BEST PRACTICE GUIDES

SECTION 3 SUPERSTRUCTURE





BEST PRACTICE GUIDES

Our series of Best Practice Guides will take you through what the Pride in the Job judges look for at each stage of construction and when considering the site manager's overall organisation and management skills.

The Pride in the Job marking sheet used by our judges has 44 marking lines split across 9 sections. The judges will give a score for each line - where there is no work to mark, that line will be left blank and no mark given. A mark of 4 indicates compliance with NHBC Standards and with Building Regulations. A mark of 5 indicates extra attention to detail over and above compliance standards. A mark of 6 would indicate that much of what the judges have seen cannot be improved upon. A mark less than 4 would indicate varying issues relating to workmanship and non-compliance with NHBC's Standards - the greater the issue or number of the same issue. the lower the mark. The final score will be all the marks awarded expressed as a percentage.

These Guides set out what the judges are looking for with clear hints and tips on the sort of practice that will lead to higher marks.

Clearly it is impossible in these short guides to cover every single point of construction - we try here to cover the main issues that are taken into account when considering a mark for each score line.

When looking at the photographs, consider each one in the context of the score line heading – don't be distracted by something else that isn't as good – that will be marked accordingly elsewhere.

SECTION 3 SUPERSTRUCTURE

STRUCTURAL FRAME AND/OR LOADBEARING WALLS EXTERNAL ENVELOPE (INC. CHIMNEYS AND FLUES) CAVITIES, INSULATION AND SOUNDPROOFING DPC'S & TRAYS INTERMEDIATE FLOOR STRUCTURE LINTELS, BEAMS & OTHER STRUCTURAL ELEMENTS BALCONIES INCLUDING FIXINGS & WEATHER PROOFING FIRE STOPPING (SUPERSTRUCTURE)

This is one of the larger sections of the Pride in the Job marking sheet and covers all aspects of the superstructure build above ground. Structure, brickwork, blockwork, timber frame, weatherproofing and aesthetic finish are all considered here.



STRUCTURAL FRAME AND LOAD BEARING WALLS





STRUCTURAL FRAME AND LOAD BEARING WALLS

This score line relates to the quality of build of the inner leaf of the external wall (either blockwork or timber) and any internal load-bearing partition or separating walls.

Images 1, 2 and 3: The forming of openings in the wall for windows and doors and the building-in of floor joists with the blocking in between are all considered by the judges. Image 1 shows a simple example of where the gauging of the blockwork has yielded a full depth block under the bearing point of the lintel - the use of cut blocks or brickettes would be marked down.

Separating walls should receive particular attention to avoid sound transmittance and in timber frame construction, the position of the wall studs and the fixing of the panels will be taken into account. Image 2 shows blockwork tight up to the joists - excellent beam-filling where there has been clear care and attention by the bricklayers. Good work with the sealant too, which may have been required for Robust Details and sound insulation.

Blockwork should be kept clean and cuts well executed - especially for those awkward angled corners where sometimes 'cut and stick' units would work very well.

Construction of masonry within height limitations of the product during build is also important. We see lots of gable walls built 7 or 8 courses high in blockwork without being backed up and supported with brickwork, this is a breach of the NHBC Standards and a reportable item.

Extra marks may be awarded if the judges see that the site manager is giving particular focus to the accuracy of work and an understanding of the structural principles. In image 3, thought has been given to the precise positioning of the padstone here. It's at the right level too with no packing, other than a double layer of dpc. In timber framed construction, the design and application of effective checking systems for connections demonstrates a good appreciation of the challenges involved. Furthermore neatness of the build process should be considered by the site manager and trades.

The work shown in these images would attract a mark of 5.



EXTERNAL ENVELOPE (INC. CHIMNEYS AND FLUES)





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Images 4, 5, 6, 7, 8 and 9: The judges will mainly look at the quality of the workmanship which, for brickwork, should include bonding, gauge and well-filled joints to prevent excessive water penetration. The visual impact of the construction is important. The images here show superlative craftsmanship in the execution of main walling, corbels and cut bricks around archways. The work shown here would all receive full marks.

The bricklayers' attention to detail and any feature work such as arches should complement the construction. Correctly positioned and formed movement joints, including sealant, will also be marked.

Particular care and attention needs to be made to internal joints to make sure the pointing is neat and even; image 7 shows a lovely example of an internal corner to a brick chimney where the bond is completely uninterrupted around the internal corner.

Any preformed feature panels within cladding systems and their respective fixings will also be considered. The installation of cladding should precisely follow manufacturers' instructions and the requirements of BBA certification.

To really drive the highest standards on site, maintaining vertical perpend joints on masonry with a high quality of work in general will reap dividends, as beautifully demonstrated in Image 8 on a block of three storey apartments.

Workmanship shown in these 6 images would easily attract a mark of 6 from the judges.



CAVITIES, INSULATION AND SOUNDPROOFING





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Images 10 and 11: Cavity wall tie positions, type and number, spacings and cleanliness are important for stability and the prevention of water penetration. A minimum 50mm bedding in on each leaf of superstructure should be achieved.

The insulation should be of the correct type and thickness for the location of the building, bearing in mind that full fill cavity insulation cannot be used in severely exposed areas in accordance with NHBC Standards. Insulation, whether partial fill or full fill should be adequately restrained in place and it should be continuous to prevent cold spots. There should be no mortar droppings resting on top of full fill cavity insulation batts.

When using partial fill insulation, cavities should maintain the minimum width of 50mm and be free of debris throughout its entirety. The insulation should be tight up against the inner leaf using the correct wall ties and clips. One point of concern with image 10 is that the blockwork is a bit high without being backed up - more than 6 courses would not be acceptable - so possibly a lost point here; so even though the workmanship is very neat, if this is a more widespread issue, it could well be marked as a 3.

For extra marks a high standard of detailing, accuracy, alignment and a particular cleanliness of wall ties, DPC trays and weep vents is needed. Insulation should be noticeably clear of debris through the use of protective measures whilst working on the wall. Judges will be impressed with innovative, effective solutions. Image 11 is a text book example of how to keep cavities clean with flushed up bricks and spotless wall ties - a full 6 marks from the judges here. **Images 12, 13 and 14:** In contrast to the above, this is definitely not what the judges want to see:

- superstructures that demonstrate a mixture of both excessive mortar debris in the cavity or brickwork and blockwork with joints which remain unfilled
- blockwork that isn`t bonded correctly in the corners and creates steps where mortar can become lodged
- off-cuts of timber joists and bricks that can become present especially where Building Regulations are now encouraging wider cavity widths to meet with the requirements of Part L.

Good aesthetics to the external component of superstructures coupled with clean, clear cavities will put you on the right road to gaining above average marks in this section. All these photos would merit a mark of 3 at best - possibly lower if these issues were seen as a more site-wide issue.

Sound proofing is a critical element relating to the safe function of the building. The correct installation of sound-resisting materials to walls, ceilings and compartments is vitally important to achieve their required performance standards.

Care should be taken to ensure that products are installed accurately and precisely to meet their performance capabilities.



DAMP PROOF COURSES AND CAVITY TRAYS





DAMP PROOF COURSES AND CAVITY TRAYS

Images 15, 16 and 17: DPCs and cavity trays should be installed at the correct level with stop ends and correctly positioned weep holes where necessary.

Vertical DPCs should be installed to openings in the brickwork to prevent water ingress occurring. Image 15 shows the vertical damp proof course is installed above box bay window to prevent water tracking across the brickwork by capillary action and into the internal space. Image 16 shows an alternative preformed vertical dpc that allows for the bonding to continue through, rather than treating it as a movement joint as in image 15. You should be mindful of any similar areas where damp proof courses should be installed.

Pre formed plastic cavity trays should be used on any roof abutments. They need to be adequately set out to take account of the installation of the roof batten and tile whilst also allowing the minimum upstand in accordance with NHBC Standards. These should be free of mortar debris and a weep hole should be placed on the lowest tray to allow for water egress. Preformed stepped cavity trays (image 16) are to be carefully set out using profiles or a pattern spar.

For the best marks the use of templates, a high standard of detailing, accuracy, alignment and cleanliness of trays and weep holes is required.

Note: The NHBC 3D viewer App which is available for free on iPhone and Android is a great pictorial asset in assisting you with highly detailed and critical areas of construction.



INTERMEDIATE FLOOR STRUCTURE





INTERMEDIATE FLOOR STRUCTURE

Images 18, 19 and 20: The judges will be looking at the structural floor, whether timber, steel, pre-cast or in-situ concrete. All required straps, noggins and strutting should be fixed in position correctly, which includes bearing on full blocks, not on joints. Restraint straps need to be fully supported by noggings - with the end of the strap turned down so as to prevent it vibrating to the underside of the floor structure. The work shown here is a good 4 marks, possibly a 5. Certainly if an extra nogging was installed to support the flying end of the strap, that would merit a strong 5 or perhaps even a 6. Image 19 shows that some thought has been put into ensuring that the strap pulls on a full block; the surrounding masonry on this course can be adapted to fit.

Correct wall interfaces must be used i.e. hangers or building in of joists and beams must be compliant with the NHBC Standards. The quality of workmanship is vital for this element of construction, particularly regarding separating walls and the requirement to avoid sound transmittance. The building in of joists into load bearing walls must be done in a neat and tidy fashion, for example as shown in image 20 where full blocks have been used to fill the gaps between the joists with no fuss - clean sharp work.

Precautions against disproportionate collapse - whatever the system of build - must be correctly installed; these are usually the twisted lateral restraint straps we see affixed to the lower chord of the joist - not the standard lateral restraint straps or support straps as they are otherwise known.



LINTELS, BEAMS AND OTHER STRUCTURAL ELEMENTS



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LINTELS, BEAMS AND OTHER STRUCTURAL ELEMENTS





LINTELS, BEAMS AND OTHER STRUCTURAL ELEMENTS

Images 21 and 22: The correct length and bedding of lintel bearings are important to ensure full distribution of the load.

Padstones should be of the required size and positioned centrally below the beam or lintel in order to evenly distribute the load. In blockwork walls, full blocks should be used for lintel bearings with correctly bonded blocks below. Girder truss bearings are also considered under this heading and as such, should be considered. Mild steel beams or RSJ's should be painted to ensure durability in accordance with NHBC Standards. It's not clear from this photo, but if this is two beams that need to be connected together, the tightening of the bolts must be done before any loading is applied.

The work shown here would be marked at a 4, or possibly a marginal 5.

Images 23, 24 and 25: When considering the placement, bearing and location of lintels you should avoid the following issues.

- Intels that are too big for the opening and encroaching into or travelling fully across the cavity
- mixing of materials, for example, face bricks over lintels or inadequate bearing on a half of a brick which is further under stress by carrying the weight of the first floor joists. Consider the overall area of construction and the implications of not getting it right first time
- poor bonding of masonry that leads to poor alignment of perpends
- inadequate padstones with inadequate sizing built as an afterthought and out of inappropriate materials

With image 25, whilst blue bricks might just work as a padstone, the more serious error here are the straight joints in the masonry below which significantly weakens the wall under that load.

The work shown in images 23, 24 and 25 is poor and would only get a 2 or a 3 - remedial work will be required to resolve the issues.

Our best advice is have a picture in your mind of how the construction is going to look. How are you going to interpret the technical information on the drawing into the house that you are building? Is it going to be compliant? Is it going to look as good as it possibly can be or are you just going to let the trades offer their interpretation and be marked accordingly?

BALCONIES INCLUDING THEIR FIXINGS AND WEATHER PROOFING





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BALCONIES INCLUDING THEIR FIXINGS AND WEATHER PROOFING

Images 26 and 27: Balconies must be accurately aligned, installed and correctly fixed back to the main frame of the building. The judges will look for correct balcony guarding materials and gaps (ie be non-climbable and be of the right height). Correct drainage for the balcony design is most important and should be in accordance with approved drawings and meet NHBC minimum requirements. Image 26 shows balconies partly complete – glass balustrading has yet to be installed. However, the work so far looks very competent and would merit a score of at least a 5.

Image 27 demonstrates a neat weathering upstand. An adequate sealing of fixings should they penetrate the weatherproof fabric is vital. This is a high risk area of construction so it is critical that balcony waterproofing and threshold details are approved by NHBC prior to being constructed. This image shows a neatly constructed splash zone detail, splash zone height to be a min 150mm above decking. Note weepholes above tray positioned at 450 C/Cs with cover flashing sealed. Simple construction that has been well managed and would attract a score of at least a 5 - if it was on a large scale around a building and all to this standard, then a 6 would be merited.

Furthermore, the care taken to make these distinctive structures look aesthetically pleasing, whatever the design, will catch the eye of the judges. Neat details around fixings to the main superstructure elements along with careful consideration to the provision and maintenance of balcony drainage and overflow systems will ensure you demonstrate your technical expertise. Efforts made to create a pleasing appearance to soffits and decking will ensure higher marks are awarded by the judges.



FIRE STOPPING (SUPERSTRUCTURE)





FIRE STOPPING (SUPERSTRUCTURE)

Images 28, 29 & 30: Fire stopping is a critical element relating to the safe function of the building. The correct installation of fire resisting materials to walls, ceilings and compartments are important to achieve their required performance standards. Care should be taken to ensure that products are installed accurately and precisely to meet their performance capabilities.

Where cavity barriers are used, they should be sized appropriately for the dimensions of the cavity. Normally they are installed under compression and as such maintaining the design cavity width is critical. Significant reduction in cavity width will mean that the barrier cannot be fitted without creating problems for the following leaf of masonry. Significant widening in the cavity width will mean that the barrier may not be fitted with the appropriate level of compression and its performance may be impaired.

Catalogued photographic records of workmanship prior to covering up are now becoming common practice on site, as is engaging the services of a specialised fire engineering company to address the fire stopping as well as maintaining an online database of records.

The judges will be looking for accurate placement of fire barriers and for the barrier material to be protected where required from subsequent construction processes. The fire barriers should be as tight as possible to the element of structure within which it is being held - so no gaps to allow the inadvertent passage of smoke or flames should be evident.

The work shown in these images is to a very good standard and well worth a mark of 5 -possibly a 6 if consistent at this level across the site.



GOOD LUCK!

We hope you have found this best practice guide useful in gaining a better understanding of what the judges are looking for at each stage of construction.

Remember, the six characteristics the judges are looking for in a site manager are:

- consistency
- attention to detail
- technical expertise

- leadership
- interpretation
- health and safety.

We wish you all the very best in the Pride in the Job competition as you strive for your very first win or to repeat or even improve on your performance in previous years.

