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What's That Smell? – Olfactory Forensics or Following Your Nose

By Robin Orme

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We all have our favourite smells – for instance, roses or baking bread. And our least favourite ones as well, perhaps sour milk or overripe cheese. We name these smells by their perceived source. But what do you do if the smell is so unpleasant that occupants cannot bear to remain in the room, but no one knows where the smell is coming from? This is the situation which Probyn Miers was asked to investigate recently.

Our client approached us after serious problems with unpleasant odours – so unpleasant that some occupants had to leave the room they were in. Our client had premises on a number of different sites. The smells occurred in accommodation which had been refurbished or extended in the past eighteen months or so. There was no consistent pattern – some rooms were affected, others were not. Descriptions of the smells varied, but one descriptor was used more often than any other – vomit.

Our client had a strong suspicion that the problem was connected with new flooring panels, as they had installed the same type of panel in all the rooms, but how could that be proved or disproved? The flooring manufacturer, unsurprisingly, said there was nothing wrong with their product and that no similar problems had been reported elsewhere in Europe, let alone in the UK. As well as wanting to know the cause, our client had two more questions: what should they do to get rid of the smell and could they get someone else to pay?

Our starting point was a thorough inspection, with the flooring manufacturer, of a number of affected rooms. We looked at everything in them – construction materials, fittings, furniture, curtains, and carpets and underlay. We pulled back carpets in the corner of each room to sniff the underlay and flooring panels and record batch numbers. Was there any mechanical ventilation drawing odours from elsewhere in the building? Was there something outside the windows? Were the smells coming in from adjacent accommodation including, in some instances, adjacent toilets, either when doors were opened or left open, or via concealed voids behind walls, above ceilings or under the floor? Could we see batch numbers on flooring panels to check whether panels in affected rooms all came from the same batch? What was the cleaning regime and did it vary in different rooms?

The results were inconclusive. The sickly smell could be detected in some affected rooms and not in others. Some people could detect the smell clearly whilst others could not. The smell was clearly not in soft furnishings and probably not coming from adjacent rooms (including the toilets) although we could not rule out transfer via concealed voids. We looked at the batch numbers, but there was no immediately obvious pattern.

Our client told us that in the meantime, they had replaced flooring panels in some affected rooms to a slightly different specification – with loose-laid wood-fibre acoustic insulation rather than combined flooring/insulation panels – and that as a result the odours were no longer a problem.

The next step was to take a more scientific approach so we recommended the appointment of an odour consultant to carry out a combined subjective and objective investigation and analysis.

The subjective part involved on-site and laboratory assessment by trained odour assessors selected for their ability to distinguish and describe odours. The consultant and two assessors assessed odours in rooms with reported problems. Air samples were taken for further assessment in the laboratory. Descriptions of the smells ranged from *"musty smell"* to *"not bearable, glue and farty, the worst room"* and *"weak sick, vomit smell"*. Interestingly, descriptors referring to sick or vomit were only used by assessors on site and never by those in the laboratory. The results were mixed, partly because the odours on the day of the site visit were clearly not as distinctive as had been experienced on other days. The descriptions illustrated the lack of an agreed vocabulary for odour description, particularly the lack of a vocabulary indicating possible source compounds.

The objective, more scientific part of the investigation involved GC-MS (gas chromatography-mass spectrometry) analysis in the laboratory of the air samples. This method analyses all the detectable compounds in the air samples for comparison with samples from other locations and with the known

chemical composition of construction materials and adhesives. Only two compounds (ethanol and acetaldehyde) were above the odour threshold, i.e. above the level at which they are generally detectable by humans. The levels of acetaldehyde were particularly high and at these levels it is often described as having a fruity smell. No clear source of the odours could be identified. If acetaldehyde was the source compound, it was probably combining with other odorant compounds to produce unacceptable odours.

The results again proved inconclusive. We were trying to link an unacceptable odour with a specific source compound, but this is difficult as there is no recognised odour dictionary, which links perceived odours with likely source compounds. Conversely, even if compounds above the odour threshold are identified, there is limited guidance as to whether these are causing the problem. It can be like looking in the proverbial haystack, but without even knowing that you are looking for a needle.

At about this time, we went back to look again at the batch numbers, which recorded the date of manufacture. We had batch numbers for only a small number of panels. We could separate these into two groups. 10 panels had been installed in rooms completed within a couple of days of each other: the batch numbers showed that these had been manufactured over a 3-week period 9-12 weeks previously. The remaining 17 panels were installed over a 3-month period, but we noticed that 12 (70%) had been manufactured on two successive days. The sample was limited, but such clustering, combined with the fact that some panels were affected whilst others were not, suggested a link to the manufacturing process. We had learnt that the flooring panels incorporated approximately 50% cellulose filler, probably recycled paper. Recycled materials are more prone than manufactured materials to variation in quality, and recycled paper might suffer deterioration if dampened. Perhaps materials used varied too much in quality. Alternatively, some batches of panels may have been subject to dampness between the factory and installation on site, causing deterioration, whilst others remained sufficiently dry.

We therefore moved on to the next phase of investigation, a materials analysis of the suspect flooring.

At this point, we had some luck. More flooring panels were being installed and odours were reported before completion, i.e. the problem was not to do with post-occupation use of the space and, in particular, not a result of the cleaning regime. Secondly, the floor insulation differed from that used elsewhere and so could be ruled out as the odour source.

In addition to a visual inspection on site, our materials consultant recommended taking samples from affected and non-affected boards, followed by petrographic examination and FTIR (Fourier Transform Infrared Spectroscopy) testing in the laboratory. From the petrographic examination under the microscope, the composition and constituents of the material and its mix quality plus other salient observable features can be established. If successful, FTIR testing takes the analysis further by identifying organic compounds which may be the source of the unacceptable odour.

The site visit by the materials consultant proved more useful than expected. Samples were taken by drilling 50mm diameter cores in the centre of a flooring panel and also at the edge where the panels were glued together. Fingertip examination (rub and sniff), of the central sample holes confirmed that the odour was present in the flooring in an area where there was no adhesive, i.e. the odour source was inherent to the material of the floor panel itself. Adhesives contain volatile compounds which can be the source of odours, but not in this instance.

The laboratory tests took matters forward, but were still not conclusive. Petrographic analysis showed unexpected deposits of material in larger air voids in the flooring as well as fibrous cellulose material, presumably recycled paper. The deposits were tentatively identified as clay minerals or possibly clumps of fibres or deteriorated fibres. The cellulose material was usually featureless but occasionally brightly-coloured with the colour bleeding into adjacent material. FTIR analysis suggested the presence of cellulose acetate or similar and, possibly, polyurethane. To use the language of police procedurals, this narrowed down the range of suspects but did not produce a smoking gun.

The final stage of the investigation will be to repeat the tests on unaffected flooring samples to confirm the significance of the anomalies previously detected. Suspect features in affected samples will be investigated further by electron microscopy/x-ray analysis and by gas chromatography-mass

spectrometry. These look at the materials involved in even finer detail, in order to identify the compounds responsible for the unacceptable odours.

The results should take matters forward, but as with any investigation you cannot be sure of the outcome at the point when you decide to undertake the work. A successful investigation often requires simple ad hoc tests (in this case, fingertip examination on site) combined with laboratory analysis using sophisticated scientific techniques and equipment.

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The New Pre Action Protocol and Expert Evidence

By Bart Kavanagh

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Introduction

The new, 2nd, edition of the Pre-Action Protocol for Construction and Engineering Disputes came into force on 14 November 2016. It replaced the first edition that had been introduced on 02 October 2000 as part of the Civil Procedure Rules and was then revised in April 2007. This article considers why a new edition was thought to be necessary; how the aims of the Protocol have been altered; whether independent expert opinion still has an effective role to play in the new Protocol and, if so, how the contributions of an expert should be managed and delivered.

Why a new protocol?

Opinion on the practical operation of the Pre-Action Protocol since its introduction in 2000 was divided between the two branches of the legal profession. Solicitors tended to support its use but the Bar, and to some extent the judiciary, were critical of it. [1] These criticisms centred on the thought that the Pre-Action Protocol simply added another layer to an already complex process and caused unnecessary additional expenditure of time and money. There were those who thought that the original Protocol should be left in place and those who thought it should be removed altogether. The 2nd edition represents a compromise between the two positions.

How have the aims of the Protocol changed?

In essence the aim of the pre action protocol is to encourage and enable parties who are in dispute to reach a settlement without embarking on litigation, arbitration or other formal proceedings with all of the costs, stress and uncertainty that such proceedings typically entail.

The original Protocol set out its objectives at paragraph 1.3 where it stated:

"The objectives of this protocol are as set out in PD Protocols, namely:

- 1. to encourage the exchange of **early and full information** about the prospective legal claim;*
 - 2. to **enable parties to avoid litigation by agreeing a settlement** of the claim before commencement of proceedings; and*
 - 3. to support the efficient management of proceedings where litigation cannot be avoided."*
- [My emphasis]

The new 2nd edition sets out its objectives in section 3, which states:

3.1 The objectives of this Protocol are:

*3.1.1 to exchange **sufficient information** about the proposed proceedings broadly to allow the parties to **understand each other's position and make informed decisions** about*

settlement and how to proceed;

3.1.2 to make **appropriate attempts to resolve the matter without starting proceedings** and, in particular, to consider the use of an **appropriate form of ADR** in order to do so.”
[My emphasis]

So we can see that the ‘exchange of early and full information’ has been transformed into the exchange of ‘sufficient information’ and that the aim of enabling parties to ‘avoid litigation by agreeing a settlement’ has become a rather vague reference to making ‘appropriate attempts to resolve the matter’.

Paragraph 3.1.1 also explains that information will be ‘sufficient’ if it allows the parties to ‘understand each other’s position’ and ‘make informed decisions’. In order to understand what these phrases might mean in the context of a dispute and how they might best be achieved, it will be useful to look at what barriers to a settlement users of the protocol must seek to overcome.

Barriers to settlement

What are the things that make disputes difficult to settle and, therefore, expensive to resolve in construction cases? Why do parties resort to litigation rather than settling their differences between themselves? Why do they allow a third party with no first-hand knowledge of the facts of the matter to impose an outcome upon them, rather than retaining control over the outcome themselves?

The answers to these questions involve both objective and subjective factors.

Objective matters are, typically, the strict legal and technical issues related to the case. These may be disputed but they are capable of being expressed as rational arguments by the lawyers and technical experts and, without more, will form the basis of either a settlement between the parties or the judgment of the tribunal.

Subjective matters tend to relate directly to the Parties to the dispute themselves. They can be difficult for either the parties or their advisers to identify with certainty and include: emotional attachment; lack of objectivity; lack of insight; financial liability. Often they derive from a party’s perception of the merits of their case, based on a partial knowledge of the strict legal and technical/factual issues. These are things which legal and technical advisers can only influence rather than direct and control, but unless they can be overcome and resolved a negotiated settlement may become impossible and an imposed judgement or award, inevitable.

In circumstances where subjective factors predominate, mediation may offer the “most appropriate form of ADR” and provide a forum for these factors to be explored.

The new protocol and the expert

Is early expert advice at Pre-Action stage simply an unnecessary expense or can it help to provide sufficient information to assist the parties to make appropriate attempts to resolve the matter? Can it help to overcome the barriers to settlement that the Protocol must address?

In addition to cases involving claims of professional negligence where, following Pantelli, [2] expert opinion is likely to be required from the start, cases involving alleged design or construction defects are also likely to benefit from expert advice.

In **Stanley v Rawlinson** [3] Tomlinson LJ made it clear that the role of an expert may extend to providing advice [4] regarding factual evidence while a case is being evaluated and prepared by a party.

“There is nothing inherently objectionable, improper or inappropriate about an expert advising his client on the evidence needed to meet the opposing case, ... There is nothing improper in pointing out to a client that his case would be improved if certain assumed features of an incident can be shown not in fact to have occurred, or if conversely features

assumed to have been absent can in fact be shown to have been present.”

In the case of construction disputes much of the factual evidence is likely to be technical in nature and expert advice and opinion may be critical in identifying the material facts and enabling the legal team to determine their effect upon the strength of the case.

If this expert advice and opinion is required to enable a tribunal to reach a decision then it seems reasonable to suppose that it will be a necessary part of the ‘sufficient information’ envisaged by the Protocol to enable parties to reach a settlement. I would argue further that independent expert opinion can, in fact, be crucial in reaching settlement, for the following reason.

The adversarial nature of litigation, arbitration and adjudication encourages a ‘winner takes it all’ approach in which objective and subjective factors both play a role. The role of the solicitor in these circumstances is to develop a strategy for winning.

Reaching a settlement, on the other hand, entails compromise and an acknowledgement of adverse facts; it requires strict objectivity to rein in the subjective and emotional factors that may be in play. This can be difficult to manage with the prospect of litigation, or its formal alternatives, lurking on the horizon.

In contrast to the overall adversarial nature of litigation, CPR Part 35.3 places an overriding duty to the court on those who may provide expert opinion evidence.

“35.3

1. *It is the duty of experts to help the court on matters within their expertise.*
2. *This duty overrides any obligation to the person from whom experts have received instructions or by whom they are paid.”*

So, the expert can, and must, stand aside from the ‘winner takes it all’ approach; must be apart from as well as a part of the legal team. As Lord Wilberforce put it, even before the advent of the CPR, expert evidence must be “*uninfluenced as to the form or content by the exigencies of litigation.*” [5]

This allows, indeed requires, the expert to provide the objective view that is vital in promoting a mind-set conducive to settlement.

Even though full expert reports with the level of detail required for formal proceedings are unlikely to be required at the Protocol stage, any expert reports or advice should be instructed on the basis of an equivalent overriding duty to the court. In addition to ensuring the independence of the advice for the purposes of the Protocol, this makes practical sense in the longer term too. It will enable the continued involvement of the same expert, and the preparation of a CPR 35 compliant report based on the initial advice, in the event that settlement is not achieved.

[1] See: *The best laid schemes of TECBAR and TeCSA: Potential problems under the new Pre-Action Protocol*. James Frampton. SCL Paper D202 May 2017 for a detailed account.

[2] *Pantelli Associates Limited v Corporate City Developments Number Two Limited* [2010] EWHC 3189 (TCC)

[3] *Stanley v Rawlinson* [2011] EWCA Civ 405

[4] The Academy of Experts specifically refers to an Expert Advisor, as someone who may not necessarily become instructed as an expert. <http://www.academyofexperts.org/system/files/documents/codeofguidance.pdf>

[5] *Whitehouse v Jordan* [1981] 1 W.L.R. 246, HL, at 256, per Lord Wilberforce

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