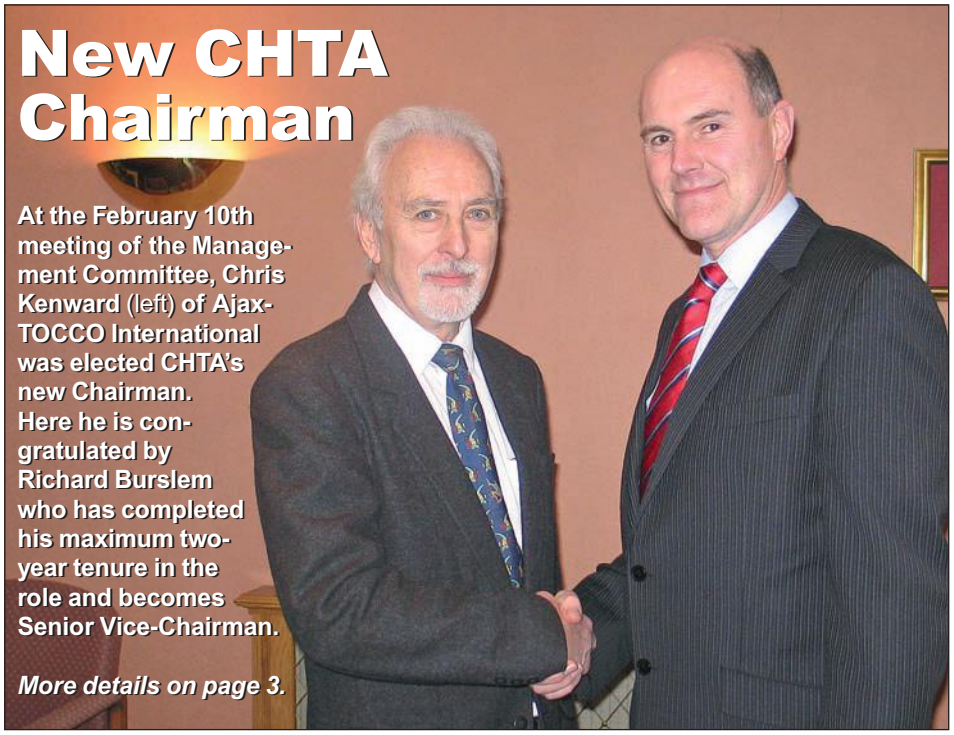
The Contract Heat Treatment Association Newsletter

HOTLINE

Issue No. 123
March 2011

Inside . . .

New CHTA Chairman



At the February 10th meeting of the Management Committee, Chris Kenward (left) of Ajax-TOCCO International was elected CHTA's new Chairman. Here he is congratulated by Richard Burslem who has completed his maximum two-year tenure in the role and becomes Senior Vice-Chairman.

More details on page 3.

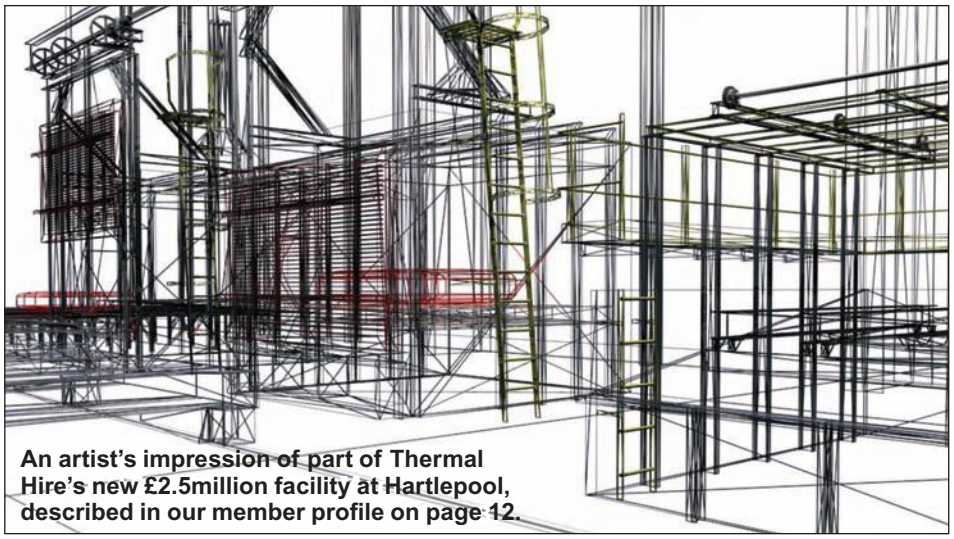
CHTA Secretariat

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

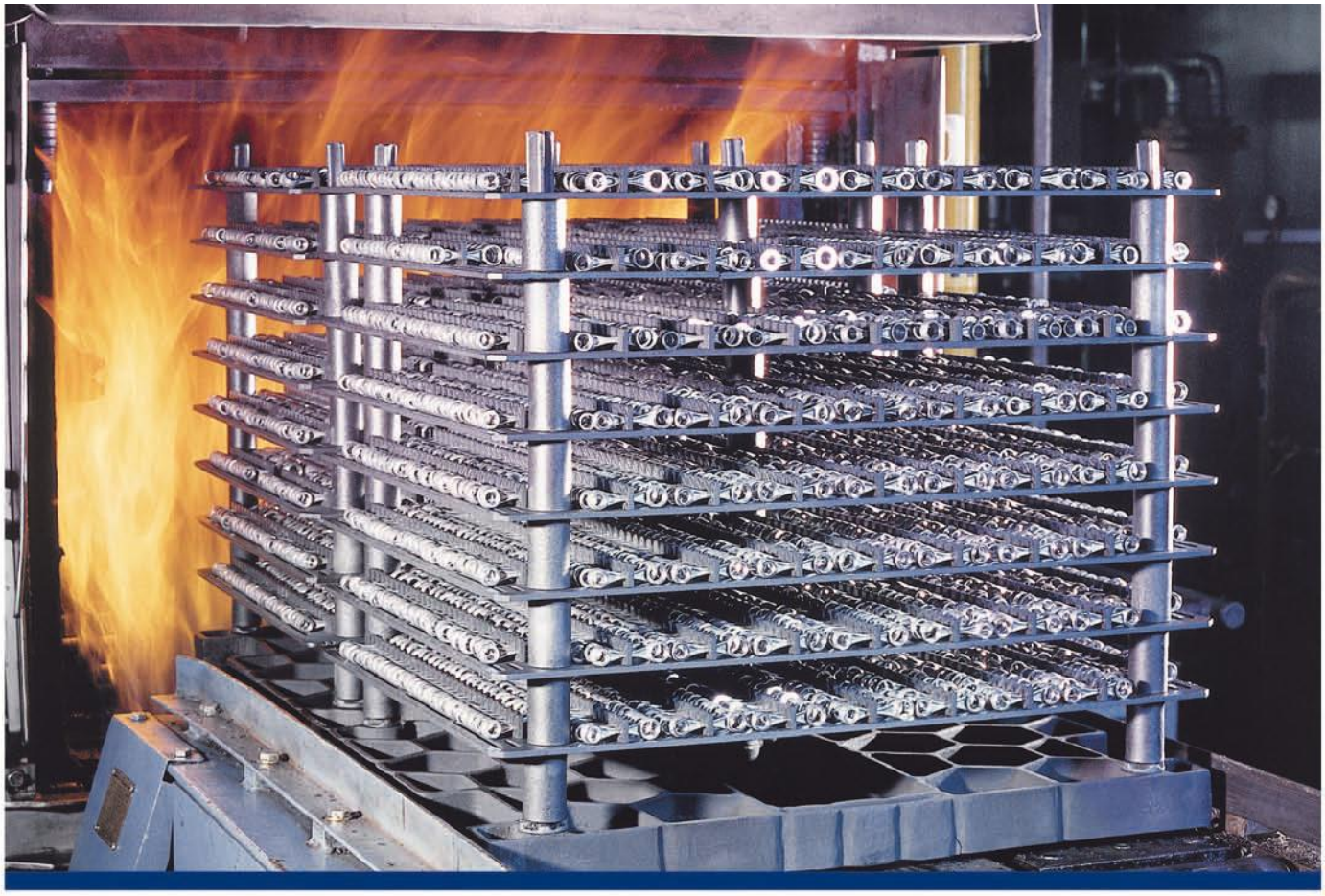
Contract Heat Treatment Association
c/o SEA, BJGF Federation,
Federation House, 10 Vyse Street,
Birmingham B18 6LT
Tel: 0121 329 2970 (or 0121 237 1123)
Fax: 0121 237 1124
E-mail: mail@chta.co.uk
Website: **www.chta.co.uk**

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

CHTA is affiliated to the Surface Engineering Association



An artist's impression of part of Thermal Hire's new £2.5million facility at Hartlepool, described in our member profile on page 12.



CFC Fixturing Solutions by Schunk

A lightweight / energy-saving alternative to your current fixture materials

The Schunk Group is the specialist for manufacturing innovative products made of CFC and CMC, no matter if the components are small-sized or large, no matter if the quantities are for series production or a single part. The entire process from the production of simple or complex geometries up to the final assembly is performed under one roof. We utilize the full spectrum of shaping technologies. Our special expertise makes us stand out in the production of components with highest purity level as well as of coated or (partially) densified components.

We will gladly develop a smart component solution for your product idea!

L, U & h-Profiles
These high strength components are available in lengths up to 2 metres

C/C Fasteners
Threaded rods, nuts and screws may be used at temperatures up to 2400 °C

Plates
Suitable for insulation linings and fixture construction. Plates 2000 x 1000 mm are available

Schunk UK Ltd.
Attn: John Whitaker
Europa Works
John.Whitaker@schunk-group.com

Richardshaw Drive
Grangefield Industrial Estate
Pudsey, Leeds, LS28 6QR

www.schunk-group.com schunk

CHTA's new Chairman: a profile


New CHTA Chairman **Chris Kenward**, Process Engineering Manager at AjaxTOCCO International Ltd, introduces himself.

I begin my period in office knowing that our previous Chairman Richard Burslem will be a difficult act to follow. Apart from his many contributions to the furtherance of CHTA's interests, all who have come in contact with him will be aware that he possesses a great intellect and quiet charm. I know that, over the next two years, I will need the help that he has so readily offered.

Career

I have spent more than 40 years in metallurgical positions, but it could have been very different. My main interest at school was biology, but the only careers suggested to me were pathology or the food industry, neither of which were very appealing. Luckily, I have an uncle who was a metallurgist and he suggested this as an interesting field.

My first position was in the R&D department of IMI Witton. IMI were a large producer of copper and brass products, but they also produced more exotic metals, such as titanium, zirconium, tantalum, etc, for the aerospace and nuclear industries. One of the most interesting developments during my time was superconductors and, as a young man, I greatly enjoyed having to explosively weld strips together.

While R&D is very interesting, the automotive component supply industry offered a higher income, which was attractive as, by this time, I had a wife and mortgage to support.

The move to GKN Hardy Spicer took me into the world of heat treatment. During my 15 years service there, processing was almost completely transformed from traditional batch carburising to in-line induction hardening.

A subsequent short period with Wild Barfield furnaces, as a technical sales representative, led me into a similar post with GKN Sinter Metals. This move gave me a valuable opportunity to deal directly with some large automotive manufacturers such as Honda, Rover, Land Rover, Jaguar etc.

After eight years of travelling up to 50,000 miles per year, the opportunity to come back to induction hardening was offered to me by what was then Tocco Heat Treatment (formerly EMA Heat Treatment). A lot has changed in the ensuing 15 years including the name (AjaxTOCCO International Ltd) but, following our move six years ago to new Birmingham premises, I believe that we now have the best subcontract induction hardening facility anywhere in Europe.

Training

My career wouldn't have been possible without the opportunity for further study. In my case, this was part-time as going to university was inconceivable for most working-class families then.

Day release to a local college was offered by most good employers. Suitable courses were available in Birmingham that enabled me to progress via the metallurgical technician / HNC route to eventually become Heat Treatment Metallurgist at GKN.

These opportunities no longer exist and I, along with the whole CHTA Management Committee, see this as one of the big challenges of the next few years.

Where is the next generation of technicians and metallurgists coming from? If we don't find a solution that is nationally recognised, all our companies could suffer in the long term.

The discussion and search for possible ways forward has begun. I would like to leave my position as CHTA Chairman in two years time knowing that young men and women have the same opportunity to grow within our industry that I enjoyed.

Future energy supplies to be discussed at CHTA AGM

***CHTA's 2011 AGM** takes place at SEA's Birmingham headquarters on **May 12th** when our guest speaker Andrew Buckley, Director General of the Major Energy Users' Council, will address "**What does the future hold for UK energy supply?**".*

The **Major Energy Users' Council** (MEUC), started life in 1987 as the then nationalised fuel supply industries prepared for privatisation and larger customers got ready for the introduction of competition in gas and electricity supply. For over twenty years, medium-size and larger organisations have come together through the MEUC (*www.meuc.co.uk*) to ensure they are buying their utilities cost-effectively and managing their use intelligently to avoid unnecessary waste.

MEUC Director General **Andrew Buckley** cut his teeth in the industrial and commercial energy market, surveying customers for their potential to switch to natural gas when North Sea supplies first came ashore.

In 1976, he established the Energy Information Centre to provide market and pricing intelligence for business users and built up the business over twenty years. He also founded the publishing imprint, Energy Publications.

He was closely involved in the energy management campaigns which followed the first energy crises and in advising firms on the switch to competitive energy purchasing after privatisation. He also acted as the European Energy Adviser to a major Japanese utility for over ten years. Andrew has written several books on the subject and has been a regular speaker. He is a graduate in Economics and Geography from London University.

***CHTA's AGM**, full details of which will be circulated in mid-April, will also provide a forum in which members will be able to update on CHTA activities and those of our affiliate SEA. A buffet lunch beforehand will provide a further opportunity for convivial networking.*

Climate Change Agreements - Milestone 5 and what next?

*SEA's **Dave Elliott** reports on the latest performance of our energy-intensive heat treatment sector and future prospects.*

MILESTONE 5

With CCA Milestone-5 reporting now completed, here is a quick overview of what is actually involved in the process and how the sector performed (this is not yet official and will require checking and verification by the Department of Energy and Climate Change (DECC)).

The main CAA10 reporting spreadsheet for the heat treatment sector has 54 rows (one for each agreement) and 70 columns. This means that just under 4000 pieces of data or formulae have to be entered. There are also separate spreadsheets for:

(a) multiple facilities – these are termed "bubble agreement";

(b) exits since Milestone 4 (2008) and non-respondents at Milestone 5 (2010);

(c) fuel conversion factors; and

(d) the actual target calculation sheet.

The target calculation sheet is of a similar size to the main spreadsheet, so almost 8000 pieces of data/formulae need to be entered before the reporting spreadsheet can be submitted to DECC.

There were 54 agreements in operation covering 68 sites; 18 of the agreements were for companies that had in-house heat treatment facilities.

Of these, 34 agreements failed to meet their Milestone-5 targets; this meant that the sector failed to meet its target by about 4.6%. However, just under 12,500 tonnes of CO_2 allowances were purchased, which then meant that the sector had beaten its target by 2.9%.

THE FUTURE

What does the future hold for Climate Change Agreements? Well it is hoped that new agreements will come into operation during this year, with the first target period being 2012; these agreements are expected to run until 2017 (this was announced in the last budget of the previous Labour government).

The current coalition government is exploring a number of possibilities, to ensure that the climate change agreements deliver "value for money". It is hoped that we will have something positive to report shortly.

NB: The maximum amount of climate change levy reduction is being reduced from 80% to 65% with effect from 1st April 2011. At the same time, the climate change levy is being increased to £0.0069/kWh for gas and £0.00485/kWh for electricity, an increase of around 3%.

Diary

March 23-25 2011
EUROPEAN CONFERENCE ON HEAT TREATMENT 2011 & 3RD INTERNATIONAL CONFERENCE ON HEAT TREATMENT AND SURFACE ENGINEERING OF TOOLS AND DIES
Wels, Austria
The theme of the European Conference is 'Quality in Heat Treatment' *www.asmet.at*

April 6 2011
BIFCA Technical Series:
FURNACE MODELLING
West Bromwich, England *www.bifca.org.uk*

April 28 2011
CHTA PUBLICITY SUBCOMMITTEE*
Birmingham, England

May 5 2011
BIFCA Technical Series:
FURNACE AND BURNER CONTROLS
West Bromwich, England *www.bifca.org.uk*

May 12 2011
CHTA MANAGEMENT COMMITTEE/ AGM*
Birmingham, England

June 7-9 2011
SUBCON 2011
Birmingham, England *www.subconshow.co.uk*

June 14-16
IMFair
Cosford, England
Conference/exhibition provides an international forum for sharing surface finishing knowledge and best practice techniques for sustainable aerospace and defence materials technology. *www.instituteofmetalfinishing.org*

June 28 – July 2 2011
THERMPROCESS 2011
Düsseldorf, Germany
"10th International Trade Fair and Symposium for Thermo Process Technology": *www.thermprocess.de*

July 5-7 2011
HEAT TREATMENT: PRINCIPLES AND PRACTICE
Rotherham, England *www.namtec.co.uk*

July 6-8 2011
A3TS 2011
Nantes, France
French-language *39th Congress on Heat Treatment and Surface Engineering.* *www.a3ts-congres.fr*

July 28 2011
CHTA PUBLICITY SUBCOMMITTEE*
Birmingham, England

August 4 2011
CHTA MANAGEMENT COMMITTEE*
Birmingham, England

September 14-16 2011
3RD INTERNATIONAL CONFERENCE ON DISTORTION ENGINEERING
Bremen, Germany *www.distortion-engineering.de*

September 20-22 2011
HEAT TREATMENT – 2011
Moscow, Russia
www.mirexpo.ru/eng/exhibitions/heat_treat11.shtml

October 4 2011
INTRODUCTION TO HEAT TREATMENT
Rotherham, England *www.namtec.co.uk*

October 6 2011
BIFCA Technical Series:
BURNER TECHNOLOGY
West Bromwich, England *www.bifca.org.uk*

October 9-12 2011
PM2011
Barcelona, Spain
Powder metallurgy world congress and exhibition: *www.epma.com/pm_2011*

October 11-13 2011
UNDERSTANDING HEAT TREATMENT
Birmingham, England
76th repeat of Wolfson Heat Treatment Centre's well-established course. Details from Derek Close; e-mail: derek.close@sea.org.uk. *www.sea.org.uk/whtc*

October 12-14 2011
67TH HÄRTEREI-KOLLOQUIUM
Wiesbaden, Germany
German-language heat treatment conference and exhibition. *www.awt-online.org*

October 17-20 2011
19TH IFHTSE CONGRESS
Glasgow, Scotland *www.ifhtse2011.org*

October 19 2011
BIFCA Technical Series:
FURNACE AND BURNER CONTROLS
West Bromwich, England *www.bifca.org.uk*

October 27 2011
CHTA PUBLICITY SUBCOMMITTEE*
Birmingham, England

October 31 – November 2 2011
26TH ASM HEAT TREATING SOCIETY CONFERENCE & EXPOSITION
Cincinnati, Ohio. USA
http://asmcommunity.asminternational.org/content/Events/Heattreat/

November 2-3 2011
HEAT TREATMENT FOR HEAT TREATMENT PROFESSIONALS
Rotherham, England *www.namtec.co.uk*

November 8-9 2011
BIFCA Technical Series:
INDUSTRIAL FURNACE TECHNOLOGY
West Bromwich, England *www.bifca.org.uk*

November 10 2011
CHTA MANAGEMENT COMMITTEE*
Birmingham, England

November 10 2011
BIFCA Technical Series:
FURNACE MODELLING
West Bromwich, England *www.bifca.org.uk*

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

Avoiding the risk of critical component failure

Long-time CHTA member Keighley Laboratories notes the importance of manufacturers checking certifications of imported material.

Critical component failures often make the headlines, whether occurring at sea, underground, in mid-air or in production plants. Faulty pipes, valves, shafts, gears, couplings and other engineered components give rise to safety, environmental, productivity and financial issues, some catastrophic.

These failures might result from design, manufacturing and assembly errors, inadequate quality assurance or unforeseen operating conditions, but sometimes they relate just to substandard materials and improper processing treatments.

OVERCHECKING MATERIAL CERTIFICATIONS

Independent metallurgical specialist, Keighley Laboratories (*www.keighleylabs.co.uk*), points out that with growing volumes of steel, alloys and metal components being sourced in the Far East, from comparatively unknown suppliers, and manufacturers in this country ultimately responsible for any component failures, there is now a pressing need to re-inspect, or *overcheck*, material certifications. In support of this view, the company draws attention to a recent US study, in which 133 out of 220 samples of imported steel rod were rated as failures by a certified test laboratory, an astonishing 60% failure rate.

"If you have specified imported material to a particular grade or heat treatment process, then overchecking is the best way to ensure you are getting what you paid for," says Keighley Labs Heat Treatment Commercial Manager, Michael Emmott. "Often we find that the raw material is not as specified, even with the correct certification, creating potential problems down the line."

"The cost of a simple chemical or mechanical overcheck or a full in-depth metallurgical analysis might be tens or hundreds of pounds, but if that item is safety-critical or forms part of a product worth hundreds of thousands, then it's a comparatively small price to pay," he continues. "Besides, given the legal implications of a failure in the field, it's either a question of verifying incoming material or possibly putting your own business at risk."

" ...133 out of 220 samples of imported steel rod were rated as failures by a certified test laboratory, an astonishing 60% failure rate."

TESTING SERVICES

Through its in-house Technical Services laboratory, Yorkshire-based Keighley Labs is able to provide independent chemical analysis, employing state-of-the-art spectroscopy or classical wet methods, metallographic examination and mechanical testing for impact resistance, hardness, ductility, tensile strength and durability.

In addition to overchecking certificated materials, these specialist techniques are also used in the allied fields of reverse engineering and failure investigation.

Reverse engineering refers to the process of duplicating an engineered component or assembly, without recourse to drawings, CAD files, specifications or documentation, determining exactly how it was originally made and treated and from what material. Keighley Labs employs laboratory and CAD/CAM resources to model parts to a high degree of accuracy; then, if necessary, it will project manage the casting, machining and heat treatment of single or multiple components.

"Customers often ask us to re-engineer specific low-volume high-value components and we apply reverse engineering techniques to such projects, usually introducing design and material upgrades, to improve to better than original spec, as part of the process," says Customer Support Manager, Len Stott. "Reverse engineering can also be invaluable for remanufacturing a vital replacement part, where the original manufacturer no longer exists or drawings have been lost.

"It is also useful for reclassifying mixed stock, where materials have been mishandled in storage and certification is missing," he continues. "On mixed batches like this, we can test the hardness profiles, looking at depth and quality of case and the microhardness, then the surface hardness, to determine which material is actually fit for purpose and which has been wrongly classified."

The Keighley Labs service also covers problem and failure investigation, employing forensic analysis techniques to determine why specific components have failed in the field, so as to prevent similar problems in the future. Its senior metallurgists, who have extensive experience across a wide range of materials, treatments and product types in many different industries, can also suggest from what material the component should be made and how it should be processed. It's just another useful weapon in the fight against critical component failure.

New requirements for hardness measurement and reporting

Indentec's John Piller outlines the calculation of "uncertainty of measurement" in hardness testing.

Indentec Hardness Testing Machines Ltd, part of the Zwick/Roell Group, have been approved by the United Kingdom Accreditation Service (UKAS) to calibrate hardness testing machines, test blocks and indenters to the latest ISO and ASTM standards.

This allows Indentec, a UKAS-accredited hardness calibration laboratory operating an ISO 17025:2005 quality assurance system, to issue calibration certificates which specify precisely the **uncertainty of measurement** for each individual test.

A complete evaluation of the uncertainty of a hardness testing instrument should be done according to the *ISO Guide to the Expression of Uncertainty in Measurement (GUM).*

DETERMINING UNCERTAINTY CONTRIBUTORS

Independent of the type of uncertainty source, for hardness there are two possibilities for the determination of the uncertainty:

- One is based on the evaluation of all relevant sources appearing during a direct calibration, e.g. force, distance, time. Refer to EA 10-16: *Guidelines on the Estimation of Uncertainty in Hardness Measurement,* 2001.
- The other is based on indirect calibration using a hardness reference block (certified reference material).

It may not always be possible to quantify all the identified contributions to the uncertainty. In this case, an estimate of type A standard uncertainty may be obtained from the statistical analysis of repeated indentations into the test piece. Care should be taken, if standard uncertainties of type A and type B are summarised, that the contributions are not counted twice.

The current hardness standards are:

- Rockwell: ISO 6508:2005 and ASTM E18-08b
- Vickers: ISO 6507:2005 and ASTM E384-10
- Knoop: ISO 4545:2005 and ASTM E384-10
- Brinell: ISO 6506:2005 and ASTM E10-10

These standards specify that all new and ***existing*** hardness testing instruments need to be directly and indirectly verified and the **uncertainty of measurement** calculated. Direct verification is necessary only at the time of machine installation, if the indirect calibration fails, or if the instrument has been moved or modified. Indirect verification is required at minimum intervals of one year.

A valid certified indenter is required for verification. The indenter calibration certificate must state the measurement uncertainty of the indenter geometry.

Uncertainty of measurement is the doubt which exists about the results of any measurement. It is important not to confuse "error" and "uncertainty":

- **Error** is the difference between the measured value and the "true value" of the item being measured.
- **Uncertainty** is the quantification of the doubt about the measurement result.

EVALUATING UNCERTAINTY

There are eight main steps to evaluating uncertainty:

1. Decide what you need to find out from your measurements. Decide what actual measurements and calculations are needed to produce the final result.
2. Carry out the measurements needed.
3. Estimate the uncertainty of each input quantity that feeds into the final result. Express all uncertainties in similar terms.
4. Decide whether the errors of the input quantities are independent of each other. If they are thought not to be, then some extra calculations or information are needed.
5. Calculate the result of your measurement, including any known corrections for things such as calibration.
6. Find the combined standard uncertainty from all the individual aspects.
7. Express the uncertainty in terms of a coverage factor, together with a size of the uncertainty interval, and state the level of confidence.
8. Write down the measurement results and the uncertainty.

When calculating the measurement uncertainty for a hardness testing machine, the following input quantities have to be measured:

- Test force; in the case of Rockwell scales, this includes the pre-test force (N).
- Measurement system, either depth for Rockwell or optical for Vickers and Brinell (mm).
- Indenter geometry (mm and degrees).
- Timing cycle (s).
- Performance of the instrument when testing certified reference test blocks (HR, HV, HK, HB).

Each of these inputs is then assessed and their **standard uncertainty** contributions added together to obtain an overall value for the **combined measurement uncertainty**. This value is then multiplied by **coverage factor, k.** Multiplying the combined measurement uncertainty by a coverage factor gives a result which is called the **expanded uncertainty**, usually shown with the symbol U. A particular value for the coverage factor gives a particular confidence level for the expanded uncertainty. Most commonly, the overall uncertainty is scaled by using the coverage factor k=2, to give a level of confidence of approximately 95%.

Having calculated the expanded uncertainty, it is important to express the answer so that the reader can use the information. The main things to mention are:

1. The measurement result, together with the uncertainty figure; e.g., 60.6HRC ±0.15HRC.
2. The statement of the coverage factor and the level of confidence; e.g., "The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of 95%.

John Piller (john.piller@indentec.com) is Managing Director of Indentec Hardness Testing Machines Ltd (www.indentec.com).

Please send comment and news items for June's *Hotline* 124 to:

mail@chta.co.uk

Deadline: May 23rd

MEMBER HISTORY

What's in a name?

A LITTLE BIT OF HEAT TREATMENT HISTORY

*CHTA member Flame Hardeners Ltd operates from "**Shorter Works**", Bailey Lane, Sheffield.*

Why "Shorter Works"? Because the company was formed by a man who developed and successfully applied for a patent for a heat treatment process. There cannot be many subcontract heat treatment companies that can claim they were founded on a process that they developed.

Albert Edward Shorter was an engineer working for Vickers Armstrong in the 1930s. He identified the need for a process of "localised heat treatment" which would be both economical and reduce distortion.

The main product of Vickers at this time was armaments and Shorter directed his initial enthusiasm to tank tracks and drive sprockets, particularly considering the hardening of the roller paths on the tracks and the profiles of the sprocket teeth. He evolved the idea of a flame hardening technique whereby localised areas were heated and immediately quenched, and further introduced heating and quenching tools together with machinery to achieve the relative movements. He had developed "progressive flame hardening".

Shorter took out a patent on the idea, which became known as "Shorterising" (a term still seen on drawings to this day), and then formed "The Shorter Processing Company". This company designed and manufactured the equipment, but it was also necessary to have a demonstration unit for the process. Some machinery was installed in works at Saville Street, Sheffield to satisfy this need.

It is interesting to note that the process was appreciated instantly and one example of its application, found in the company archives, was the hardening of components for the engine and propulsion system of the Mauretania, an advanced passenger liner of the time.

The British Oxygen Company saw the process as a future market for the gases that they manufactured and bought the operation from Shorter. The demand for "demonstration" hardening of batches of components grew and they realised that they were actually operating a subcontract heat treatment company (not part of their business plan).

At the end of the war in 1945, BOC decided that enough was enough and, although they would keep the intellectual property rights for the manufacture of equipment, they would sell the "heat treatment company". It was bought by Mr Herbert Buckley (a man already operating a heat treatment company known as Holt Brothers in Halifax).

Realising the strategic importance of keeping the operation in Sheffield, Mr Buckley moved it to Bailey Lane but, most importantly, maintained the connection with the company origins by naming the premises Shorter Works.

Flame Hardeners Ltd was incorporated when the operations moved to Bailey Lane. It has since developed techniques of surface hardening (including induction hardening) over the years under Mr Buckley and successive managements until passing into the current ownership.

Flame Hardeners is a company proud of its origins but is also searching constantly for new applications for the years of acquired knowledge, skills and experience. Tooling is continually being developed to solve hardening problems on the most complex of components.

MEMBER NEWS

HOLT BROTHERS PURCHASED

Halifax-based Ellis Fish Holdings Ltd purchased CHTA member Holt Brothers (Halifax) Ltd in November.

With over a century of experience in specialised metal treatment, Holt Brothers is a well-established and respected business in its field. Offering the most extensive range of heat treatment options and metallurgical services, including predictive computer modelling and failure investigation work, the company has built a position at the forefront of its industry within the UK.

"The position of Holt Brothers as a leader in the provision of high-quality high-specification services to the engineering industry is an ideal fit with the aims of our own business model," commented Roger Fish, director of Ellis Fish Holdings. "We hope to use our skills and contacts to now build on what the team at Holt Brothers has already achieved, maintaining a leading position in the UK metallurgical industry with a view to further expanding and developing the business."

With Holt Brothers for 50 years, and Managing Director of the company since 1992, Vladimir Murawa has been retained as consultant for two years to help ensure a smooth transition.

PhoenixTM Ltd

New to the market (and *Hotline* advertising), but not new to the heat treatment industry, is the company Phoenix Temperature Measurement (PhoenixTM).

Based in Ely, Cambridgeshire, UK, and Bad Oeynhausen, Germany, PhoenixTM (*www.phoenixtm.com*) specialise in the design and production of complete systems for thermally-profiling furnaces, finishing ovens and ceramic kilns. Directors Ian Budden, Dave Plester and Michael Taake are familiar names within the heat treatment industry in Europe.

PhoenixTM design systems for temperature profiling and surveying various heat treatment processes such as gas and low-pressure carburising, homogenising steel tubes, annealing laminations for electric motors, bright annealing steel coils, and many others.

Temperature profiling is common practice in many heat treatment plants and is achieved by attaching thermocouples to critical points of the product and connecting these probes to a data logger. By protecting the data logger with a thermal barrier, the whole system can travel through the furnace together with the product. In this way, the true product temperature is monitored and stored for later analysis.

PhoenixTM profiling system exiting furnace.

Design of the profiling system, from the thermocouples through to the thermal barrier, is critical as this instrument must maintain a high degree of accuracy while resisting extremes of temperature, atmosphere and pressure. With over 60 years of combined temperature-profiling experience, the senior PhoenixTM personnel have a deep understanding of all aspects of the design of products for these industries. Most importantly, they have good knowledge of the processes in which they will be used.

PhoenixTM offer a local service to customers as all their equipment is designed, manufactured, and serviced in the UK. The aim of Phoenix TM, according to sales director Michael Taake, is "to bring innovation, quality and simplicity to the process of thermal profiling. Customers can be assured that the profiling systems supplied by PhoenixTM will have true experience designed into them, will be built to the highest quality standards, and will also be easy for operators to use."

Energy & Environmental Services Ltd

When individuals with a wealth of industry lead experience of thermal process engineering come together, exciting developments are bound to happen. New *Hotline* advertiser Energy & Environmental Services Ltd (E2SL) is now in its tenth year of designing, manufacturing and installing some of the most technologically-advanced furnaces, ovens and combustion and control systems around.

The directors of the business have individual areas of expertise that include burner design, fuel engineering, refractory specification, control system development and on-site installation and commissioning. Major research and development facilities around the UK have given firm foundations to these core individuals that manage an ever-growing business.

What sets E2SL (*www.e2sl.co.uk*) apart from other furnace builders? Anyone with rudimentary engineering skills can design and build a furnace or oven. This has certainly been the case in the past and, to some degree, still happens today; but E2SL tackle projects from a completely different angle.

The company are experts in thermal process engineering; so the starting point is always the thermal input requirements for the specified charge material. From this, burner designs, ratings, fuel calorific values, heat-recovery techniques, temperature uniformity and temperature tolerances within the furnace working envelope are calculated to give the optimum solution. Furnace shape and contours can be calculated precisely, using computational fluid dynamics to ensure that burner firing systems stir the furnace atmosphere in the most efficient way possible.

Designing thermal process systems in this manner ensures the energy released from the optimum amount of fuel is transferred to the charge material effectively. With fuel prices constantly on an upward trend, it's important for customers to stay ahead of the competition.

Energy-efficient aerospace-quality heat treatment.

Environmental legislation seems to get tougher every year. This can only be of benefit to society but it does bring great challenges for anyone working with thermal process systems. Reducing the amount of fuel used naturally reduces the emissions to atmosphere, but E2SL offer further clean-up of flue gases. Dependent on the particular project requirement, a number of methods and systems have been employed, giving harmful-emission reductions never before seen.

E2SL offer service, maintenance and upgrading of existing plant to ensure optimised performance. Full turnkey installations, incorporating technologically-advanced design developed in co-operation with UK universities, can also be undertaken to maximise the returns from capital investment. In every case, thermal uniformity and low energy consumption are key aims of projects, with the result that E2SL expertise is used regularly by manufacturers supplying quality-critical components in steel and its alloys, titanium, aluminium and ceramics.

From small heat treatment units to furnaces capable of heating in excess of 100 tonnes, E2SL have a reference list (*www.e2sl.co.uk/index.php/client*) of cus-tomers covering a wide range of industrial sectors.

Specifying plant can be difficult, but get it wrong and you will pay the costs. Get it right, improve your product quality, reduce your fuel costs / environmental impact and reap the rewards.

MEMBER PROFILE

Thermal Hire invests £2.5M in new plant

Established in 1974, CHTA member Thermal Hire Ltd, latterly with three sites in Wigan, Hartlepool and Hebburn, is one of the UK's leading heat treatment companies, undertaking a range of in-house and on-site projects for its customers throughout the world.

For well over thirty years, Thermal Hire has provided an extensive range of heat treatment services, developing its expertise and capability to be able to treat work ranging from small engineering components, such as bolts, to structures as large as containment vessels for nuclear power stations.

In these difficult times, when the Industrial economy is struggling to maintain healthy order books, Thermal Hire has taken the forward-looking decision to invest over £2.5million in a new heat treatment facility. Adjacent to its existing plant in Hartlepool, Teesside, it is ideally located only three miles from major trunk road and motorway links.

The current Hartlepool plant operates 16 furnaces capable of heating material to 1250°C and with 100 tonnes capacity. Furnace sizes range from 2m up to 15.5m long, 1.2m to 5.4m wide and 1m to 3.6m high. Temperatures and times are recorded and controlled with the latest digital equipment to very tight tolerances.

The adjacent new facility, developed to provide a range of hardening and tempering treatments, comprises six furnaces and four new quench units. Relocated from Thermal Hire's Hebburn site, due to close shortly as part of a consolidation exercise, four of the furnaces are 3.2m long x 2.5 m wide x 1.2m high. The water and polymer quench tanks, 4m long x 4m wide X 3.2m deep, have excellent internal agitation; the work platforms also oscillate vertically during the quenching cycle to ensure complete hardening transformation is achieved. Typical transfer times from furnace to submersion in the quench medium, for loads up to 6 tonnes, is 38 seconds

In order to ensure future success in capturing the widest range of business, Thermal Hire has also invested in two very large new furnaces and quenches. The furnaces, 12.5m long x 3.2m wide x 2m high, are again capable of achieving 1250°C. The two quench units are 14m long x 4m wide x 4m deep; both have state-of-the-art agitation, including 256 jets per tank and work-platform oscillation, and automatically-controlled cooling via chiller units.

Using up-to-the-minute and uniquely-designed handling equipment, Thermal Hire is able to achieve furnace-to-quench transfer, of payloads up to 20 tonnes, within 55 seconds, ensuring that complete hardening is attained.

The new facility will give Thermal Hire a total of 22 furnaces and four quench units at Hartlepool. It has been developed specifically to strengthen the company's position within the heat treatment service sector and to provide the widest range of treatments to its new and existing customers.

Market Movements

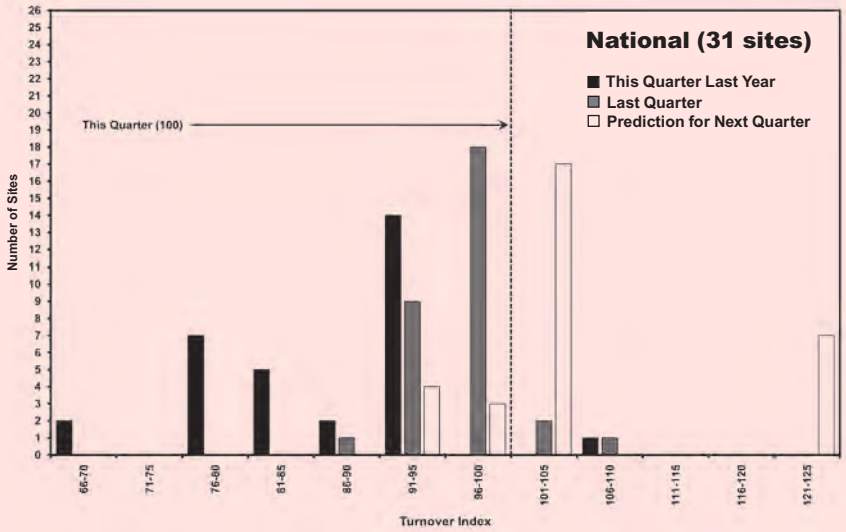
ANALYSIS OF QUESTIONNAIRE REPLIES RELATING TO 31 CHTA MEMBER SITES

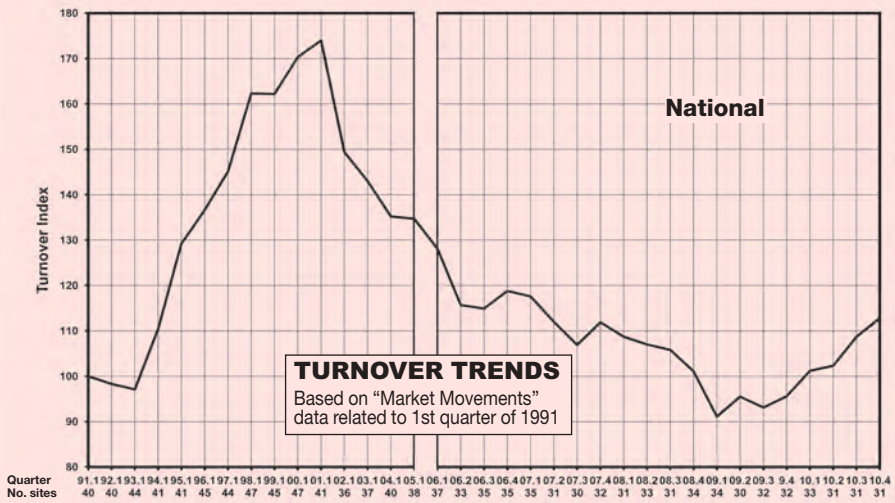
"THIS QUARTER" =

1 OCTOBER – 31 DECEMBER 2010

= TURNOVER INDEX 100

OVERALL ANALYSIS (31 SITES)	Mean index
This quarter last year	87.2
Last quarter	96.4
Predicted next quarter	106.9





STATESIDE STATS

NORTH AMERICAN 2010 SALES UP 26.6%

CHTA counterparts participating in the Metal Treating Institute's Monthly Sales Statistics Program reported heat-treating sales of $791.4million in 2010, a rise of 26.6% from the $624.9million recorded for the January-December period of 2009. December billings amounted to $67million, an increase of 32.5% compared with December 2009's $50.5million.

The latest returns indicate January sales of $75.9million, an increase of 27.7% over January last year when billings amounted to $59.4million.