

THE IMPORTANCE OF APPOINTING THE RIGHT ‘EXPERT’

In the world of materials failure analysis, plastics are one of the most common materials encountered as they are in universal use for packaging, electronic films, power cables, construction materials etc. What were once novel applications for plastics are now commonplace. When damage occurs, an expert will often be needed to establish the root cause of the claim.

Defining ‘expert’ is like defining time; people have a clear idea of the concept but agreeing a common definition is not easy. An academic qualification, industrial or commercial experience or post graduate research into a relevant discipline are probably important requirements. According to the Civil Procedures Rules (“CPR”) an expert is ‘a person who has been instructed to give or prepare expert evidence for the purpose of proceedings’. However remote Trial might seem at the time of an expert’s instruction, the emphasis is firmly on the prospect of litigation. The CPR also stipulate that ‘it is the duty of experts to help the Court on matters within their expertise’. This duty overrides any obligation to the person from whom experts have received instructions or by whom they are paid’. Barristers, not experts, are paid to advocate – a point sometimes forgotten even by experts.

Plastics are the product of carbon's unique facility to form linear or branched chains of almost any length and stable single or multiple rings. The way in which they are arranged and processed into the long-chain molecules (polymers) that comprise plastics, will significantly influence their performance and characteristics. Many plastics are then modified to improve, for example, resistance to ultra-violet light or flammability. Sometimes these additives can react with the parent plastic or with each other and cause premature failure of the material.

Dr. Edward Ingham, a polymer engineering expert with significant experience of plastic failure investigations, explains "due to the unique nature and microstructure of polymers, the processes by which they deform and by which cracking develops are dependent on other extrinsic factors such as time in service, applied stress (loading), temperature and the service environment (e.g. air, water or chemicals)."

A key process in polymer failure analysis is fractography – studying the fracture surfaces to determine the

relationship between the observed mechanisms of cracking and the microstructure. There are also a series of specific analytical techniques for polymers, which can be used to assist in failure analysis.

The photograph below shows a hot water pipe operating at a temperature of 70°C, which was made from a plastic (polypropylene) that failed in service.



Dr Ingham explains "From a detailed examination of the fracture surfaces using optical and scanning electron microscopy and consideration of the operating conditions, it was considered that the cracking may have been caused by oxidative degradation of the polypropylene by the type disinfectant used in the pipe system. This hypothesis was confirmed by conducting oxidation induction time

tests, which indicated significant depletion of antioxidant across the pipe wall and the identification of carbonyl species, using Fourier Transform Infra-Red Spectroscopy (FTIR), which are indicative of degradation."

When the manufacturer of the pipe was identified, it was found that their technical literature clearly stated this type of disinfectant should not be used, due to the potential for damage to pipe and fittings.

In such a case, a generic materials scientist might not have a sufficiently comprehensive understanding of fracture analysis or the ability to evaluate the contribution of polymer characteristics, service conditions and other factors, on the failure.

The Loss Adjuster plays a key role, working in collaboration with the Insured and expert, to develop a clear and robust understanding through expert advice of how failures arise. This leads to more effective management of Liability claims, averting those lacking merit and providing early warning of those that should be compromised before significant further costs are incurred.

Three key factors to consider when appointing an 'expert'

