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Bonding of Gypsum Plaster to Plain Concrete Surfaces

Gypsum plasters on concrete surfaces are a system which has proven to be good for many years. Components of this system are:

- faultless concrete surfaces as base;
- a professional application of a functional bonding coat, and
- the careful application of an appropriate gypsum plaster.

Should these points not be observed sufficiently, a potential as for plaster damages must be taken into account.

In the framework of this paper the bonding within the system ’CONCRETE – BONDING COAT – GYPSUM PLASTER’ was examined. This was done on the basis of fracture patterns gained under tensile stress. In this experimental process not only the plaster base was varied (cement type, water/cement ratio, surface roughness) but sometimes also the bonding coat and the gypsum plaster. The outer conditions were determined in such a way that extreme stresses were simulated:

- processing of gypsum plaster and bonding coat at 5 °C and
- moisture saturation of the plaster base surface.

On the basis of the experiments carried out the following statements as to the **plaster base surface** can be made:

- The **type of cement** that was used for the production of the slabs has a significant influence on the bonding compound. It can be said that cements with a relatively high alkali content lead to a worse bonding compound. The cement with a lower alkali content showed in our investigations almost always a comparably better fracture pattern.
- Investigating **lightweight concrete slabs** it could be found that with the **moisture** increasing on the plaster base surface, the bonding compound deteriorates at least as far as bonding coats of reduced quality are concerned. Thus, lightweight concrete with its high moisture potential is more in danger of losing the bonding compound to the gypsum plaster than normal concrete. Pre-storage of **lightweight concrete slabs** in **alkali salt solution** (in comparison to water) before applying the plaster led to a deterioration of the bonding compound.

As for the **bonding coats** the following statements can be made:

- Comparing numerous series of experiments it can be shown that the danger of an adhesion break (detachment of the plaster from the concrete) strongly increases when no bonding coat is used.
- When one compares the two applied bonding coats with one another, it becomes clear that **the quality of the bonding coat** influences the fracture pattern significantly. Under various conditions observed here (in nearly 90 % of all cases), the bonding compound is better, when a bonding coat of high quality is used, rather than one of average quality.

Summarising one can conclude that the bonding of gypsum plaster on concrete depends - as is well known - on

- the compliance with the processing rules given by the producers of bonding coats and gypsum plasters and
- avoidance of too high plaster base mo

but it also depends on

- the alkali content of the cement type used in the concrete and
- the quality of the bonding coat

One can achieve a better and more durable bonding in the system 'CONCRETE – BONDING COAT – GYPSUM PLASTER' by means of lower alkali contents in the concretes and by using high-quality bonding coats in a professional manner.

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