INVESTIGATING FAILURES IN LIQUID APPLIED CAR PARK DECK WATERPROOFING

Marion Ingle  Senior Associate, Sandberg LLP

Liquid applied polymer based waterproofing surfaces are applied to car park decks to provide: waterproofing; structural protection; wear resistance; slip/skid resistance to pedestrians and traffic; and aesthetic demarcation. However premature failure, sometimes within a very short time, is costing the UK construction industry millions of pounds every year. The presentation considers: the general approach to a failure investigation; typical examples of failures and the application of investigative techniques.

ANALYSIS OF PLASTIC PIPE FAILURES AND TESTING TO ENSURE LONG TERM INTEGRITY

Edward Ingham  Director, Polymer Engineering Consulting

Plastic pipes are widely used by utilities and industry for the transmission of water, gas, sewerage and chemicals. This presentation examines examples of plastic pipe and joint failures which have occurred in service, as the result of factors such as the quality of the pipe material, issues caused during installation, or deterioration caused by the medium that the pipe was transmitting.

The analytical and physical testing techniques that are used to determine the causes of failure are discussed, as is the development of non destructive techniques (NDT) for ensuring the integrity of both new and existing plastic pipelines.
FAILURE INVESTIGATION OF POLYMER COMPOSITE COMPONENTS

Emile Greenhalgh  Professor of Composite Materials, Imperial College

Polymer composites are increasingly used in construction due to their superior durability and specific performance compared to those of conventional materials. Fractography of polymer composites is a growing discipline, in which the fracture surface morphologies of failed components are studied, and the source, sequence and modes of these failures are inferred. Fractographic analysis is a powerful research and investigative tool for solving engineering problems and can deliver significant cost savings for component development. Finally, it is an invaluable tool in support of in-service failure investigation of polymer composite components, although this discipline is relatively immature compared to that of conventional construction materials.

The presentation will provide the motivation for fractographic analysis of polymeric composites, and outline what fractography of polymer composites can provide the researcher and investigator, with examples given. Finally, the presentation will culminate with an insight into the areas in which further developments are required for fractography of polymer composites.

THE ROLE OF THE SCIENTIFIC METHOD IN DETERMINING THE ROOT CAUSE OF POLYMER FAILURE INVESTIGATION

Rob Bailey  Director, Winton Materials Science

Plastics failure analysis - together with fractography, can be used as part of a methodology for materials selection, product design and application optimisation in the laboratory. Once a product is deployed, these techniques can be used to consider the root cause in the case of a premature failure or for an end of life analysis. It can often be very challenging to give definitive failure analysis evidence for in-service failure. Increasingly fracture surfaces are used as central evidence to support other data and to help piece together a hypothesis for the root cause analysis of a product failure. Fracture surface interpretation is being used widely by polymer suppliers, plastics processors and product designers. More importantly, fracture surface interpretation is being used increasingly as key evidence in legal disputes involving product liability. With this in mind, the dependence upon the opinion of a failure investigator is more onerous.

The first challenge to failure investigators is to show that a given datum - a fracture surface, is properly interpreted. Sometimes, this is where a failure investigation stops and conclusions are made. However, it is as important as fractography to include the parallel steps of a failure investigation. Determining the context, the significance of a fracture surface and the weight such evidence adds to supporting a hypothesis can be vitally important. In this regard, the Scientific Method, as a process by which to consider each hypothesis, can be useful as a check for investigators to maintain objectivity.

In this presentation, examples are given and the development of candidate hypotheses is considered using the Scientific Method as a framework for undertaking complex plastic failure problems.

To register for this free event, please e-mail Keith Watkinson at: kmwatkinson@outlook.com