

PRACTICAL TUNING OF INDUSTRIAL CONTROL LOOPS

BIRMINGHAM

4 & 5 December 2014

Campanile Hotel

EDINBURGH

11 & 12 December 2014

The Edinburgh Training Centre

ONLY **£995** per person
excluding VAT

A 2-day practical workshop presented by:

Geoff Bottrill

HNC, DMS, MIEE

Senior Hazardous Areas Engineer



Includes FREE reference manuals valued at £79.90

EARLY BIRD BOOKING OFFER

TOTAL VALUE TO YOU: £369

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- Practical Alarm Management for Engineers and Technicians
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- Practical Boiler Control and Instrumentation for Engineers and Technicians
- Practical Control Valve Sizing, Selection and Maintenance

PLUS OUR 4-FOR-3 BOOKING OFFER

See registration form for details

WHAT YOU WILL LEARN:

- Fundamentals of tuning loops – both open and closed loop
- How to recognise the key characteristics of process plant from a control perspective
- Significance of dead time and transfer lags
- PID controller behaviours
- How to troubleshoot and identify problems
- Differences between ideal/interacting/non-interacting controllers
- Combination of control modes to use
- How to tune more control loops in less time with effective results
- Practical rules of thumb for tuning systems
- Ziegler Nichols and Lambda tuning
- How to recognise configuration deficiencies
- Optimum amount of filtering or dampening to apply to the measurement
- How control valves impact on control loop performance
- How to solve problems such as valve hysteresis, stiction and non linearities
- Tune complex loops ranging from cascade to feedforward
- When to use derivative control for the best tuned loop

WHO SHOULD ATTEND:

- Automation engineers
- Consultants
- Control engineers
- Electrical engineers
- Electricians
- Electronic engineers
- Energy management consultants
- Facility managers
- Installation and maintenance technicians
- Instrumentation engineers
- Mechanical engineers
- Technicians

Register **NOW**: Email the registration form to us at uk@idc-online.com

For more information contact (020) 8335 4014 or visit www.idc-online.com

YOUR INSTRUCTOR



*An intensive,
PRACTICAL,
two-day workshop
presented by:*

GEOFF BOTTRILL

HNC, DMS, MIEE
Senior Hazardous Areas Engineer

Geoff has been working in the instrumentation, measurement and control fields for over twenty-five years and has spent the past fifteen years specialising in Hazardous Areas, Intrinsic Safety and Instrumentation Drawings. Geoff began his career at Kent Instruments as a service engineer working in both the UK and East Africa. His experience ranges from systems design functions and on-site trouble shooting, to technical and commercial customer support.

Recently Geoff has taken on the responsibility of mentoring engineers in training, in addition to the presentation of engineering workshops in the process control and measurement field. His positive interactive approach to teaching has made him popular with workshop attendees worldwide.

The fee for each workshop covers all materials including workshop manual, lunches and refreshments

FREE REFERENCE MANUAL AS A HARD-COPY AND eBOOK

(Valued at £79.90)

Our delegates don't just receive photocopied notes! You will receive the comprehensive fully illustrated reference manual, as a hard-copy and eBook version, filled with hundreds of pages of tables, charts, figures and handy hints.



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<£3,000 FOR UP TO 6 PEOPLE, and
can be **CUSTOMISED** to your needs.

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WHEN AND WHERE you need it!

All IDC Technologies training workshops are available on an on-site basis, presented at the venue of your choice, saving delegates travel time and expenses, thus providing your company with even greater savings. For more information or a **FREE** detailed proposal contact:

Kevin Baker on (020) 8335 4014
or email: training@idc-online.com

THE WORKSHOP

This workshop is designed to train you and/or your staff, in the configuration and tuning of industrial control loops with minimal use of mathematics and formulae. Controllers need to be carefully matched to the process to work optimally; this matching procedure is called tuning. Controllers that are not correctly configured and tuned will not perform optimally and will not reduce variability in the process as they should.

The aim of this workshop is to provide and/or enhance the skills required to configure and tune a controller for optimum operation. An optimally tuned processed loop is critical for a wide variety of industries ranging from food processing, chemical manufacturing, oil refineries, pulp and paper mills, mines and steel mills. Although tuning rules are designed to give reasonably tight control, this may not always be the objective. Some thought needs to be given when retuning a loop as to whether the additional effort is justified as there may be other issues which are the cause of the poor control. These issues will be discussed in some detail in the workshop. At the end of this workshop you will have the skills to troubleshoot and tune a wide variety of process loops.

Pre-requisites: Basic knowledge of instrumentation and process plant would be useful.

It is strongly recommended you bring a laptop computer to help with the practical exercises. Otherwise a calculator and pen can be used to assist with the calculations.

THE PROGRAM

DAY ONE

FUNDAMENTALS OF LOOP TUNING

- Processes, controllers and tuning
- PID controllers – P, I and D modes of operation
- Load disturbances and offset
- Speed, stability and robustness
- Gain, dead time and time constants
- Process noise
- Feedback controllers
- How to select feedback controller modes

FUNDAMENTALS OF TUNING

- Open loop characterisation of process dynamics
- Default and typical settings
- General purpose closed loop tuning method
- Quick and easy open loop method
- Fine tuning for different process types
- Simplified lambda tuning

THE DIFFERENT TUNING RULES

- Different rules compared
- Typical tuning settings
- When to use them/when not to use them
- Rules of thumb in tuning

DAY TWO

TUNING OF VALVES

- Hysteresis
- Stiction
- Characteristic selection and correction
- Positioner configuration and tuning

AUTOMATED TUNING

- Self tuning loops
- Adaptive control

TUNING OF MORE COMPLEX SYSTEMS

- Cascade systems – tuning of them
- Feedforward, ratio, multivariable systems
- Interactive loops tuning
- Dead time compensation
- Practical limitations

GOOD PRACTICE

- Good practice for common loop problems
- Flow control loop characteristics
- Level control loop characteristics
- Temperature control loop characteristics
- Pressure control loop characteristics
- Other less common loops

SUMMARY, OPEN FORUM AND CLOSING

SIMULATION EXERCISES

Throughout the workshop, simulation software is used to simulate real loops and to give you real hands-on exercises in a safe practice environment. You will see the simulated process output respond to your input and configuration changes on the loop controller. You will reinforce and apply the concepts learnt using real field test data in simulation.

PRACTICAL SESSIONS

This is a practical, hands-on workshop enabling you to work through exercises which reinforce the concepts discussed. Sessions include:

- **Model response**
- **Trial and error tuning**
- **Ziegler Nichols tuning**
- **Open loop step analysis**
 - Self regulating process
 - Integrating process
- **Protuner analysis**
 - Self regulating analysis
 - Integrating analysis
- **Protuner data acquisition**
- **Feed forward**
- **IMC tuning**

To gain full value from this workshop, please bring your laptop/notebook computer.

DELEGATE DETAILS

Contact: _____ Company Name: _____

Company Address: _____

City: _____ County: _____ Post Code: _____

Phone: _____ Fax: _____ Email: _____

ATTENDEES:

Mr/Ms: _____ Job Title: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Mr/Ms: _____ Job Title: _____ Email: _____

Should you have more people interested in attending this workshop, please contact the UK office on (020) 8335 4014 or email: uk@idc-online.com

WORKSHOP DETAILS

- BIRMINGHAM** - 4 & 5 December 2014
Campanile Hotel
- EDINBURGH** - 11 & 12 December 2014
The Edinburgh Training Centre

Please register by 13 November to avoid disappointment

HOW DID YOU HEAR ABOUT THIS WORKSHOP? (PLEASE TICK)

- Received a brochure in the mail
- Received an email from IDC
- Searched online (Google, Yahoo etc)
- Recommended by a friend/colleague
- Other (please specify) _____

DISCOUNT OFFER - SAVE £995 - BOOK 4 DELEGATES, PAY FOR 3!

Register three people on a public two-day workshop and receive your fourth registration FREE

* discounted and free registration to be used for the same workshop in the same venue.

PAYMENT DETAILS

Note: Prices are EXCLUSIVE of VAT

Please Note: Full payment is required prior to the commencement of the workshop.

- BOOKING FOR ONE DELEGATE:** £995 x 1 delegates = £ _____
- BOOKING FOR FOUR DELEGATES:** £995 x 3 delegates = £ _____
The fourth participant is FREE
- EARLY BIRD BOOKING OFFER:** (if booking on or before 6 November 2014)
YES, I qualify and would like to receive my 4 FREE eBooks PLUS 25% OFF the registration price
LESS 25% = £ _____
+ VAT = £ _____
TOTAL = £ _____

I wish to pay by Cheque, made payable to IDC Technologies
 Company Order Number: _____

Please charge my Mastercard Visa Expiry Date: ____/____/____

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On the reverse of your card, above the signature, is a security number. In order to authorise your card transaction, we require the last 3 digits:

If the Cardholder's address is not the same as shown above please tick this box:

BILLING INFORMATION (PLEASE INVOICE TO)

- My billing information is the same as above in 'DELEGATE DETAILS'
- Please send invoice to: Company Name: _____

Company Address: _____

City: _____ County: _____ Post Code: _____

REGISTER NOW:

Fax: (020) 8335 4120

Mail: IDC Technologies Suite 18, Fitzroy House, Lynwood Drive, Worcester Park, Surrey, KT4 7AT

Email: uk@idc-online.com

Web Site: www.idc-online.com

ENQUIRIES: Phone: (020) 8335 4014

WORKSHOP DETAILS

- Workshops start at 8:30am and finish at 5:00pm daily.
- Registration is from 8:00am on the first day.
- The workshop fees are per delegate and include a reference manual, handouts, lunches and all refreshments.
- Full payment is required prior to the commencement of the workshop.

EARLY BIRD BOOKING OFFER

Please note that the Early Bird Booking Offer is only available to those registrations received on or before 6 November 2014 and paid prior to the commencement of the workshop.

CONFIRMATION

Confirmation of receiving your registration will be sent within 48 hours. Official confirmation and details of the workshop will be sent to you prior to the workshop date. Please wait for official confirmation before making accommodation and/or travel arrangements.

CANCELLATION

A fee of 20% will apply for written cancellations received 7-14 days prior to the commencement of the workshop. Cancellations received less than 7 days prior to the workshop are not refundable however substitutes are welcome.

PLEASE NOTE

Venues to be confirmed upon registration. Venues are subject to change. Instructors may change without notice.

IDC Technologies has no affiliation with suppliers or manufacturers and therefore presents a completely unbiased factual view of the industry.

100% MONEY BACK GUARANTEE

IDC Technologies' engineers have put considerable time and experience into ensuring that you derive the maximum value from each workshop. If you feel by lunch time of the first day that the workshop is not appropriate, please let us know so that we can arrange a 100% refund of your fee.

PRIVACY INFORMATION

If your address details are incorrect, or you wish to remove your name from our mailing list, please contact us by phone, fax or email.

At times we make use of lists that cannot be cross-checked against our own database and you may receive a duplicate. If so, please pass this on to an interested colleague.

CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

This program is designed to meet your continuing professional development requirements. A certificate documenting your attendance will be awarded at the end of the workshop. This serves as important evidence of your continuing professional commitment to your career.

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