The Contract Heat Treatment Association Newsletter

HOTLINE

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CHTA Secretariat

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CHTA is affiliated to the Surface Engineering Association

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gear TECHNOLOGY

Ask Not What Your Heat Treater Can Do for You...

Alex Cannella, Associate Editor, *Gear Technology*

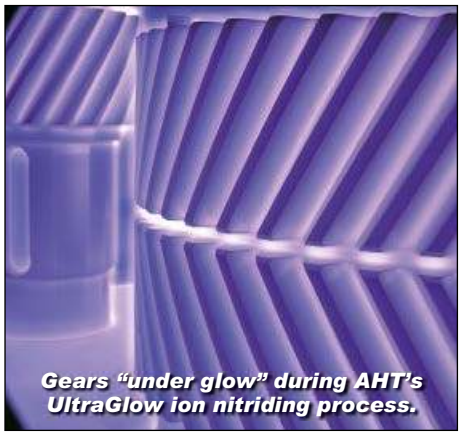
When sending gears to be heat treated, manufacturers can end up unwittingly making mistakes that slow down turnaround time. We talked to some heat treaters to get their best advice on how you can help them help you.

Turnaround time is one of the most discussed facets of manufacturing that we talk about here at *Gear Technology.* Every month, there's always news about a new product or technique that promises to improve that metric, and we're constantly giving advice on how to make your business run faster and leaner. But at the end of the day, there are certain steps of the process that are largely out of the manufacturer's hands.

At first glance, sending gears to be heat treated might seem like one of them. After all, manufacturers can certainly shop around and look for the right heat treater for them, but at the end of the day, giving your gears over to a heat treater requires a degree of trust that the job will be done professionally and expediently, and the reality of the business world is that expectations aren't always met.

But the ball isn't entirely in the heat treater's court, and often when the heat treat process hits a snag, it can actually be due to errors that stem from the manufacturer's side. Every heat treater has nightmare stories; improperly documented or tested gears, gears with different specifications than the treater was expecting, and even specification demands that are just plain impossible to meet, are all issues that they can and do regularly face.

Every one of these problems complicate a heat treater's job and, by extension, slow down work and force an increase in turnaround time. When gears come in with different specifications than previously expected, for example, all the prep work they've already done for the gears is wasted, and they have to invest additional time taking it from the top again. And on the flip side, manufacturers can sometimes, depending on the situation, actually help heat treaters skip steps and work faster just by providing the appropriate information. We reached out to heat treaters both big and small to ask them about the most common mistakes they see gear manufacturers make and their best tips to avoid making them. Here are some of the best ways you can make your heat treater's life easier and, in doing so, improve your own turnaround time.



Gears "under glow" during AHT's UltraGlow ion nitriding process.

WHAT CAN YOU DO FOR YOUR HEAT TREATER?

Rule Number One: Communicate!

Every heat treater we talked to, without fail, stressed the importance of communication first and foremost. "Optimizing turnaround is all about communication," said Phil Harris, marketing manager at Paulo. "The more you let your heat treater know about your process and the next steps in the supply chain, the better. We have seen mutual benefit from co-ordinating lot sizes with furnace capacity, in some cases holding furnaces for customer delivery times, shipping directly to the next step in the supply chain, or taking on additional processing steps in our facilities."

All heat treaters, be they ion nitriders, vacuum carburizers or otherwise, are willing to discuss the needs and specifications of your application, and their number one piece of advice is to take advantage of that. The more heat treaters know about your gears, the better they can leverage their expertise. They can confirm that your gears can reach the demanded specifications and, in the event that they can't, work with you until they can. The more you're on the same page with your heat treater, the less likely it is you'll run into hiccups when it comes time to send your gears to be treated.

It sounds like painfully obvious advice, but almost every problem a heat treater runs into has to do with a failure of communication in one way or another. Just taking the time to make sure that you're on the same page as your heat treater can prevent any number of major delays before they have an opportunity to happen.

So, what should you be telling your heat treater? Harris has a few suggestions.

"Ensuring we know what material your gears are and that the hardness specification is achievable is a great start," Harris said. "Remembering to send test coupons can prevent us from cutting a gear, depending on the testing requirements. We need to work together to understand distortion, especially with higher-temperature processes. Let your heat treater know about cutting fluids and rust preventative, as those fluids can impact our surface treatments. Lastly, communicating test locations is often missed, but can cause a lot of headache if we end up measuring different areas of the gear."

Test locations are a helpful piece of information heat treaters aren't always provided. It can be important for them to test the same location on the gear that the customer does. If, for example, the gear manufacturer tests the tooth tip but the heat

treater tests the tooth root, it's possible to get different results, which leads to delays as the heat treater scratches their head and has to try and get in touch with the customer. And in situations where gears require different case depths at different locations on the tooth, it can become doubly important to specify the test location when you provide your test information.

Rule Number Two: Start Early and Keep up to Date

While the idea of keeping in touch with your heat treater isn't a revolutionary one, not as many gear manufacturers know when they should start to open that line of communication. The answer is to do so as early as you can. And when heat treaters say early, they mean before you even start manufacturing the gears.

"Gear manufacturers need to incorporate the help they receive from their heat treat facility early in the program," said Frederick Otto, president at Midwest Thermal-Vac. "Thousands of times (and I am not exaggerating) a particular gear ends up at the heat treater with pre-determined specifications that cannot be done. If only this was brought to the table before any gear cutting was started."

"Talk early on and have some head to head meetings and so forth on design," said Gary Sharp, chairman and CEO of Advanced Heat Treat Corp. "Get some development done on prototypes as early as possible so we can get [the gear manufacturer] samples so that they can do some initial testing in case further adjustments need to be made."

Every advantage achieved by talking to your heat treat supplier is compounded by making sure you start talking to them as early as possible and, almost as importantly, keep them informed as your own gear designs change, as that affects their own process.

"Another situation is lack of internal specifications with the correct revision," Otto said. "The correct revision is not sent up front, wasting days of communication and valuable heat treating time, while waiting to receive the requested information. Then only to find out that temperatures, quench media and other specifications that tie a heat treater's hands add unnecessary cost."

If making sure your heat treat servicer is informed is the number one way to prevent unnecessary delays, then making sure that you talk to them early and often is the best way to make sure they're informed. The more you dedicate yourself to keeping your heat treater appraised of your gears' specifications, the better and faster they can do their job and send your gears on to the next step of production.

Midwest Thermal-Vac's Ion Heat pulse plasma nitrider.

Rule Number Three: Vet Your Material Supplier

A mistake can happen anywhere on the supply chain, and that includes with the material supplier. According to Enrique Lopez, sales and marketing director North America for ALD Thermal Treatment Inc., one of the leading problems ALD encounters is when a gear manufacturer sends gears made of poorly mixed or low quality material. It's also an error echoed by Otto, who described "consistently" getting gears made from the wrong material altogether.

"I know it sounds like a basic thing," Lopez said. "But you would be surprised how often that happens, even with big customers where you're supposed to have high-quality materials."

It's a mistake that ultimately rests with the material supplier (or, perhaps, even further up the supply chain), but it's also one that gear manufacturers don't always notice when cutting their gears. But even if low-quality materials make it through the gear-cutting process without being noticed, the problem will always rear its head during heat treatment when the treater doesn't get the results they're expecting. And when it does, it forces production to halt.

"When we do the heat treatment, of course we will have different results," Lopez said. "And then we will start scratching our heads and figuring out what is happening, wasting a lot of time doing trials, correcting recipes and doing all that, just for the next load coming having again a different situation."

Once a gear manufacturer runs afoul of this problem, it's not necessarily a total loss. According to Lopez, there are a few options going forward to deal with the situation, but they both consume time in their own way.

"In our case, we offer the customer two ways," Lopez said. "They can either have the material back, or we can figure out what to do with this material. Sometimes, the material is so mixed that even within one load, you have good parts and bad parts. Some other times, you can effectively find a breakpoint where you can say 'well, the loads received between [these days] are problematic,' and then you can pull that apart and develop a specific recipe to modify and deal with that usually-lower DI. So you can save the materials, you can have good parts, it's just a matter to composite differently."

According to Lopez, the best way to avoid the problem altogether is to just regularly check the materials you're receiving from your supplier.

"I think if a customer relies on their sources, it is still a good idea to have some checks, regular audits and very good control just to keep a certain level of uniformity in the material they use," Lopez said.

Rule Number Four: Protect Your Gears in Transit

According to FPM Heat Treating's Vice President, Jim Feltner, one of the most frequent mistakes they see is improperly-packaged gears that arrive at the facility damaged.

"Unfortunately [some gear manufacturers] do not realize how much a skid or tub of parts can bounce around on the truck which could lead to potential damage or scrap if the gears come in contact with each other," Feltner said.

Standard shipping companies accidentally damaging gears is one thing, but according to Otto, gears can sometimes be damaged even when they're being transported by heat treaters' own local shipping services. Gears that show up damaged on arrival


A titanium gear after undergoing AHT's ion/plasma nitriding process.


Midwest Thermal-Vac's LPC vacuum carburizing system ICBP 3030.

are yet another potential snag in production and, as with anything else unexpected that happens in the heat treatment process, requires the heat treater to take time to consult with their customer before they can proceed. To avoid this, Feltner advises making sure your gears are securely packaged with the assumption that the container will be bouncing while in transit.

WHAT CAN YOUR HEAT TREATER DO FOR YOU?

Of course, productivity and turnaround time isn't solely on the gear manufacturer. There are a number of ways that heat treaters have been working to make sure orders are done swiftly and precisely, not least among them being systems like Paulo's Production Information Customer Service (PICS). PICS tracks orders through Paulo's entire facility, from the moment they arrive until they leave. When a shipment of gears arrives, they already have an order number, complete with an already-established design process. Coupled with the fact Paulo can hold furnaces for specific shipments, this allows the company to trim a significant amount of set-up time.

"PICS stores part numbers and the related heat treatment recipe, so when your order arrives there is no scrambling to design a process and no operator error inputting that recipe," Harris said.

Paulo is, of course, not the only company with such a set-up. ALD has a comparable system at their own facilities, including their automatic carburizing lane. According to Lopez, even though ALD specializes in high-volume shipments, they can still turn around most jobs in 72 hours.

"You just have to scan it," Lopez said. "And the system will know perfectly what to do. At the end of the line, we'll have a product that didn't have any hiccups or delays at any point."

Midwest Thermal-Vac, on the other hand, offers CMM measuring both before and after heat treatment, which Otto notes also can improve turnaround time, and recipes stay programmed in the company's furnaces after their first use, which guarantees a repeatable heat treatment cycle on subsequent orders. Midwest Thermal-Vac also runs their furnaces 24/7.

"If repeating the CMM measuring process, this would prevent having to ship multiple times from the heat treater to the manufacturer," Otto said. "This would save valuable time and eliminate shipping costs. CMM measuring also provides critical information to be able to move ahead to the heat treating trial. This service edge eventually provides a faster turnaround time with superior quality."

Advanced Heat Treat, on the other hand, opts for the quantity approach. With over 50 nitriding furnaces that the company

AHT's UltraOx Layers heat treatment process provides added protection against corrosion as well as the black matte finish seen here.

keeps running 24/7, AHT President Mike Woods is confident in his company's ability to match its competitors in turnaround time while remaining flexible. FPM adopts a similar approach by maintaining a high amount of redundant equipment between three separate locations.

You may have noticed, however, that many of these turnaround-improving processes are still dependent on one thing: that the heat treater knows exactly what they're getting ahead of time. Processes like Paulo and ALD's automatic tracking systems are predicated on the assumption that the gears they receive will be exactly what advance documentation told them they would be. And while companies like Advanced Heat Treat and FPM may pride themselves on their flexibility, differing test results will still force them to spend additional time coordinating with a gear manufacturer before they can proceed. This all drives home just how important the gear manufacturer is in the heat treatment process, even if they aren't the ones performing the actual process, and that if you want a smooth heat treatment with a quick turnaround, the most important thing you can do is remember to talk to your heat treater.

For more information:

Advanced Heat Treat Corp.
(319) 232-5221 *www.ahtweb.com*

ALD Thermal Treatment Inc.
(810) 357-0685 *www.ald-vt.com/cms/en/vacuum-technology/home*

FPM Heat Treating
(847) 228-2525 *www.fpmht.com*

Midwest Thermal-Vac
(262) 605-4848 *www.mtvac.com*

Paulo
(314) 647-7518 *www.paulo.com*

Hotline asked CHTA members to comment...

Richard Burslem, Wallwork Heat Treatment:

Although the *Gear Technology* article relates specifically to the heat treatment of gears in the USA, the advice is universal in terms of both manufacturing sector and geography. The first two messages are communicate with your heat treater and start this process early, and I wholeheartedly agree.

Your heat treater can confirm that the proposed specification is achievable, advise on alternative materials, if the one specified is not available, and discuss details such as how a case depth should be specified depending on subsequent machining. All these things need to be established before manufacture; not afterwards when it may be too late.

Stress relieving may be a treatment that controls distortion of the heat-treated part and so saves money by reducing extra machining or even total scrappage. On the other hand, it may be unnecessary on your particular part and lead to extra cost and extended production time. Ask at the design stage. Your heat treater has no interest in making your part more expensive than it needs to be; it makes you less competitive in today's global market and if you lose the job, so does your heat treater.

Please be aware of the costs and delays involved with mixed material, not only from your supplier but in your own stores too. This can lead to cracked parts, 100% inspection requirements or, even worse, your customer receiving parts not fit for purpose, with a subsequent loss of trust and a substantial claim. For long-running jobs, many heat treaters will process samples of new material batches alongside existing materials so that they can be verified before production; all you need to do is ask.

One useful supply-chain management tool with regard to transit is the collection of parts for heat treatment from one location and the delivery back to a different one. Many heat treaters offer this service and it can save several days in the total manufacturing time. It may not be possible, but if you don't ask, you won't know.

Remember, we are here to help but we can't do that unless we know what it is you are trying to achieve. With many engineering companies having little metallurgical expertise these days, heat treaters can assist you to get the job right BEFORE you start to make it. As the old British Telecom television advert used to say, "It's good to talk!"

Garry Hawkins, Hauck Heat Treatment:

This article, written for the gear manufacturing sector, highlights common issues that all heat treaters have encountered and which could be avoided with better communication at the initial development stage.

However, these matters are not just restricted to the gear fraternity but can equally apply to all manufacturing sectors. In recent years, many UK manufacturing companies have lost experienced internal technical knowledge. They rely on the

competence of the heat treater, but often omit important details of all their needs or fail to give a reasonable schedule detailing their production plans. I am sure many of us have been frustrated by the demand of a 0.5mm 90-hour nitride treatment for overnight delivery!

Hotline 139 published a comprehensive article, in March 2015, with an example of a heat treating purchase order checklist. This followed the aerospace approach to contract review, ensuring that as much information is checked as possible prior to processing, proven to reduce subsequent quality issues.

Initially this caused longer delays while the heat treater tried to get information not previously supplied. Once the customer is aware of required information, then the contract-review stage speeds up.

Further to this, a full review of the drawings, materials and specifications (in partnership with the customer) can also reduce time delays and possibly give improved processing routes.

The net result is that many more engineering sectors have realised the benefits of close relationships with the heat treater. Notable sectors that are benefitting are motorsport and aerospace where, particularly with new products, they can review all options in the development stages PRIOR to the demands of production needing to be fulfilled.

While it is difficult to give a definitive checklist for these other issues on all components and customers' designs, the *Gear Technology* article shows the importance of communication to allow the heat treater to help. Advice can vary from material type and condition, pre-heat-treatment operations, optimising load sizes, racking of parts in the furnace, improved heat treatment cycles, new processes and post-heat-treatment operations. All of these can assist in improved turnaround and prevent delays.

Although most heat treaters will have a number of design authorities with whom they have a close relationship, they also have many more customers who are not the design authority and would not be able to discuss drawings or specifications.

In the latter instance, the heat treater will take much care about distortion, handling, etc and, where required, will contact the customer to ask him for any extra information required and talk it through. This will cause some initial delays but, once resolved, will prevent future delays.

These relationships are difficult to form and quite often only initiated after a problem has been identified, which is usually too late.

It would be great to have an absolute list of possible causes of problems but the reality is that the customer would be overwhelmed; this could possibly have counterproductive effect and frighten him away.

As professional heat treaters, all we can do is continue to assist customers and possibly feature similar articles in other trade publications to emphasise that we can help.

Member news

AHT ONE OF THE FIRST AWARDED AS9100 REVISION D

The UK's specialist in the heat treatment of aluminium alloys, Alloy Heat Treatment (AHT) have joined an elite class after being awarded the AS9100 revision D certificate at a recent BSI ceremony.

AHT Quality Director Steve Roberts stated: "We are very proud of this. We are only the fourth company in the EMEA (Europe, Middle East and Africas) to have a certificate for AS9100 revision D awarded, and the first subcontract heat treatment company in the EMEA to be issued with the certificate."

The aerospace standard AS9100 takes the ISO 9001 requirements and supplements them with additional quality system requirements, established by the aerospace industry in order to satisfy CAA, DoD, NASA and FAA quality demands.

Alloy Heat Treatment at the BSI awards ceremony.

AHT pride themselves on rewarding talent and invited some of their employees, including apprentices, to the BSI awards ceremony. Roberts explained: "One of the reasons we travelled to the ceremony, was for our employees to gain an insight into the BSI. We invited them so they could see the company being rewarded for our great efforts to achieve this."

Dudley-based AHT's apprentices are on manufacturing and engineering courses, financially supported by the company, at Dudley College and the University of Wolverhampton.

BSI's Chief Executive Howard Kerr awarded AHT with their certificate. BSI support organisations in making excellence a habit, their services being designed to align with the steps clients need to take in understanding how to achieve best practice. Roberts observed: "BSI have helped us a lot; our Client Manager, Kieran Birmingham's support with time management and assistance during the transition has been a real help in achieving this award."

AHT also hold Nadcap accreditation and preferred-supplier status to many aerospace primes. The company can process components up to five metres long and three tonnes in weight. They can also offer rapid quenching into either polymer or water (hot or cold) if required.

CON MECH ACHIEVES EARLY APPROVAL TO ISO 9001:2015

Con Mech Engineers Ltd have become one of the first companies in our industry to receive certification to the new upgraded ISO 9001:2015 quality management standard.

The certification applies to all three of the company's business sectors: Heat Treatment Services; Ground Engagement Tools; and Precision Engineering.

Christine Ames, Managing Director commented, "From the outset we saw the value of the new ISO standard and were determined to be an early adopter of the system. We pride ourselves on technological leadership and believe that winning early approval for this globally-accepted standard would help us stay ahead".

Many companies will be familiar with the process-based ISO 9001:2008 quality control system. The new ISO 9001:2015 version moves the system to a new level. It puts leadership at the centre and requires the company's top management to be active throughout the process. It moves on from "preventive actions", looking at risk analysis instead, and ensures greater focus on better communication and on external opportunities for the business. It also fits more closely with other related standards, such as the environmental standard ISO 14001.

"Achieving the new standard has been the result of a great deal of hard work from all the team at Con Mech and we are justifiably proud of the outcome. We are confident it will have benefits to our business and enable us to serve our customers better", Christine continued.

Con Mech Engineers are based in Stanley, County Durham. The CHTA-member Heat Treatment division provides specialist heat treatment services that extend the operational life and improve the performance of key components in critical applications in oil and gas, defence and heavy industrial applications. The Precision division manufactures precision-machined components for a range of industrial applications. The Ground Engagement Tools division manufactures *Blademaster*-branded wear parts for construction and mining machinery.

The company has a workforce of 60 and has been a specialist in metal components for over 60 years.

WALLWORK CAMBRIDGE'S SUCCESSFUL TRANSITION TO AS9100 REV D

Aerospace heat-treatment and hard-coatings professionals, Wallwork Cambridge, have just received their AS9100 revision D certificate and, in so doing, become one the first few dozen UK companies to make the transition. All companies working within the aerospace sector must be in compliance with the revision by September 2018.

Works manager Andy Fox said: "Preparing for the audit has been a massive effort by all the team and especially by quality manager Adam Yates who joined us in Cambridge from the Bury site just six months before the audit."

Site director, Simeon Collins, added, "Aerospace orders are rising and it is vital that we continue to meet the necessarily-stringent quality standards of the industry. Revision D includes additional requirements for product risk systems, traceability and mitigating counterfeit parts. Interestingly, it also extends into ethical sourcing and business context, taking it beyond quality and day-to-day management."

Cambridge is the first member of the Wallwork Group to attain their revision D certificate but other members in Bury and Birmingham are hot on their heels and will soon follow.

AS9100 revision D certificate for Wallwork Cambridge reaffirms the company's commitment to quality.

Besides AS9100, the company also holds approvals from many aerospace primes including Rolls Royce, BAe Systems, Airbus, Safran, Bombardier and Moog.

MORE SUCCESSFUL ACCREDITATIONS FOR KEIGHLEY LABS

Directors and employees at Keighley Laboratories Ltd were celebrating the successful results of two audits in May.

The heat treatment division has achieved the Nadcap (Heat Treating) accreditation for their nitriding process, to add to the company's growing list of accreditations and prime approvals. This achievement is important for Keighley Laboratories as it demonstrates their commitment to delivering the highest standards of heat treating to the aerospace industry.

MD Debbie Mellor and Keighley's successful Nadcap team in front of the nitrider.

"Congratulations to Keighley Laboratories on successfully passing what may be the aerospace industry's most stringent process capability assessment audit," said Joe Pinto, Executive Vice-President and Chief Operating Officer at the Performance Review Institute. "Nadcap audit criteria are widely acknowledged to be hard to meet and companies like Keighley Labs, who succeed at doing so, rightfully deserve recognition."

In addition, the heat treatment division had recently undergone a successful annual BSI reassessment for BS EN 9100 / AS 9100 accreditation.

Managing Director, Debbie Mellor, commented: "The range and number of accreditations held by Keighley Laboratories builds the support and confidence of our customers. They highlight the company's achievements and strengths, particularly important in our competitive market. This confidence is demonstrated by customer interest in our new gaseous nitrocarburising process which is now up and running.

As part of our continuing strategy to increase business with the aerospace sector, the Technical Services division at Keighley Laboratories plans to extend existing Nadcap (Material Testing Laboratory) scope to include chemical analysis."

GROWTH AT ALPHA-ROWEN

CHTA members Alpha-Rowen Ltd are moving equipment into a new 1000m² building developed by Alpha-Rowen Holdings, close to the existing one at Tipton's Barnfield Road in the West Midlands. This will effectively allow the company to operate as one site, as the two buildings are a short walk apart.

Building work has been taking place over the last twelve months and the furnaces are now being re-sited. The move to the larger building also allows the installation of a further austempering furnace as well as significantly improving the facilities available to both the employees and customers. Incorporated within the building will be a new laboratory allowing several requirements of CQI-9 to be achieved.

Guests were wowed by the new building when a party was held there recently to celebrate both its opening and Alpha-Rowen Chairman Kevin Rowen having been in the heat treatment industry, with his own businesses, for thirty years. A live band provided the entertainment and a hog roast ensured everyone was catered for.

Said MD Mike Leach: "The whole project has some months to run, but marks a significant step forward for Alpha-Rowen. We expect that our customers and employees will see the benefit of this investment for many years to come".

Alpha-Rowen's new building.

eQuaLearn

APPROVED TRAINING PROVIDER FOR PYROMETRY

The eQuaLearn training arm of Nadcap-administering PRI has earned the status of "Approved eQualified Training Provider" based on the content of its *Introduction to Pyrometry* course. eQuaLearn is the first global training provider to achieve this qualification.

Regularly offered in the UK, this course provides a full review of the requirements and comprehensive discussion on the SAE AMS 2750E specification. The objectives of the course are to assure a thorough understanding of pyrometric controls applicable to heat treating, the application of pyrometric controls within the typical heat treat facility, and the intent and interpretation of AMS 2750E.

Upcoming UK dates and locations of *Introduction to Pyrometry* are listed in *Hotline*'s diary (page 20). A complete list of all eQuaLearn courses is available at *www.eQuaLearn.com.*

Please send news items for December's *Hotline* 150 to: *mail@chta.co.uk*
Deadline: November 16th

Your guide to October 13's second CHTA-co-sponsored international conference/exhibition...

Let's make a great day (and night) of it!

Conference/exhibition

Historic Kenilworth's Chesford Grange hotel will host a multi-session conference and table-top exhibition focusing on latest industry advances in heat treatment and metal finishing. Here we preview what will be on offer in the presentations and from the many heat-treatment-related exhibitors, a number of whom are loyal *Hotline* advertisers.

Drinks reception / dinner

Opportunities for the UK heat treatment community to get together over a few drinks are rare these days. Also attend the post-conference/exhibition evening drinks reception (kindly sponsored by Wallwork Heat Treatment) and dinner, with entertainment from John Hotowka, "The Laughter Dinner Speaker®" (pictured), and let's make a great night of it!

Surface Engineering and Heat Treatment Industry Conference

13 October 2017
Kenilworth, UK

Co-sponsored by...

CONFERENCE PROGRAMME

09.00-09.45	**Registration and table-top exhibition**
09.45-10.45	**Chairman's welcome / Opening plenary session:** **Smart Software Solutions for Surface Engineering Companies** Richard Randle, Valuechain **Training and Development of Sales Staff** Chris Kealy, Consultant
10.45-11.15	**Networking lunch and table-top exhibition**
11.15-13.00	**SURFACE ENGINEERING: Session 1** **Chief Executive's Introduction** David Elliott, Surface Engineering Association **Environmental Legislation Post BREXIT** Caroline Almond, Squire Patton Boggs (UK) **Replacing Hexavalent Chrome in the Pre-treatment of Aluminium** Duncan Beckett, Coventya **REACH and the Automotive Supply Chain** Matt Griffin, Jaguar Land Rover **REACH Authorisation of Chromium Trioxide - Latest News** Dirk Wiethoelter, MacDermid Enthone Industrial Solutions **Trivalent Hard Chromium Plating** Dr Rami Haidar, Atotech **HEAT TREATMENT: Session 1** **Chairman's Introduction** Alan J Hick, Contract Heat Treatment Association, UK **Lightweight Jigs and Fixtures: Process and Quality Improvements with Oxide Fibre Ceramics in Heat Treatment Furnace Applications** Mathias Kunz, WPX Faserkeramik GmbH, Germany **Lightweight Jigs and Fixtures: Carbon Composites in Controlled-atmosphere Furnaces with Oil Quenching** Florian Heck, GTD Graphit Technologie GmbH, Germany **Efficient Radiant-tube Gas Heating of Industrial Heat Treatment Furnaces with "Flameless Oxidation"** Lee Rabe, WS Wärmeprozesstechnik GmbH, Germany **Reducing Operating Costs with *EndoInjector*™ and *ExoInjector*™** Daniel Panny, Atmosphere Engineering Company, Germany **Operating Experience with Modular Controlled-atmosphere Heat Treatment Systems** Philippe Warter, Codere, Switzerland
13.00-14.00	**Networking lunch and table-top exhibition**
14.00-16.00	**SURFACE ENGINEERING: Session 2** **Key Environmental Priorities and Pressures for the Surface Treatment Sector 2017-2021** Neil Goodlad, Environment Agency **HSE Key Priorities** Sarah Palfreyman, HSE **REACH Enforcement and Authorisation** Mike Potts, HSE **Rapid, Safe and Reliable Cyanide Detection, Anytime, Anywhere** Benedikt Kirchgaessler, Cyanoguard **Getting the Best Deal for Your Water Supply and Treatment** Philip Davies, Access Utilities UK **HEAT TREATMENT: Session 2** **Operating-cost Reduction with *ZeroFlow® Nitriding*** Leszek Małdziński, Poznań University / Seco/Warwick, Poland **Technology of Vacuum-furnace Cooling-rate Control with Gas (and Oil) Quenching** Philippe Lebigot, BMI, France **The Practical Use of Ipsen's *PdMetrics*™ Software Platform for Predictive Maintenance** Jan Urban, Ipsen, Germany, and Mike Long, Vacuum & Atmosphere Services, UK **The Industrial Internet of Things (Industry 4.0) and the Heat Treater** Peter Sherwin, Eurotherm by Schneider Electric, USA
16.00-17.00	**Closing plenary session** **Energy and Utilities Analysis - Getting the Best Deal** Liam Conway, Control Energy Costs Ltd **Noise in the Workplace** Robert Lomax, Wakefield Acoustics
17.00-17.30	**Networking coffee break and table-top exhibition / Close**
19.00-20.00	**Evening Pre-dinner Drinks Reception sponsored by Wallwork Heat Treatment Ltd**
20.00	**Dinner / Entertainment**

Industry sponsors...

www.sea.org.uk/conference

SPONSORS AND EXHIBITORS (at 17 August)

www.almor.co.uk

Almor is a group of specialist alloy fabricators and furnace engineers focussed on supporting the needs of heat treaters and other process sectors where high temperatures or corrosive environments are encountered. Wellman Furnaces is a division of the Group which is also UK and Ireland representative for furnaces supplied by Aichelin, BMI and Codere.

www.bmi-fours.com

Since 1947, **BMI** has been a player to be reckoned with in the heat treatment industry and has become one of the world's leading manufacturers of vacuum furnaces. The company offers a wide range of industrial furnaces for vacuum, low-pressure or plasma heat and thermochemical treatments, providing standard or customised solutions.

SPONSOR

www.bodycote.com

With more than 180 accredited facilities in 23 countries, **Bodycote** is the world's largest provider of heat treatment and specialist thermal processing services. Bodycote improves the properties of metals and alloys, extending the life of vital components for a wide range of industries. Customers have entrusted their products to Bodycote's care for more than 30 years.

www.buehler.co.uk

Buehler is a manufacturer of scientific instruments and supplies for cross-sectional material testing. With its comprehensive range of sectioning, mounting, grinding/polishing, imaging/analysis and hardness-testing equipment, along with consumables, the company is well established as the world's leading supplier of metallographic sample preparation and analysis instruments to a wide variety of testing environments.

www.codere.ch

Switzerland-based **Codere** SA is a major international supplier of batch and continuous controlled-atmosphere furnaces for a variety of heat treatments. These include modular bell-furnace systems with various quenching options. Accompanying at the exhibition will be Almor Group, Codere's agent for the UK and Irish markets.

SPONSOR

www.cec.uk.com

Control Energy Costs are consultants providing tailor-made utility management, procurement and support services to businesses that have become disillusioned with using an energy broker. Covering electricity, gas, water and associated costs, the company works in partnership with clients, providing an all-encompassing service and dealing with any issue that may arise – old or new.

Cronite Castings

www.safe-cronite.com

Now part of the worldwide Safe Group, **Cronite Castings** is a leading supplier of furnace furniture made from special-purpose alloys resistant to high temperatures and thermal shock. The emphasis is on the design and manufacture of cast heat treatment handling jigs and fixtures with low weight / high component load and energy/furnace efficiency.

www.dbsantasalo.com/

David Brown Santasalo introduces a new 3-metre-diameter x 3-metre-deep gas carburising furnace, the largest controlled-atmosphere pit furnace in the UK. Carburising is conducted under a nitrogen/methanol atmosphere system. The equipment is complimented by an oil-quench tank, wash tank and tempering furnace of the same capacity.

SPONSORS AND EXHIBITORS

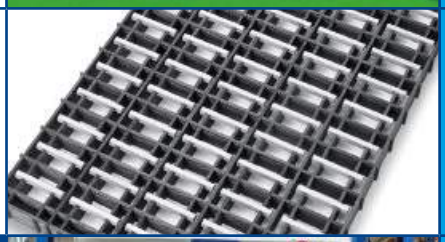
Eurotherm by Schneider Electric

www.eurotherm.co.uk

For over 50 years, **Eurotherm** has been a global supplier of instrumentation and process-control solutions, delivering: process optimisation and improved energy usage; reduction of waste and scrap; increased plant availability; secure data management; reduced operator error; and enabling regulatory compliance (AMS2750 & CQI-9).

GTD Graphit Technologie GmbH

www.gtd-graphit.de



GTD is responsible for the distribution and the refinement of Toyo Tanso graphite and CFC materials used in heat treatment applications (i.e. CFC fixtures and carriers, insulation material in the form of felt, CFC plates and consumables) in Germany, Great Britain, Austria, Hungary, Poland, Czech Republic, Slovakia, and German-speaking Switzerland.

SPONSOR

HAUCK HEAT TREATMENT

www.hauckht.co.uk

Hauck Heat Treatment provide the range of heat treatment, HIP and PVD processes required by all manufacturing industries. We commit ourselves to the highest quality, not just in the treatment of your products but also in the way we treat you. Our customers have access to extensive experience and expert metallurgical knowledge from 27 locations across the UK and EU.

SPONSOR

Ipsen

www.ipsen.de/EN/

Ipsen designs and manufactures industrial vacuum furnaces, atmosphere furnaces and supervisory control systems for a wide variety of thermal processing markets including: aerospace, automotive, medical, energy and commercial heat treating. The company is exhibiting in conjunction with Vacuum & Atmosphere Furnaces Ltd, its agent for the UK and Ireland.

Nabertherm

MORE THAN HEAT 30-3000 °C

www.nabertherm.com

With 500 employees worldwide, **Nabertherm GmbH** have been developing industrial furnaces for many different applications for 70 years and manufacture the widest and deepest range. 150,000 satisfied customers in more than 100 countries offer proof of our commitment to excellent design, quality and cost efficiency. Short delivery times are ensured due to our complete in-house production and our wide variety of standard furnaces.

www.phoenixtm.com

PhoenixTM designs and manufactures temperature-uniformity surveying and profiling systems. Measuring the temperature profile through heat treatment processes is achieved by attaching thermocouples connected to a datalogger protected by a thermal barrier. The whole system can pass through the furnace with the product, allowing accurate temperature data to be stored for later analysis.

www.rubig.com

RÜBIG Systems Engineering is a globally-active producer of customised heat treatment plants (plasma nitriding/coating and gas nitriding of machined or forged steel parts). The know-how reflected in the systems has been gained in the in-house job shop. With the brands *MICROPULS® Everest, MICROPULS® Diamond Xtended, MICROPULS® Procoat* and *GASCON K2,* RÜBIG has reached the top of nitriding and coating.

www.tenova.com

With its locations in Menden and Dortmund, Germany, IVA **Schmetz GmbH** is a manufacturer of vacuum and atmosphere furnaces for the heat treatment industry. The company specialises in manufacturing various kinds of furnaces for heat treatment processes, such as hardening, annealing, tempering, brazing, nitriding, carburising, sintering, etc.

www.schunk-group.co.uk

Schunk UK Ltd has been the manufacturing and sales centre for products of the Schunk Group in the UK and Ireland for over 50 years. For heat treatment, the company supplies standard components for furnace lining, felts and foils for furnace insulation, and lightweight batch carriers and other furnace components made from carbon fiber reinforced carbon (CFC).

www.secowarwick.com

Seco/Warwick Group is a technological leader in innovative heat processing solutions. Expertise includes end-to-end solutions in five categories: vacuum heat treatment; atmosphere and aluminium thermal processing; controlled-atmosphere brazing of aluminium heat exchangers; and vacuum metallurgy. The group has eleven companies located on three continents, with customers in nearly 70 countries.

shrh.sxl.cn

Art Casting is a series of baskets, trays and fixtures for heat treatment furnaces, developed by **Shanghai Ronghan** Business Consulting Co., Ltd. and its co-operators with unique design and high quality. They can be used in a wide range of furnaces made by the major suppliers and have been widely employed by many operators in Germany and China.

www.supersystemseurope.com

Super Systems Europe is a provider and system integrator of complete process measurement, control and automation products and systems for furnaces and machinery in the heat-treatment, surface-engineering and thermal-processing industries. It develops and manufactures oxygen probes, gas analysers, touchscreen instrumentation, datalogging equipment and control panels.

SPONSOR

www.vacat.co.uk

Vacuum and Atmosphere Services Ltd are the UK's leading provider of products and services for the heat treatment industry. With the most comprehensive engineers, the company is the single biggest provider of services for both vacuum and atmosphere furnaces. Now agents for the world's largest furnace manufacture, Ipsen, VAS are also able to provide the most technologically-advanced and highest-quality heat treatment furnaces.

SPONSORS AND EXHIBITORS

www.wakefieldacoustics.co.uk

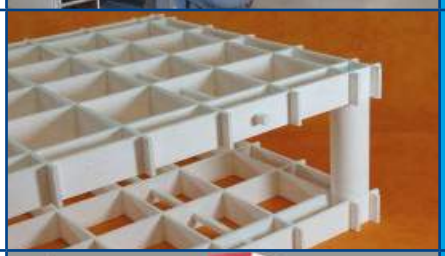
Wakefield Acoustics is one of the UK's leading manufacturers of advanced industrial and environmental noise control systems for a wide variety of sectors worldwide. With a commitment to process excellence, we are accredited to ISO9001:2015, ISO14001:2015 and BS OHSAS18001:2007.

SPONSOR

www.wallworkht.co.uk

The **Wallwork Group** offer comprehensive heat treatment and PVD coating services to aerospace standards. Most areas of the UK are covered by the 40+ vehicles operated by the Group. Additionally the Group manufacture heat-resistant Ni/Cr furnace jigs and fixtures, developed from 50+ years of experience, and PVD coating machines.

wpx-faserkeramik.de



WPX is a leading supplier of furnace furniture made from oxide ceramics matrix composites (OCMC). OCMC parts survive extreme thermal and mechanical shocks. They are insulating, non-corrosive and non-oxidizing. OCMC separating grids for CFC carriers eliminate carbon contamination / sticking of parts. Major automotive suppliers and OEMs are WPX customers.

www.zwick.co.uk

Zwick/Roell Indentec, UK manufacturer and global supplier of advanced hardness-testing products and support services, offers a wide range of manually-operated and fully-automated systems. These are available with UKAS-accredited calibration in accordance with ISO and ASTM requirements and are Nadcap compliant. Custom fixtures accommodate difficult-to-hold samples. Specialists provide access to extensive experience and expert hardness-testing knowledge.

For full details of the conference/exhibition, go to:

www.sea.org.uk/industry-conference/

Technology developments

BODYCOTE LAUNCHES GAME-CHANGING TECHNOLOGIES

Bodycote, the world's largest provider of heat treatment and specialist thermal processing services, has introduced *Powdermet*® technologies, a group of additive-manufacturing processes used in the production of complex components via powder metallurgy.

Bodycote has decades of experience creating complex high-integrity components from powdered metal. Bodycote *Powdermet*® technologies now incorporate new, patent-pending techniques that combine 3D printing with well-established net-shape and near-net-shape techniques. This new technology dramatically reduces the manufacturing time and production cost of a part compared with producing it using 3D printing alone.

Bodycote* Powdermet® *enhances 3D-printing technology.

Powdermet® technologies ensure complete powder consolidation, achieve structural homogeneity, and eliminate internal porosity and unconsolidated powder flaws. The process can produce components with varying surface features and thicknesses, with higher structural integrity than alternative production techniques.

The need for brazing or welding parts together to form larger structures is eliminated. Instead, the finished article can be produced as one seamless component and largely avoid the size limitations imposed by the constraints of 3D printing. Different parts of a component can be formed from different alloys, presenting the ideal and most cost-efficient solution. Component design can be tailored to the actual requirements for performance and not limited by subsequent machining operations.

Stephen Harris, Group Chief Executive, commented that "the recent breakthroughs are truly game-changing technologies for component design and manufacturing. Industry applications are wide-ranging, with early adoption expected in aerospace, oil and gas, power generation and mining". Bodycote continues to invest in resources and capital for development in additive manufacturing technology to create significant value for customers and meet the future growth demands. As well as its *Powdermet*® technologies, Bodycote provides a full range of heat treatment, hot isostatic pressing (HIP) and electrical discharge machining (EDM) services across North America and Europe, tailored specifically to support the needs of companies manufacturing metal components utilising 3D printing.

AIRCRAFT TECHNOLOGY FOR HIP AND KNEE REPLACEMENTS

A coating system that enables light and strong titanium alloy to replace steel-based bearings in landing gear, on the Airbus 350 and 380 passenger jets, could soon be used in human hip and knee replacements. Advanced hard coatings specialist, Wallwork Cambridge, has been awarded funding from Innovate UK, the government-backed sponsor of breakthrough technologies, to research the medical application of this process.

The development has promise as an enabling technology that may lead to customised implants made by additive manufacturing leading to light, strong, safer and longer-lasting joint replacements with potentially huge savings for the NHS.

Titanium is already widely used in orthopaedic surgery as bone splints, plates and other devices. The material has high strength, fatigue resistance, lightness and good bio-compatibility, though long-term use can cause staining to skin tissue. Unfortunately, it performs poorly in load-bearing situations due to its relative softness. When used in aircraft bearings, Wallwork overcome this with a duplex coating process where deep nitrided cases are created in the metal surface to make it more resilient. This is then followed by the application of a hard micro-thin and highly lubricious coating by physical vapour deposition (PVD). The company is one of the largest PVD processors in Europe.

Knee and hip replacements are usually made from an alloy of cobalt, chrome and molybdenum (CoCrMo) or from ceramics. These materials are sometimes used in hybrid structures in combination with high-density polymers. Issues have arisen of metal-ion leakage from CoCrMo devices, plastic degradation and breakage or chipping of the ceramic implants in active individuals. This can cause pain and discomfort to patients and be highly damaging to surrounding tissues.

Under development at Wallwork is *Agilliant*, a patented coating that will provide an effective barrier against the release of metal ions and which also includes a small proportion of silver to give active protection from post-operative infection. The material is super smooth, permitting the easy passage of tendons so that they do not become inflamed. The barrier is also effective against bio-tribo corrosion by the synovial fluid that still acts as a natural joint lubricant in artificial implants.

Head of research and development at Wallwork, Dr Jonathan Housden explained: "The duplex coating process, incorporating *Agilliant* as the final coating, opens the way for the introduction of a new generation of durable titanium implants. These will be lighter and more comfortable for the patient with fewer complications caused by post-operative infection and mechanical wear. Early trials to simulate many years of use suggest that the joints will, in many cases, outlive the patient, leading to a £300million annual saving for the NHS by allowing more efficient use of orthopaedic resources as rework of failed or compromised treatments is reduced."

Wallwork Cambridge, a centre for medical implant hard coatings.

Wallwork is collaborating with the Institute for Functional Surfaces at the University of Leeds in relation to the aerospace technology transfer. A major implant manufacturer and leading NHS centres are their project partners for the *Agilliant* coating.

Extreme care is taken with the development of all new technologies in the medical field, but the company anticipates the first patient trials for the new devices could commence in as little as four years, after completion of intensive laboratory simulations.

The Contract Heat Treatment Association Newsletter

HOTLINE

ADVERTISING

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/36/.*

2017 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/46/).***
- **Post regular items in *Hotline's* "advertiser news".**

2017 DEADLINES

Issue	Publication month	Order deadline	Copy deadline
Hotline 147	March	10 February	17 February
Hotline 148	June	11 May	18 May
Hotline 149	September	10 August	17 August
***Hotline* 150**	December	9 November	16 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*

Devoted exclusively to the UK heat treatment community

FORTHCOMING EVENTS

Diary

September 18-20 2017
HEAT TREATMENT 2017
Moscow, Russia *www.htexporus.com/*

September 21-23 2017
CHINA (BEIJING) INTERNATIONAL HEAT TREATMENT EXPO 2017
Beijing, China *http://en.cihtexpo.com/*

September 27 2017
HEAT TREATMENT CONGRESS
Bilbao, Spain *http://metalspain.com/heat-treatment.htm*

September 28 2017
BIFCA course: BURNER TECHNOLOGY
West Bromwich, England *www.bifca.org.uk*

October 9-10 2017
NADCAP AUDIT PREPARATION – HEAT TREATING
Sheffield, England
www.equalearn.com/learncenter.asp?id=178409

October 11-12 2017
INTRODUCTION TO PYROMETRY
Sheffield, England
www.equalearn.com/learncenter.asp?id=178409

October 13 2017
SURFACE ENGINEERING AND HEAT TREATMENT INDUSTRY CONFERENCE
Kenilworth, England
Co-sponsored by SEA, CHTA and Wolfson Heat Treatment Centre. See pages 9-14.
www.sea.org.uk/industry-conference/

October 17-19 2017
MODERN FURNACE BRAZING SCHOOL
Pontardawe, Wales
www.wallcolmonoy.com/products-capabilities/brazing-alloys/brazing-school/

October 24-26 2017
29TH ASM HEAT TREATING SOCIETY CONFERENCE & EXPOSITION
Columbus, Ohio, USA
www.asminternational.org/content/Events/heattreat/

October 25-27 2017
73RD HÄRTEREIKONGRESS
Cologne, Germany
Heat treatment congress, including exhibition, with simultaneous German/English translation: *www.hk-awt.de*

October 26 2017
BIFCA course: FURNACE & BURNER CONTROLS
West Bromwich, England *www.bifca.org.uk*

October 26 2017
CHTA PUBLICITY SUBCOMMITTEE*
Birmingham, England

October 26-27 2017
SURFACE ENGINEERING FOR RESEARCH & INDUSTRIAL APPLICATIONS (SERIA)
Singapore *www.ms-expo.com/surface-engineering-research-and-industrial-applications-seria-2017*

October 31 2017
PRINCIPLES OF HEAT TREATMENT
Rotherham, England *www.amrctraining.co.uk*

November 1-2 2017
ADVANCED ENGINEERING 2017
Birmingham, England *www.advancedengineeringuk.com*

November 2 2017
PRINCIPLES OF HEAT TREATMENT
West Bromwich, England *www.amrctraining.co.uk*

November 9 2017
CHTA MANAGEMENT COMMITTEE*
Birmingham, England

November 13-14 2017
INTRODUCTION TO PYROMETRY
Birmingham, England
www.equalearn.com/learncenter.asp?id=178409

**Members wishing issues to be raised at CHTA meetings should notify CHTA's Secretary, well beforehand, at* mail@chta.co.uk.

Market Movements

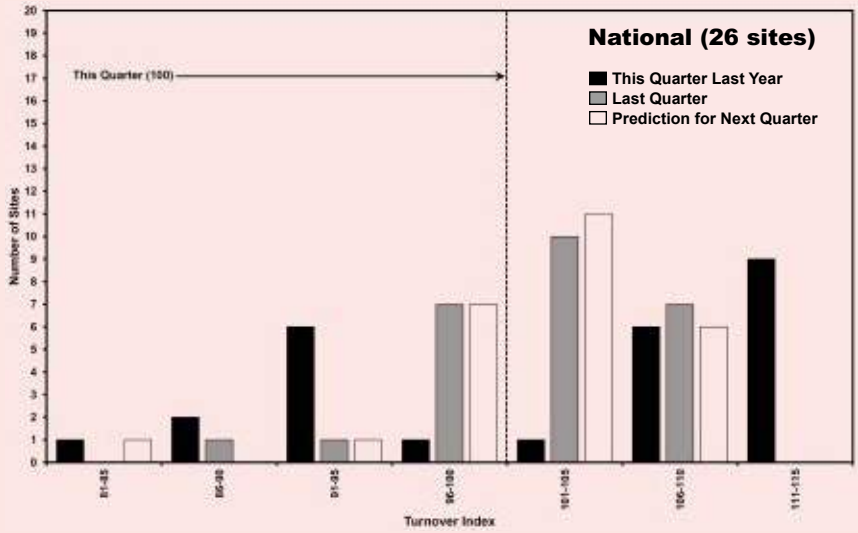
ANALYSIS OF QUESTIONNAIRE REPLIES RELATING TO 26 CHTA MEMBER SITES

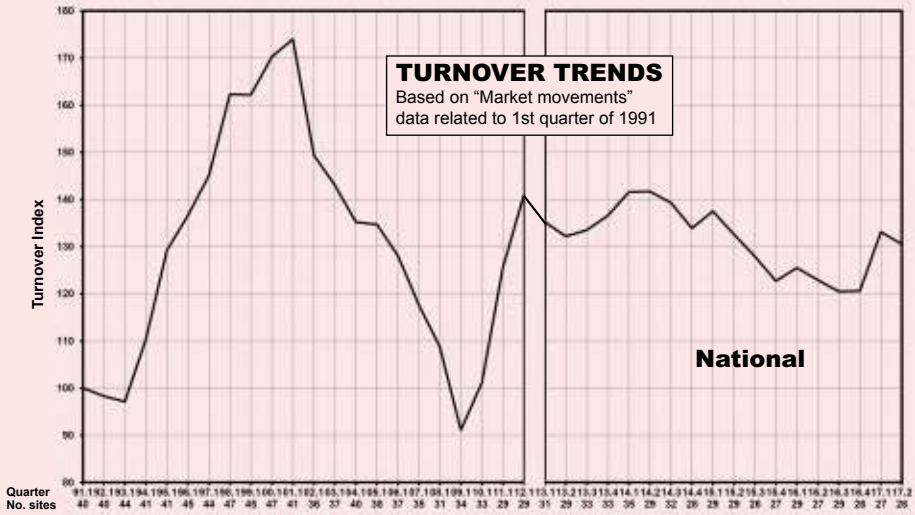
"THIS QUARTER" =

1 APRIL - 30 JUNE 2017

= TURNOVER INDEX 100

OVERALL ANALYSIS (26 SITES)	Mean index
This quarter last year	102.5
Last quarter	102.0
Predicted next quarter	101.7





November 14 2017
NON-DESTRUCTIVE TESTING AND HEAT TREATING
Manchester, England
Nadcap technical symposium. *http://p-r-i.org/index.php*

November 15-16 2017
PRI SPECIAL PROCESS COURSE: HEAT TREATING (OWNER)
Birmingham, England
www.equalearn.com/learncenter.asp?id=178409

November 21-23 2017
26TH NATIONAL CONFERENCE ON HEAT TREATMENT
Jihlava, Czech Republic *www.htconference.cz/en/*

November 23 2017
PRINCIPLES OF HEAT TREATMENT
London, England *www.amrctraining.co.uk*

November 23 2017
BIFCA course: INTRODUCTION TO INDUCTION HARDENING
West Bromwich, England *www.bifca.org.uk*

December 11-12 2017
INTRODUCTION TO PYROMETRY
Manchester, England
www.equalearn.com/learncenter.asp?id=178409

NICKEL PRICE (US$/lb)

Please send comment and news items for December's *Hotline* 150 to: *mail@chta.co.uk*
Deadline: November 16th