Damage-free Level Thresholds

Research project: Z6 – 10.08.18.7 – 07.33 / II 2 - F20-07-040
The project was supported by
„Forschungsinitiative Zukunft Bau des Bundesamtes für Bauwesen und Raumordnung“

Conducted by: AIBAU, Aachener Institut für Bauschadensforschung und angewandte Bauphysik, gem. GmbH, Aachen

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Summary Account

Connections between areas that are exposed to humidity and those that are not have to be carefully damp-proofed and protected against the penetration of water behind the sealing layer. Examples of such connections are exterior thresholds of roof terraces, balconies, terrace doors or house entrances, and, on the other hand, interior thresholds of moderately exposed wet rooms in residential buildings. The most simple way to achieve a damp-proof connection is to install a raised threshold. But in barrier-free construction any change of floor levels should be avoided, if possible. In this respect, the requirements of damp-proofing and of barrier-free accessibility contradict each other.

This research study points out typical reasons for damage of insufficiently damp-proofed level thresholds. It also describes constructional details that have proved to be satisfactory in practice, and suggests techniques that will guarantee a permanently damage-free function of such connections under specific conditions of water-related stress and exposure.

Following a survey among designers, producers and building experts, both damage-prone and well-functioning details of level thresholds were identified and documented. The research study describes the most frequent areas of damage and explains the reasons for failure. Serious damage is often caused by the faulty execution of damp-proofing joints on the threshold, especially when a threshold is exposed to a great deal of moisture.

On the other hand, the inspection of damage-free exterior and interior thresholds has shown that level thresholds can function successfully in practice. Since thresholds and door frames are rarely suitable for flanging – though according to regulations they should be – the damp-proofing joint on the side of the door frame can seldom be applied uninterruptedly. In spite of this, the joints have remained damage-free in many cases. As a rule, however, they were protected from the immediate effects of the weather.

Judging from the results of the investigation, structural details that really comply with present regulations often seem to be unnecessarily costly and complicated. It would be more appropriate to design simpler solutions.

Damp-proofing measures required for exterior level thresholds clearly depend on their probable exposure to water. Obviously, a threshold on the 3rd floor, located under a cantilevered balcony on the north side of a building in a landlocked area, is much less exposed to humidity than an unprotected threshold which is oriented towards the weather side, on the 10th floor of a building in a coastal area. Therefore, three classes of exposure (protected, partly protected, unprotected) are defined in the study, depending on a threshold’s exposure to driving rain, on the direction in which it is facing and on the degree of protection provided by the building structure.

The study explains the damp-proofing measures required for each class of weathering exposure. If a connection is only slightly exposed to water, the height of the edge of the sealing layer above the floor finish and the width of the joint can be much smaller than if it is exposed to an average or great amount of water. Apart from the generally known constructional varieties which place the joint of the sealing layer on the exterior side of the door, a new type of construction with an interior joint is described in detail in the study. Though this type demands a water-resistant threshold profile, it allows the joint to be placed in a weatherproof area. Thus it can be expected to meet high safety standards.

The study also deals with problems of thermal insulation, resistance to condensation and of air-tightness in the threshold area and suggests adequate solutions.

Furthermore, it describes measures to make the joints function more reliably, for example by protecting the threshold from weathering exposure, by raising it to a minimum height or by draining the threshold area.

Firms producing doors are called upon to design threshold and frame profiles in such a way that sealing joints can be easily and permanently fixed.

In moderately exposed wet rooms in houses and flats it is general practice to apply filler sealings with composite floor coverings (AIV = Abdichtung im Verbund), whereas damp-proofing sheets are only used if the sub-base is susceptible to moisture.

The threshold area's exposure to water can be reduced by placing the shower as far as possible from the door, by protecting it from splash water, and by giving sufficient slope to the spacious shower area. If this is not possible, the sealing should be continued behind the door case and joined to an angle which is turned up ca. 2 – 5 mm above the surface of the floor finish. Apart from that, the effects of possible water penetration in adjoining rooms should be reduced by damp-proof floor finishes (tiles, slabs).