The Penetrant Professor from Met-L-Chek®

ASNT Conference News

Well, the Fall ASNT meeting in Las Vegas was held and is now over. The venue of the Rio Hotel was pretty good, with nice rooms and good meeting accommodations. One need not ask, but there was a slot machine or other device at every location so that those inclined to test their luck had plenty of opportunities to do so.

For us, who have the interests of penetrant users at heart, the Tuesday afternoon session of talks was the highlight. There were three of these, and we will present some of the highlights of each.

The first talk was by **George Hopman,** and it discussed some of the popular (but ***incorrect***) old wives tales concerning penetrant inspection. We think that George is a very good person to discuss these, since he has years of "hands on" experience in the field, and his supplemented insights gained that way with simple experiments to illustrates his points. A list of the misconceptions discussed by George is as follows:

Older materials are not good!

Penetrants will dry on the parts!

TAM panels can show system performance degradation!

Post emulsifiable penetrants can separate!

One can measure the white light intensity emanating from a black light!

Penetrant can be over-removed from parts by water splashing from an adjacent tank!

Penetrant inspection will find all defects!

We expect that this talk will be published in Materials Evaluation, but in the meantime, if you want details about any of these misconceptions, George may be contacted at **george@ndesolutions.net**.

The second talk was by **Dave Geis,** of Magnaflux. Dave has been working with the task group that is defining the relevant characteristics of UV-A lamps for penetrant and magnetic inspection. This task group was convened by **John Brausch,** of the Air Force Materials Laboratory, and the goal is to develop a specification that governs the type of black light and its use so that optimum inspections can be performed. A driving force for this work is that the traditional mercury vapor UV-A sources are being phased out as alternate sources possess more desirable characteristics. Dave gave an

update and summary of the characteristics being investigated and considered. These include:

Limitations on the maximum irradiance

A specified beam profile of minimum irradiance

Specified minimum working distance

Detailed requirements for the emission spectrum

Required temperature stability

Specified battery discharge time

Limited visible light emission from the UV-A source

Again, there are details in this discussion that have been addressed in two published **Materials Evaluation** papers. These can be found in the **June 2013** issue, and are authored by **John Brausch** and by **Rick Lopez**.

The third talk was by **Michelle Ceveninni**, of NDT Italiana, and discussed the use of fluorescent magnetic particle inspection in undarkened areas.

There are proven advantages to this, since the contrast between the fluorescing particle indications and the background exceeds the contrast when using visible particles alone,

even when the visible light intensity is as high as 100 foot candles. This allows the inspection to be made quicker and more accurately. To facilitate making the inspection in this way, magnetic powders that are both visible and fluorescent are available, giving inspectors the flexibility to make the inspection either in a darkened inspection booth or under visible light, using both the visible and fluorescent response of the powder. This paper will also appear in a future issue of **Materials Evaluation**, together with illustrations and details concerning sensitivity.

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White Light Inspection

We recently had a question concerning visible penetrant inspection. The inspector wished to have information about the wave length of our visible penetrant so that he (or she) could choose an illumination source that had a wave length that would enhance the visibility of the indications.

There are several ways to answer this question. The most obvious one is that if one is attempting to maximize the sensitivity of the inspection process, it is far better to switch to fluorescent penetrant systems. Visible penetrants are not rated for sensitivity and are only assumed in general to be relatively equal to fluorescent sensitivity one. In any event, the qualification process that leads to inclusion on **QPL AMS 2644** uses tests that are conducted under daylight illumination with no wavelength specified. Consequently the performance of visible penetrants has been confirmed by the qualification process under ordinary visible light, and tweaking the frequency of the illumination is unlikely to result in gains that would in any way compare to those more easily obtained by using fluorescent penetrants.

On the other hand, it is approximately correct that the wave length of **VP-30** is in the range of 600 to 650 nm, and one could seek illumination sources that might increase the seeability of the indications. If one is using **ASTM E-1417** as a specification, one must be sure to follow the intensity requirements, so that the inspection is in conformance with the specification. These are as follows:

7.8.4.3 Visible Lights—For Type 2 visible dye examinations,the lighting systems shall be checked at intervals specified in Table 1 to ensure a minimum of **100 fc (1076 lx)** when measured at the examination surface.

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