

## Avoiding Surface Imperfections in Concrete

### IMPORTANT SAFETY INFORMATION

When handling and using cement or fresh concrete, avoid skin contact. Wear suitable protective clothing.

### Cement and Concrete Association of Australia

The Association is a non-profit organisation sponsored by the cement industry in Australia to provide information on the many uses of cement and concrete. This Guide is distributed by the Association for that purpose. Since the information provided is intended for general guidance only and in no way replaces the services of professional consultants on particular projects, no legal liability can be accepted by the Association for its use.

SEPTEMBER 2001 B13

Page 1 of 2



## Honeycombing

### WHAT IS HONEYCOMBING?

Honeycombing refers to voids in concrete caused by the mortar not filling the spaces between the coarse aggregate particles. It usually becomes apparent when the formwork is stripped, revealing a rough and 'stony' concrete surface with air voids between the coarse aggregate. Sometimes, however, a surface skin of mortar masks the extent of the defect. Honeycombing may extend some depth into the member.

Honeycombing is always an aesthetic problem, and depending on the depth and extent may reduce both the durability performance and the structural strength of the member.

### WHAT CAUSES HONEYCOMBING?

Honeycombing is caused either by the compaction not having been adequate to cause the mortar to fill the voids between the coarse aggregate, or by holes and gaps in the formwork allowing some of the mortar to drain out of the concrete. In some cases, the member shape and detailing/placement of the reinforcement compounds the effect of inadequate compaction.

### PRACTICES TO MINIMISE THE OCCURRENCE OF HONEYCOMBED CONCRETE

To minimise the incidence of honeycombed concrete:

- Ensure the mix has sufficient fines to fill the voids between the coarse aggregate.
- Use a mix with appropriate workability for the situation in which it is to be placed.
- Ensure the concrete is fully compacted and the placing methods minimise the risk of segregation.
- Ensure the reinforcement layout and the section shape will permit the concrete to flow around the reinforcement and completely fill the forms.
- Check that the formwork is rigid and well braced, the joints are watertight and any penetrations through the formwork, eg form ties, are properly sealed.

Avoiding Surface  
Imperfections in Concrete  
**Honeycombing**

Cement  
and Concrete  
Association of  
Australia

Page 2 of 2

helen rix design



### REPAIR OF HONEYCOMBING

It is always better to avoid imperfections such as honeycombing in concrete rather than have to repair them. However, if honeycombing does occur then it can be repaired using the following techniques.

The extent and depth of the honeycombed area first needs to be defined. This can be done by chiselling out the affected area to expose sound concrete or by using non-destructive testing techniques such as impact-echo.

If the honeycombed area is small in extent and depth does not significantly jeopardise the quality of the cover concrete protecting the reinforcement then, it can be repaired by patching with mortar of a similar colour to the base concrete.

Any lightly attached stones should be removed before the mortar is worked into the spaces between the aggregate ensuring that it completely fills the honeycombed area. The area should be slightly over filled and screeded off to give a similar texture to the surrounding surface. The patch should then be cured.

Consideration needs to be given to the appearance of the repaired surface relative to adjacent untreated surfaces. As a general rule, mortar used for patching should be made from the same materials as the original concrete except that a proportion of off-white cement should be mixed with the original cement to lighten the colour and thus better match the existing surface.

If the honeycombing is extensive and penetrates down to the reinforcement or even deeper then it is necessary to cut out the defective concrete and replace it with sound concrete. It is essential that the reinforcement be surrounded by sound concrete. The advice of a suitably qualified engineer should be obtained to check that the load-carrying capacity of the member, as repaired, will be satisfactory.

There is no repair method, thus it is best to take precautions, as outlined, to avoid them.