

Case Note – product « RIW » Liquid Asphaltic Composition - failure of damp-proof membrane in new-build office extension resulting in avoidable undesirable work-space health impacts



Introduction. Rapid growth prompted RSPB to build a 2-storey extension at their HQ, The Lodge, Sandy, Bedfordshire SG19 2DL for the Publications & Education Teams of creative personnel. The project was out-sourced & run by local architects. In-house involvement from the RSPB Land Agency Team was minimal. Their decisive input later attests to perceptive diagnostic skills.

The Project. This was run on conventional design/tender/supervision lines. An outsourced local Architect took responsibility for design and the whole process to Final Account. The ground floor was a *slab/raft* formed in mass poured concrete. “RIW” LAC® by RIW of Binfield, Bracknell, Berkshire RG42 4PZ was specified to waterproof the ground-floor “service duct” about 40cm wide & c.50cm deep, housing electrical & telephony cables and heating pipes, on duct floor & vertical surfaces. (Amongst suggested uses & applications for this product – see Note 2 below). The open-plan working-space had high levels of natural light, & was well-decorated, befitting creative teams, offering a bright and airy working-environment. The floor-covering was 50cm x 50cm snug-fit decorative carpet-tiles laid over sheet “particle-board” i.e. “chipboard”, flooring.

The Problem. Soon after Completion & occupation by 30 people, *one member* of the Publications Team, Designer “Patsy” fell ill. Her symptoms were complex & persistent but not obviously ‘flu-related. Patsy was youthful & normally healthy & not at all “precious”! The symptoms affected her concentration & output and persisted for many weeks. A range of treatments for “allergies” were prescribed, both conventional and unconventional, including *acupuncture*. Patsy also re-located into work-space elsewhere on the campus! There, a casual conversation triggered a closer look by the Author at her work-station in the new building.

The investigation. The felt-effect carpet tiles around Patsy’s work-station were somewhat uneven on the surface. On lifting one or two, the tiles appeared underneath to be damp. The material, a nylon-composite had expanded, slightly. There were also grey/brown mould-deposits on the underside of 2 or more tiles. The phenomenon appeared to be very local. The sheet particle-board flooring was found to be damp on the surface & some distortion had taken-place. (Seemingly, this indoor flooring material was absorbent & not water-resistant; so prone to humidity-induced warping). There were also mould-deposits on the flooring panels. On lifting the flooring panels, the service-duct was found to *run directly beneath* Patsy’s work-station. A leaking pipe was suspected to be the moisture-source but eliminated.

The Cause. Ruling-out pipe leakage, the moisture was found to be penetrating/rising damp via the concrete slab. Perhaps the service-duct had not been correctly waterproofed? Moisture/vapour passed from the ground into the concrete slab/raft then penetrated porous un-treated flooring and

decorative floor-finishing materials, above. Without effective ventilation, warm moist conditions enabled mould to flourish. It seems that Patsy had reacted to the humidity and air-borne mould spores. It is unclear if waterproofing had been omitted or the specified RIW material had “failed” or not been properly applied in the 2 full coats demanded on all 3 concrete surfaces.

Remedial work. Once moisture-damaged material had been removed, the area deep-cleaned and thoroughly dried-out; the service-duct was re-treated with LAC® & replacement materials installed. Patsy moved-back, after a suitable interval & was able to return to full health & productivity! The allergic reactions did not re-occur. Nor did any of her colleagues suffer. The Client was absolved of all costs. The disruptive incident spanned many months...

Observations & learning-points. This experience highlights need for careful selection of both structure *and* decorative surfaces to ensure that the design/construction is practicable and suitable. Secondly, that potentially troublesome design-details (e.g. an horizontal service duct in porous concrete at ground-level requiring careful detailing of waterproof barriers) is thoroughly researched, beforehand. For example, an approved waterproofing additive to the wet concrete mix (e.g. “XYPEX” which blocks porosity from within) obviates necessity for the extra care required to ensure continuity & proper coating/dressing on contiguous surfaces when 2 coat-treatment is required). Pay close attention to symptoms of personnel who exhibit reactions to the range of “sick building-syndrome” effects. Carpet, as a repository for pollutants presents some potential for reduced indoor air quality; (static; dust; fumes, notably from formaldehyde, classified by WHO as a known human carcinogen; odours; spores). Above all, where critical construction-tasks are concerned, the whole process must be properly supervised by an experienced professional. Similarly, as a precaution, the marginal extra cost of using a water-resistant flooring medium, would have been justified & *may have prevented the later sequence of undesirable effects*. “Continued caution should... be exercised when considering the use of wall-to-wall carpeted floors in schools, kindergartens & offices as well as children’s bedrooms unless special needs indicate that carpets are preferred” (Becher R; Øvrevik J, & Bakke V, 2018 – Int. J. Environ Res. Public Health, 15(2): 184 (Norway).

Conclusion: Without the regrettable suffering of RSPB’s own “canary at the coalface”, this concealed defect would surely have gone unnoticed, perhaps for several years!

Further reading. EN 12369-1 Woodbased panels – values for structures – Part 1: OSB, particleboards & fibreboards; EN 300 Oriented Strand Boards (“OSB”), definitions, classification & Specifications; EN 309 Particleboards – definitions & classification.

Notes : 1. LAC is a 2-coat cold-applied damp proof membrane which dries to a uniform gloss black finish. The coating is a solution of natural & petroleum bitumens in white spirit.

2. LAC is typically used as a damp proof membrane to ground floors, as a vapour-barrier behind cladding & for “tanking” basements. It is also suitable for waterproofing foundation walls, **ducts** , lintels, columns, beams & similar structures at, above & below ground level. LAC may also be used to provide a barrier to Radon Gas. (RIW, 2018 Technical brochure).

3. “Can damp & mould affect my health? Yes, if you have damp & mould in your home you’re more likely to have respiratory infections. Damp & mould can also affect the immune system.” (NHS UK, 2018)(www.nhs.uk/common-health-questions/lifestyle/ can damp...).

4. *Air Pollution: WHO guidelines for indoor air quality: dampness & mould*, ISBN 7989289041683, 2009, World Health Organization. “The most important health problems associated with building moisture & biological agents are respiratory symptoms; allergies & asthma plus disturbance to the immune system. The most

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important means for avoiding adverse health effects is prevention or minimisation of persistent dampness & microbial growth on interior surfaces & in building structures.” (WHO, 2009 Geneva, Switzerland)

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