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Durability of connections between liquid sealing materials and damp-proofing sheets, exemplified by accessible and non-accessible flat roofs

Short version

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In recent years, roofing sheets installed on accessible or non-accessible flat roofs have been more and more frequently combined with reinforced liquid plastic materials (“Flüssigkunststoffe” - FLK), especially at the edges and at the joints of above-surface building components. A great number of newly-developed liquid plastics, whose application is comparatively easy, offer economic solutions for the waterproofing of buildings, especially when there are complicated geometric structures with irregular joints.

As the examination of flat roofs and their joints has shown, the connection between liquid waterproofing materials and roofing sheets has often been prone to failure, though in some cases the damage did not occur before the end of the usual warranty period of five years. In the present research project, the practical performance of the connection between waterproofing sheets and liquid plastics has been assessed by on-site inspections, by the evaluation of expert reports, and by a survey among building experts and roofers. The survey shows that, as a rule, the connections between sheets and liquid waterproofing materials function adequately. In the cases of defects in the overlapping area, the damage mostly occurred directly after application works had been finished, in 82 % of the cases within four years after the completion of works.

Apart from the degree of sloping in the overlapping area, the position of the connection is an important criterion for assessment. If the overlap is situated at surface level, it is considered as “lying”; if it is raised above the water-bearing level, it is termed “standing”.

The requirements for application, which are briefly described below, will ensure the proper function of the relevant connections:

In standard roof constructions, “lying” connections should reach degree 3 in preliminary tensile tests (“Schälzugprüfung” according to Swiss Norm SN 564281/2:2011), i.e. a great degree of strength will be needed to peel off the material by hand; the liquid applied material (FLK) cannot be removed completely. “Standing” connections should reach degree 4: the liquid materials cannot be removed by hand.

Before application, the underlying surface must be prepared appropriately.

Care must be taken to ensure the required minimum thickness of the liquid applied materials.

It is essential to prevent water from penetrating behind the connections.

Workers need to be trained adequately.

For high quality roofs, “standing” connections should be used to the greatest possible extent. Where this is not practicable, other constructional techniques have to be used to prevent water from collecting in the overlapping area.

The required minimum thickness of the liquid plastic materials must be guaranteed by tests and documentation.

The penetration of the roof surface should be minimized as far as possible.

The results of the research project show that the combination of liquid applied materials and damp-proofing sheets is a reliable and durable technique, provided that construction and application are in compliance with the above-mentioned rules. It has been successfully used for several years and should be incorporated into current building regulations.