belgium

elconews e-zine

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Seasons Greetings to all of our readers

'Tis the season of exhibitions

Over the last couple of months, Elcometer has been busy exhibiting all over the world.

The 27th September 2005 saw the start of a frantic exhibition season for Elcometer, with each show dedicated to coatings and surface finish.

Eurocoat kicked off the flurry of activity in Lyon, France. This was followed by Eurofinish in Ghent, Belgium in October. November saw Surface World held in Birmingham, UK and Eurosurfas in Barcelona, Spain while the season ended with ChinaCoat held in Shanghai, China.

All shows reported great attendance with much interest in the range of products.

Alain Stévaert, Elcometer Belgium reported on the Eurofinish show:

"Eurofinish 2005 became one of the most successful shows we at Elcometer SPRL have ever participated in. The show, dedicated to surface treatment attracted more than 4500 visitors from Belgium, Netherlands, France, Germany, Italy, Switzerland and many more. Our stand attracted vast numbers of visitors showing great interest in our entire product range."

Colin Bennett, Elcometer UK's Sales Manager had this to say about Surface World 2005:

"Surface World is always a good show for us and this year has been no exception. We exhibited a wide range of products that were very well received and generated much interest."

The reason that these shows and the others attended were so successful is because all exhibited the entire range of products.

Products such as the Elcometer 456 Coating Thickness Gauges, Elcometer 1730 Car Wash Simulators, Elcometer Gloss Meters, Elcometer Hardness Testers, Elcometer 215 Oven Data Loggers and the Elcometer 550 Uncured Powder Thickness Gauges to name but a few were exhibited.

Colin Bennett summed up that showing the full range of products really works by adding:

"People were interested in the fact that they could purchase everything they need for their coatings processes from us. From testing coatings in the laboratory, on the production line, final testing and to testing in the field, customers could buy what they needed from one reputable and trusted supplier – Elcometer."

High flyers

Phil Booth – Elcometer UK, tells us why Avco 2000 chose Elcometer for their inspection needs.

Avco 2000, based at Manchester Airport UK, have been providing maintenance, repair and inspection services for major airlines for over 20 years. An established CAA (Civil Aviation Authority), FAA (Federal Aviation Administration) and EASA (European Aviation Safety Agency) approved maintenance facility, their work covers many areas of the aeroplanes, including the windows.

Perspex windows in aeroplanes develop micro cracks on the outside of cabin windows from pollution, dust, sand, de-icing etc. These cracks are normal and are regularly repaired before they cause a safety risk, or need complete, costly replacement. The window thickness needs to be closely monitored to ensure the thickness does not drop below specified safety levels.

Darren Sadler, Quality Manager for Avco, contacted Elcometer for a measuring solution. Having used Elcometer products before, Darren was keen to see what solution Elcometer could offer. Phil visited Darren with a selection of possible options, including the Elcometer 205 and 207 Ultrasonic Thickness gauges.

Needing to test the thickness from one side was essential. With some passenger planes having more than 200 windows, inspection is a lengthily process and any time that can be saved, must be saved. Also, as window maintenance is rated as the third highest maintenance cost in the aviation industry, an affordable, accurate and easy to use gauge is essential.

The Elcometer 205 Ultrasonic Thickness gauge provided the perfect, cost-effective solution. Able to measure a wide variety of materials including steel, epoxy, plastic and glass fibre, the Elcometer 205, in conjunction with the Elcometer 15627 transducer, was the ideal choice.

product of the month

The Elcometer P500 Valve Box Locator

The Elcometer P500 has been specifically designed to accurately locate iron valve boxes and manhole covers.

Detecting metal objects to a depth of 1m / 39", this rugged metal detector has the ability to ignore false readings such as drink cans, cigarette packets and other metallic waste material. The strong focused search field ensures accurate location of objects even close to metal fencing or vehicles.

If you would like further information on the Elcometer P500 Valve Box Locator, or any of our other products, please visit our website www.elcometer.com or contact your local Elcometer distributor.

coatings on site

Elcometer 2060 specification change

When the old Elcometer 2060 Groove Depth Checker was replaced by a new version recently, the connection to a computer changed too. This now requires one of two new cables be used

The new connector now being used in the unit (see picture, right) provides the option for USB or RS232 connection. Be careful to choose the right one.

A USB connection option can be ordered using part number KT002060P005. This kit consists of a connecting cable, a Digimatic interface (USB 264-014) and EDTS software.

The RS-232 connection option can be ordered using part number KT002060P006. This kit consists of a connecting cable, a Digimatic Interface (RS232 IBR-MDI) and EDTS software. Also available for RS232 is a PC Cable with Excel Software (KT002060P006).

If you have an older gauge with the original connector and would like a computer connection cable for it, these are still available as part number KT002060P004.

For further information on the Elcometer 2060, please visit our website **www.elcometer.com** or contact your local distributor.

Precision engineering

A manufacturer of electric motors and components for the automotive industry are constantly checking the quality of their products to ensure they meet specification and standards.

A specific example of this is that in their electric motors, there is a component that consists of 2 metal plates that are bonded together with adhesive.

Probe Placement Jig

As part of their quality check procedure, a sample of plates are removed from the motors and separated. Then, the thickness of the dry adhesive on the plates is measured.

This all sounds like a fairly straightforward process, until it is realised that these plates are only in the region of 10mm x 15mm / 0.39” x 0.6”. So, to achieve consistent and accurate test results on such a small surface, an Elcometer Probe Placement Jig is utilised to hold the plate and to measure in the precise and predetermined locations each and every time.

Elcometer 456 Coating Thickness Gauge

To take readings, the company use an Elcometer 456 Coating Thickness Gauge for use on ferrous substrates with a miniature ferrous probe.

They then systematically measure the thickness of the dry adhesive on each corner of the metal plate, to ensure the thickness meets their requirements and that any variation is within specified tolerances.

coatings in the lab

Gone with the wind

Wind farms are an increasingly popular energy source, with over 68,000 onshore operational wind turbines globally.

Before being commissioned, these apparently simple turbines have rigorous tests to pass to ensure they last their intended lifespan of 20 to 25 years.

The towers of the wind turbines are mostly made of steel, or in some cases concrete, while the blades are generally made of glass fibre reinforced polyester (GRP).

With towers up to 80m / 262 ft in height, and rotor diameters of up to 65m / 213 ft, the coatings must be able to withstand the harsh environment without constant maintenance. The following factors are taken into consideration and measured:

GLOSS

The wind turbines are painted a light grey colour because tests have proved this to be the most inconspicuous colour under most lighting conditions. Its gloss needs to be controlled to avoid sunlight being reflected, causing light pollution. The Elcometer 400 Novo-Curve is ideal for this purpose, measuring on the gently curved surfaces.

ADHESION

The adhesion of the coatings on the various parts must be strong enough to resist the variation in weather conditions found in these exposed locations and to protect the structure. For this, the Elcometer 106 Pull Off Adhesion tester or the Elcometer 107 Cross Hatch Cutter can be used on test panels included during the coating process.

ABRASION

Abrasion resistance of the coatings must be high to avoid erosion by wind-borne particles and rain. Samples can be evaluated using the Elcometer 1720 Abrasion, Scrubbing & Washability Tester, to ensure the chosen coating is able to endure the punishing conditions.

Elcometer website updates

The Elcometer website has some new useful additions, providing you with even more information, the first being that the site is now available in **Chinese**.

Back-issues of **elconews e-zine** are now available in the **Downloads** section of the website (left hand side menu, bottom). For the latest information though, you should still subscribe to the mailing list.

Also in Downloads, there is a section with **Instruction Manuals**. The drop down list provides access to those currently available, helping you to get the information you need when the paper version cannot be found.

Finally, some of our product images are now animated. They show the product in action and how it is operated. Have a look at the Elcometer 1730 Car Wash Simulator and Elcometer 1720 Abrasion, Scrubbing and Washability Tester for examples.

concrete inspection

Salty concrete

One of Elcometer's customers suspected that concrete made in a small island in the Mediterranean Sea might contain too much chloride. The effect of this would be the fast corrosion of reinforcement bars and therefore low seismic resistance of the structure.

The problem is due to having salt in the aggregate, which is then mixed with cement to make concrete. To remove it, the sand and rock must be washed but because the local water supply is also salty, it requires a large source of expensive de-ionised water. There seemed to be no sign of such a supply so he thought it was probably easier for the supplier to ignore the problem and hope nobody noticed. The customer asked about a test.

Steel reinforcement survives in concrete because of the chemistry. Calcium hydroxide in cement gives concrete a high alkalinity (12 – 13pH) and transforms the surface of steel to form a layer of ferric hydroxide. This passivates the steel, stopping corrosion. Chloride from salt reduces this alkalinity and so destroys the protection. Standard BS EN 206-1 (Concrete - performance, production, placing and compliance criteria) requires the amount of chloride in reinforced concrete to be less than 0.40% by mass of cement. In a typical concrete, there is 1 part of cement to 7 parts of aggregate (ballast) plus water so the chloride should not exceed 0.05% of the mass of concrete (500ppm).

If chloride is introduced with the aggregate and with the water during mixing, the protection of the steel may be reduced if not compromised. Therefore, it is important to test the materials to be sure the chloride content is low. By adding the contributions of chloride from the sand, stone and water, a total measure of salt can be obtained. Existing concrete can be tested too, to find how much chloride is already in there. Simple field tests, such as the Elcometer 134A and 134W can be useful for this.

The salt problem is not restricted to maritime locations; the same is likely in a dessert.

Water, water everywhere

A lining or coating within concrete water storage and supply tanks, prevents the contents of the tank from physically touching the structure. It is important that there are no holes, pinholes or even flaws in the lining surface, as water can seep through these causing premature damage and corrosion.

The Elcometer 236 High Voltage Holiday Detector makes detecting and locating these tiny pinholes simple. As the coating acts as an insulator, a hole or flaw in the concrete lining will allow a spark to form.

The return lead of the Elcometer 236 must be connected to the structure of the concrete tank, such as to a rebar or a nail. The moisture within the concrete provides sufficient conductivity for an accurate test, highlighting any flaws, so they can be repaired before causing any costly problems to the tanks.

standards news

SSPC Technology Guide 15 (June 2005)

Coatings applied to surfaces contaminated with salts often do not perform well. This Guide helps select a procedure for retrieving and analysing these salts.

The procedures are grouped in three classes. The resulting liquid is analysed for conductivity (total salts) or ferrous ion, chloride ion, sulphate ion or nitrate ion concentration.

Class A: A known volume of liquid is contained in a fixed area and turbulence helps dissolve the salts

Elcometer 138 Bresle Kit & Patches

Method A1: A hypodermic needle is used to fill a patch on the surface and the solution is tested for ions. This is the Elcometer 138 Bresle Kit.

Method A2: A latex sock holds a solution, which is tested for chloride or nitrate ions. This is the Elcometer 134S Salt Detection Kit.

Elcometer 134S Salt Detection Kit

Class B: A known volume of liquid is applied within a measured area. There may or may not be rubbing of the surface.

Method B1: The surface is washed with deionised water using cotton swabs. The liquid is tested for the concentration of ions. Elcometer has no equipment for this.

Method B2: Pre-wetted filter paper rests on the surface for a fixed time. Its conductivity is proportional to the quantity of salts collected. This is offered as the Elcometer 130 Salt Contamination Meter.

Elcometer 130 Salt Contamination Meter

Class C: The entire surface is placed in a known volume of boiling water.

Method C: Boil a sample coupon in deionised water and test the liquid in a laboratory. Elcometer has no equipment for this.

DISCUSSION

Guide 15 Appendix D states that no method is believed capable of retrieving all the salts from a surface. The proportion that is retrieved depends on the method used, the operator, the roughness and pitting of the surface, the size of the test area, the type and concentration of the salt and the time to extraction the salts. The efficiency of the various methods is as yet uncertain.

SSPC-Guide 15 replaces SSPC-TU4 and is available from the Steel Structures Painting Council at www.sspc.org.

contributions, comments or questions?
e-mail us: editor@elcometer.com

Measuring colours

In this 3-part series, we look at how colours are controlled in industry.

Most of us see things the same way but some of us do not. We may all agree grass is green but the sea could be described as blue, green, grey or a mixture of these – even in the same location.

Identifying or matching colours in manufacturing is often more important than what a photographer or an artist does. They can say 'that is how I saw it' and we can't argue. But an item assembled from, say, 3 parts, each with slightly different shades of the same colour, is open to criticism and likely to be judged to be of bad quality.

SOME CONTROL

To control colour we must first assign a number to it. The simplest form of this is to use a box of coloured cards (or a fan of them) and choose one. Once the target is agreed, the production is compared to it.

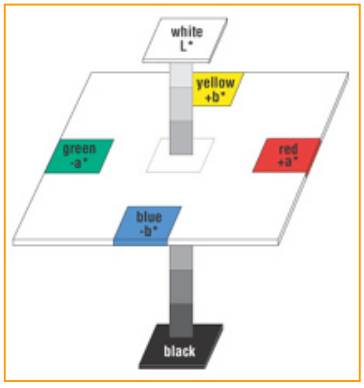
RAL colour charts

Unfortunately, the ambient light can play tricks on the eyes of the beholder, as can the eyes themselves. So a judgement may be criticised and re-work be discussed. Next day, the same may be acceptable. A controlled light source (luminaire) can fix one of the problems but we still have the difference in eyes to deal with.

BACK TO BASICS

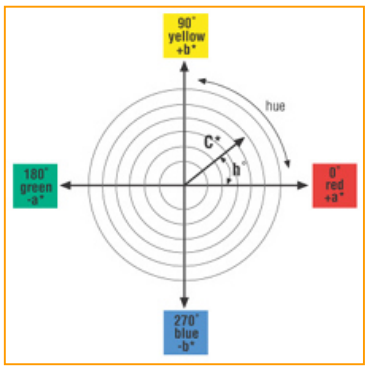
Way back, red, green and blue light reflected off a matt surface was used to determine the average response of human eyes. This was turned into a mathematical model called a chromaticity diagram, which represented colour in two dimensions and lightness (and darkness) in a third dimension. This non-linear map was remodelled into what is now called the 'CIE Lab' colour space.

In **CIE Lab** (see diagram right), one axis of the colour plane goes from red to green, the other from yellow to blue. This plane can be placed up or down on a gray scale, which goes from black to white. As the colours get closer to black or white, the range and variety decrease to almost nothing.



In a 3-dimensional model, it is easy to pick any point and calculate the distance to some other point. This is useful when determining the difference between two almost similar colours. Not only is the magnitude of the difference found, but the direction too. For example, the difference between two blues could be that the second colour is lighter and greener.

Another popular colour space model is **Lch** (see diagram below). This is a spherical model similar to the physical collection of coupons made by Munsell.



The axis of dark to light is depicted vertically. Radiating out from this is chroma or intensity of colour. Circulating around the lightness axis is the variety of colours called hue. Deviations can be described as, for example, darker, less chroma and more hue (darker, less intense and slightly different colour).

INSTRUMENTS

Tristimulus and spectrophotometer are the main types of colour meter. The first measures reflected light collected by 3 separate filters (red, green and blue). The signals from these are combined and the CIE Lab or Lch values are calculated. The geometry of the illumination is either 0/45 or 45/0 degrees.

The spectrophotometer collects the light in a sphere with a small hole (aperture). The light is analysed across the rainbow using a very narrow filter.

Elcometer Portable Spectrophotometer

From the resulting spectral response, the CIE Lab and Lch values are calculated. The illumination of the test area and collection of light are almost hemispherical.

After measuring two samples, the colour difference between them can be calculated.

Usually, an eye can observe a colour difference (ΔE) of about 1 unit. The instrument can 'see' 10 times better – one good reason to trust it's judgement more than a human!

In the next part of this series we will look at the equipment used to determine colour.

If you have any questions about colour, please contact us.

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