The Contract Heat Treatment Association Newsletter

HOTLINE

Issue No. 141
September 2015

Inside . . .

CHTA Secretariat

Items for inclusion in *Hotline* and enquiries about CHTA activities should be addressed to:

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Alan J. Hick B.Sc., C. Eng., FIMMM

CHTA is affiliated to the Surface Engineering Association

Materials Processing - Composites, Heat Treatment Plating, Primary Metals Processing

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or

Come and talk to us at:

Surface Engineering
& Heat Treatment Exhibition
Stratford Manor Hotel, Warwickshire
16th-17th October

Advanced Engineering Show 2015
NEC Birmingham
Hall 5, Stand D55
4th-5th November

What has Nadcap done for the aerospace industry?

Since Nadcap launched 25 years ago, it has steadily grown to become the premier co-operative industry programme for improving aerospace manufacturing processes around the world. To mark the anniversary in July, the ***Performance Review Institute*** *(PRI) has compiled data to highlight five ways that the programme has benefited the industry participants:*

Nadcap has created a collaborative environment where aerospace OEMs and suppliers come together to develop consensus process control criteria and requirements.

The number of subscribing OEMs has increased from one, when the programme started in 1990, to 53 in 2015. The number of active accreditations now exceeds 6900 from suppliers located in 50 countries. The programme has grown to include active participation from companies in North America, Europe, Asia, South America, Africa and Australia.

Nadcap provides a range of tangible and intangible benefits to OEM subscribers as well as accredited suppliers.

86% of over 2800 respondents to the supplier survey recognise that Nadcap has improved quality in the aerospace industry. Additional identified benefits were improved process efficiency, reduced escapes to customers, reduced defect rate, improved first-time yield, increased revenue, and improved customer satisfaction.

OEM subscribers to Nadcap benefit through access to *eAuditNet*, a global comprehensive database of all supplier audit performance information. In-depth process capability assessments, conducted by subject-matter experts selected by industry, enable OEM subscribers to effectively and efficiently manage their supply chain.

The Nadcap programme captures multiple subscribers' requirements in a single audit.

Nadcap reduces redundancy for all, through the industry working together to create harmonized audit criteria, based on industry and OEM subscriber requirements. Audit criteria are developed in 19 different technologies such as heat treating, non-destructive testing, composites and surface enhancement.

Nadcap audits improve consistency across industry and across the supply chain.

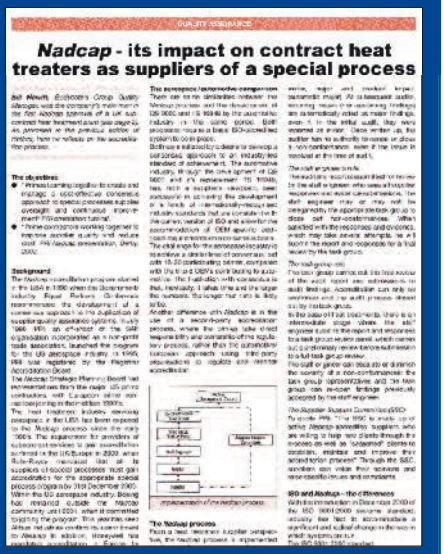
According to a survey conducted in 2015 by the Nadcap Management Council (NMC), 93% of Nadcap subscribers reported that Nadcap audits yield these benefits.

Nadcap augments OEM subscriber resources in overseeing the special process supply chain.

In the 2015 NMC survey, 92% of subscribers stated that Nadcap augments their company resources in terms of managing special process suppliers. Feedback included "The data from Nadcap oversight is (*sic*) used readily when determining how often to engage with accredited suppliers" and "Allows us to minimise the number of on-site visits."

Comments to mail@chta.co.uk.

Nadcap and CHTA members


QUALITY ASSURANCE

Nadcap **- its impact on contract heat treaters as suppliers of a special process**

Whilst Nadcap was first introduced (in the USA) in 1990, it was not until September 2003 that the first UK heat treater, Bodycote Heat Treatments at Woodford, gained Nadcap approval, an achievement noted and assessed by Bill Hewitt in *Hotline* 94 (above). Today, at least 20 CHTA member sites boast the PRI-administered accreditation...

Accredited Nadcap™ Heat Treating

Coming soon...

13-15 October 2015

UNDERSTANDING HEAT TREATMENT

Readers are reminded that Wolfson Heat Treatment Centre's much-lauded **Understanding Heat Treatment** *course is being repeated again this year at SEA's Federation House headquarters in Birmingham.*

The aim of the well-established annual *Understanding Heat Treatment* course is to convey a general appreciation of the metallurgical/technological background to industrial heat treatment processing. It examines the various processes, how they are carried out and controlled, what they seek to achieve in structures and properties, and the problems that can be encountered.

With the emphasis on steel heat treatment, the following topics are covered:

- basic metallurgical theory of heat treatment;
- quenching principles and practice;
- surface hardening theory and practice;
- furnace types, materials, heating methods;
- temperature measurement and control;
- salt-bath heat treatment;
- controlled-atmosphere heat treatment;
- vacuum heat treatment;
- fluidised-bed heat treatment;
- quality control/assurance in heat treatment;
- computer software to assist the heat treater.

The course features lecturers who are working in or associated with the heat treatment industry. They all have many years of experience and are well-known experts within their own specific fields. Delegates are provided with a comprehensive set of subject notes and a certificate of attendance.

For full registration details, contact Derek Close, Wolfson Heat Treatment Centre, Federation House, 10 Vyse Street, Birmingham B18 6LT (tel: 0121 237 1122; fax: 0121 237 1124; *www.sea.org.uk/whtc*; e-mail: *derek.close@sea.org.uk*.

Member news

PROMOTING CONTRACT HEAT TREATMENT AT *ADVANCED ENGINEERING UK 2015*

On behalf of CHTA, John Jervis (Bodycote) will be speaking at one of the conferences at the coming *Advanced Engineering UK* show which takes place at the National Exhibition Centre, Birmingham on 4-5 November this year *(www.advancedengineeringuk.com)*. John will address "**The activities of the Contract Heat Treatment Association and the case for outsourcing heat treatment in today's economy**". He asks fellow members if there are any non-commercially-sensitive examples they can offer of businesses they have persuaded to move from in-house to the outsourcing alternative. He would also welcome any photographs of equipment investments they would like including in the presentation. Your contributions please to: *John.Jervis@bodycote.com*.

We are not alone!

Gord Montgomery's editorial in the August issue of North America's The Monty (www.themonty.com) *highlighted a global problem…*

GOOD PEOPLE ARE HARD TO FIND

There is no doubt in our minds that the number-one issue facing the heat treating industry these days is the lack of good experienced people. An experienced maintenance individual, a qualified metallurgist, an estimator or a qualified heat treat sales person are all equally as hard to find.

It's a shame as this is a good, respectable well-paying industry but the fact that it is such a little known facet of the manufacturing process means that very, very few people get into the business as a choice; rather for most it is a "family affair" and the examples of this abound.

The solutions are obvious but will not be achieved overnight. For instance there is the Japanese model of increased automation which reduces the number of qualified people required and this model should be coupled with a determined plan to get more young people aware of the industry right out of high school.

Neither are an overnight answer but the health of the industry depends upon getting more young people involved. Food for thought.

Comments to mail@chta.co.uk.

£2MILLION INVESTMENT SUPPORTS VACUUM BRAZING EXPANSION FOR WALLWORK

Peter Cookson, who has more than two decade's experience in industrial vacuum brazing, has joined the Wallwork Group to lead a programme of expansion in this speciality.

A new vacuum brazing workshop in Manchester is close to commissioning, adding to existing facilities at the Cambridge site that are set to double. With recent additions to vacuum processing capacity in Birmingham, the company is able to undertake more, larger and increasingly-complex vacuum brazing work, including single pieces sized up to 2m³.

"These are exciting times," Peter observed. "To capture a larger slice of the premium vacuum brazing market in aerospace, motorsport, scientific equipment, nuclear and oil and gas industries, Wallwork is investing £2million over all three locations. This will enable us to meet growing customer expectations. Much of this is going into facilities, specialised equipment, bespoke jigs and tooling. The company is already Nadcap approved for heat treatment at Manchester. Plans are in hand to accelerate Nadcap applications for heat treatment and vacuum brazing at Cambridge by early 2016."

Wallwork is well known throughout the engineering sector for a comprehensive range of heat treatment and hard coatings services that improve the performance of wear parts and other critical components. "We are delighted to have Peter on board," commented Ian Griffin, Manchester site director. "Peter adds a new depth of expertise to what is a well-established and highly-regarded department. We are confident that, with the expanded and upgraded facilities, we will give an exceptional level of service to our customers, from prototype and development work through to volume processing, all under stringent quality control and backed by our commitment to rapid order turnaround.

Outside work, Tameside resident Peter is kept busy by his young family, a fanatical interest in Manchester City FC and as a hockey player for Stockport league winners, Hazel Grove.

FURTHER AWARD SUCCESS FOR TTI GROUP

Surface engineering and heat treatment specialist, TTI Group Ltd, has a double celebration after being awarded the prestigious SC21 (21st Century Supply Chains) Silver recognition award at its Letchworth site and becoming recognised as the first process house to achieve this status. In further news the group has also now officially joined the Airbus SC21 cluster.

This award represents a significant progression up the SC21 awards ladder, bearing in mind the gap between award levels, after the site previously attained Bronze status in both 2013 and 2014.

Elsewhere, the TTI group also has another current SC21-award-winning site as the Cheltenham facility received SC21 Bronze last November. This group expertise will benefit the Telford site during their Q4 SC21 deployment with the aim there of submitting for an award in time for the *Farnborough Airshow 2016*.

SC21 is a programme designed to increase the competitiveness of the aerospace and defence industry by raising the performance of the supply chains. Over 650 companies are currently signed up to the SC21 journey and are committed to achieving common industry development and performance gains.

Presentation of the SC21 award at TTI Letchworth in July: (l. to r.) Tony Alderton (Plant Manager at Letchworth), Phil Curnock (Head of Supply Chains at the SC21-promoting ADS Group), Dave Bull (Director of DB Concept Solutions) and Yvette Lawlor (Group Quality Manager at TTI).

Owned by the Dutch organisation Aalberts Industries, the TTI Group Ltd has six UK processing plants, three of which have aerospace facilities (Letchworth, Cheltenham and Telford).

The TTI Group signed up to SC21 in March 2012, as a self-starter, and used the performance improvement programme to benchmark its improvement efforts internally and to help identify its next steps. This successful implementation lead to Bronze awards in both 2013 and 2014, becoming the first heat treatment plant (process house) to achieve this recognition.

At the core of the group's continuous improvement strategy over the past few years has been the TTI Challenge document, which has been cascaded through the business. The TTI Challenge is based around a four-phase roadmap of customer

NEW CHTA MEMBER

Hotline welcomes a new CHTA member:

Qualtherm Ltd, Unit A, Vector Park, Johnsons Bridge Road, West Bromwich, B71 1DG. Tel: 0121 525 1620.
Contact: Spencer Lowe, Technical Sales Manager (*spencerlowe@qualtherm.co.uk*).

Approved to ISO 9001:2008, this company operates a 15m long x 5m wide x 3m high state-of-the-art furnace for stress relieving, annealing and normalising.

focus, culture and learning, continuous improvement and investment.
Andy Borg, TTI Group's Managing Director said: "Achieving supply chain improvement is critical to the continued global competitiveness of UK industry. TTI Group Ltd are delighted to be able to demonstrate our continued commitment to the SC21 programme".
Tony Alderton TTI Letchworth Plant Manager said "Adopting SC21 has given the plant a structure that drives our continuous improvement activities. It is rewarding to see how SC21 has improved our methods of working and also the workplace for the team at the plant. Most importantly, it is being seen by our customers in the form of improved delivery and quality performance".

SIMON BLANTERN ELECTED TO IFHTSE

Former CHTA Chairman Simon Blantern, Bodycote's Vice-President Sales Europe (Aerospace, Defence & Energy), has been elected as the UK's representative on the Executive Committee of the International Federation for Heat Treatment and Surface Engineering (IFHTSE). He takes over from long-serving Paul Stratton in 2016.

BODYCOTE TO OPEN NEW PLANT IN POLAND

Bodycote, the world's largest thermal processing services provider, recently opened a new heat treatment site in Wroclaw, Poland as part of its expansion strategy in Eastern Europe. Building on this investment, Bodycote has announced its intention to open another greenfield heat treatment site in the aviation valley close to Rzeszow, Poland. The new facility will support the manufacturing supply chains in this region and is expected to be operational by the second half of 2016.
Initially, vacuum heat treatment, vacuum brazing and nitriding will be offered. Other processes will follow, as demand for heat treatment services in the region continues to grow. Additional customer-supporting services are likely to include HVOF and plasma coatings, vacuum oil-quench and aluminum heat treatment.
The new facility will hold international quality standards including Nadcap and AS 9100, as well as OEM approvals. First-tier suppliers to United Technologies Corporation (UTC), Rolls-Royce and SAFRAN, among others, will be supported.

WALLWORK SUPPORT MOTORSPORT STUDENTS

Formula Student is an international competition to build a racing car from scratch, attracting over 100 new engineering undergraduate teams to Silverstone every year. The 2015 team from The University of Sheffield Mechanical Engineering Department overcame myriad technical challenges in translating their design from a computer model to a race-ready car. A particularly sticky problem with brake components was solved in collaboration with hard-coating specialist Wallwork Cambridge.
Team Principal Thomas Bloomfield explained: "Design of components requires extensive and complex CAD work to ensure all the parts will fit together, but the most difficult task is often the parts manufacture. Using additive manufacturing (3D printing) gives us high flexibility. An ability to make extremely accurate and lightweight components ensures the car has a good power to weight ratio for race advantage."
Final-year student Nathaniel Wellicome led the chassis and vehicle dynamics team who selected titanium as the material for callipers and other key brake components. He explained: "Strong, fatigue resistant and, most of all, light in weight, titanium has many advantages in this situation but also one major drawback, because of its very poor coefficient of friction. Being a relatively soft material, compared with say steel, it can bind in metal-to-metal contact under load. We therefore approached Wallwork for their advice on hard coatings, given their particular aerospace and motorsport experience."
Dr Jonathan Housden of Wallwork takes up the story: "The parts were manufactured by the Sheffield students using an additive

The Sheffield Formula Racing 2015 car.

process where metal powder is fused, by electron beam melting (EBM), to create the complex component shapes. Machining of the mating surfaces had been undertaken to overcome the surface roughness that is typical of EBM and provide a smooth substrate to apply the coating. Simply applying a hard coating to this machined surface would be insufficient since the titanium substrate alone is too soft and the coating would fail, so we applied a duplex coating, *Nitron-O*. Using this process, we first nitride the surface to produce a hard layer to support the subsequent titanium nitride coating. *Nitron-O* enables titanium alloy to be used in high-load sliding-wear situations where it could not otherwise be used. It provides a hard-wearing and low-friction surface to prolong service life."
Components were returned to Sheffield for final assembly and trials before the race event. International teams gathered at Silverstone for the race and technical judging, between July 9 and 12, after which the students dispersed to follow careers in industry or further study.
Thomas Bloomfield concluded: "Students carrying out this challenge commit to a time-demanding task undertaken alongside their degrees. This means they develop fantastic time-management skills and learn how to deal with realistic high-pressure fast-paced environments. This makes them very employable and is why some companies, like Wallwork, are happy to sponsor the team by sharing their expertise. For Wallwork, Dr Housden added: "Engineering is a dynamic profession and projects like this help us engage with the next generation of engineers, a collaboration that is mutually beneficial."
To follow the Sheffield motor engineers story, go to their *YouTube* channel *https://m.youtube.com/watch?v=1wg7llyBHhk*.

TECHNICAL AWARENESS SEMINAR

Other news

NEW "HOT BOX" SYSTEM FOR MONITORING PART TEMPERATURE THROUGH OIL QUENCH

PhoenixTM have successfully engineered a 'hot box' system for monitoring part temperature throughout a carburising heat treatment cycle, including the oil quench.

Carburising in a sealed-quench furnace is a common heat treatment process for the manufacture of gears, etc., and oil is the most frequently used quench medium. During the oil quench, products in the batch can sometimes experience distortion problems which may have several causes including oil flow patterns, temperature variations, etc.

Monitoring the temperature profile throughout the complete cycle at various depths within the product and locations around the batch can generate valuable problem-solving data. However monitoring part temperature from a datalogger external to the furnace is not possible; so the PhoenixTM oil quench system, which is able to travel throughout the process with the products, can provide the solution.

PhoenixTM TS12 'Hot Box' system for oil quench.

The PhoenixTM TS12 Series Oil Quench System (patent pending GB1509136.6) uses a multi-channel, high-temperature datalogger protected by a thermal barrier which has a two-part insulation system. The inner thermal barrier is completely sealed to prevent oil reaching the data-logger. The outer insulation layer provides additional heat protection in the furnace, but is sacrificed during the oil quench. The system is designed with enough thermal capacity to go through the complete heat treatment cycle, including the oil quench and subsequent wash process.

The PhoenixTM 'Hot Box' system underwent multiple trials in the test centre of IWT (Germany) where the data collected have been incorporated in an upcoming research project.

To see a video of the system in action, go to *https://goo.gl/ewsCvm*.

THE FATE OF *HEAT TREATMENT OF METALS* JOURNAL

The August 2015 edition of North America's *Industrial Heating* magazine contains some misinformation perpetrated by a reporter not checking his facts.

In the article "European Transitions and Happenings", David Pye reports that "…Wolfson Heat Treatment Centre will once again publish its technical magazine (*The* (sic) *Heat Treatment of Metals*), which was terminated in 2004".

Readers will be disappointed to be made aware that the once world-renowned journal is NOT returning. Both Wolfson Manager Derek Close and Alan J Hick, proud Editor of *Heat Treatment of Metals* during his 31 Wolfson years, wish to set the record straight.

In 2005, *Heat Treatment of Metals* was incorporated into the quarterly *International Heat Treatment and Surface Engineering (IHTSE)*, a new journal co-edited by the late Tom Bell and the voice of the International Federation for Heat Treatment and Surface Engineering (IFHTSE).

December 2014's *IHTSE* (Vol.8, No.4) announced that it was the last issue under extant publishing conditions which were being reviewed; the outcome is awaited. Surprising that David, who referred to IFHTSE in his column, was not aware of this development!

The actual good news is that, as copyright holder, Wolfson Heat Treatment Centre will soon be making classic material from the 124 editions of *Heat Treatment of Metals* (1974-2004) freely downloadable from its website (*www.sea.org.uk/whtc/*).

Prof. Tom Bell (left) and Alan J Hick compare the first edition of *International Heat Treatment and Surface Engineering* journal and the last issue of *Heat Treatment of Metals*.

Your guide to the first English national conference/exhibition encompassing heat treatment since 2003...

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

Conference/exhibition

Stratford-upon-Avon's Stratford Manor 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 participating 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 comedian Ian Moore (pictured), and let's make a night of it!

Surface Engineering and Heat Treatment Industry Conference

16 October 2015

Stratford-upon-Avon, UK

Co-sponsored by...

CONFERENCE PROGRAMME

09.00-09.45	**Registration**
09.45-10.45	**Chairman's welcome / Opening plenary session :** **R&D tax relief on the day-to-day activities of heat treaters and metal finishers** Dominic Bartholdi, Leyton UK **Growing your business through digital** Alexis Bradbury, Browndog Design
10.45-11.15	**Networking coffee break and table-top exhibition**

	SURFACE ENGINEERING: Session 1	HEAT TREATMENT: Session 1
11.15-13.00	**Chief Executive's Introduction** David Elliott, Surface Engineering Association ***STOWURC*: New Effluent Treatment Processes Using Materials from Crab Shells** Martin Goosey, MTG Research Ltd. **COMAH 2015** Sandra Ashcroft, Health & Safety Executive **Employment Law** Nigel Lea, Citation Ltd **Drying Solutions** Mervyn Brown, Harter Oberflächen und Umwelttechnik GmbH	**Chairman's Introduction** Alan J Hick, Contract Heat Treatment Association, UK **Industrial Laser Hardening** Tony Bransden, Ionbond Germany GmbH **Challenges and Benefits of Temperature Profiling in the Heat Treatment Industry** David Plester, PhoenixTM, UK **Using Heat Treatment Software to Increase Productivity** James Cross, Super Systems Europe, UK ***HybridCarb* - Method to Reduce Operating Costs in Gas Carburising Processes** Bernd Edenhofer, Ipsen, Germany

13.00-14.00	**Networking lunch and table-top exhibition**

	SURFACE ENGINEERING: Session 2	HEAT TREATMENT: Session 2
14.00-16.00	**New method to detect hexavalent chromium in exhaled breath condensate samples** Kate Jones, Health & Safety Laboratory **Latest Regulatory Developments** David Elliott, SEA Chief Executive & President, CETS **Cleaning and Degreasing With Solvents – Your Future Option** Richard Starkey, SAFECHEM **Hexavalent-free Processes for Plating on Plastics** Duncan Beckitt, Coventya ***uDiamond* - The Future of Nano-diamond Technology for the Surface Treatment Industry** John Torr, Carbodeon Ltd Oy	**Gas Carburising without Internal Oxidation (Activated Carburising)** Maximus Akuh and Mike Wilkinson, Air Products, Germany/UK **Low-pressure Carburising and High-pressure Gas Quenching** Matthias Rink, Ipsen, Germany **Faster Carburising with *PreNitLPC*** Michał Sut, Seco/Warwick, Poland **Solution-oriented Approach to Nitriding/ Nitrocarburising Controls** Pat Torok, United Process Controls, USA **Thermochemical Heat Treatments: the Changing UK Scene** Steve Plumb, TTI Group, UK

Industry sponsors...

16.00-16.30	**Closing plenary session** **Reshoring production back to the UK** Alison Phillips, MAS
16.30-17.15	**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**

www.sea.org.uk/conference

HEAT TREATMENT EXHIBITORS

www.ajaxtocco.co.uk

AjaxTOCCO International Ltd are the largest supplier of induction heating services in the UK. These include subcontract induction hardening, in a state-of-the-art facility, plus the supply of bespoke equipment for hardening, melting, forging and brazing needs. The company also supplies power-transmission items such as inductors, power leads, bus bars, etc., both new and reconditioned, plus equipment spares and service for various makes.

www.alloyheat.co.uk

NADCAP-approved **Alloy Heat Treatment** are the UK's leading specialists in the heat treatment of aluminium alloys. With over 40 years experience as a subcontractor focused solely on the processing of aluminium alloys, they are the preferred destination for companies within all sectors of the light metal industry.

A TENOVA COMPANY

www.bmi-fours.com

Since 1947, **BMI** Fours Industriels 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.

www.bodycote.com

The leading provider of thermal processing services worldwide, **Bodycote** is uniquely placed, via its global network and the experience and knowledge of its people, to offer high-quality, reliable and cost-effective heat treatment services to manufacturers, whatever their size or market sector.

PROFESSIONAL SOLUTIONS

www.citation.co.uk

Citation is the UK's leading provider of Employment Law and Health & Safety compliance advice and has been SEA's recommended supplier in these areas since 2006. Risk assessments, manual handling, COSHH, hot working, HSE inspections, Fee For Intervention, staff training, contracts of employment, discipline and grievance procedures, employment tribunals....Citation can help.

www.claytonholdings.com

Clayton Thermal Processes is part of the Clayton Holdings Group, whose activities are allied to the metals engineering, plastics, paint and foundry industries. Manufacturing and maintaining fluidised-bed furnaces for variety of processes related to those sectors, the group also offers subcontract services for heat treatment, paint and polymer removal and the removal of casting cores.

INDUSTRIAL FURNACES FOR HEAT TREATMENT

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 Robey-Wellman Boilers & Furnaces Ltd, Codere's newly-appointed agent for the UK and Irish markets.

Cronite Castings

L'esprit industriel

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.

For full details of the conference/exhibition, go to *www.sea.org.uk/conference*

HEAT TREATMENT EXHIBITORS (continued)

www.eurothern.co.uk

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

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 Services Ltd, its agent for the UK and Ireland.

www.keighleylabs.co.uk

Keighley Laboratories specialises in the analysis, testing and heat treatment of metals. It offers a comprehensive range of thermal processing treatments. These, together with its independent UKAS and NADCAP accredited metallurgical test house and laboratory, enable the company to provide full technical support to customers, and all available on one site.

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.safechem-europe.com

SAFECHEM Europe GmbH is an experienced provider of services and solutions related to the safe and sustainable use of solvents in surface cleaning. Branded, fresh chlorinated and modified alcohol solvents deliver exceptional surface cleaning results. Handled in the *SAFE-TAINER*™ system with a wide range of services and *CHEMAWARE*™ know-how, the risk is virtually managed. Customers benefit from a high-quality cleaning solution in line with regulatory and environmental requirements.

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.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 industry. It develops and manufactures oxygen probes, gas analysers, touchscreen instrumentation, datalogging equipment and control panels.

www.ttigroup.co.uk

In addition to offering an extensive range of heat treatment, HIP and PVD processes, **TTI Group** also provide specialist treatments designed to overcome specific problems such as abrasion, corrosion and adhesion. Their team of specialists provide customers with access to extensive experience and excellent expert metallurgical knowledge.

For full details of the conference/exhibition, go to *www.sea.org.uk/conference*

VAS
VACUUM & ATMOSPHERE SERVICES LTD
www.vacuum-atmosphere-furnace.co.uk

Vacuum and Atmosphere Services Ltd offer a wide range of products and maintenance services for vacuum and controlled-atmosphere furnaces. These include new plant sales, furnace refurbishment, hot zone relines, re-bricks/refurbishments, instrument upgrades and extensive spare parts. The company is exhibiting in conjunction with Ipsen, for whom it is UK and Ireland agent.

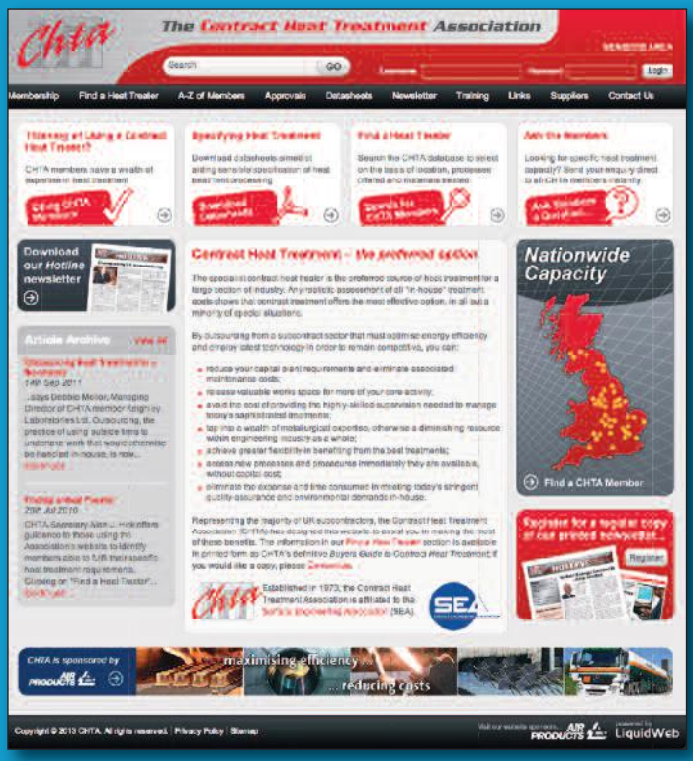
Zwick / Roell
Indentec
www.zwick.co.uk

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/conference*

For the best in subcontract heat treatment services, go to...

www.chta.co.uk



...your definitive guide to sourcing from over 60 UK-wide specialists

Changing times: flame hardening

"Experience over the years leads to changes, improvements, progress and better quality," says Flame Hardeners' managing director ***Roger Haw****. "Since we published our 1952 brochure – over 60 years to reflect the changes – it's interesting to see what we said then and what we say now."*

Here are some examples relating to the advantages of the Shorter Process for flame hardening, together with the reasons why the message is different:

Surface finish

1952: *There is no scaling – a grey matt finish results.*

Today: There is no scaling – the finish is usually dark blue or black. If desired, we can lightly shot-blast the item to give a grey finish.

Modern quench media are a great improvement in obtaining the correct quenching rate to give the desired levels of hardness, which have increased over the years. These media tend to leave a different surface colour.

Dimensional change

1952: *The dimensional change is usually negligible with the minimum of distortion but the material ordered should be suitable for flame hardening and the steel supplier should be informed that it is intended to flame harden the material. The steel should have the correct metallurgical history (e.g. long slender rollers should not be made from steel that has been cold worked); there should be no cold straightening at any stage.*

Today: The dimensional change is usually minimal, subject to our advice on processing routes and material recommendations.

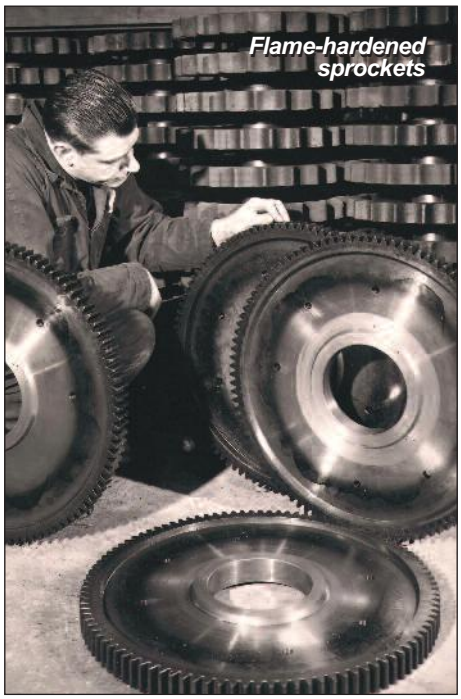
We can advise upon the manufacturing routes, the necessity (or otherwise) to introduce stress relieving at an intermediate machining stage, and possible changes in the dimensional shape of any component which may improve stability.

Core strength

1952: *The core strength is unimpaired by the process.*

Today: The core strength is unimpaired by the process. The selling point of surface hardening is that only the area of the component needing hardening requires heating and that the depth of such heating is less than 1mm deeper than the required hardened depth.

Roger Haw, Managing Director of Sheffield-based Flame Hardeners Ltd *(www.flamehardeners.co.uk)* served as CHTA Chairman in 2005-2007.



Flame-hardened sprockets

Last operation?

1952: *Hardening can be the last operation.*

Today: Hardening can be the last operation, but sometimes we advise against this, as explained with regard to dimensional change.

Localised hardening

1952: *Hardening is easily restricted to localised areas.*

Today: Hardening is easily restricted to localised areas because we have years of experience in designing heating tools (for both flame and induction hardening) in order to achieve this.

Surface Hardness

1952: *The full potential surface hardness is obtained with a high impact value in the core.*

Today: The correct design requirement of balance application between the surface hardness and depth and the core hardness for any particular application can be achieved. It is not always desirable to harden to the maximum surface hardness attainable.

Speed/cost

1952: *It's quick and economical.*

Today: The process is cost advantageous when compared with other hardening techniques, particularly when considering the total energy input. However, the process of heating and quenching is controlled by the volume rate of change and different surface hardening processes have different rates of heat input and subsequent quenching, e.g. spin hardening applies heat more gradually than progressive hardening.

With progressive hardening there is an optimum traverse speed that can be employed and, as all flame and induction hardening is a machine operation rather than a furnace operation, such speeds affect the processing time and hence the cost. Therefore, the speed of production for a one-off component is very likely to be quicker than a similar furnace treatment, but the time taken to produce a thousand of the same component may be longer than the time taken to harden similar items by other treatment methods.

Depth of hardening

1952: *There is a good depth of hardening that can be varied – usually 0.090" at high hardness.*

Today: Hardened depths of up to 20mm can be achieved, providing the component geometry and the material are suitable.

Applicable materials

1952: *There is a wide range of steels from which to choose.*

Today: The processes of flame and induction hardening can be applied to components manufactured in plain-carbon steels, low-alloy steels, cast irons and SG irons.

The trend by steel manufacturers to produce a smaller range of steels restricts the total number of steel specifications available. The materials suitable for use, therefore, fall into the four categories mentioned above.

Changed message

Roger Haw explains why the message has changed: "We have the benefit of over 60 years' development of techniques and improvement of materials and quenching media, the combination of which makes flame and induction hardening valuable and economic treatments."

One statement made in the foreword of Flame Hardeners' 1952 brochure requires an apology (even 63 years later) believes Mr. Haw, and it is this:

'We think Shorter Process flame hardening is an art'.

"This is absolute rubbish," he stresses. "The processes of flame and induction hardening are a science; they always have been and always will be. That unfortunate statement, made so long ago, totally detracts from the skill and knowledge of all companies engaged in the technique."

Fours Industriels BMI: the vacuum specialist

Export Manager Philippe Lebigot outlines the activities of Hotline*'s new advertiser.*

Founded in 1947 in Lyon (France), Fours Industriels BMI was acquired in June 2013 by the Tenova Group (part of the Techint Group), a key player in the fields of mining and metalworking, with a dual and reciprocal benefit: enriching the Tenova products portfolio and improving BMI's standing worldwide.

Since its creation, BMI (*www.bmi-fours.com*) has been designing and manufacturing industrial furnaces for heat treatment. From the early 1980s, it has specialised in the manufacture of industrial vacuum furnaces for the main heat and thermochemical treatments.

Today, BMI owns several patents and many technical and specific designs resulting from its experience in the development of innovative solutions, as much for the techniques (e.g. nitriding and low-pressure carburising) as for its technical offerings (e.g. rotary gas cooling volute, inflatable seal, direct heating/cooling tempering furnace).

Thanks to its experience and innovative capacity, BMI provides high-technology vacuum furnaces for a wide range of treatments including gas quenching, oil quenching, and oil and gas quenching in combination. Applications include high-temperature brazing, aluminum brazing, stress relieving, sintering, MIM (metal injection molding), *ALLNIT®* low-pressure nitriding, *ALLCARB®* low-pressure carburising, tempering, ion nitriding and IVD coating.

In addition to providing a standard range of industrial furnaces to its clients, BMI offers the option of adapting its equipment to their needs in order to provide specific vacuum heat treatment solutions, based on technologies that are largely tested in the industrial environment. This ability to furnish specific solutions results in custom-made furnaces which are designed to match the most stringent requirements of the most advanced fields of activities. These encompass aeronautics, aerospace, automobile and medical sectors, as well as the steel and equipment suppliers and, of course, the heat treatment subcontractors.

Over the last decade, for example, BMI has developed, for the aeronautics industry in China, a range of vacuum oil-quenching furnaces for landing gear heat treatment and huge furnaces to stress relieve titanium-alloy aircraft components (fuselage and frame) - the bigger one having a useful zone of 2.5 x 7 x 1.5m for a maximum load of seven tons. This range of vertical oil-quenching furnaces successfully meets customers' expectations. The number of orders for such equipment over the years has put BMI in a leading position in Asia, with an estimated market share of 80%.

More recently in France, a fully-automated 3m-deep vertical low-pressure carburising furnace, for the treatment of long aircraft screws, has been developed.

Thanks to a strong local sales and service network, built over the years, BMI is today able to deliver about 80% of its production abroad, to China, Taiwan, Europe and Russia as well as Canada, Mexico and middle-eastern countries, mostly in the aerospace industry.

Recent successes in the UK drive us to set up a partnership with a locally-based company able to provide sales and service support. BMI will be present at October 16's *Surface Engineering & Heat Treatment Industry Conference* and we would be glad to discuss this opportunity to collaborate with anyone interested.

For further information, contact Philippe Lebigot at Fours Industriels BMI (*philippe.lebigot@tenova.com*; tel: +33 474 94 34 44).

Thanks for the memories

The recent 140th edition of *Hotline*, looking back over 40 years, invoked many memories of my working life in the heat treatment industry. Congratulations to Alan Hick for putting together a superb edition.

Having finally retired from Tamworth Heat Treatment in August, I must thank all my colleagues in the industry and a host of loyal customers and suppliers who have provided friendship and support over the years, leaving me with many happy memories.

The changes in the industry that I have been involved with since 1965 have been phenomenal and a great experience and I am proud to have been part of it.

I have always embraced change and new technology and I believe this will be a big challenge for the industry and the people within it as the pace of change accelerates in the years ahead.

My best wishes to you all and thanks for the memories.

Alan Whitehouse

Dear Alan:

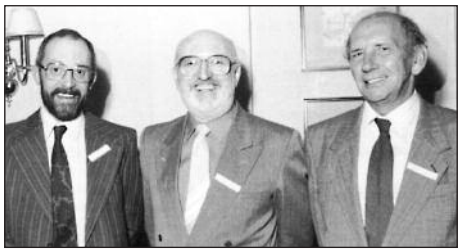
May I compliment you on your article, "Forty Years of *Hotline* – a fond look back". It conjured up a considerable number of memories and faces for me. An incestuous industry, with many unforgettable characters.

I have always felt that the 50 years I spent in the industry were extremely exciting, with so much development and innovation taking place over a short period. I am honoured to have been part of it.

Nowadays, apart from my contact with a couple of your members, I am somewhat out of touch with the current industry; so I do appreciate the regular copy of *Hotline* which you kindly send to me. Quite a number of new faces and the faces which I do recognise having matured somewhat – haven't we all?

It is good to see you carrying out your role with creativity and efficiency as you have always done. If you remember, I used to say to you that you had the best job around – you have earned it Alan.

Keith Bennett



Keith Bennett (Senior Heat Treatment), flanked by former CHTA Chairman Ian Brown (Wallwork) and Terry Gladman (University of Leeds), all speakers at 1993's CHTA-co-sponsored Wolfson conference "Heat-treatment Response of Aluminium-containing Plain-carbon Steels".

Dear Alan:

Great job. This edition really is very excellent - well done!!

Andy Borg, TTI Group

Dear Alan:

I agree with Andy, an epic edition!

Richard Burslem, Wallwork Heat Treatment

Hi Alan:

This is a superb edition marking 40 years of *Hotline*: you have clearly put a lot of work into this. Great job!

Keith Laing, TTI Group

Congratulations Alan, you have surpassed yourself.

Chris Kenward, AjaxTOCCO International

FORTHCOMING EVENTS

Diary

September 14-16 2015
HEAT TREAT SUMMIT NORTH AMERICA
Erie, Pennsylvania, USA
www.secowarwick.com/events/show/127?locale=en_US

September 15-16 2015
INTRODUCTION TO PYROMETRY
Birmingham, England
www.equalearn.com/learncenter.asp?id=178409

September 15-17 2015
HEAT TREATMENT 2015
Moscow, Russia
9th international specialised exhibition: held annually, the only exhibition of thermal equipment and technologies in Russia. *www.htexporus.com*

September 16 2015
HEAT TREATMENT CONGRESS
Bilbao, Spain *www.metalspain.com/TT.htm*

September 16-17 2015
NEW TRENDS IN HEAT TREATMENT
Zbaszyn, Poland
18th Seco/Warwick seminar.
www.secowarwick.com/events/show/95?locale=en_US

September 22 2015
BIFCA course: BURNER TECHNOLOGY
West Bromwich, England *www.bifca.org.uk*

October 8 2015
5TH INTERNATIONAL CONFERENCE ON DISTORTION ENGINEERING
Bremen, Germany *www.distortion-engineering.de*

October 8 2015
BIFCA course:
INTRODUCTION TO INDUCTION HARDENING
West Bromwich, England *www.bifca.org.uk*

October 8-9 2015
NOVATHERM 2
Woźniki, Poland
With emphasis on nitriding/nitrocarburising, seminar on "innovative solutions in heat treating".
www.novatherm.org/en/seminar/

October 13-15 2015
UNDERSTANDING HEAT TREATMENT
Birmingham, England
80th repeat of Wolfson Heat Treatment Centre's course. Details from Derek Close: tel: 0121 237 1122; e-mail: *derek.close@sea.org.uk; www.sea.org.uk/whtc* ***See page 3.***

October 16 2015
SURFACE ENGINEERING AND HEAT TREATMENT INDUSTRY CONFERENCE
Stratford-upon-Avon, England
Co-sponsored by SEA, CHTA and Wolfson Heat Treatment Centre: *www.sea.org.uk/conference/* ***See pages 9-13.***

October 20-22 2015
28TH ASM HEAT TREATING SOCIETY CONFERENCE & EXPOSITION
Detroit, Michigan, USA
www.asminternational.org/content/Events/heattreat/

October 20-22 2015
MODERN FURNACE BRAZING SCHOOL
Pontardawe, Wales
www.wallcolmonoy.com/products-capabilities/brazing-alloys/brazing-school/

October 21 2015
BIFCA course: FURNACE & BURNER CONTROLS
West Bromwich, England *www.bifca.org.uk*

October 22 2015
CHTA PUBLICITY SUBCOMMITTEE*
Birmingham, England

October 26-27 2015
INTRODUCTION TO PYROMETRY
Manchester, England
www.equalearn.com/learncenter.asp?id=178409

October 21 2015
BRASIL HEAT TREATMENT CONGRESS
São Paulo, Brasil *www.metalspain.com/brasil.html*

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

Market Movements

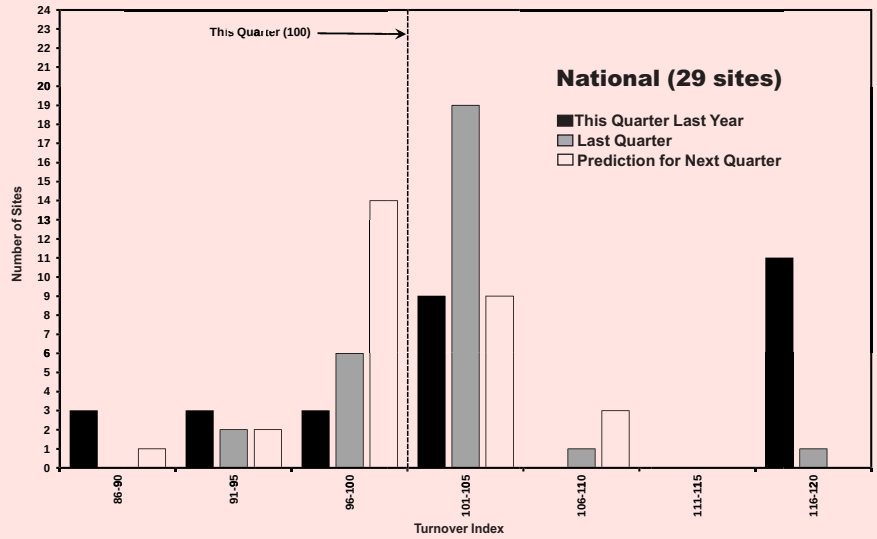
ANALYSIS OF QUESTIONNAIRE REPLIES RELATING TO 29 CHTA MEMBER SITES

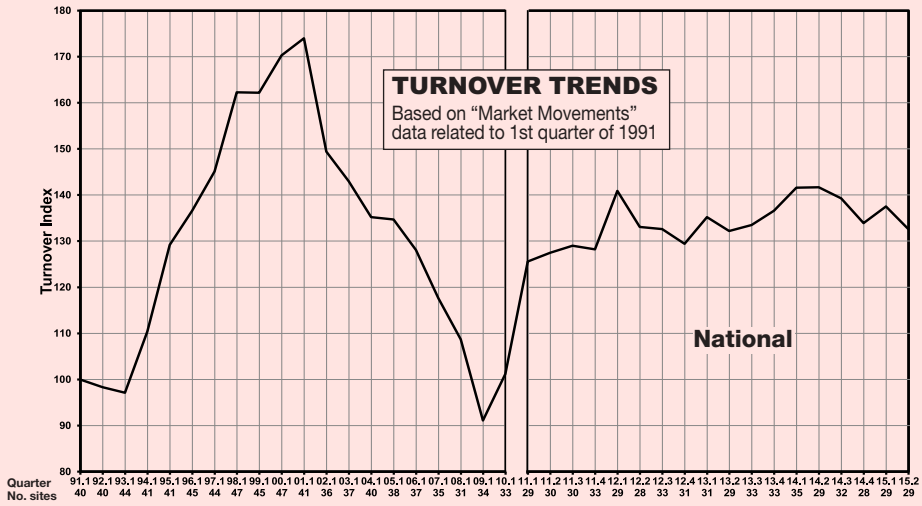
"THIS QUARTER" =

1 APRIL – 30 JUNE 2015

= TURNOVER INDEX 100

OVERALL ANALYSIS (29 SITES)	Mean index
This quarter last year	106.1
Last quarter	103.3
Predicted next quarter	100.8





October 28-30 2015
71ST HÄRTEREIKONGRESS
Cologne, Germany
Heat treatment congress, including exhibition, with simultaneous German/English translation: *www.hk-awt.de*

November 5 2015
CHTA MANAGEMENT COMMITTEE*
Birmingham, England

November 5-6 2015
BALTMATTRIB 2015
Tallinn, Estonia *www.ttu.ee/baltmattrib2015*

November 24-25 2015
BIFCA course: INDUSTRIAL FURNACE TECHNOLOGY
West Bromwich, England *www.bifca.org.uk*

November 24-25 2015
CONFERENCE ON CHEMICAL HEAT TREATMENT OF METAL SURFACES
Jihlava, Czech Republic *http://www.htconference.cz/en/*

November 30 – December 1 2015
NADCAP AUDIT PREPARATION – HEAT TREATING
Birmingham, England
www.equalearn.com/learncenter.asp?id=178409

NICKEL PRICE (US$/lb)

Please send comment and news items for December's *Hotline* 142 to: *mail@chta.co.uk*
Deadline: November 18th