity



Stepped cavity trays - Proprietary

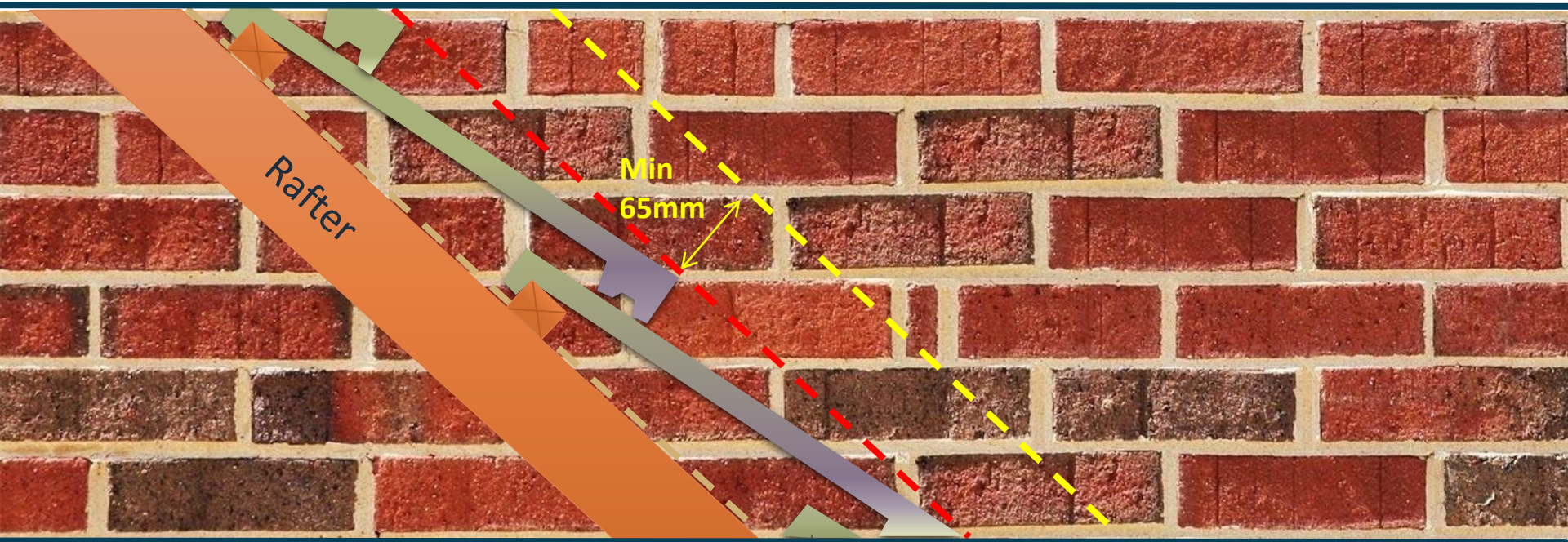
'Getting it right first time'

Soakers/secret gutter omitted for clarity



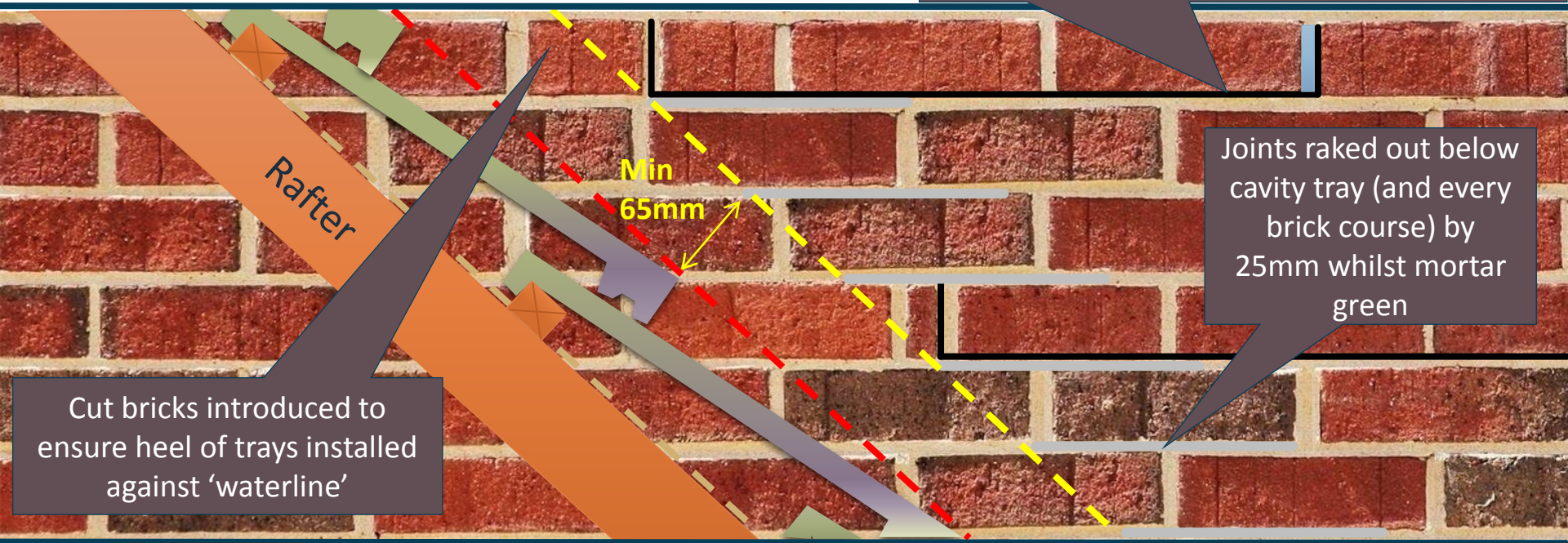
Stepped cavity trays - Flexible

'Getting it right first time'



Stepped cavity trays - Flexible

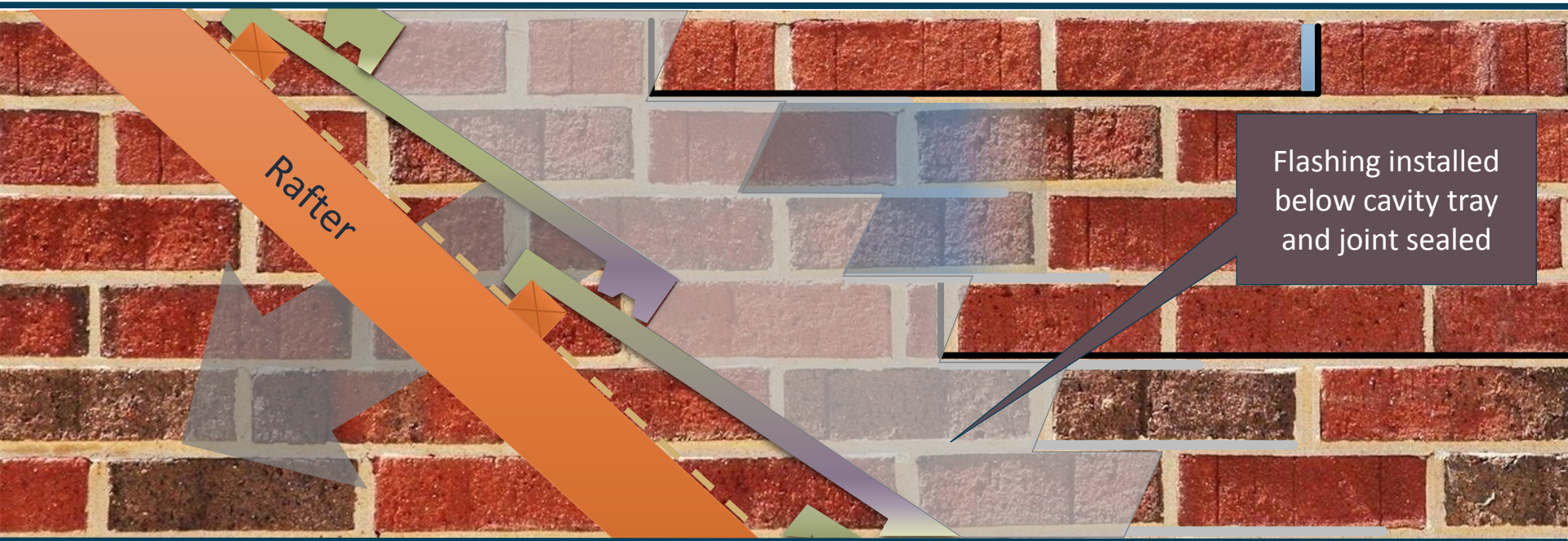
'Getting it right first time'



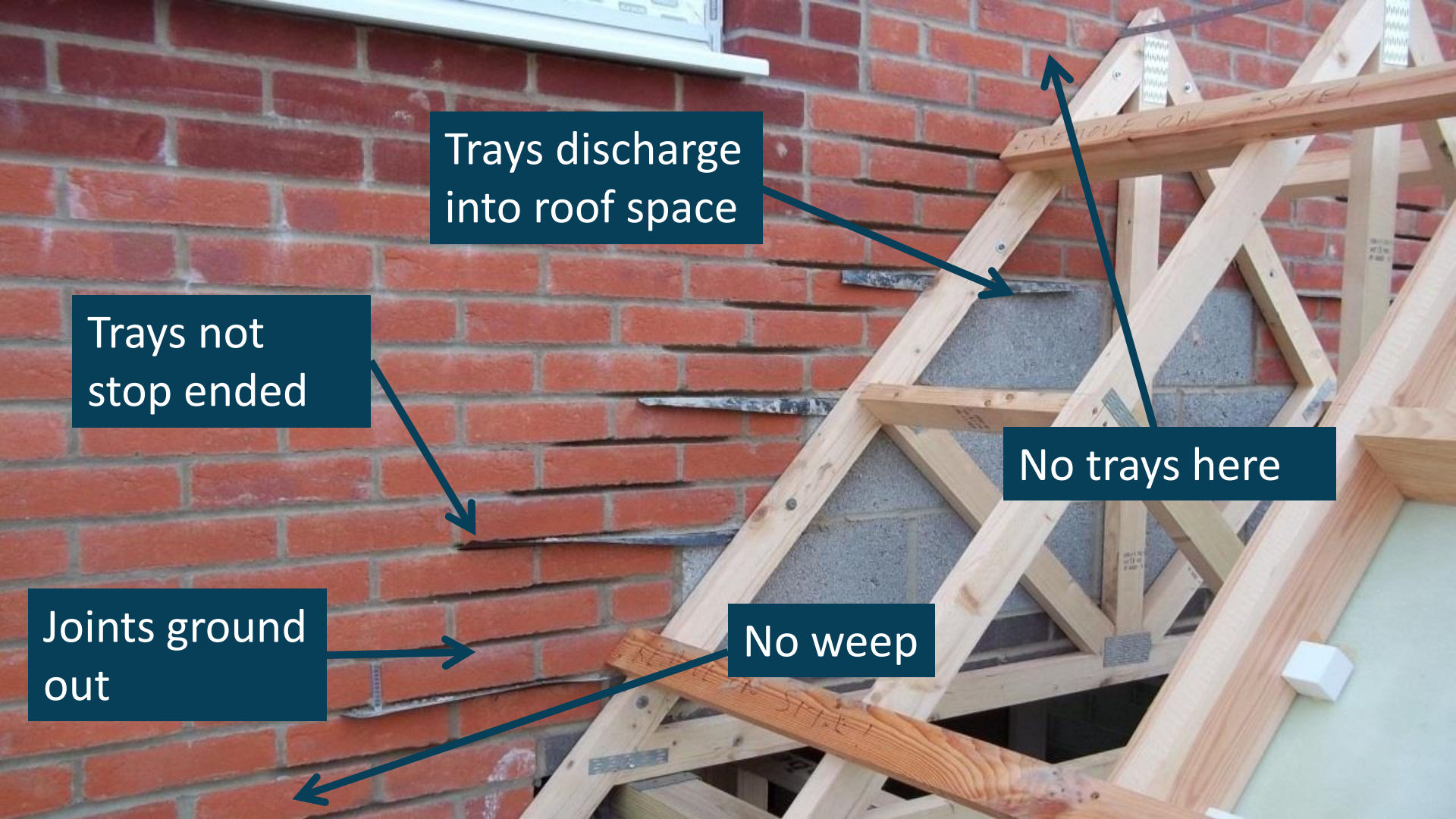
Stepped cavity trays - Flexible

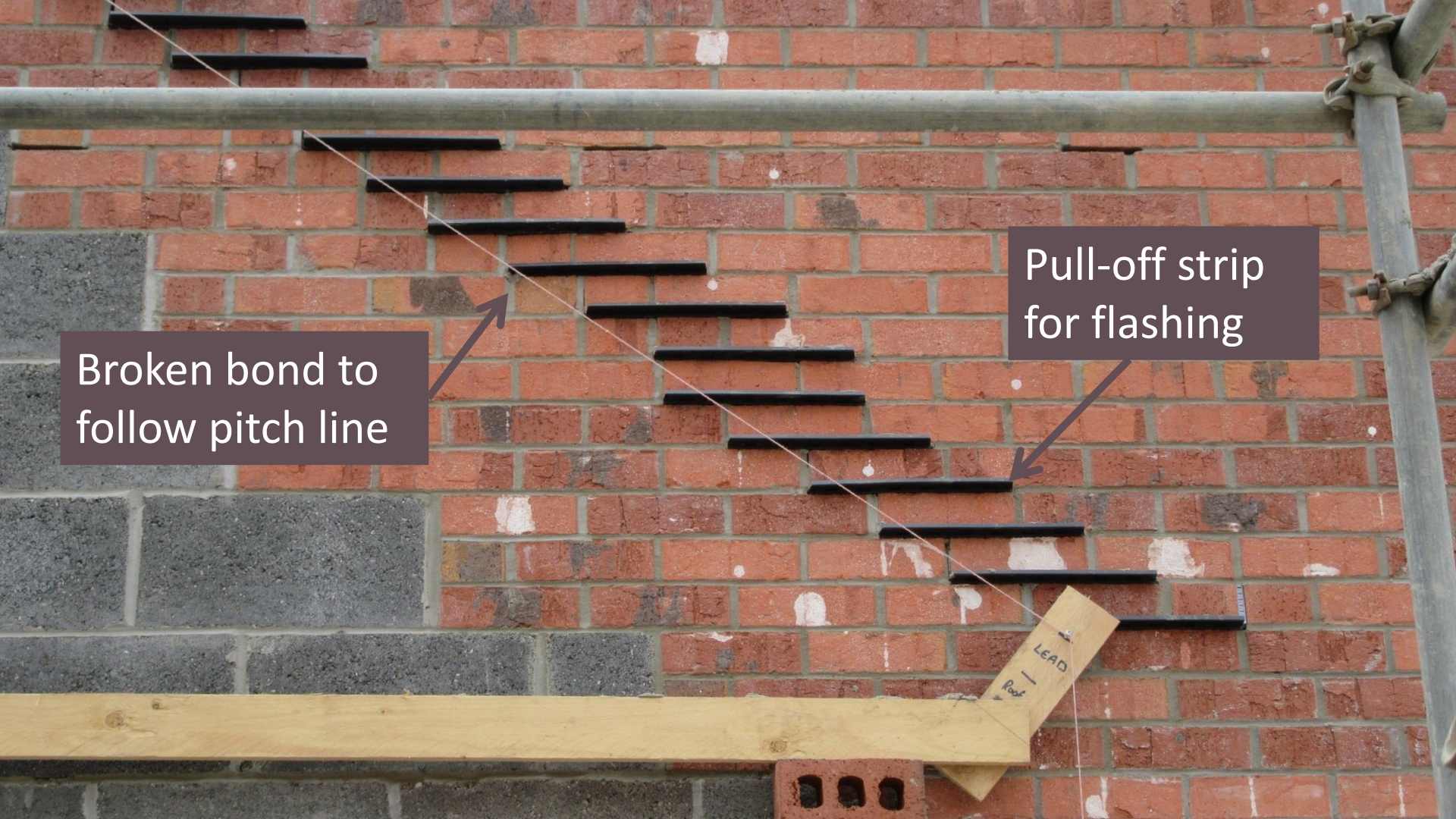
'Getting it right first time'

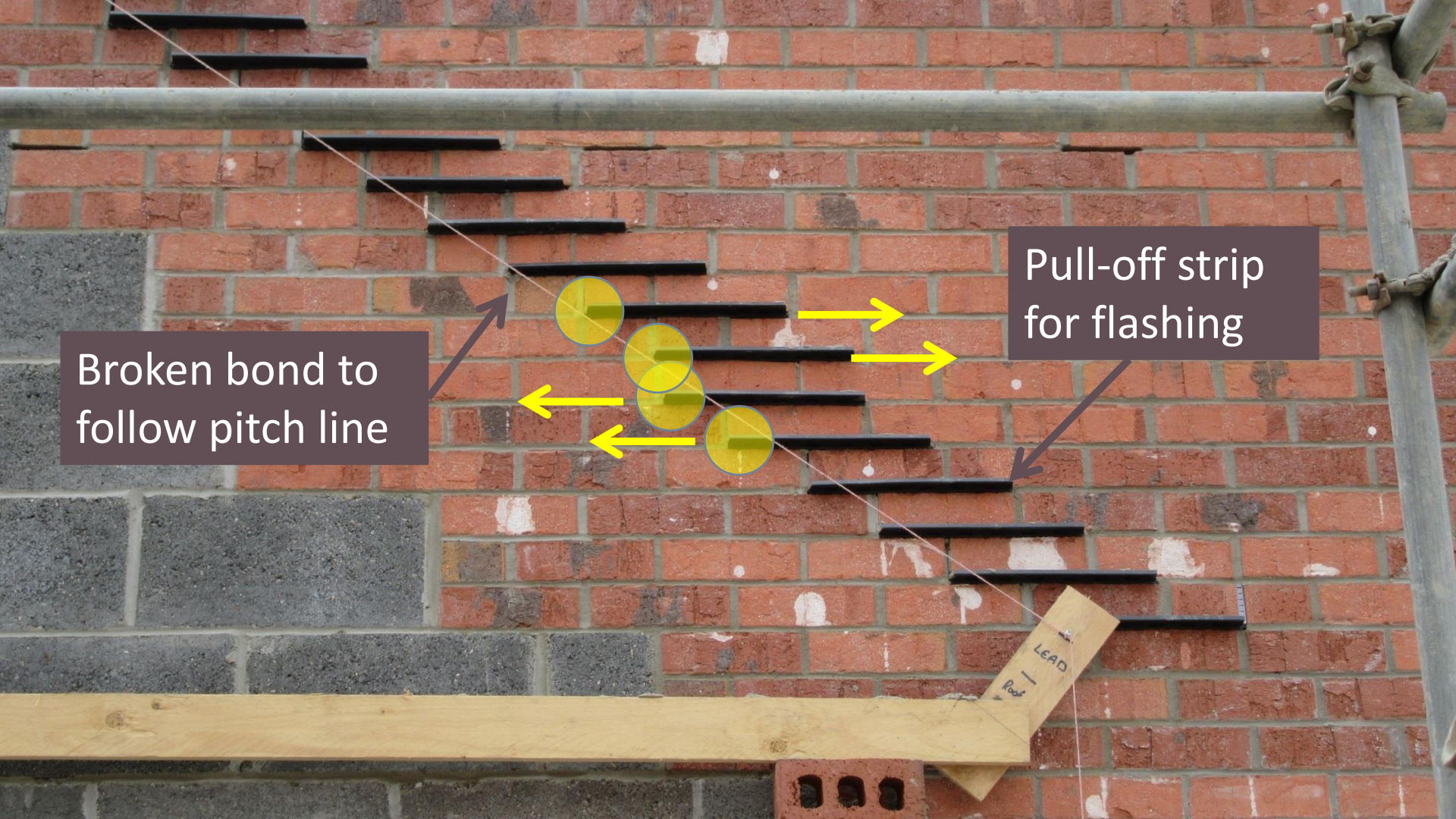
Soakers/secret gutter omitted for clarity




Brick dust would suggest grinding
Is there a tray?
No sign of a weep hole?


Trays discharge into roof space
Trays not stop ended
No trays here
Joints ground out
No weep


Broken bond to follow pitch line
Pull-off strip for flashing
LEAD
Roof


Broken bond to follow pitch line
Pull-off strip for flashing
LEAD

Should lead flashing sit under or on top of cavity trays?

a) Under

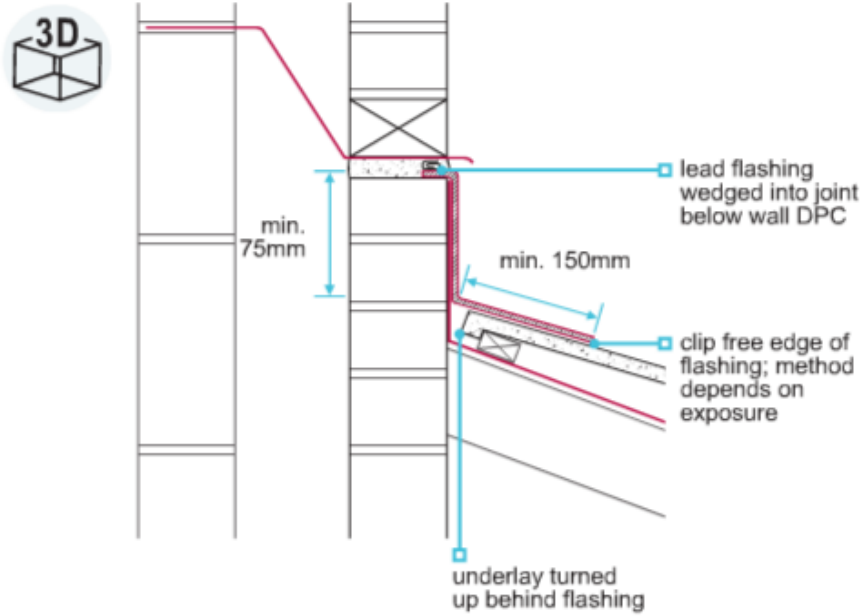
b) Above

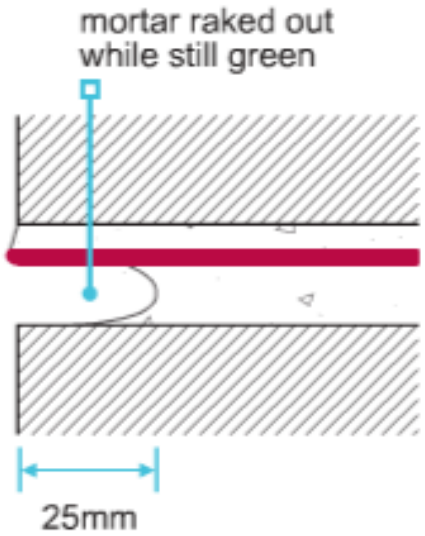
Should lead flashing sit under or on top of cavity trays?

a) **Under**

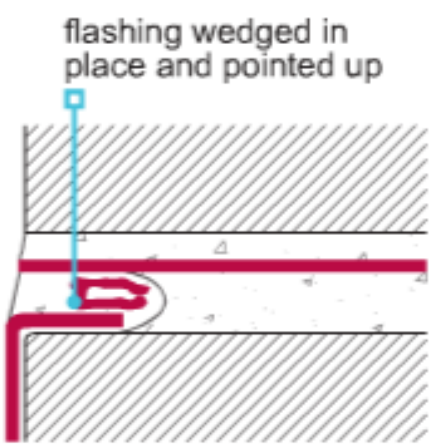
b) Above

Connections with flashings

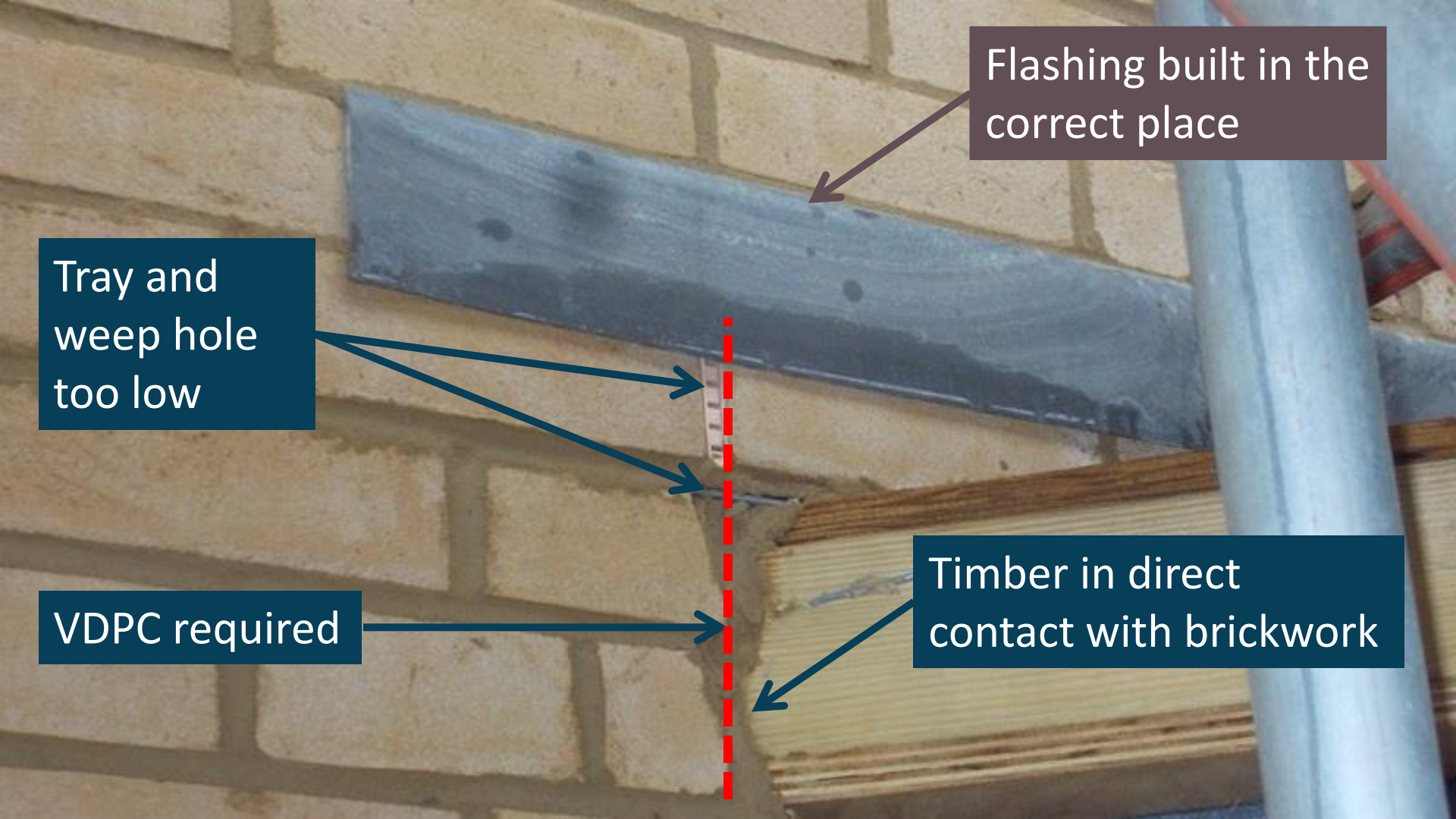


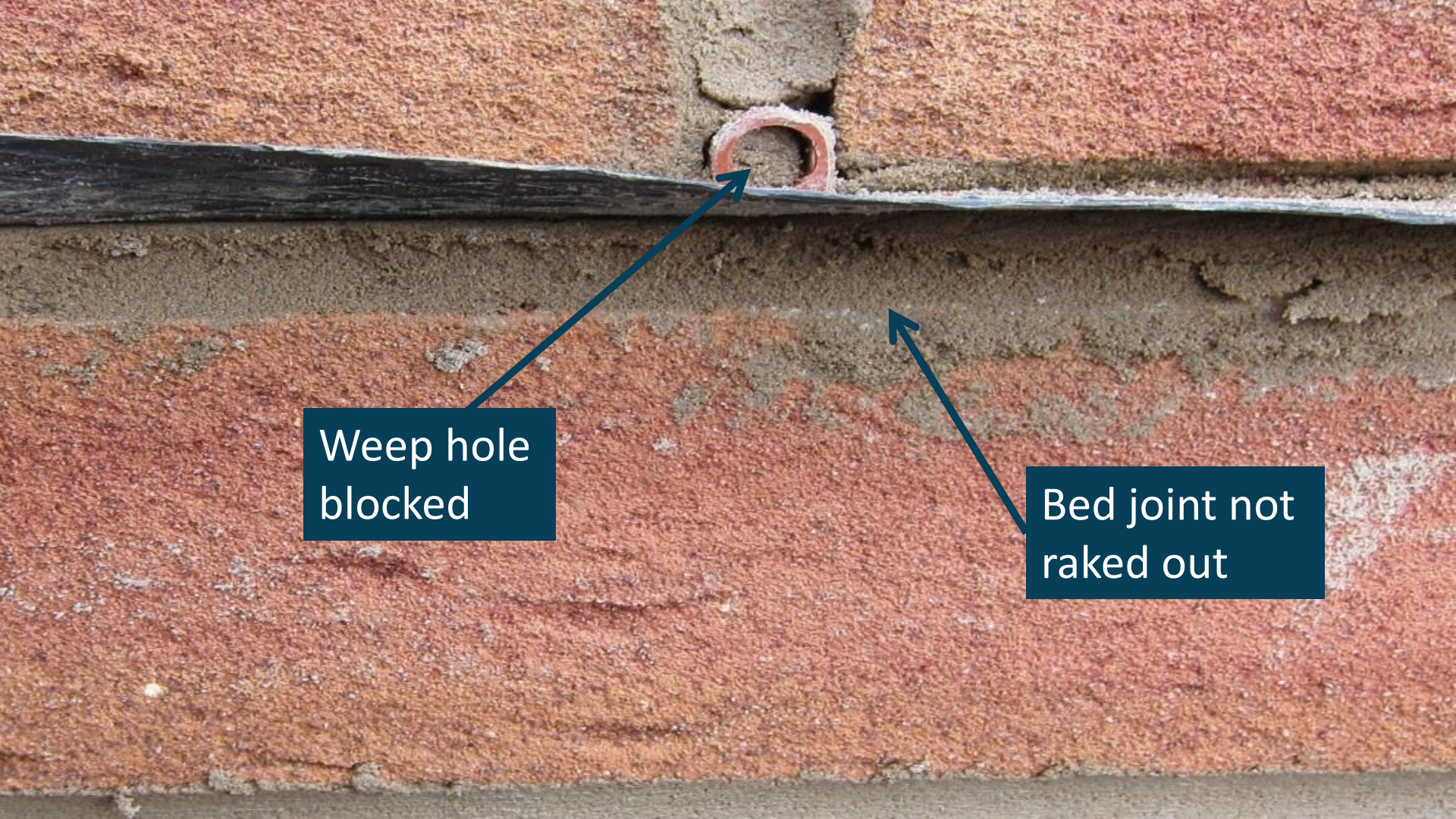


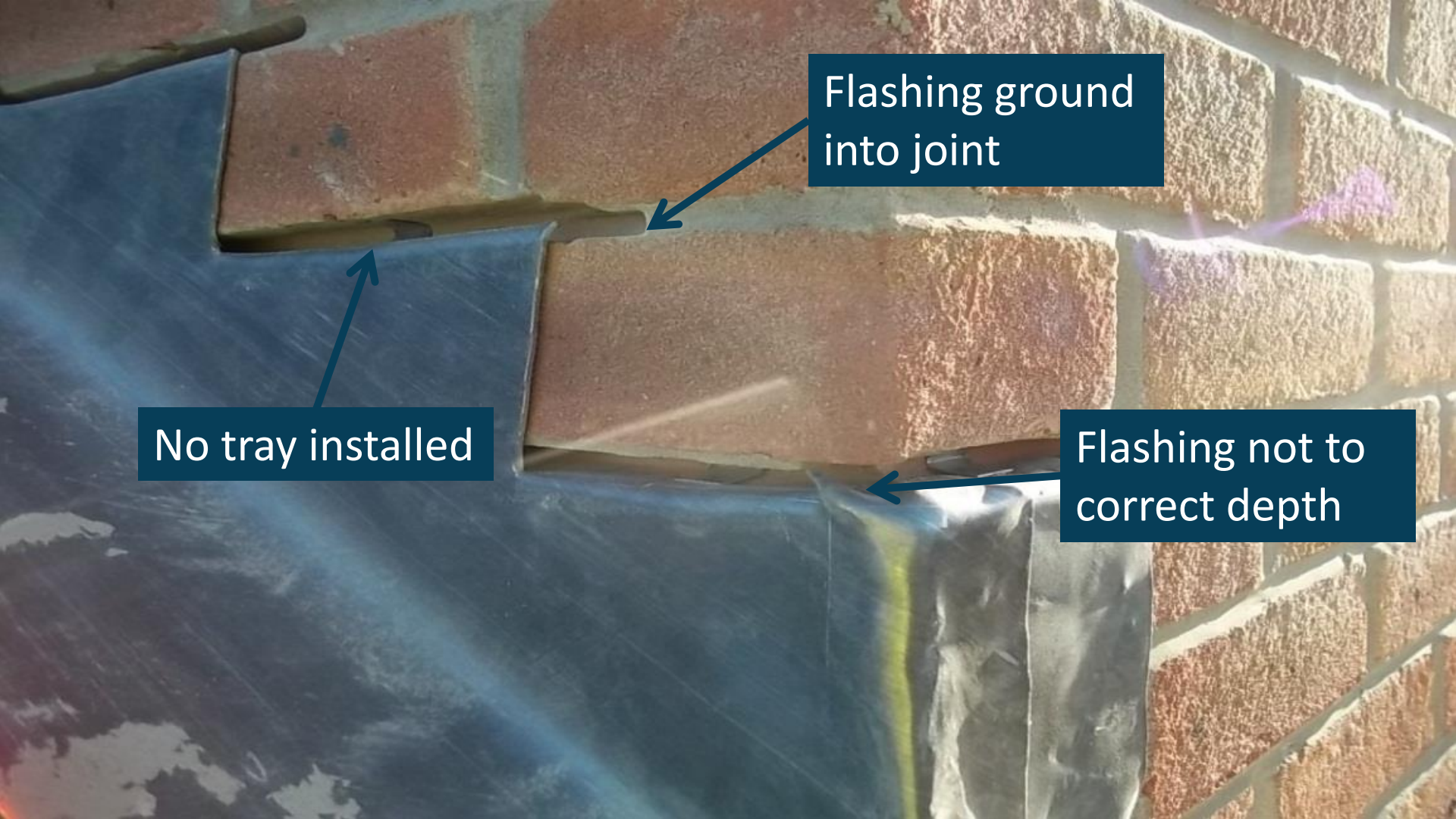
Stage 1

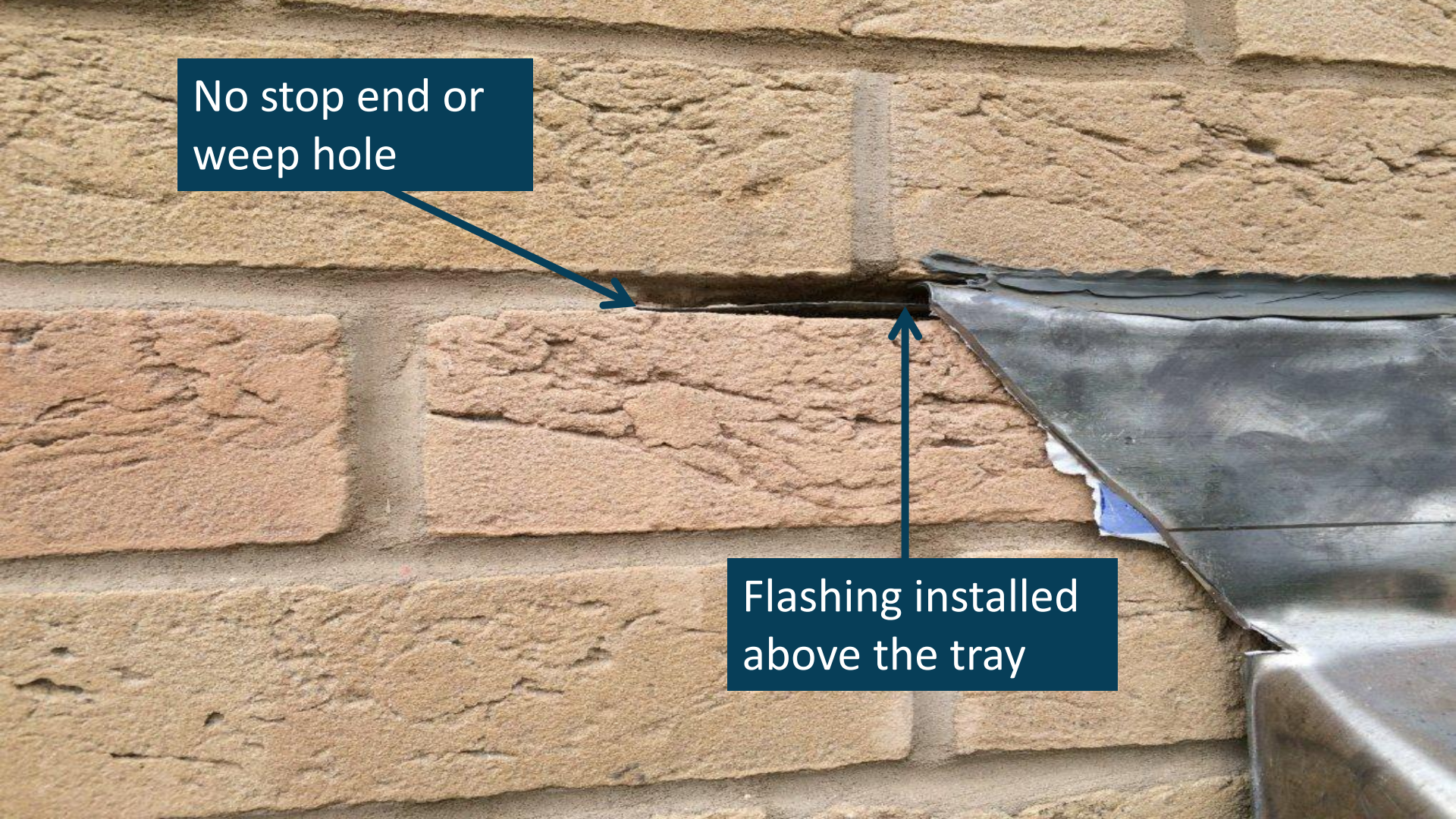


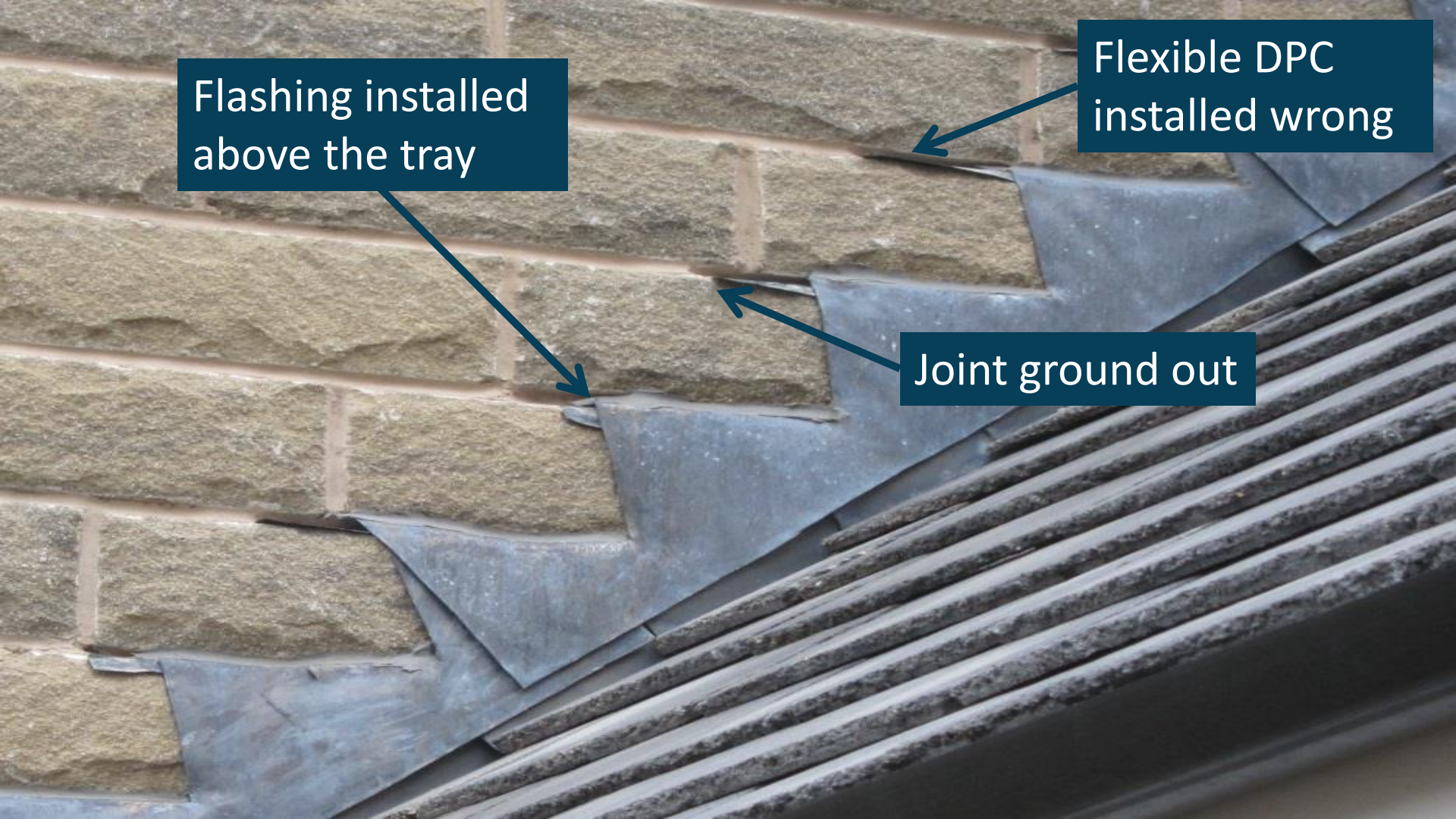
Stage 2

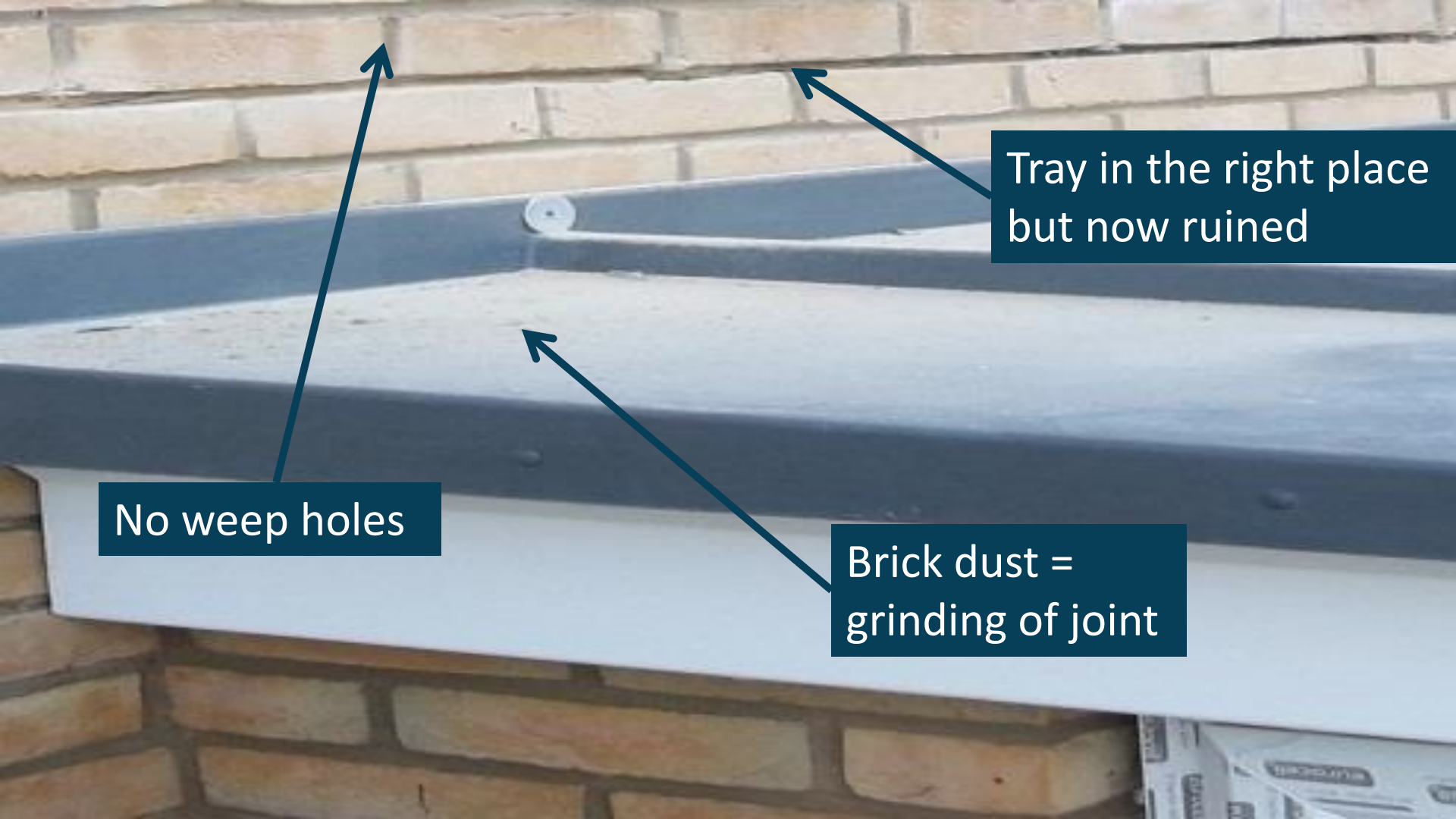

Flashing built in the correct place
Tray and weep hole too low
VDPC required
Timber in direct contact with brickwork

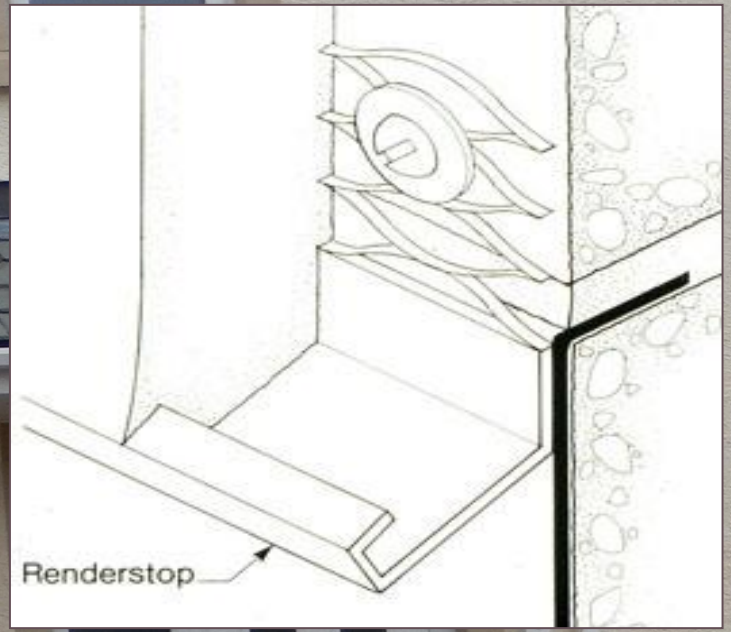

Weep hole blocked
Bed joint not raked out


Flashing ground into joint
No tray installed
Flashing not to correct depth


No stop end or weep hole
Flashing installed above the tray


Flashing installed above the tray
Flexible DPC installed wrong
Joint ground out


Tray in the right place but now ruined
No weep holes
Brick dust = grinding of joint


Renderstop

When fitting cavity trays to rendered properties, weep holes are required:

a) At no more than 900mm centres and minimum 2 per opening

b) At no more than 450mm centres

c) Only at the bottom of stepped trays.

d) Not required

When fitting cavity trays to rendered properties, weep holes are required:

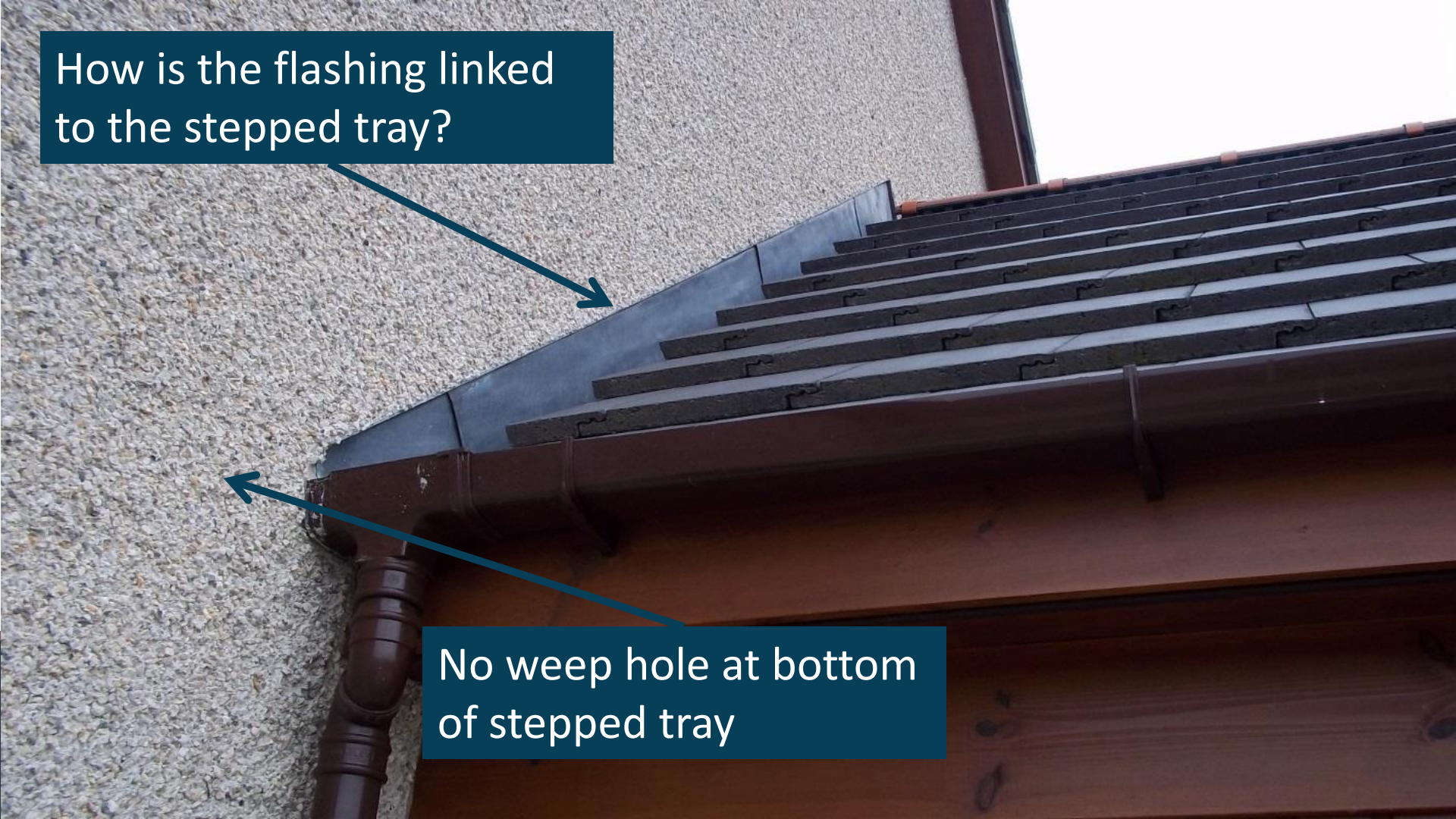
a) At no more than 900mm centres and minimum 2 per opening

b) At no more than 450mm centres

c) Only at the bottom of stepped trays.

d) Not required


Weeps above door opening not required


How is the flashing linked to the stepped tray?
No weep hole at bottom of stepped tray

- Claims statistics
- **Areas of concern**
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  - Render
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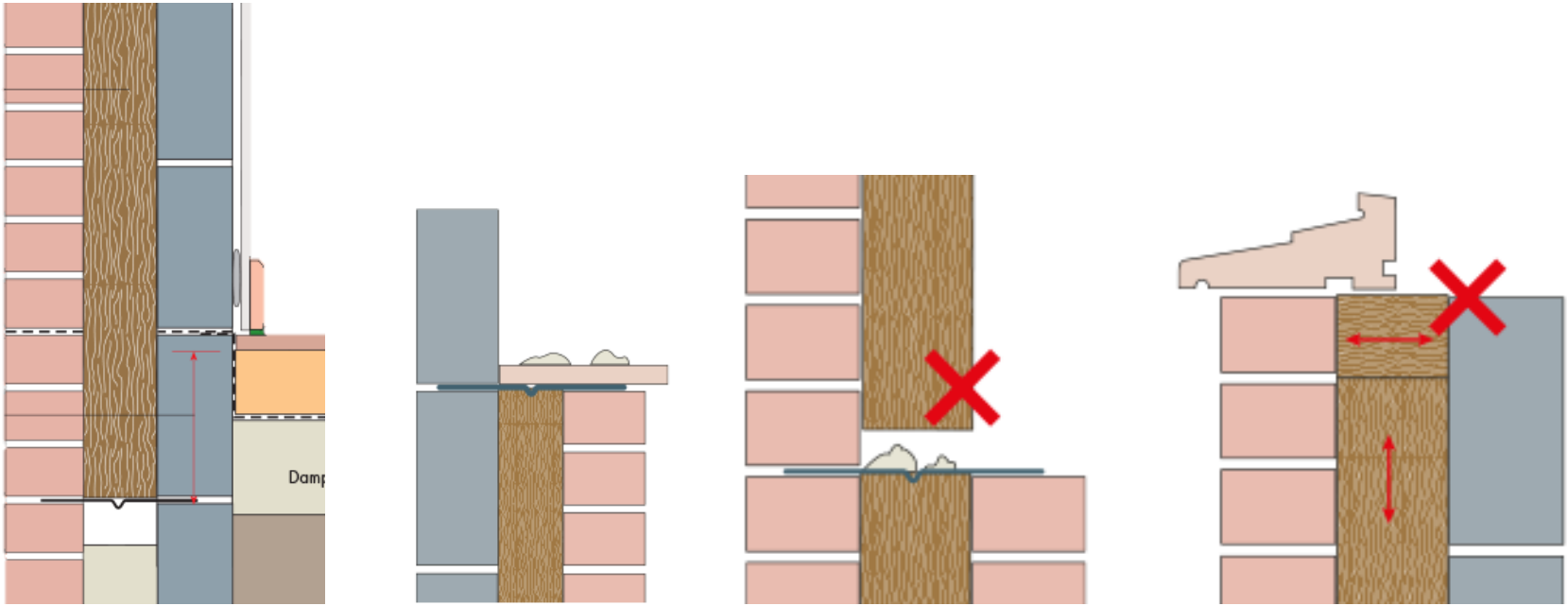
- Managing out the problem

Design vs As-Built & Homeowner chills

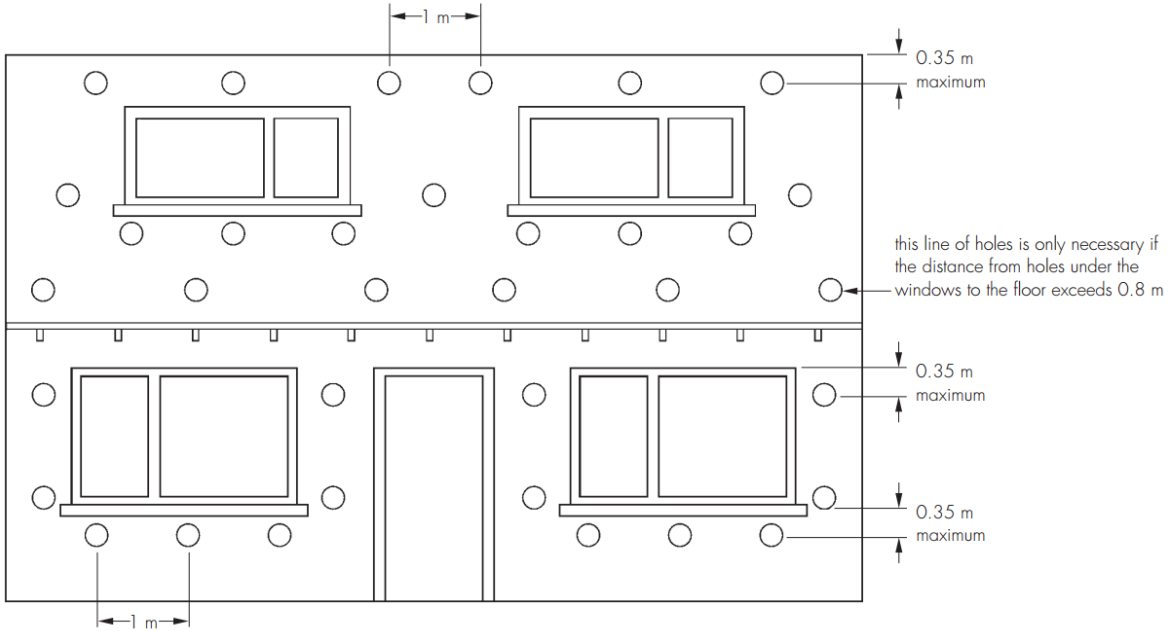
- Good practice
- Retro-filling cavities
- Things to avoid

Credit: Knauf Insulation

Good practice

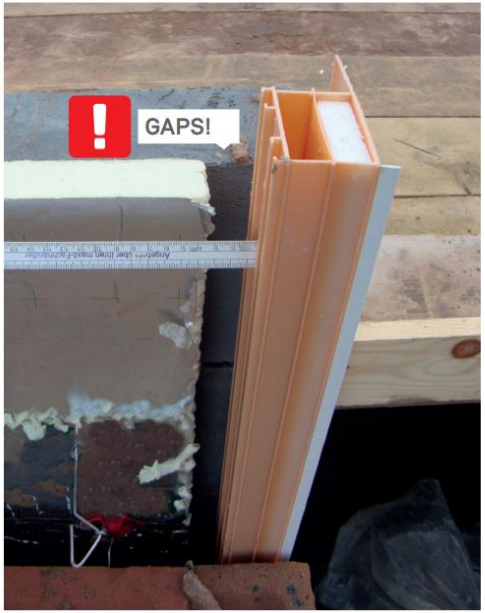


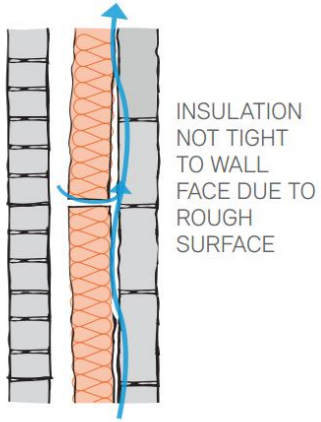
Retro filling cavities

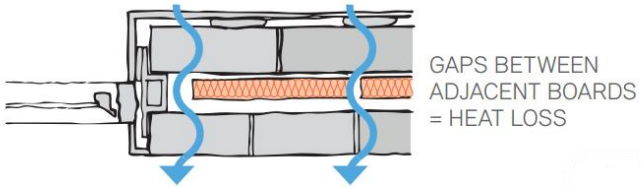


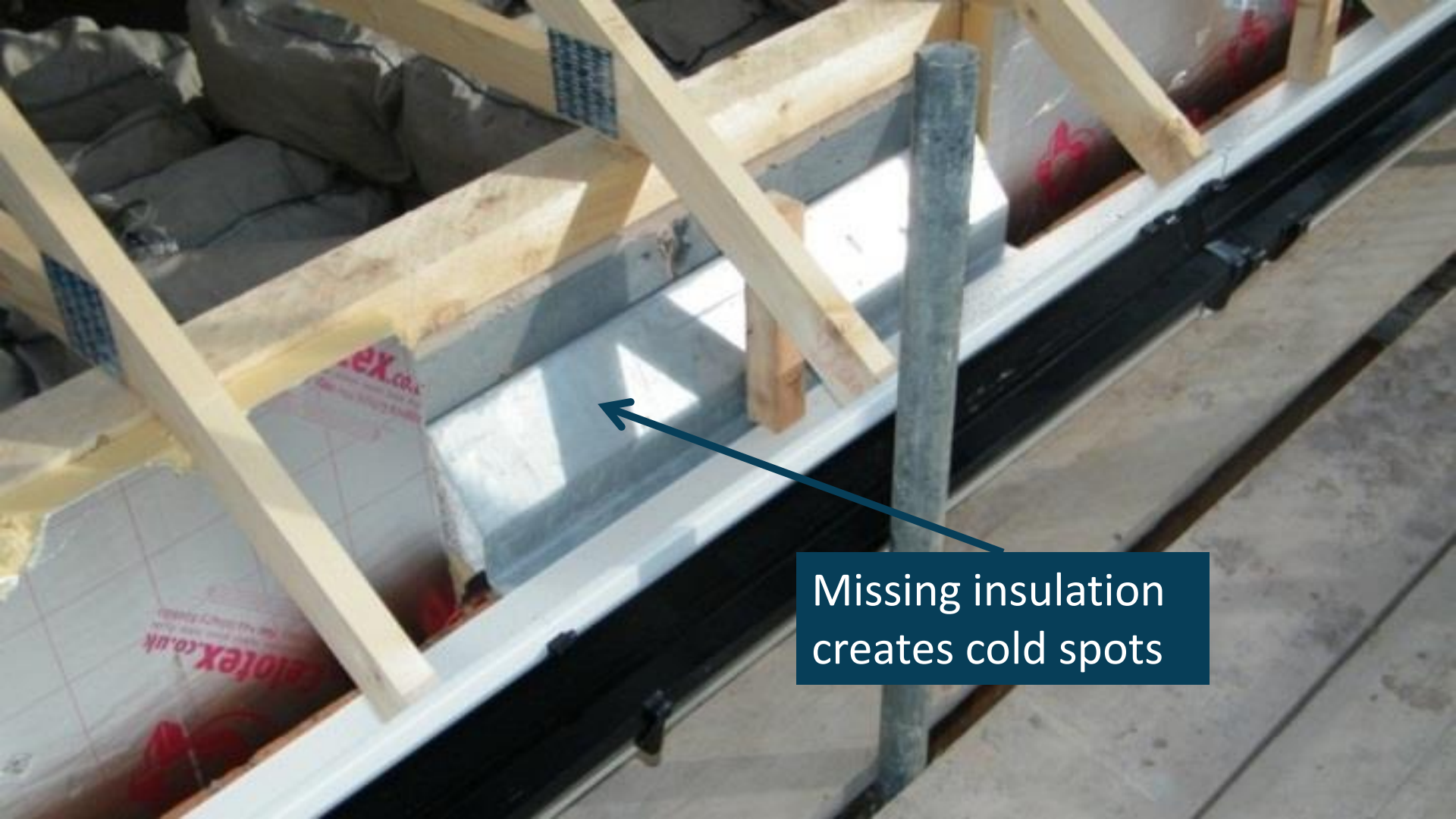
Credit: ZCH & Cavity Trays

Things to avoid



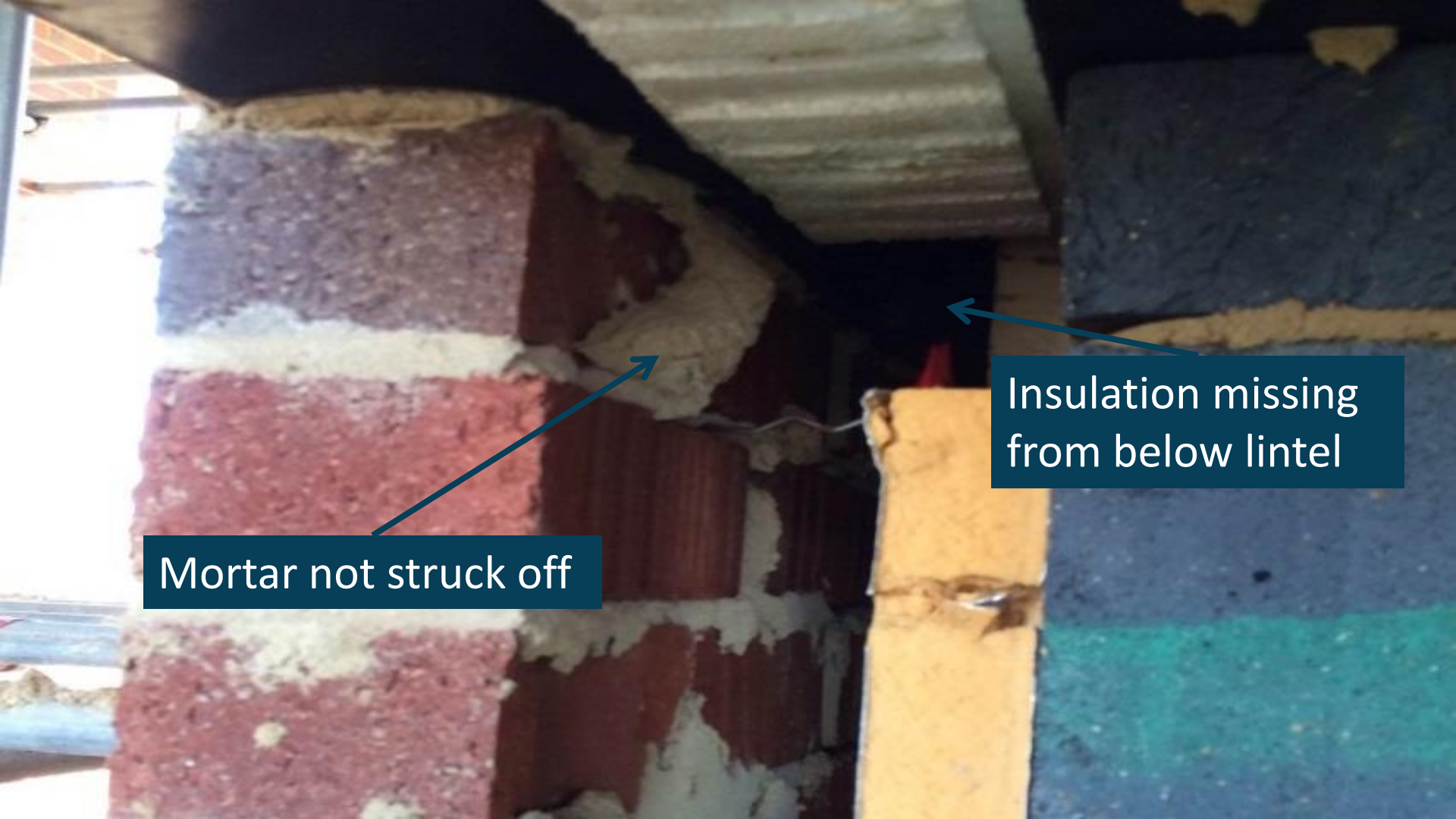





Missing insulation
creates cold spots


Cavity closer too
narrow to close cavity

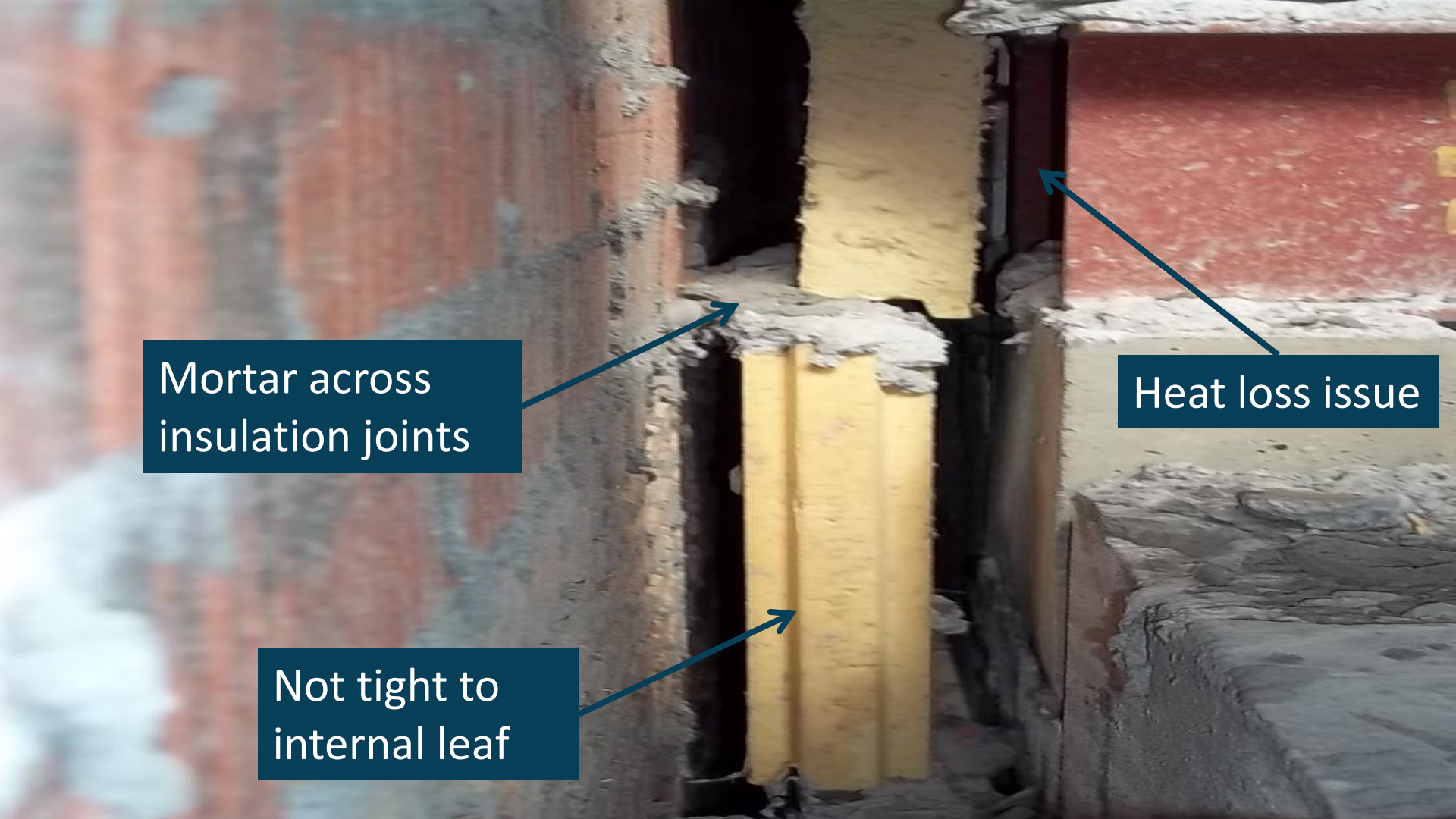

Poorly cut insulation
around window former


Insulation missing from below lintel
Mortar not struck off


JCB


Under-filled Insulation


Cavities must be closed for fire at window openings (AD B3 6.3)
Very short cavity closer


Mortar across insulation joints
Heat loss issue
Not tight to internal leaf

- Claims statistics
- **Areas of concern**
  - Cavity trays and DPC's
  - Insulation
  - **Render**
  - Structure
- Managing out the problem

The most common causes of cracking in render are

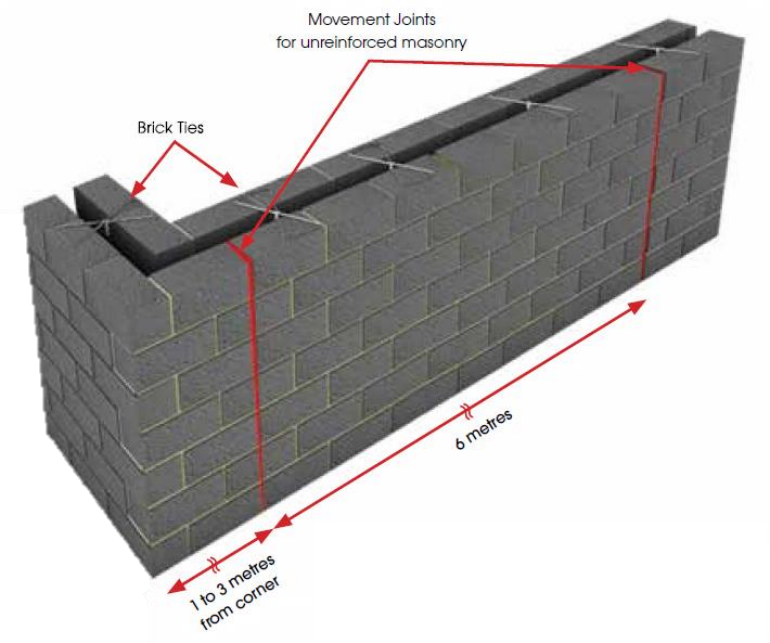
- Blockwork – porosity / strength / mixing materials
- Lack of movement joints/reinforcement
- Incorrect application and curing
- Incorrect render mix
- Protection of work

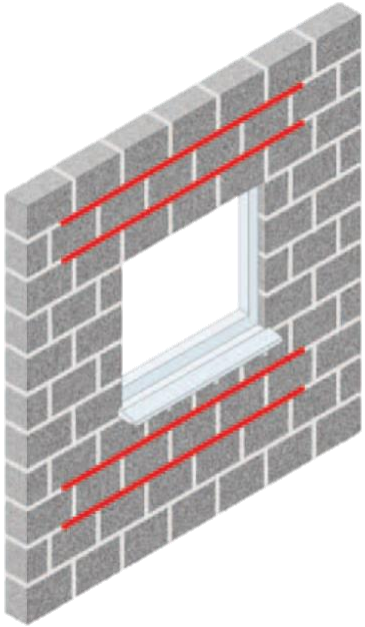
Credit: Weber Saint-Gobain

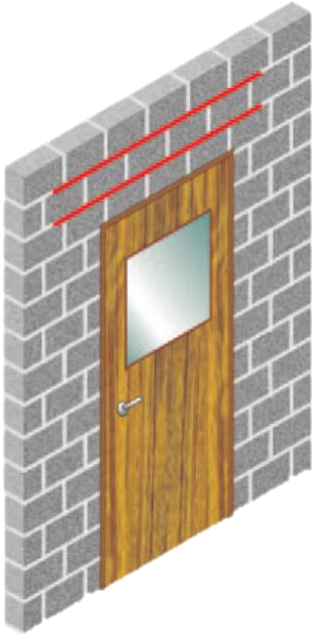
Substrate

Credit: Weber Saint-Gobain

Movement joints and bed reinforcement

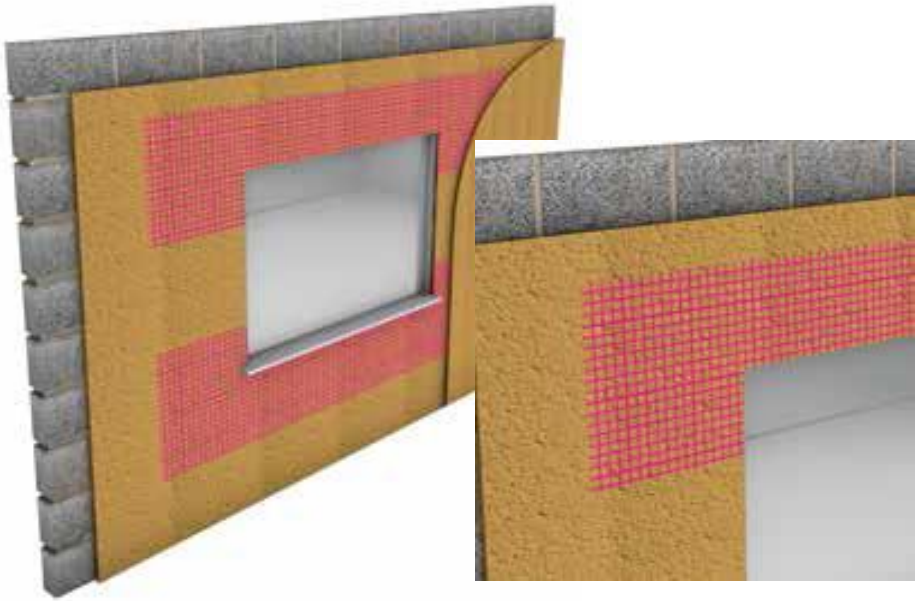




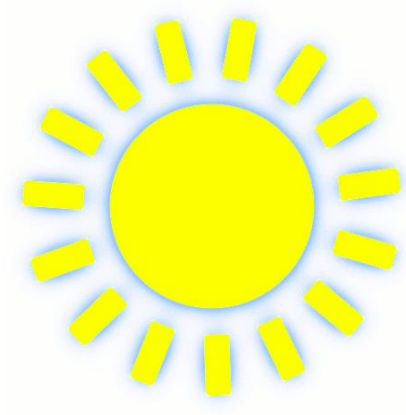


Credit: Weber Saint-Gobain

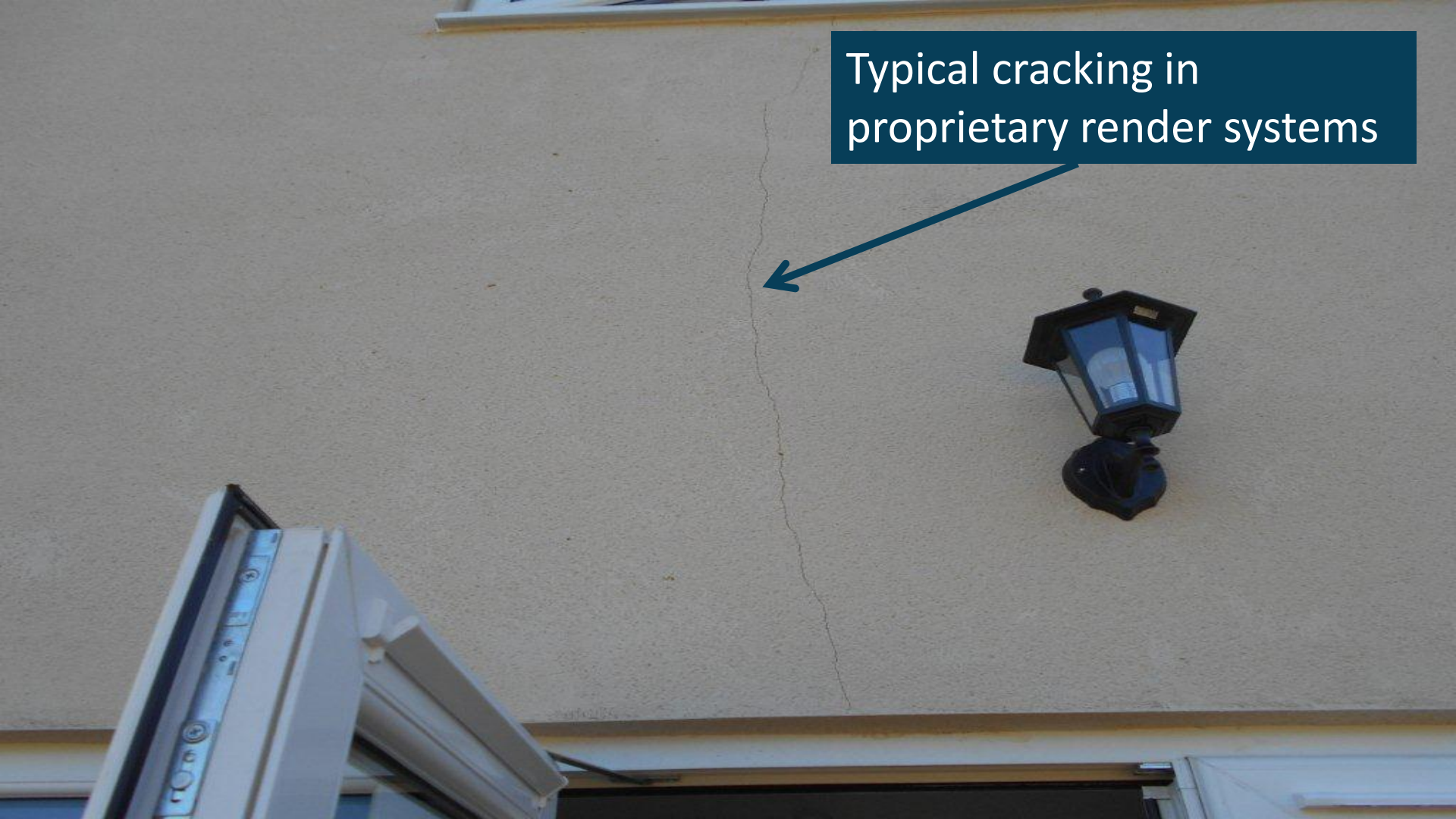
Suction and stress control



Weather considerations




No P


Typical cracking in proprietary render systems

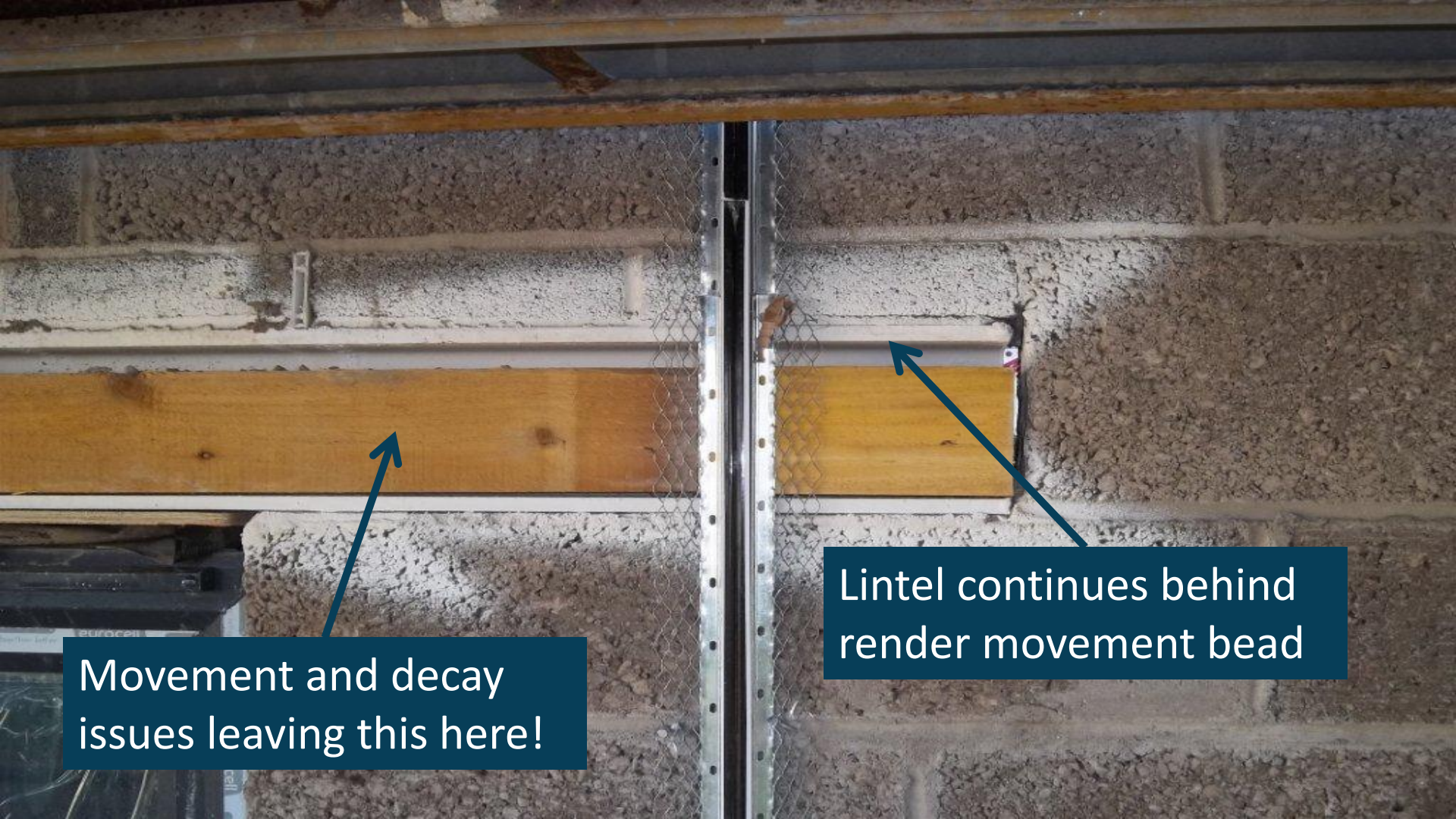

Typical cracking in
proprietary render systems


Scratch coat too thin.
Should be at least 10mm


2mm
10mm


Scratch coat too thin (10mm)
Reveals missed


eurocell
eurocell
eurocell


Movement and decay issues leaving this here!
Lintel continues behind render movement bead


Reveal too tight to the soffit


Neat stop beads to allow suitable settlement gap


System 10

- Claims statistics
- **Areas of concern**
  - Cavity trays and DPC's
  - Insulation
  - Render
  - **Structure**
- Managing out the problem

Parapets and coping stones

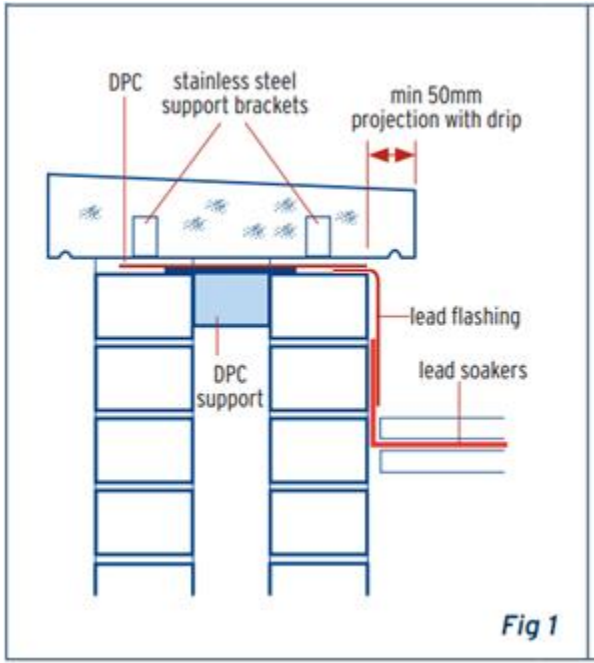


Fig 1

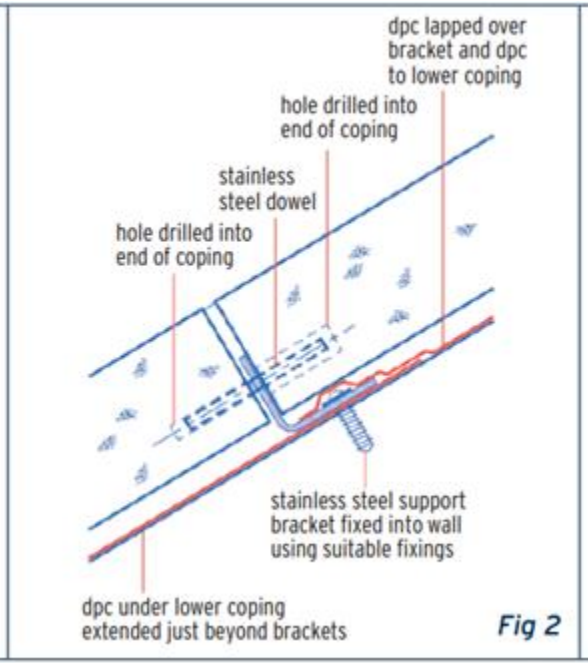


Fig 2

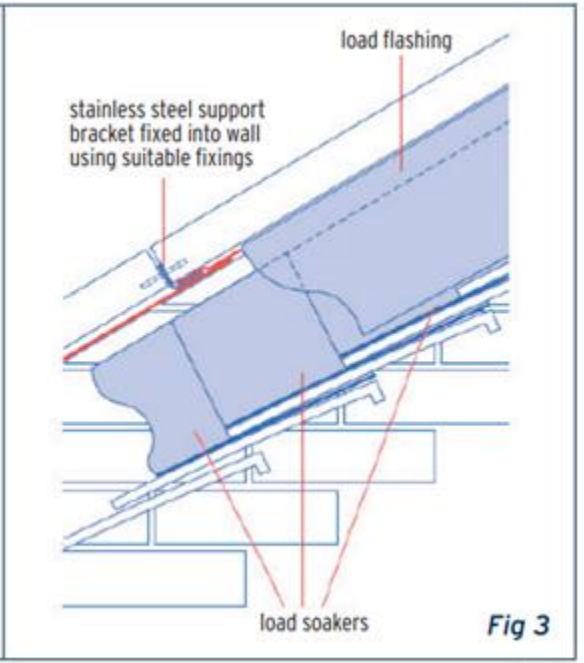
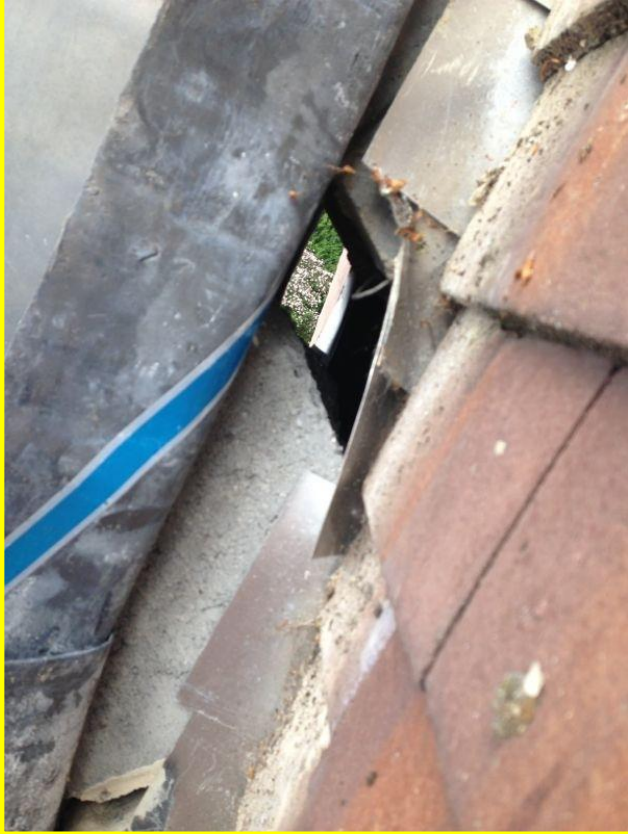


Fig 3



Raising Standards. Protecting Homeowners

NHBC External Walls Seminar

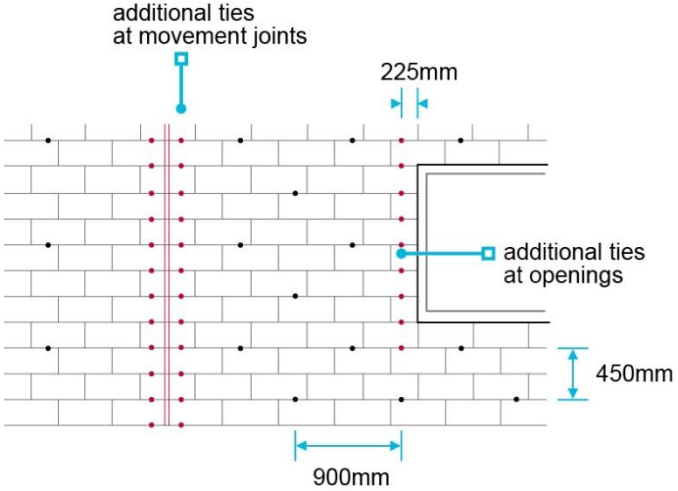
Increasing industry awareness
of defects of external walls

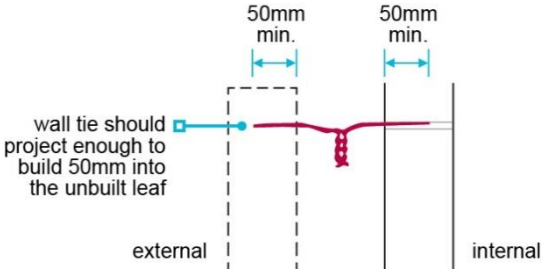
Table 10: Spacing of wall ties

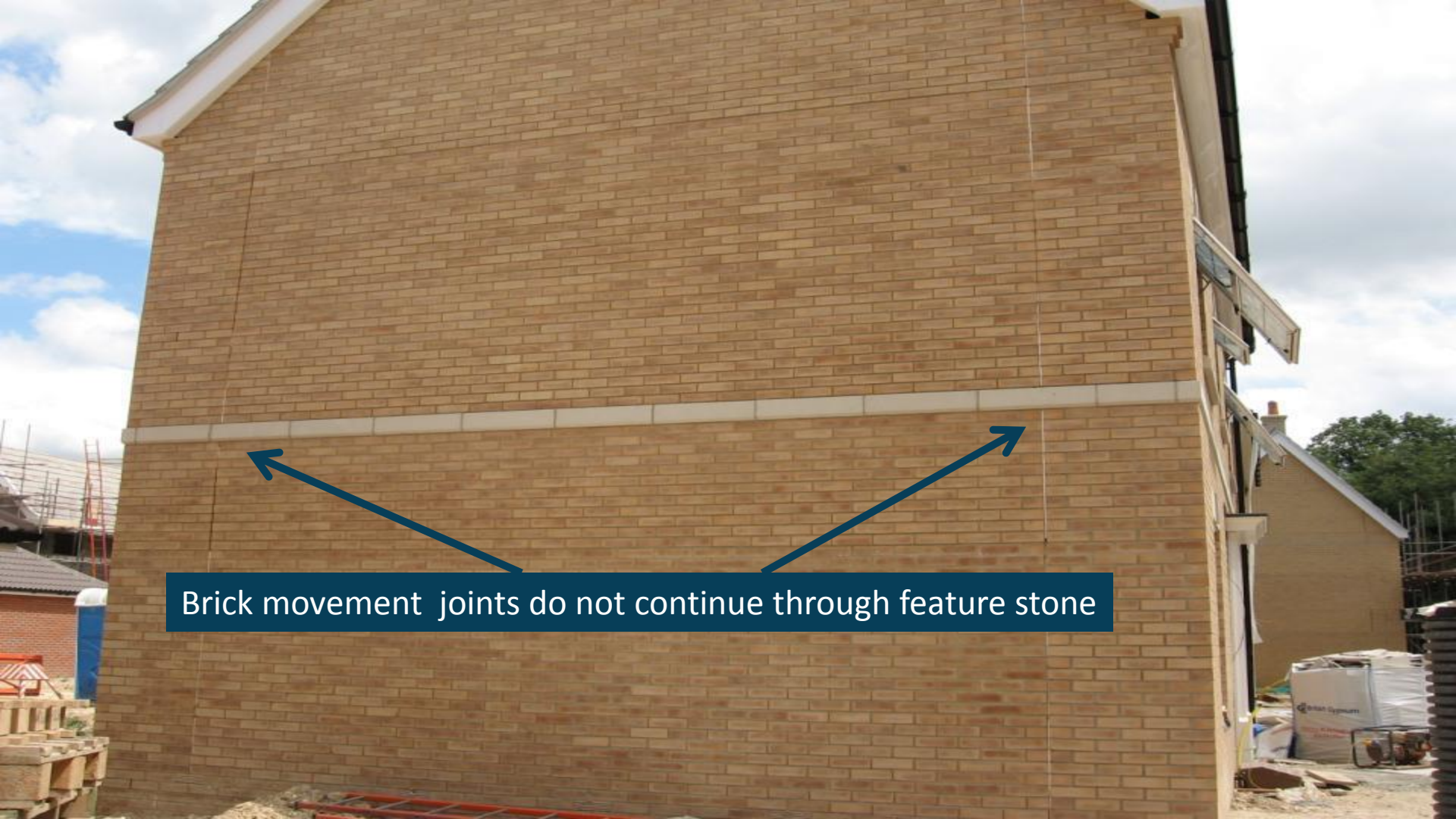
	Maximum horizontal spacing (mm)	Maximum vertical spacing (mm)
General wall area	900	450
Jamb openings, movement joints, etc.	Within 225 of opening	Not more than 300(1)
Top of gable walls	225 (parallel to the top of the wall)	Not more than 300

Notes

1 The cavity insulation may need cutting to insert the tie.





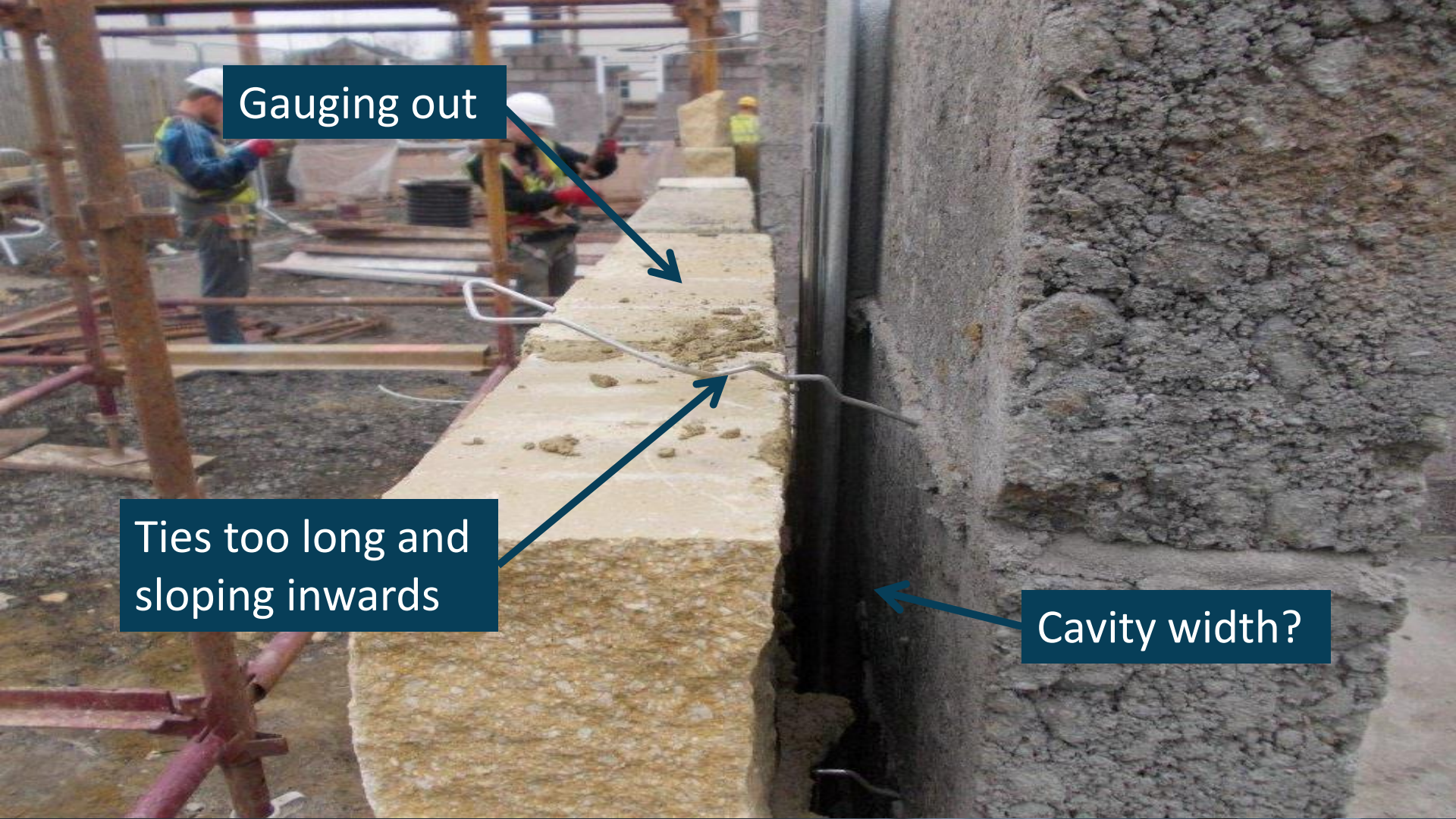

Brick movement joints do not continue through feature stone

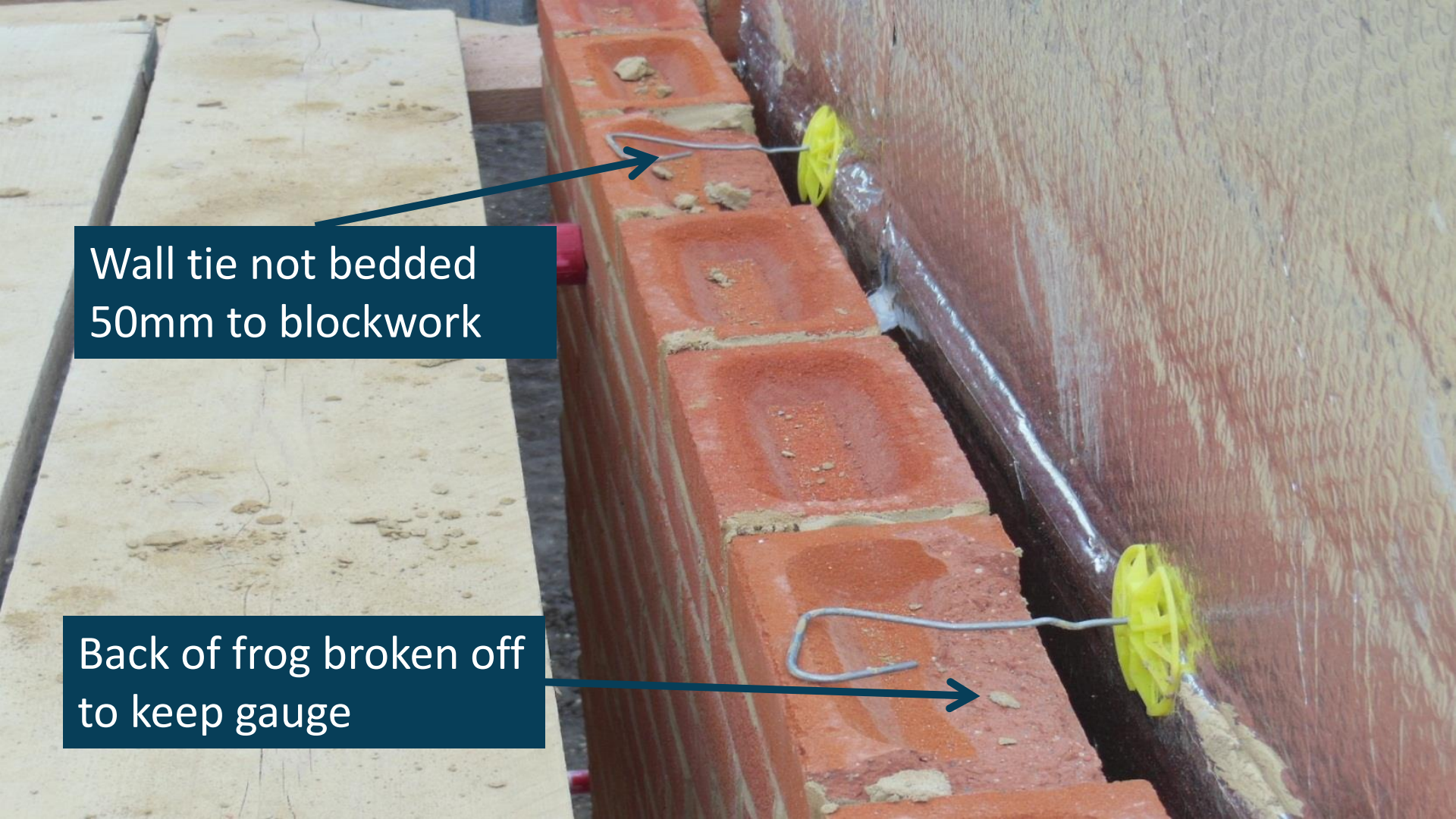

Toothed brickwork
and blockwork!


If we wanted to be picky, open joint here


50mm embedment?


Tell-tale slot confirms ties
installed after laying.


Gauging out
Ties too long and sloping inwards
Cavity width?


Wall tie not bedded 50mm to blockwork
Back of frog broken off to keep gauge

Three key reasons why lintels should be fully bedded on mortar?

- To ensure it is level
- To spread the load evenly
- Prevent passage of moisture


Lintel dry bedded


Daylight on this one!


Not just lintels, no packing to steel beam

Which three are the most commonly recorded RI's for external walls?

a) Remove mortar debris from cavities

b) Inadequate fire stopping

c) Joints not fully filled

d) Excessive depths of service chases

e) Incorrect cavity tray installation

Which three are the most commonly recorded RI's for external walls?

a) **Remove mortar debris from cavities**

b) Inadequate fire stopping

c) **Joints not fully filled**

d) Excessive depths of service chases

e) **Incorrect cavity tray installation**

- Claims statistics
- Areas of concern
  - Cavity trays and DPC’s
  - Insulation
  - Render
  - Structure
- **Managing out the problem**

Quality doesn’t happen by accident!

You get what you inspect not what you expect

How can we support you?
We're in this together!

- Trade Talks
- Benchmark & Consultative inspections
- Increased site time e.g. Pre-start meetings
  - Risk Guides
- Further Site Manager training (including OnSite)
- Enhanced technical guidance
  - New Standards with 3D models

Key messages to take away

- In this together
- Workmanship
- Site Manager can make the difference
- Get it right first time
- You get what you inspect, not what you expect

A final thought….

Its all about **Teamwork**


NHBC
Raising Standards. Protecting Homeowners
External Walls Seminar
Working together to get it right