

PROPERTY CARE ASSOCIATION

Certificated Surveyor in Structural Waterproofing Examination (CSSW) 7th July 2015

NOTES FOR CANDIDATES:

1. Read the instructions and questions carefully
 2. Answers should be illustrated with sketches where appropriate
 3. Any abbreviations must be given in full when first used
 4. The duration of this written paper is 2½ hours
 5. The paper consists of 2 sections which are assessed separately: **both** must be passed
 5. **All 6** questions should be answered
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PART 1:

1. You designed and installed a Type C waterproofing system to an existing vaulted wine cellar of a large country house. However, a month after completing all finishes the irate client is in contact saying the system has failed and the wine bins and his expensive wine is covered in black mould. When you mention that this could be due to condensation he responds that this can't be so as the walls are wet to touch and anyway there is ventilation by way of an extractor fan working continuously at the far end of the wine cellar.

Some details of the cellar and the work carried out:

- a. The vaulted wine cellar is accessed off a larger main cellar that is used for washing and laundry. The cellars have external soil retaining walls but with light-wells to one side wall (blocked up to the wine cellar but accommodating the fan)
- b. There is an old timber door entering the wine cellar, from the main cellar, that is poor fitting and not self-closing.
- c. The waterproofing work involved fitting of lath CDM to all walls, brick vaulted ceiling and within the brick wine bins.
- d. All the lath membrane was subsequently plastered with a gypsum-based plaster and galvanised angle beads fitted to edges.
- e. Floor/wall drainage channel was fitted into a perimeter rebate formed around the edge of the replacement concrete floor slab targeting a sump and pump system in the wine cellar corner. There are two accessible channel flush/access points.
- f. The CDM 20 mm floor membrane was overlaid with chipboard 'floating' floor finish incorporating insulation.
- g. You agree to attend site to look at the problem.

Site visit information:

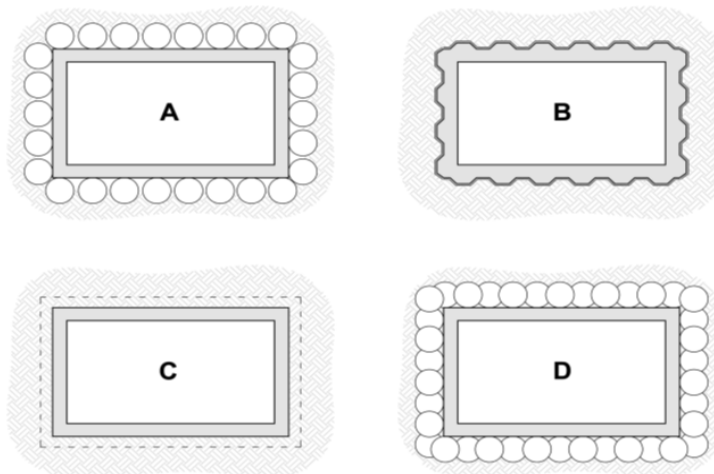
There is black mould growing on most wall and wine bin surfaces – also on the wine bottles. There is no evidence of water staining to the plastered surfaces although the gypsum plaster is showing reluctance to dry down for decoration. The floor is dry. The galvanised angle beads are starting to corrode. The fan is working permanently. Using various equipment you record air temperatures in the Main cellar at 16°C with 65%RH whereas in the wine cellar the wall surface temperatures are 7°C and 90%+RH at the time of visit.

Question:

1. What checks would you make to confirm that the waterproofing has not failed?
2. How would you prove that it has been caused by condensation and explain the use of equipment to support your argument?
3. What recommendations would you suggest to solve the problem?

[20 marks]

2. Please see below four indicative plan drawings of typically constructed reinforced concrete basement structures:-



Questions:

- i. Please briefly describe each type of construction
 - a.
 - b.
 - c.
 - d.
- ii. Which design is inherently the most watertight?
- iii. Which design is most likely to give you the greatest access to the outer faces of the basement structure and why?
- iv. Can the remaining designs be waterproofed externally? If yes, what considerations may you have to give before installing an external membrane system?

[20 marks]

PART 2:

3. a. Define 'hydrostatic pressure' and 'capillarity'.
- b. In relation to hydrostatic pressure, answer the following questions in relation to a basement constructed with a floating (i.e. not anchored by the walls) concrete floor slab and brick walls, and subjected to a head of water:
- What factor determines hydrostatic pressure?
 - An un-waterproofed basement with a concrete floor and brick walls is subjected to a head of water, and leakage occurs through both the brick walls and concrete floor. Describe what factors will affect the rate of leakage through the two materials.
 - Is there anywhere else where leakage may occur?
 - If a cementitious system is applied to the internal face of the walls and floor, will the pressure on the membrane be different on the different materials (concrete and brick) when the head of water is the same?

[15 marks]

4. Following the application of a cementitious system condensation may occur:
- Define 'Relative humidity' and 'Dew point'
 - What part do 'relative humidity' and 'dew point' play in the formation of
 - surface condensation
 - interstitial condensation
 - List the instruments and describe how you would use them and data required to determine that surface condensation was the cause of dampness following the installation of a cementitious system, and not a water-proofing failure.

[15 marks]

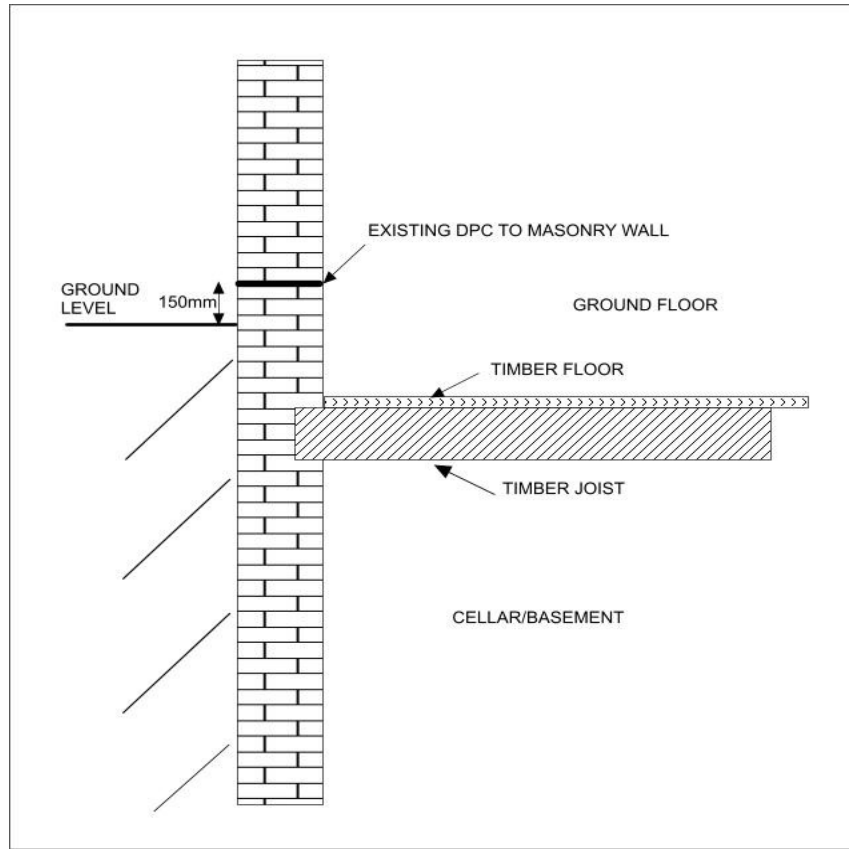
5. A basement is to be fitted with a cavity drain system. What tests would you undertake to the floor before laying the membrane?

Why should you provide rodding eyes/access points to a wall/floor junction membrane?

What is the minimum fall needed for a floor slab to enable it to drain to the sump?

[15 marks]

6.



The diagram shows a scenario where the external ground levels and DPC are above the internal timber floor level. You have been asked to waterproof the basement using a cavity drain system.

Questions:

- 1. At what level would you terminate your waterproofing and why?**
- 2. Draw a detail showing how you would overcome the problem posed by the timber joists.**

[15 marks]