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World of concrete

Chris Beninati - Elcometer USA, reports on the success of their latest exhibition.

World of Concrete is the largest concrete construction exhibition and conference in the industry. Held at the Las Vegas Convention Centre, USA, between the 16 –20th January 2006, the show attracted 1800 exhibitors and welcomed over 80,000 visitors.

"We had many potential customers visit the Elcometer booth with the vivid orange banners that could be seen from afar." reports Chris, "Many showed much interest in the new Elcometer 331 Covermeters and our moisture products, especially the new Elcometer 7410, and were amazed by the ease of use, the accuracy and the options available to them.

Other large draws to the booth were adhesion of coatings on concrete and coating measurement. Our range of concrete products, providing the accuracy, functionality and reliability that you would expect from Elcometer, made the WOC show a success, bringing in hundreds of new leads from across the world."

Intergas III

Raafat Nakhla – Anglo Egyptian, Egypt, tells us why Intergas was such an important exhibition to attend.

Intergas III Exhibition and Conference was held between 18 – 20th December 2005 at the Cairo International Convention and Exhibition Centre, Egypt. It attracted 120 exhibitors and more than 9000 visitors.

Being Egypt's most important oil, gas and petrochemicals show, it was attended by Anglo Egyptian, the authorised Elcometer distributor in Egypt.

Raafat told us "Intergas was a great success for us. Visitors were especially pleased to find that as we had the full range of Elcometer coatings inspection equipment, they could fulfill their inspection instrument requirements from a single source.

He added "Intergas is organised under the High Patronage of H.E Sameh Fahmy, Minister of Petroleum and Mineral Resources. The show is very well regarded and has much sponsorship from organisations such as Shell, Society of Petroleum Engineers, EGAS and ECHEM.

The result is a very high quality exhibition with attendance from the most important and influential figures in the petrochemical and mineral resources field. They were looking for new products that will make their work easier and faster while at the same time being more accurate than ever. This is where Elcometer products fit the bill perfectly."

Accuracy for car dealer assessments

John Adshead, Elcometer UK tells us about the increased interest in the Elcometer 311 Refinishing Gauge.

Designed specifically to meet the requirements for the automotive market, the Elcometer 311 Refinishing Gauge is once again growing in popularity among the automotive sector.

John tells us "Working with the automotive industry everyday, it's interesting to see the renewed interest in the Elcometer 311 gauge over the last 12 months, where sales in the UK have tripled.

The Elcometer 311 has always been a popular gauge because of it's ease of use and accuracy. Once again, more and more automotive manufacturers and retailers are recognising that this tailor-made, very simple to use gauge, that comes pre-calibrated on automotive steel and aluminium is ready to go, straight from the box. Because it can measure coating thickness on both ferrous and non-ferrous substrates, it enables the user to check coating thickness all over the car with a single gauge."

Concrete manufacturer chooses Elcometer

BAMR (Pty) Ltd, the South African distributor for Elcometer, supply products to Rocla, one of the largest concrete manufacturers in South Africa.

Rocla wanted more from their covermeters. They needed enhanced performance, accuracy, ease of use and durability. BAMR (Pty) Ltd, showed them the new Elcometer 331 Covermeter range which fulfilled all of their requirements and more. As a result of the demonstration, Rocla have purchased several units and are very happy with the enhanced functionality.

product of the month

Elcometer Protective Coatings Inspection Manual

The Elcometer Protective Coatings Inspection Manual is your essential guide to the complex world of protective coatings inspection, application, materials, defects, corrosion theory and much, much more.

Easy to read, comprehensive, fully illustrated and clear to follow, it is ideal for paint contractors, manufacturers, engineers, consultants, inspectors and professional training schools.

For further information on the Elcometer Protective Coatings Inspection Manual, or any of our other products or publications, please visit our website www.elcometer.com or contact your local Elcometer distributor.

coatings on site

Prevention is better than cure

The overall cost of corrosion in the US is estimated to be approximately $276 billion, which does not include any associated costs to businesses, for example when a bridge closes. The annual cost of protective coatings to keep America's metal from rusting is estimated at $108.6 billion. Carbon-steel is still the material of choice in many building projects, so as the volume of metal continues to rise, so do the costs associated with corrosion.

A recent study found that the cost of treating or preventing corrosion on a road bridge is 10 times less than having to close it. If the coating system used is inadequate or applied incorrectly and fails, the bridge will still rust.

The effect of this failure impacts a wide range of people and businesses. The cost of preventative coating systems vary from 4% to 20% of the cost of it's application. The importance of using measuring and inspection equipment such as the Elcometer range of coating inspection equipment including the Elcometer 456 Coating Thickness Gauge is clear – checking each stage of the coating process ensures the job is correct first time. Investment in these accurate, high quality gauges is a small price to pay when controlling such expensive and important projects. As always, prevention is better, and far more cost- effective, than the cure.

Blasted surface coatings

Measuring a coating on grit blasted or shot blasted surfaces requires specific measurement techniques in order to obtain a true reading of the coating thickness.

Grit blasting produces a surface profile with angular valleys and peaks. A coating thickness gauge will only measure from the top of the peaks, creating an anomaly between the true coating thickness and the readings displayed on the gauge. To combat this problem, ISO 19840 have produced a standard in order to calibrate your gauge. By firstly measuring the surface profile, with an instrument such as the Elcometer 223 Surface Profile Gauge, the value of the peak to valley height is cross-referenced to a table of values. The table will tell you the alteration in microns (the offset) you need to make to your gauge readings in order to obtain a true dry film thickness measurement. The Elcometer 456 Coating Thickness Gauge has the benefit of an offset feature. This allows you to input the micron value as specified in ISO19840 and the gauge will then automatically calculate the true coating thickness measurement of each reading taken.

Shot blasted surfaces are much smoother and therefore the system of measurement for grit blasted surfaces is unnecessary. Although measurements of the coating thickness gauge will be different in each place the probe is placed, this natural variation can be evened out by averaging. By taking 10 readings in a defined area and averaging the results, an accurate reading can be obtained. Again, the Elcometer 456 can automatically average results for quick and easy coating measurement.

coatings in the lab

Getting the most from your Elcometer 456

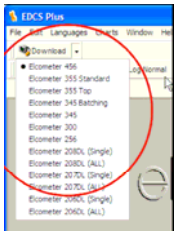
Whether working in a coating testing laboratory, quality control environment or anywhere that involves measuring coating thickness, there will be a requirement to make a record of your readings. Readings can then be accessed for future reference, for reporting and comparison purposes and for ISO record keeping.

When using instruments, such as the Elcometer 456 coating thickness gauge, there are three ways readings can be recorded: writing down in a log, manually entering onto a PC or uploading directly from a gauge onto a PC.

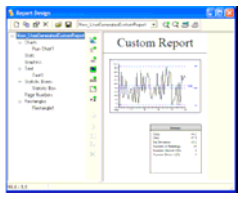
Writing down results creates a margin of error by misinterpretation of handwriting because handwriting styles vary from person to person and also from country to country. Manually entering measurements into a PC is also open to error. When inputting numbers, it is easy to catch the wrong number, so if the value on the gauge is 80µm, it is very possible to catch 5, 7 or 9 which will compromise the results by almost 50% if 50µm is entered and not 80µm. The final and by far the best way, is to upload results directly from the gauge, leaving no room for error of mistyped or misinterpreted results.

This is where Elcometer take coating data management to a new level with the EDCS+ software. The versatility of EDCS+ enables you to manage your data the way you want to, allowing you to access, analyse and present your data quickly and easily.

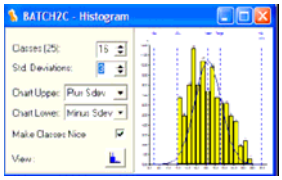
Here are just a few examples of what you can do:



- A vast range of Elcometer gauges can be used with EDCS+ software – simply choose your gauge from the list.
- Setup your preferences to customise your working environment including units of measurement, language, default gauge, chart configuration, export settings, user authentication and toolbar setup.
- Archive and organise your data as you need to see it, rename batches, setup folders etc.
- Compare data between different batches.



- Design your own reports to meet your corporate identity – add your company logo, photographs of the product under inspection, include notes & e-mail as a PDF file.
- Edit your data as required, copy to clipboard and paste it into your own document. Data can then be exported as a file to include in spreadsheet reports.
- Create, delete and rename databases.
- Open, create, edit and delete individual batches.
- See how spread out your data is from your target thickness with charts and histograms.



concrete inspection

Blush & bloom

People choose epoxy coating for concrete floors because of their reputation for durability and toughness, but if the coating is not applied under proper conditions, the result is coating failure due to amine blush or bloom.

Amine blush and amine bloom occur when certain epoxy resin coatings are applied under low-temperature and / or high humidity conditions.

WHAT IS AMINE BLUSH & AMINE BLOOM?

Blushing occurs when moisture condenses on a coating surface, or is drawn out from within the concrete, during the curing process. The blush appears as white patches or a hazy appearance in the coatings.

Blooming occurs when the amount of condensation causes water-soluble compounds to migrate from the body of the coating to the coating surface. When the moisture evaporates, the surface will appear to have sticky deposits.

THE EFFECTS ON THE COATING

Amine blush and bloom affect the coating performance because they result in poor gloss, discolouration and poor adhesion of any subsequent coatings. The poor adhesion leads to coatings delaminating, blistering, powdering and cracking.

Delamination of coating on concrete floor

HOW TO PREVENT BLUSH & BLOOM

Blush and bloom can be prevented or minimised by ensuring climatic conditions are correct. Using the Elcometer 319 Dewpoint Meter confirms if conditions are suitable for epoxy application and curing.

Depending on when and where the coating is being applied, waiting for optimum conditions is not always feasible.

When the first layer has cured, you can visually check for blush and bloom looking for a milky appearance, a waxy surface etc. In this case, the surface needs to be thoroughly washed and dried to ensure all traces have been removed before the next layer is applied. This must be repeated for every layer and is an expensive process.

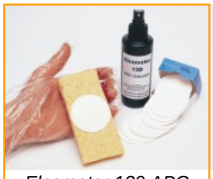
Blush and bloom are not always visible even though they are present. In this case, you have 3 options:

1. Apply the next layer and hope the coating doesn't fail.

2. Wash the surface thoroughly, which is expensive if there is no amine present.

3. Check the surface with an amine blush kit.

The Elcometer 139 ABC (Amine Blush Check) is a quick, simple and immediate test to confirm if amine blush or bloom is present. Elcometer 139 ABC kits cost a fraction of the cost of a coating failure or washing the surface between layers when not necessary, making this the essential test kit for anyone using epoxy products.



Elcometer 139 ABC Amine Blush Check

standards news

New standard for vitreous and porcelain enamels

'BS EN 14866:2005 Vitreous and porcelain enamels – Regenerative enamelled and packed panels for air-gas and gas-gas heat exchangers' specifies the minimum requirements and the functional characteristics of the enamel coatings applied to heat exchangers.

According to the new standard, the enamel coating thickness should be determined in accordance with EN ISO 2178. Across two test panels, there should be 54 measurements with a mean average of 150µm ± 30µm.

The Elcometer 456 and Elcometer 355 Coating Thickness Gauges can both be used in accordance with this. The advanced data logging and statistics of the gauges, enables quality reports to be stored and printed.

Coated thickness standards

Formal quality systems such as those described in ISO 9000 and Guide 25 require that gauges be properly controlled, logged and in calibration. Increasingly, users are specifying that the readings taken by the gauges are traceable to National Standards. Elcometer provide three types of coating thickness standard: coated standards, foils and zero test plates.

The Elcometer 995 Coated Thickness Standards are hard wearing and durable and will last for a very long time. Mounted in a protective folder, they provide the user with an ideal method to accurately measure the performance of coating thickness gauges consistently.

Elcometer 995 Coated Thickness Standards

The standards are available in Ferrous (F) and Non Ferrous (NF) substrates and depending on your requirements come as two piece, three piece and four piece versions. Each Elcometer 995 is supplied with a calibration certificate as standard and has ±2% accuracy. Re-certification by Elcometer to meet your requirements is also available.

Elcometer 990 Calibration Foils

The Elcometer 990 Calibration Foils and Zero Test Plates are ideal for use in the laboratory, on the production line or the construction site. The calibration foils are especially useful for calibration on curved surfaces.

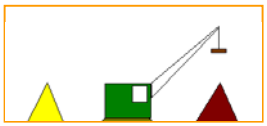
Each foil is uniquely serial numbered and can be certified traceable to National Standards. Foils are available in thicknesses from 12.5 to 20mm (0.5 to 790 mils) with precision foil accuracy of ±1%.

Elcometer provide a range of low-carbon and aluminium Zero Test Plates. These test plates, when used in conjunction with a set of foils, are ideal to test a coating thickness gauge's functionality and calibration. They are also useful when it is difficult or impractical to obtain an uncoated substrate.

Coatings on metal - part 1

The thickness of a coating on metal directly affects the protection of the item when it is subjected to wear or attack by corrosion. Generally, the more coating there is on it, the longer it lasts. But, if this layer is too thick, parts may not fit together or the coating may break up, so the thickness of the coating must be measured.

METAL SUBSTRATES



Metals are put in two basic groups, based on how the recycling business sorts scrap metal. The magnetic metal pieces are attracted to a big magnet on a crane.

Magnetic metals and alloys include iron, steel, ferritic and duplex stainless, and nickel and cobalt alloys. These are called "ferrous metals".

The remainder of the pile will be non-magnetic metals and non-metal pieces. Separating these is easy because all metals have a certain look, which is different to plastic and wood. These metals have various colours from light grey, to yellow, to brown, to dark grey.

Non-magnetic metals and alloys include aluminium, brass, copper, lead, titanium as well as austenitic stainless steel, monel and inconel. These are called "non-ferrous metals".

Be careful using the term "non ferrous" because there are many alloys that contain iron, nickel and cobalt that do not attract a magnet. Strangely, some modern alloys that look metallic are neither magnetic nor conductive.

Dry film thickness gauges that use a magnet, the Elcometer 101, 211 for example, can measure on ferrous metals but not other metals. Electronic gauges, such as the Elcometer 456F, use an F-type probe specifically for these metals. The Elcometer 456N can also measure on the non-magnetic metals, by using an N-type probe. If you need to measure both ferrous (F) and non-ferrous (NF) metals an Elcometer 456 FNF gauge automatically switches between the two modes.

It is worth mentioning conductivity. All metals conduct electricity though some not so well, such as lead. Only one non-metal conducts (just about): carbon.

WHICH PROBE?

Before choosing which probe to use, it is necessary to consider both the substrate and the coating.

Magnetic metal substrates require the F-type probe, which uses the electromagnetic induction technique. Their coatings cannot be magnetic, but that leaves many different materials, such as paint and zinc that can be measured. The thickness limit of metal coatings is those thicker than about 1mm (40 thou or mils). Above this point, the signal from the probe becomes absorbed in the coating and is no longer influenced by the substrate.

Non-magnetic metal substrates require the N-type probe, which uses the eddy-current technique. Their coatings cannot be other metals but carbon is allowed. There is no problem measuring lacquer or plastic coatings on non-magnetic metals.

WHAT INFLUENCES THE READING?

Obviously, the thickness of the coating changes the gauge's reading.

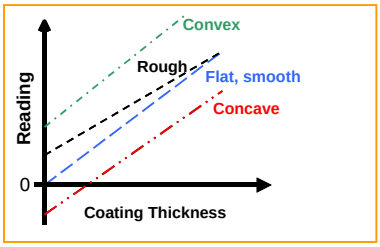
There are other variables too and they must be controlled through calibration.

Substrate, Shape and Surface.

Metals have conductivity and magnetic permeability, some more than others. Sometimes these change if the metal is heated and cooled. It is always necessary to calibrate to a similar piece of metal as the substrate of the sample.

The curvature of the sample influences the reading. A convex surface effectively bends away from the centre of the probe. This makes the reading higher than that on a similar flat surface. In a concave, the side of the probe is closer to the surface and the reading is reduced. That is why it is necessary to calibrate to a similar shape as the sample. N-type probes are affected more than F-type.

Rough metal substrates increase the reading of a probe, particularly for non-magnetic metals. The eddy-current circulates below the valleys so the peaks of the roughness act as an extra coating. Calibrating to a similar surface roughness can correct for this, though other techniques can be used too.



The graph (*right*) demonstrates how the coating thickness reading can change if the dry film thickness instruments are calibrated on smooth, flat surfaces .

SETTING THE GAUGE

The process of calibration adjusts the readings of the gauge so actual thickness values are displayed. This process will be repeated each time a different sample is to be measured.

There are two setting points, one on a standard thickness of plastic and one on the bare metal. The same can be done at two different thicknesses to improve readings over a smaller range. Intermediate thickness standards will confirm that readings over that part of the scale.

SCATTER

Rough surfaces are generally uniform, but mechanical damage is random. If there were only one reading on a sample, a dint in the substrate could distort it and the reading would not be representative. It is always better to take 10 readings over an area and to calculate the average value because this result is more repeatable than a single reading. The Elcometer 456 gauges can automatically average results making this a simple procedure.

REPEATABILITY

Accuracy is often less important than consistency. As an example, consider a table. If all the legs were 2mm short, the table would function perfectly. But if one was wrong by 1mm and three were right, the accuracy would be better but the table would not be stable. Consistency is necessary especially if more than one gauge is used. Similar calibration to the same standard and readings taken in the same way will ensure this.

In the next issue of* elconews e-zine *we will look at the gauges used for measuring.

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