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## CHTA Secretariat

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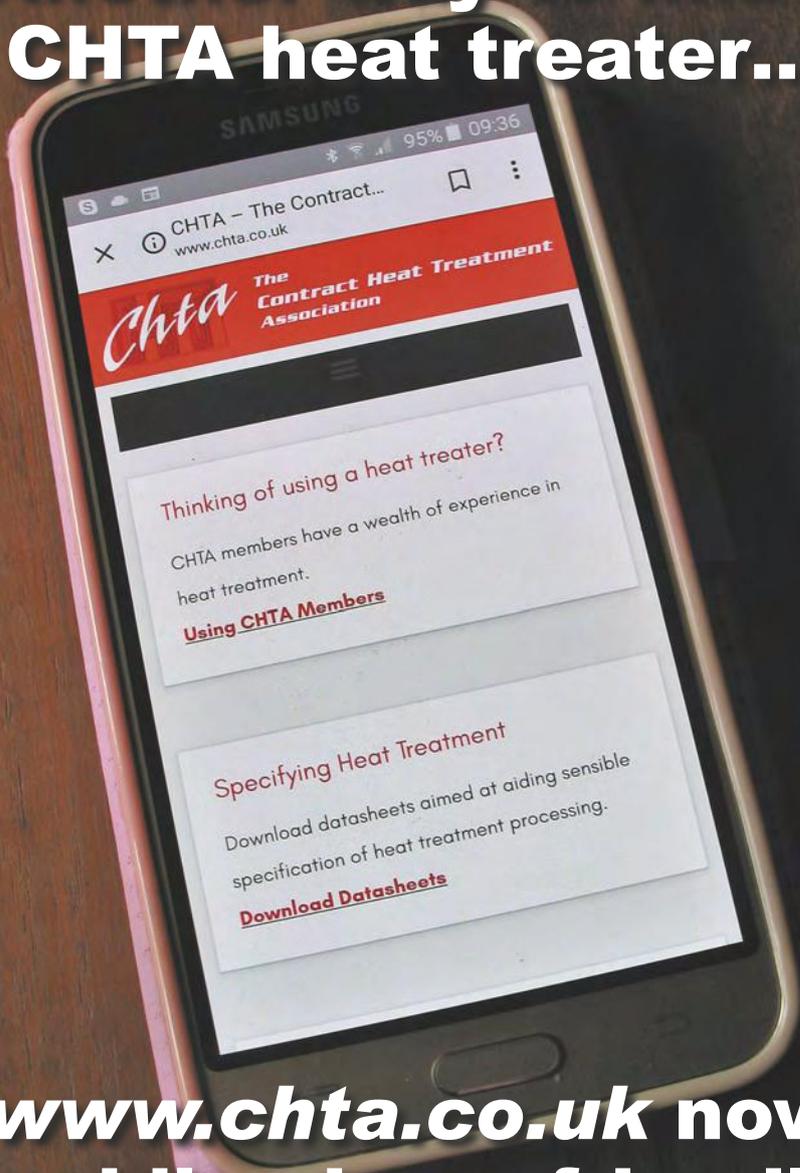
CHTA Secretary and *Hotline* Editor:  
Alan J. Hick B.Sc., C. Eng., FIMMM

The Contract Heat Treatment Association is not responsible for the statements made or opinions expressed by contributors to *Hotline*.



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# Another way to find a CHTA heat treater...



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**Guido Plicht**  
Metals Processing & EPAT  
Industry Manager E&A

(42258)

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# New CHTA website launched

**April 15th saw the upgraded CHTA website go live.**

Retaining the well-proven features of its ageing forerunner, the new [www.chta.co.uk](http://www.chta.co.uk)

has been transitioned onto a modern phone-friendly platform in order to take advantage of the many advances since the site was last updated in 2010.

CHTA members are encouraged to check their entries, under "A-Z of members" and "Approvals", and contact [mail@chta.co.uk](mailto:mail@chta.co.uk) if any amendments are required.

The screenshot shows the CHTA website homepage with a red header. The logo 'The Contract Heat Treatment Association' is on the left, and 'Members Area' is on the right. A search bar contains the text 'FIND A HEAT TREATER'. Below the header is a dark navigation bar with links: Home, Membership, A-Z of Members, Find a Heat Treater, Approvals, Datasheets, Newsletter, Conference, Links, Suppliers, Members Area, and Contact. The main content area features several white boxes with red text: 'Thinking of using a heat treater?', 'Specifying Heat Treatment', 'Find a Heat Treater', and 'Ask the Members'. There are also promotional banners for a 'HOTLINE' newsletter, 'Contract Heat Treatment - the preferred option', and 'Nationwide Heat Treatment Capacity'. A sidebar on the right promotes a 'regular copy of our printed newsletter...'. At the bottom, there are three green boxes: 'Hotline Newsletter', 'CHTA Heat Treatment Certificates', and 'Hotline'. A footer banner for 'AIR PRODUCTS' is also visible.

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July 30, 2018

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Continued...

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- tap into a wealth of metallurgical expertise, otherwise a diminishing resource within engineering industry as a whole;
- achieve greater flexibility in benefiting from the best treatments;
- access new processes and procedures immediately they are available, without capital cost;
- eliminate the expense and time consumed in meeting today's stringent quality-assurance and environmental demands in-house.

Representing the majority of UK subcontractors, the Contract Heat Treatment Association (CHTA) has designed this website to assist you in making the most of these benefits.

Established in 1973, the Contract Heat Treatment Association is affiliated to the Surface Engineering Association (SEA).



## Nationwide Heat Treatment Capacity



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### Hotline Newsletter

CHTA's quarterly *Hotline* newsletter is the only regular UK publication devoted to heat treating.

### CHTA Heat Treatment Certificates

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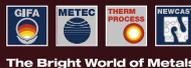
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The holy grail for many heat treaters is an accurate, reliable and easy-to-use method for measuring case depth non-destructively. How far away are we? This article, reproduced here with kind permission, reviews the current status.

The article appeared originally in the September/October 2018 edition of the USA's now-monthly highly-informative publication *Thermal Processing* and can be downloaded from: <http://thermalprocessing.com/hardening-depth-measurement/>



For a free subscription to *Thermal Processing*, go to: <http://thermalprocessing.com/subscribe/>

# Nondestructive methods to determine hardening depth can be cost-efficient, but also challenging

By Robert M. Wolfe and Guang Yang, The Timken Company, USA

Surface hardening heat treatments are popular in the manufacture of steel products as a means of significantly improving strength and fatigue resistance and mitigating wear [1]. In the production of bearing components, manufacturers know it is important to control the case depth of the hardened surface layer to ensure safety and reliability.

Most current state-of-the-art solutions for hardening depth measurement are based on a statistical sampling approach using the inspection of certain selected characteristics, followed by various destructive testing methods. However, some well-known nondestructive methods - such as eddy current, ultrasonic inspection and, more recently, Barkhausen noise techniques - have also been explored to determine hardening depth [2-3].

Nondestructive methods reveal hardened depth based on the material property differences, such as hardness and residual stresses, between the surface hardened layer and the core. Nondestructive solutions can be cost-efficient and can be applied to the entire production process without destroying valuable components. Each nondestructive method has demonstrated success in some specific applications. But nondestructive measurement of case depth is also a challenging task that can be significantly affected by surface condition, microstructure, grain size, and geometry variation. Each of these methods has advantages and disadvantages [2-4].

Some of the recent developments in nondestructive case depth measurement are presented below:

## ELECTROMAGNETIC CASE-DEPTH MEASUREMENT

The conductivity and permeability of bearing products change along with heat treatment and the hardening process. Therefore, case depth can be evaluated nondestructively by measuring characteristic differences in the bearings' electric and/or magnetic properties using electro-

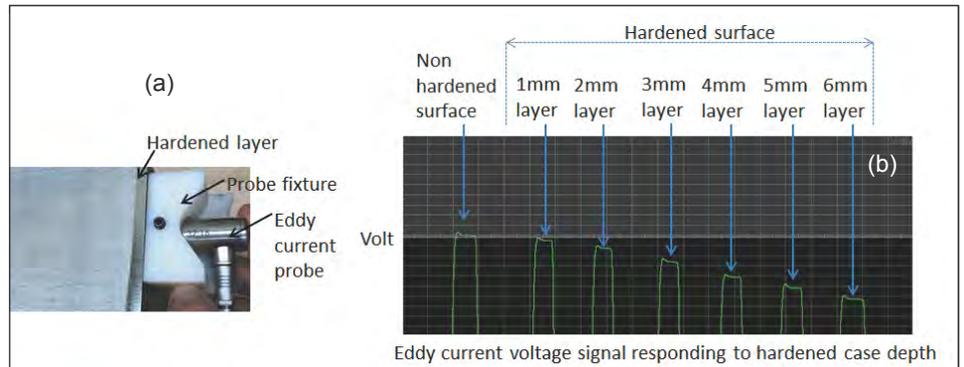


Fig. 1: Eddy-current method for case-depth measurement: (a) Single-frequency eddy-current test set-up; (b) Eddy-current voltage signals responding to hardened case depths

magnetic methods [3]. The eddy-current method is the most highly developed electromagnetic nondestructive technique applied to case-depth measurement thus far. Traditional single frequency, multi-frequency, and pulsed eddy-current methods have all been studied and reported for hardening-depth measurement [5-7].

Another electromagnetic technique, the Barkhausen noise method (also referred to as the micromagnetic method), has been investigated to determine hardening depth as well [3]. Barkhausen noise measurement is sensitive to stress and microstructural changes and is based on the principle of inductive measurement of a noise-like signal generated when a magnetic field is applied to a ferromagnetic material. Barkhausen noise measurement has been studied and successfully correlated with hardness and case depth [3]. Other related approaches, including alternating and direct current potential-drop methods, have also been explored in hardening depth measurement [4].

### Eddy-current method

When surface hardness is low, the steel microstructure exhibits high permeability with high eddy-current density; as a result, substantial magnetic flux is induced. Conversely, when surface hardness is high, the permeability drops and the eddy-

current density decreases accordingly. The induced magnetic flux that accompanies high surface hardness is less than that induced at low surface hardness. As a result, the voltage signal seen in Equation 1, which is determined by the magnetic flux, becomes lower in accordance with the hardened layer depth [7].

$$V = -N \frac{d\phi}{dt} \quad \text{Equation 1}$$

where V = voltage signal of eddy-current method; N = number turns of eddy-current coil;  $\Phi$  = induced magnetic flux.

The single-frequency eddy-current set-up for hardened-layer measurement and some corresponding signals are shown in Fig. 1.

The critical parameter of the eddy-current method is the eddy-current penetration depth (also called skin depth), which is determined by frequency and material properties, as shown in Equation 2.

$$\delta \text{ (penetration depth)} = \frac{1}{\sqrt{\pi \cdot f \cdot \mu \cdot \sigma}} \quad \text{Equation 2}$$

where f = frequency;  $\mu$  = permeability;  $\sigma$  = conductivity.

As the frequency increases, the induced eddy current is more concentrated near the surface. This principle is demonstrated

in Fig.2, where an eddy-current probe has been placed above a steel surface with a hardened layer. The lower frequency generates deeper penetration; thus, a lower frequency is preferred in order to perform deeper case measurement with superior sensitivity. On the other hand, higher frequencies produce strong sensitivity when the hardened layer is thin. As a result, multi-frequency eddy-current methods have been explored to accommodate these observations [6-7].

**ULTRASONIC CASE-DEPTH MEASUREMENT**

The metallurgical properties of surface induction-hardened medium- and high-carbon steel components can make them amenable to nondestructive case-depth measurement using ultrasonic techniques. Development of this test method was explored by Good [8] in the early 1980s. Further refinement of the technique occurred in the early 1990s at the Fraunhofer Institute (IZFP) and Pacific Northwest National Labs, which led to respective patents [9-10]. Developments critical to industrial use included appropriate test frequencies, signal averaging and filtering methods to allow consistent waveforms to be obtained from the ultrasonic signal.

The measurement principle is based on the propagation of ultrasonic shear waves applied at an angle to the test surface. The shear waves produce a backscattering effect as they reach the case/core transition because of the differences in the microstructure's acoustic impedance properties in this zone.

In order to obtain a reliable signal from which a measurement can be made, a few conditions must be satisfied. First, the hardening must be deep enough so that the front surface and backscattered peaks are sufficiently separated in time. This assures distinct peaks from which time-of-flight can be calculated. Second, the transition zone between the case and core must be sufficiently discrete such that the backscattered peak is above noise levels (Fig.3) [11]. A good response is achieved by induction surface-hardening a component with an unhardened core, where the minimum depth of hardening is between 1.5 and 2mm. In this instance, the fine-grained martensitic case zone is in sharp contrast to the coarse-grained ferrite/pearlite microstructure of the core. This condition results in a distinct backscattered signal peak (from surface hardening, Fig.4).

Surface treating processes that are not suitable candidates for ultrasonic measurement methods include shallow-hardening processes such as nitriding,

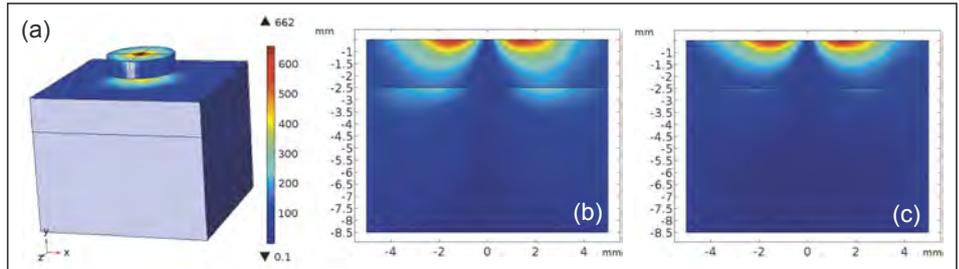


Fig.2: Numerical simulation of an ET probe over a steel specimen (hardened top layer): (a) Magnetic flux density distribution (Gauss); (b) Induced current density distribution along specimen depth at frequency = 100Hz; (c) Induced current density distribution along specimen depth at frequency = 1kHz.

diffusion-hardening processes such as carburising, and relatively slow conductive surface heating processes that produce a wide transition zone.

The depth of hardening is determined by the relationship:

$$d = \frac{\tau \times v_s \times \cos \alpha}{2} \quad \text{Equation 3}$$

where  $\tau$  = transit time from the front surface to the beginning of the back-scattered peak;  $v_s$  = velocity of sound in steel;  $\alpha$  = angle of sound incidence through the hardened zone.

Variations and errors in measurements may also be introduced by metallurgical conditions such as large amounts of secondary phases (e.g., retained austenite), segregation, and large or varying grain size in the hardened zone. The influence of these conditions on the ultrasonic signal is a function of the test frequency. Maximum attenuation and undesirable scattering occur when the feature dimensions approach the wavelength of the ultrasound.

In any discussion on case-depth measurement, it is necessary to define the reference method. This can vary depending on applicable standards, products or

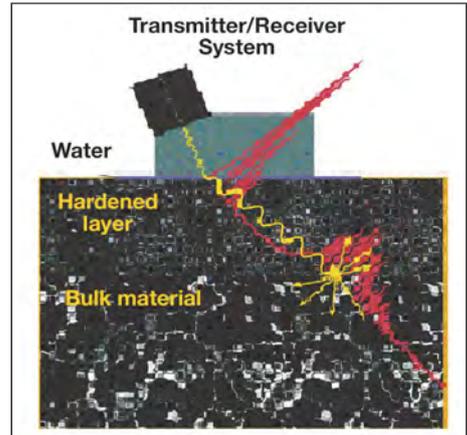


Fig.3: Illustration of ultrasonic backscattering from surface hardening.

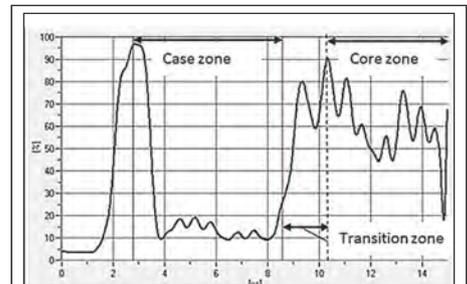


Fig.4: Typical ultrasonic A-scan showing backscattered signal from surface hardening.

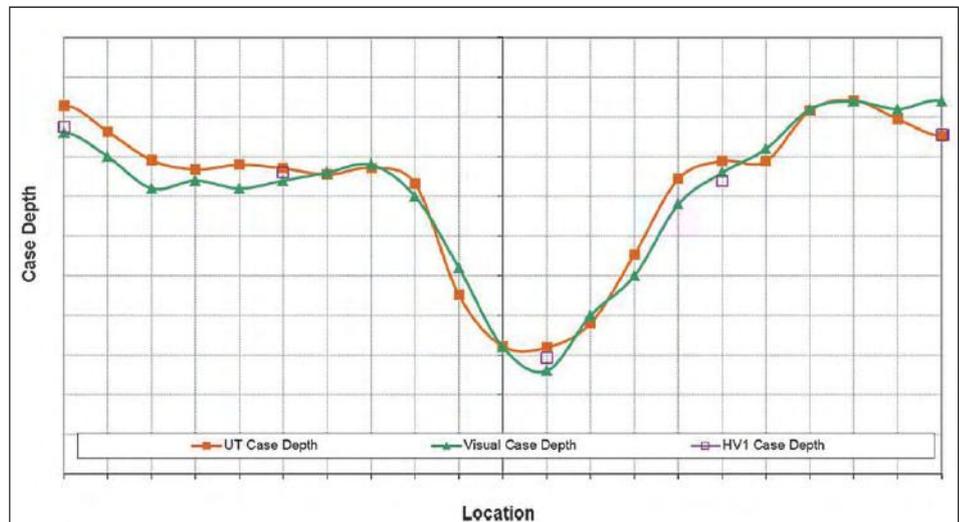


Fig.5: Comparison of UT backscatter, visual and hardened case depth.

customer requirements [1]. One of the more common approaches is a specified hardness value to a measured depth. Since ultrasonic backscattering is typically dominated by microstructure effects rather than hardness itself, it is reasonable to assume that a measurement correction might be necessary to correlate these methods. After correction, good correlation between backscattered, visual, and hardness measurement methods is demonstrated, as shown in Fig.5 [12].

Nondestructive case-depth measurement has enabled significant cost reductions by reducing or eliminating destructive analysis. This is especially true for large and complex parts where destructive sampling is prohibitive. Successful nondestructive inspection applications are contingent on understanding the details of the material's condition as well as the limitations of the test method.

**REFERENCES**

1. Rothleutner, "Metal Urgency: Case Depth Determination", *Thermal Processing*, March-April 2018.
2. Y. Salchak, et al., "Method of case hardening

- depth testing by using multifunctional ultrasonic testing instrument", *Materials Science and Engineering*, Vol. 81, 2015.
3. M. Deveci, "Nondestructive determination of case depth by Barkhausen noise method", *Master of Science thesis, Tampere University of Technology*, May 2016.
4. C.X. Zhang, "Assessment of depth of case-hardening in steel rods by electromagnetic methods", *Iowa State University*, 2009.
5. R. Palanisamy, "Prediction of eddy current probe sensitivity for the sizing of case depth in ferrous components", *IEEE Transactions on Magnetics*, Vol. 23, No. 5, September 1987.
6. J. Cuffe, et al., "Eddy Current Measurement of Case Hardened Depth of Steel Components", *17th World Conference on Nondestructive Testing*, 25-28 October 2008.
7. A. Banno, "Development of hardening penetration depth evaluation technique", *JSAE Congress (Autumn)*, 27 October 2004.
8. M.S. Good, et al., "Evaluation of Feasibility for the Ultrasonic Measurement of Case Depth in Case Hardened Steels", Technical report, <http://www.dtic.mil/dtic/tr/fulltext/u2/a117901.pdf>
9. Herbert Dipl Phys Willems, "Apparatus for non-destructively measuring the thickness of a hardened layer", *Patent DE4239159C2*.

10. M.S. Good, et al., "Ultrasonic material hardness depth measurement", *Patent US5646351A*.
11. W. Theiner, et al., "Process Integrated Nondestructive Testing of Ground and Case Hardened Parts", *Fraunhofer IZFP, PINT NDT — ECNDT, Barcelona*, 2002.
12. Internal Timken research report.

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**LETTER TO THE EDITOR**

**R&D tax credits**

With reference to the item on page 4, just a few observations and follow-up regarding my cited *Hotline* 137 article on the benefits of the R&D tax credit scheme. We have gained considerable benefit over the last few years by engaging in this process and I offer a few tips and observations borne out by our experience.

• **You might be surprised by what you can claim.**

If your business activity in any way involves answering an unknown; either by the substitution of existing materials or involves a significant change in the way parts are processed in order to provide an alternative solution to your client, then it's worth considering this scheme.

• **You can do it yourself...**

...although I would recommend, at least initially, the involvement of a reputable consultancy with a proven track record in the field. We have elected to continue with our chosen consultancy partners, principally because they offer full support in the unlikely event (if you do it right) of an HMRC challenge. Many businesses do not have the time, experience or capacity to mess around dealing with government agencies; unfortunately, there are sanctions if you get this wrong.

• **It gets easier the more you do it.**

Just like any other business activity, once you've established familiarity with the rules and a template/framework to populate, it becomes routine.

• **Play with a straight bat!**

This should go without saying, but only include items within the claim that you absolutely know meet the criteria. This is why it helps having a reputable partner who does this for a living.

• **The benefits can be substantial.**

I recommend the activity is conducted by the senior management team because some of the elements involved are likely to be commercially and company sensitive. However, the potential gains can be quite significant and definitely worth the investment.

**Simon Day**  
Managing Director,  
ADI Treatments Ltd

**R&D tax relief for CHTA member**



*Managing Director Simon Day\* recounts how ADI Treatments has used the services of R&D tax specialist Leyton to identify and claim a substantial corporation tax rebate.*

CHTA Member ADI Treatments, the West Bromwich-based specialist in batch austempering processes, seeks growth by way of substitution of existing materials and traditional processes.

Like many businesses, we did not realise that large elements of background work developing new customers could qualify for R&D tax relief. We just naturally did what we needed to do in order to grow and didn't think of this activity in terms of R&D. However, following a chance meeting with a UK-based customer at a show in Germany (of all places), the conversation

touched on their successful R&D corporation tax rebate and suggested ADI explore this avenue, as it could prove fruitful.

The usual time constraints and, at first glance, daunting complexity of the government's R&D tax scheme, meant that it was unlikely ADI would be able to prepare a claim with the in-house resources at its disposal. The option was to involve one of the specialists in this field, whose fees can be up to 25% of any successful claim.

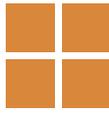
Following exploratory meetings, it was decided to appoint Leyton to manage the R&D tax claim process. Leyton's graduate engineers showed a quick grasp of the technical aspects of the business, which gave ADI the confidence to engage in the process.

**"...a corporation tax rebate of around £70,000."**

Leyton follow an established four-step procedure in order to develop and support the claim:

1. Technical analysis - through a series of interviews they help determine the activities qualifying for R&D tax relief.
  2. Financial analysis - records are interrogated to identify the expenditure incurred on the qualifying activities, both in-house and external.
  3. Documentation - a comprehensive report is produced giving a narrative along with supporting documents in order to secure the claim.
  4. Support - provide full assistance, free of charge, in defending the claim in the event of an HMRC compliance audit.
- The whole process initially took around three weeks to develop to the point of making the claim. Subsequent claims can be produced a little quicker once the business's *modus operandi* is established and understood.
- It's worth noting that up to three previous tax years can be claimed retrospectively and not just the last financial year! ADI, with the help of Leyton, were able to identify total qualifying expenditure (including the R&D uplift of 125%) of approximately £300,000, which translated into a corporation tax rebate of around £70,000. This is obviously very helpful and easily justifies the time investment of senior staff.

*Simon's Hotline 137 article*



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# Seen at CHTA's 2019 AGM...



(L to r): Paul Handley (Heat Treatment 2000), Chris Kenward (Ajax Tocco International) and ADI Treatments' Arron Rimmer and Simon Day.



CHTA Chairman Mike Leach (Alpha-Rowen) flanked by Air Products' Paulina Kus and Guido Plicht, our guest speaker.



Keith Laing (Hauck Heat Treatment), Paul Towler (Wallwork Heat Treatment) and Chris Marsh (Kepston).



Shaun Rowlands (Heat Treatments (Northampton)) with CHTA auditor Phil Taylor (Bakers) and Kevin Langston (Tamworth Heat Treatment).



In his presentation, Guido Plicht celebrated the 20th anniversary of Air Products' sponsorship of Hotline and CHTA's website.



Mark Florance (Techniques Surfaces UK) with SEA CEO Dave Elliott and CHTA Secretary Alan J Hick.



New Chairman Mike Leach presents his CHTA progress report.



Debbie Mellor (Keighley Laboratories), with Roger and Julie Haw (Flame Hardeners).



Alloy Heat Treatments' Ian Perks with Wallwork's Ian Lacey and Craig Richards.



Mike's report encompassed topics including membership, committee activities, the new website, Hotline, training and future CHTA strategy.

Some 42% of member sites were represented amongst the delegates attending CHTA's May 9th Annual General Meeting, the 41st since the Association became incorporated as a company limited by guarantee in 1978. Staged at SEA's Federation House headquarters in Birmingham, the event again proved an excellent opportunity for convivial networking and useful updates by CHTA's Chairman and Surface Engineering Association CEO, Dave Elliott.

## Member news

### WALLWORK AT "MADE IN THE MIDLANDS" ...

On June 20, stand L22 at the *Made in the Midlands (MIM)* 2019 Expo sees Wallwork Group showcase a range of heat treatment and ultra-hard coating services.

"The Midlands and surrounding area represents a significant customer base, so we are pleased to be exhibiting again at *MIM* in their 10th anniversary year. Wallwork Birmingham, based in Small Heath, is one of our busiest group members," commented Howard Maher, sales manager.

Being close to the UK's huge motorsport cluster, Wallwork's expertise, in highly-controlled metal component heat treatments and precision plasma vapour deposition (PVD) and diamond-like coatings, is sought out by top racing teams.

With AS9100 accreditation and many aerospace prime approvals, the company is also a significant supplier to the aerospace industry. Recent group investments at Birmingham include additional capacity for the processing of aluminium components and also more vacuum furnaces.

"While aerospace and motorsport are the glamour industries, we also undertake a vast amount of work for general and precision engineering contractors of all sizes and specialisms. These can include tooling, prototypes, small batch work through to high-volume needs," added Howard.

Following on from the 2017 acquisition of the Metaltech business, the company has also established the processes of *Xylan Fluoropolymer* coatings and molybdenum disulphide dry film lubricants at other group locations.

Highly-skilled metallurgists and surface engineers, along with full laboratory and substantial in-house testing facilities, enable Wallwork to provide a quality service. A dedicated, national fleet of over 50 commercial vehicles ensures end-to-end speedy order turnaround.

### ...AND THE PARIS AIR SHOW

Exhibiting for the first time at the International Paris Air Show, Wallwork Group is looking to expand its thermal processing services into Europe. "For some time now, we have been establishing firm relationships with Europe-based aerospace component manufacturers and this has encouraged us to exhibit in Paris," explained Howard Maher.

The company is in Pod 10 of the Midlands Aerospace Alliance stand, located in the British Pavilion. "Judging from stand visitor interest at the last Farnborough Air Show,



we are expecting strong interest in our much-expanded vacuum brazing and plasma nitriding services."

With an enviable reputation in ultra-hard PVD coatings, the company will also be championing its range of Nadcap-approved *Nitron Flight* coatings for aerospace that can offer up to 33 times improved life on specific components. *Nitron Flight* contributes significantly to reducing life cost ownership, fuel consumption, CO<sub>2</sub> emissions and more.

### PRECISION HARDNESS-TESTING PERFORMANCE FOR PRIMES

The largest subcontract heat treater of aluminum alloys in the UK, accredited to process components to prime specifications, turned to a manufacturer of Brinell hardness testing machines to develop a more efficient testing process.

Alloy Heat Treatment (AHT), which serves the aerospace, automotive, energy and other sectors, has a large number of prime customer approvals including Leonardo Helicopters, Airbus, Safran, Boeing, and BAE Systems. They are accredited to heat treat to these primes' specifications and often work as a trusted supplier to other companies that deal directly with them. Part of the prime specifications dictates that Brinell hardness testing is carried out prior to releasing the components. AHT settled on the Foundrax *BRINtronic* automatic Brinell microscope, designed by Foundrax Engineering Products, based in Wessex, England.

"Part of the release process for aluminum alloys is that we must do conductivity and hardness testing on every job that leaves us," said Steve Roberts, Quality Director with AHT. "As such we were looking at ways that we could gain efficiencies in this

process. Using the *BRINtronic* from Foundrax has allowed us to gain these efficiencies."

Brinell hardness measurements were required to be taken in areas of components where access is limited by intricate machine webbing or where the nose diameter of the microscope is restricted to approximately 30mm.

"One of the problems we needed to solve with equipment selection is that the microscope must get into quite intricate places," continued Roberts. "All the other microscopes we looked at have wide noses on them, so the design of the Foundrax scope was right up our street. We've used the manual Foundrax microscopes for as long as I've been here."



"As the microscope automatically measures the indentation at multiple points, results are instant," said Alex Austin, Managing Director of Foundrax. "They are recorded and, of course, the operator doesn't have to turn the microscope 90 degrees and re-measure as he would with manual measurement. There is well over a 50% saving on measuring time."

"Obviously, the usability of the *BRINtronic* suited us," said Roberts, "because we could get it into the places that we would struggle with using the competitor's equipment. The process of measuring was far easier as, with the others, we had to try and hold with both hands and press buttons. They weren't particularly well balanced either; so, in practice, we were losing efficiencies rather than gaining them."

**Please send news items for  
September's Hotline 157 to:  
mail@chta.co.uk  
Deadline: August 16th**

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# SEA Insurance Services for CHTA members

Dunsby Associates are proud to have recently secured the endorsement of the Surface Engineering Association to provide exclusive insurance and risk management products to its members.

As affiliates of the Surface Engineering Association, CHTA members can take advantage of the recently-established SEA Insurance Services where bespoke risk management solutions specific to the needs of contract heat treaters will be available.

Neil Dunsby, MD of Dunsby Associates says: "over the past twelve months we have worked closely with the SEA and gained an understanding of its activities, achievements and overall philosophy. This understanding has enabled us to develop our SEA Insurance Services offering, where a risk management approach is central to identifying business risks and ensuring that correct covers are placed. Our consultative approach aims to simplify the purchase of insurance and we work closely with our clients throughout the year and as their businesses evolve. We very

much look forward to furthering our understanding of CHTA member activities and to supporting members across all of the exposures their business may face"

We are looking forward to forging a strong relationship with both the SEA and CHTA and with all members, to deliver a first-class suite of products, services and support which are tailored to specific requirements.



With many years' experience in designing and delivering bespoke insurance programmes to both SME and corporate clients, our highly-skilled and knowledgeable team pride themselves on providing practical solutions that deliver real peace of mind.

Located in Birmingham, just a stone's throw from the SEA offices, makes us ideally placed to further strengthen our industry knowledge alongside the CHTA and its members.

We invite all CHTA members to get in touch over the coming months, whether it's a specific issue they are facing, a formal review or just to find out more about what we do and how we do it.

We will be sharing our thoughts on key

issues affecting businesses today along with hints and tips on simplifying and managing your insurance programmes and we will be attending events throughout the year.

All members are entitled to a free, no-obligation health check which will provide you with an overview of your existing insurance programme, ensuring not only you and your business are fully covered, but your staff, your customers and your suppliers are as well.

SEA Insurance Services contact: **Martyn Turner or Chris Swain – 0121 631 3051**

SEA Insurance Services is a trading name of Dunsby Associates Insurance Brokers Limited which is authorised and regulated by the Financial Conduct Authority (Registered No.726080).

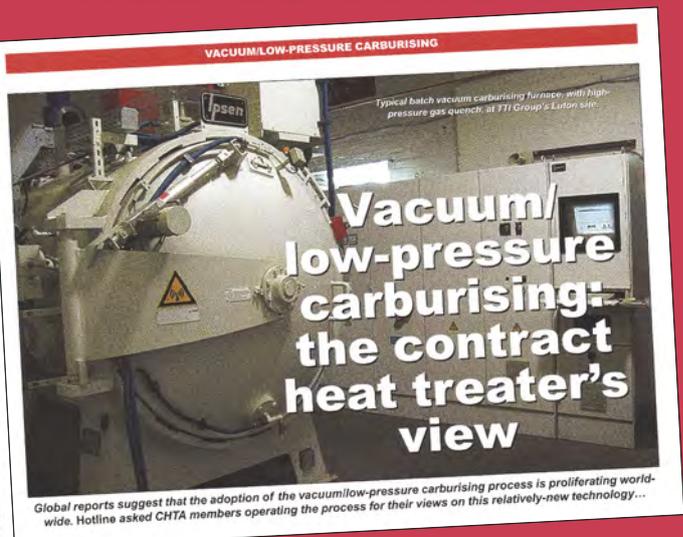
**Spread the word by proclaiming your CHTA membership**



For use on company letterheads, literature, websites and advertisements, members can download CHTA's logo from the Members Area of the Association's website.

HOTLINE

## Register for a regular copy of our printed Hotline newsletter



**Go to...  
www.chta.co.uk**



# If you supply to heat treaters, advertising in *Hotline* is a no-brainer

The only UK publication devoted to heat treating, the Contract Heat Treatment Association's quarterly newsletter *Hotline* is circulated in hard-copy form and is also downloadable from CHTA's website at [www.chta.co.uk/newsletter/](http://www.chta.co.uk/newsletter/).

## 2019 ADVERTISING RATES

Single-insertion charges for black-and-white ads:

Size	Dimensions	Charge
Quarter page	121mm high x 86mm wide	£199 +VAT
Half page	121mm high x 178mm wide or 254mm high x 86mm wide	£352 +VAT
Full page	254mm high x 178mm wide	£630 +VAT

For full-colour ads, add an extra £265+VAT to each of the above charges.

Advertisers in four consecutive quarterly editions of *Hotline* are entitled to a series rate where all of the above prices are discounted by 20% per insertion.

## ADDED BENEFITS OF SERIES ADVERTISING

As well as enjoying a 20% discount on the rates listed, advertisers in four consecutive editions of *Hotline* are, at no additional charge, entitled to:

Feature in a one-off "advertiser profile" in *Hotline*.

Appear on the Suppliers page of CHTA's website ([www.chta.co.uk/suppliers/](http://www.chta.co.uk/suppliers/)).

Post regular items in *Hotline's* "advertiser news".

## 2019 DEADLINES

Issue	Publication month	Order deadline	Copy deadline
<i>Hotline</i> 155	March	8 February	15 February
<i>Hotline</i> 156	June	10 May	17 May
<i>Hotline</i> 157	September	9 August	16 August
<i>Hotline</i> 158	December	8 November	15 November

## COPY REQUIREMENTS

High-resolution PDFs are preferred

*Hotline* does not accept recruitment advertising.

For further details, contact *Hotline* Editor Alan J. Hick. Tel: 0121 329 2970; e-mail: [mail@chta.co.uk](mailto:mail@chta.co.uk)

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# Diary

**June 11-12 2019**  
**METALLURGY FOR NON-METALLURGISTS**  
 West Bromwich, England  
<https://thecbm.co.uk/wp-content/uploads/2018/11/CBM-metallurgy-for-non-metallurgists-11-12-June-2019.pdf>

**June 25-29 2019**  
**THERMPROCESS 2019**  
 Düsseldorf, Germany  
 "12th International Trade Fair and Symposium for Thermo Process Technology":  
<http://www.thermprocess-online.com/>

**July 1-2 2019**  
**INTRODUCTION TO PYROMETRY**  
 Cambridge, England  
[www.equalearn.com/learncenter.asp?id=178409](http://www.equalearn.com/learncenter.asp?id=178409)

**July 3-4 2019**  
**A3TS 2019**  
 Lille, France  
 46th congress on heat treatment and surface engineering held in parallel with the SVTM 2019 exhibition of vacuum technologies and materials treatment: [www.congres.a3ts.org](http://www.congres.a3ts.org)

**July 25 2019**  
**CHTA PUBLICITY SUBCOMMITTEE\***  
 Birmingham, England

**August 8 2019**  
**CHTA MANAGEMENT COMMITTEE\***  
 Birmingham, England

**September 2-3 2019**  
**INTRODUCTION TO PYROMETRY**  
 Southampton, England  
[www.equalearn.com/learncenter.asp?id=178409](http://www.equalearn.com/learncenter.asp?id=178409)

**September 3-5 2019**  
**MATERIALS TESTING 2019**  
 Telford, England  
[www.bindt.org/events/Materials-Testing-2019/](http://www.bindt.org/events/Materials-Testing-2019/)

**September 10-12 2019**  
**22ND SECO/WARWICK SEMINAR: HEAT TREATMENT 4.0**  
 Karpacz, Poland [www.secowarwick.com/en/seminar-2019/](http://www.secowarwick.com/en/seminar-2019/)

**September 16-17 2019**  
**NADCAP AUDIT PREPARATION – HEAT TREATMENT**  
 Derby, England  
[www.equalearn.com/learncenter.asp?id=178409](http://www.equalearn.com/learncenter.asp?id=178409)

**September 17-19 2019**  
**HEAT TREATMENT 2019**  
 Moscow, Russia  
 13th annual international exhibition, the only one on thermal equipment and technologies in Russia.  
[www.htexporus.com/](http://www.htexporus.com/)

**September 17-19 2019**  
**26TH IFHTSE CONGRESS**  
 Moscow, Russia  
 In conjunction with Heat Treatment 2019.  
<http://www.htexporus.com/download/ifhtse-2019.pdf>

**September 18-19 2019**  
**INTRODUCTION TO PYROMETRY**  
 Derby, England  
[www.equalearn.com/learncenter.asp?id=178409](http://www.equalearn.com/learncenter.asp?id=178409)

**September 19 2019**  
**BIFCA course: BURNER TECHNOLOGY**  
 West Bromwich, England [www.bifca.org.uk](http://www.bifca.org.uk)

**September 25 2019**  
**SPAIN HEAT TREATMENT CONGRESS**  
 Bilbao, Spain <http://metalspain.com/heat-treatment.htm>

**October 8-10 2019**  
**EUROPEAN MODERN FURNACE BRAZING SCHOOL**  
 Pontardawe, Wales [www.wallcolmonoy.com/products-capabilities/brazing-alloys/brazing-school/](http://www.wallcolmonoy.com/products-capabilities/brazing-alloys/brazing-school/)

**October 15-17 2019**  
**HEAT TREAT 2019**  
 Detroit, Michigan, USA  
 30th ASM Heat Treating Society conference and exposition:  
[www.asminternational.org/web/heat-treat-2019](http://www.asminternational.org/web/heat-treat-2019)

**October 17 2019**  
**SURFACE ENGINEERING ASSOCIATION INDUSTRY CONFERENCE**  
 Kenilworth, England [www.sea.org.uk/events/](http://www.sea.org.uk/events/)

# Market Movements

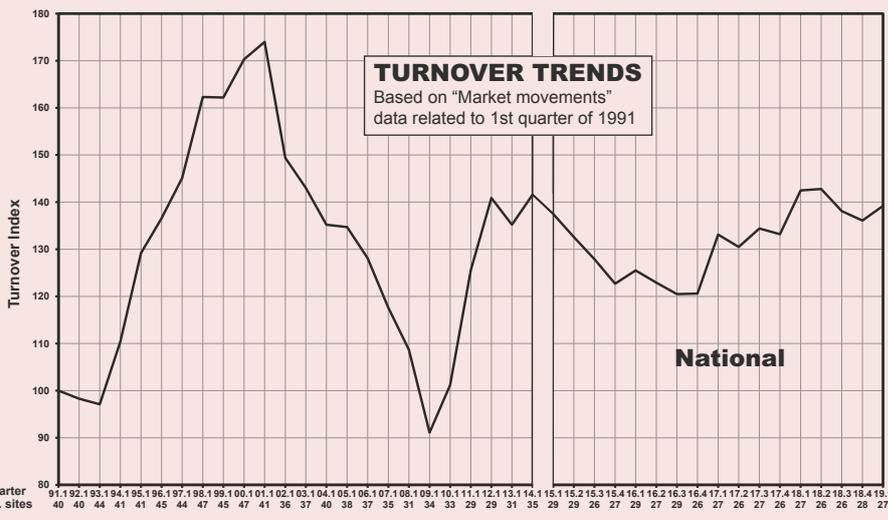
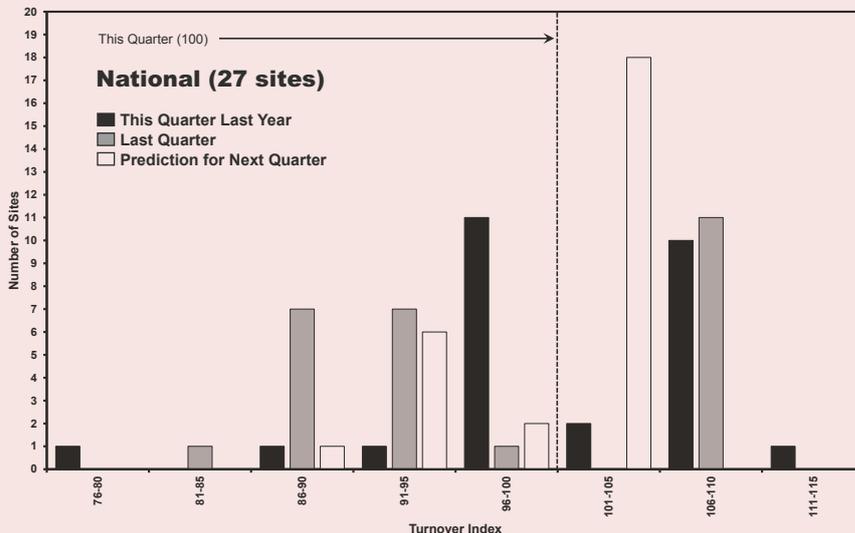
ANALYSIS OF QUESTIONNAIRE REPLIES RELATING TO 27 CHTA MEMBER SITES

“THIS QUARTER” =

**1 JANUARY - 31 MARCH 2019**

= **TURNOVER INDEX 100**

OVERALL ANALYSIS (27 SITES)	Mean index
This quarter last year	101.3
Last quarter	97.8
Predicted next quarter	100.4



**October 17-18 2019**  
**THERMAL TECHNOLOGY 2019**  
 Osaka, Japan  
 4th edition of furnace exhibition/conference:  
<https://thermaltechnologyexpo.jp.messefrankfurt.com/osaka/en.html>

**October 22-24 2019**  
**75TH HÄRTEREIKONGRESS**  
 Cologne, Germany  
 Heat treatment congress/exhibition: <https://www.hk-awt.de/>

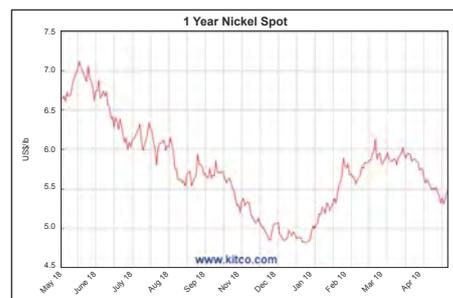
**October 24 2019**  
**CHTA PUBLICITY SUBCOMMITTEE\***  
 Birmingham, England

**October 24 2019**  
**BIFCA course: FURNACE & BURNER CONTROLS**  
 West Bromwich, England [www.bifca.org.uk](http://www.bifca.org.uk)

**October 30-31 2019**  
**ADVANCED ENGINEERING 2019**  
 Birmingham, England [www.advancedengineeringuk.com](http://www.advancedengineeringuk.com)

\*Members wishing issues to be raised at CHTA meetings should notify CHTA's Secretary, well beforehand, at [mail@chta.co.uk](mailto:mail@chta.co.uk).

## NICKEL PRICE (US\$/lb)



Please send comment and news items for September's Hotline 157 to: [mail@chta.co.uk](mailto:mail@chta.co.uk)  
**Deadline: August 16th**