

Michael Brown's Practical Process Control Training Courses



Your workshop leader

Michael Brown graduated from the University of the Witwatersrand as an electrical engineer. He is a specialist in control loop optimisation, with over 30 years experience in process control instrumentation. His main activities are consulting and teaching practical control loop analysis and optimisation.

He has worked on optimising loops in over 300 plants in Southern Africa, Europe, UK, USA, and Cyprus, and has presented courses in many countries around the world.

Phone: 082-440-7790

Fax: 086-671-9320

Mail: PO Box 1813
Cresta
2118

E-Mail: michael.brown@mweb.co.za

Web site: www.controlloop.co.za

Who should attend?

Advanced Control Engineers
Chemical Engineers
Consulting Engineers
Design Engineers
Electrical Engineers
Instrument Engineers and Technicians
Maintenance Engineers
Mechanical Engineers
Metallurgists
Process Control Engineers and Technicians
Process Engineers
Production Managers
Project Managers

Most process control courses fall into two categories; control courses that teach process control from a mathematical standpoint with little direct application; and control system vendor schools that stress the operation of the particular brand of control system. Our training is designed to bridge the gap between theory and practice and concentrates entirely on practical solutions to control.

Benefits of our training courses to your plant:

Provides control and instrumentation personnel as well as process people and operators with a really practical understanding of control which previously was always a rather "grey" area

- ◆ Improves regulatory control of your process
- ◆ Increases product quality
- ◆ Increases plant throughput
- ◆ Saves on raw materials
- ◆ Reduces trouble shooting and downtime
- ◆ Saves energy
- ◆ Enhance profits dramatically
- ◆ On-line analysis of equipment performance increases periods between off-line maintenance

Just a very few of the many companies who have participated in our Control Courses:

- ABB
- Afrox
- Alpha Laval (UK)
- Alusaf
- Anglo Alpha Cement
- Anglo American
- Anglo Platinum
- Arcelor Mittal Steel
- BHP Billiton
- BP (UK)
- British Steel (UK)
- Caltex Refinery
- Carlton Paper
- Clover SA
- Consol Glass
- Columbus Steel
- Cyprus Petroleum
- De Beers
- Dow Corning (UK)
- Engen Refinery
- Ergo
- Eskom
- GEC Alstrom (UK)
- Glaxo Wellcome (UK)
- Goldfields
- Hulett Aluminium
- ICI (UK)
- Impala Platinum
- Illovo Sugar
- Johnson Mathey
- Kimberley Clark
- Lonrho
- Middelburg Ferrochrome
- Mondini
- Nampak Tissue
- National Power (UK)
- Natref Refinery
- Northam Platinum
- Palaborwa Mining
- Petro SA (Mossgas)
- PFG Building Glass
- PG Bison
- PPC
- Richards Bay Minerals
- SA Breweries
- Sappi
- Sasol Polymers
- Shell & BP Refinery
- Sasol Synthetic Fuels
- Tioxide (SA & UK)
- Tongaat Sugar
- Unilever
- Vametco

**COURSES ACCREDITED BY ESETA. ACCREDITATION NO ES/ETQA/0073
& ECSA CPD VALIDATED TRAINING COURSES (PARTS 1 & 2) - SAIMC**

MICHAEL BROWN CONTROL ENGINEERING CC

INTRODUCTORY COURSE

Who Should Attend: This course is designed for people who are involved in running a process plant, but are not really familiar with the practical elements of process control, and its potential. They are specifically for people like process engineers, and production personnel. **However we also recommend that instrumentation and control people wanting to take the Parts 1 and 2 courses (see later) should first attend this course.**

Introduction And Appreciation Of Practical Process Control

Length of Course: One day.

Synopsis: A concentrated course held either in the client's plant or at a training centre in Johannesburg. It serves as an introduction to feedback process control and its application in plants. The course is essentially practical rather than theoretical.

It has been found that the majority of control loops in plants operate extremely poorly. Control loops are frequently tuned very sluggishly, and operators, tending to accept this as natural, are used to switching loops into manual both during start up, and for load changes that the controller should have easily handled. The right training will allow them to judge if the controls are indeed working adequately, and what to expect from them. Furthermore, in plants where our courses have been presented, a new spirit of co-operation between the various departments has emerged.

Objectives: Upon successful completion of the course the student will understand:

- The purpose of each element in the control loop.
- The reasons for various control strategies.
- The role performed by instrument engineers and technicians.
- The importance of teamwork for successful operation of the plant.
- Problems that often occur in loops.
- How optimally tuned loops should behave.

Topics:

Items Around The Feedback Loop:

- The importance of measurement in control
- The final regulating device (valves etc.)
- The controller
- Control strategies

Tuning Methods:

- Tuning methods
- Loop analysers

Loop Analysis:

- The current state of the average loop
- The main problems encountered in loops
- Examples of such problems taken from plants around the world

Control From the Operation's Point of View:

- The current situation
- The desirable situation
- The importance of teamwork between various disciplines

Practical Demonstration on Simulator:

- Loop analysis
- Problems in loops
- The behaviour of various types of optimally tuned loops

PART 1: Trouble Shooting & Loop Tuning

Length of Course: Three days if held in a Johannesburg training centre. Normally additional 2 day practical if held in the client's plant.

Synopsis: This course teaches the fundamentals of practical process control including troubleshooting and optimisation of control systems. Particular emphasis is paid to solving problems that occur in many loops but about which very little formal knowledge has previously been available. Three days are spent in classroom lectures and workshops accompanied by analysis of real field test data and dynamic simulation. A further two days are spent optimising actual loops in the plant in the course held in the client's plant.

Who Should Attend: The course is designed for instrument technicians, control engineers, and other people responsible for the operation and maintenance of the plant control systems. The course will be very beneficial to people with a lot of previous experience in the control field, as well as beginners.

Objectives: Upon successful completion of the course the student will be able to:

- ◆ Determine the testing sequence to optimise each loop in a control system.
- ◆ Understand why loops often don't behave in the way they should, and what steps must be taken to rectify the problem.
- ◆ Perform control loop analysis tests to troubleshoot and tune feedback control systems for optimum performance.
- ◆ Understand and apply test techniques and control strategies needed to optimise various processes, including deadtime dominant loops, cascade controls, surge tank controls, and adaptive gain.
- ◆ Have much greater confidence in himself and in his own abilities to perform his job successfully.

Topics:

The role of various elements in the control loop
Operational characteristics
Understanding your brand of PID controller
The dynamics of different types of processes
Problems with final control elements
Loop analysis and testing
Hysteresis analysis
Non-linearity and solutions
Surge control
Ratio control
Examples of real world loop problems
Measuring principles in the digital world
Noise and how to deal with it
Loop tuning for optimum practical results
Filtering

PART 2: Control Techniques For More Difficult Processes

Length of Course: Two days.

Synopsis: This course concentrates on the more advanced features in the design, testing, simulation, and optimisation for more difficult processes. Lectures, workshops, and demonstrations using the Protuner WPSA software with dynamic simulator, are used to teach the concepts and necessary techniques to successfully optimise control operation in your plant.

Who Should Attend: The course is designed for instrument technicians, and for control and process engineers, who wish to increase their practical knowledge on general, as well as more complex applications of process control.

Note: Delegates must have previously completed the Part 1 course.

Objectives: Upon successful completion of the course the student will be able to:

- ◆ Recognise and understand all types of even complex process dynamics, and then be able to apply the most appropriate tuning to achieve the best control.
- ◆ Make practical use of frequency plots to obtain optimum tuning parameters that meet specific requirements.
- ◆ Implement advanced control concepts such as error squared, adaptive gain, integral only controllers.
- ◆ Optimise the operation of dynamically coupled interactive processes.
- ◆ Implement feedforward dynamic compensators to reduce the effect of load changes by typically an order of magnitude on the controlled variable.
- ◆ Make use of modelling techniques to experiment with various control strategies off-line before employing them on the actual plant.

Topics:

Basic modelling
Feedforward control
Combined feedforward and feedback control
Coupling and interaction
Decoupling by tuning
Multivariable decouplers
Practical frequency plot basics
Design and tune a controller from a frequency plot
Process dynamics of nearly all process classes
Tuning techniques for difficult classes of processes

Note:

- 1. It is highly recommended that both Parts be taken together as Part 2 is a continuation of Part 1.**
- 2. The scheduled courses in Johannesburg consists of a combined Part 1+2 course.**
- 3. It is also recommended that the Introductory Course be taken prior to these courses.**

COURSE DATE SCHEDULE 2015

Effective: January 7, 2015

Courses in our Johannesburg Training Centre:

Introductory Course

13 March
5 June
16 October

Combined Parts 1+2 Course (5 Days)

16 - 20 March
8 - 12 June
19 - 23 October

Courses held in client's plant:

Subject to arrangement with client.

COURSE FEES 2015: (Prices exclude VAT)

Courses in Our Johannesburg Training Centre: (Price per person)

Introductory Course (1 day)	R2,865.00 ###
Combined Parts 1 & 2 Control Loop Optimisation Course (5 days)	R16,403.00 ###

Courses held in client's plant in South Africa:

In-Plant Introductory Course:

(1 day, price per group of 10) R18,084.00

Course: Part 1 (Troubleshooting & Loop Tuning - No Practical Session)

(3 days, price per group of 6) R37,769.00

In-Plant Course: Part 1 (Troubleshooting & Loop Tuning + 2 Day Practical)

(5 days, price per group of 6) R62,948.00

In-Plant Course: Part 2 (Control Techniques For More Difficult Processes)

(2 days, price per group of 6) R28,149.00

In-Plant Course: Part 1+2 (No Practical)

(5 days, price per group of 6) R65,917.00

In-Plant Course: (Practical)

(2 days, price per group of 6) R25,179.00

Plus living, travel, and any other directly related expenses at cost + 10%. Use of company cars at R6.95/km.

Prices for courses outside South Africa: On application.

For all bookings: Phone Michael Brown at 082-440-7790, or fax 086-671-9320, or email at michael.brown@mweb.co.za

5% Discount Payment for courses in our training centre: A 5% discount on these courses is available if payment is made into our account at least 3 weeks prior to the courses.

Payment for courses in client's plant: Before or at time of presentation of course.

Accommodation: Course participants are responsible for making their own reservations, however hotels will be suggested on request.

Original Invoices: If emailed invoices are not acceptable, then an additional charge will be levied for courier delivery, as normal post is too unreliable.

Cancellations: Bookings for all courses cancelled between 21 and 10 days prior to the course are subject to a 50% cancellation fee. Cancellations 10 or less days prior to the course are subject to a 100% cancellation fee. We also reserve the right to cancel any course if an insufficient number of delegates have booked. In such an event, fees that have been paid will be refunded in full. The client is liable for any unrecoverable expenses prepaid by ourselves, or penalties incurred by cancellation of bookings, irrespective of when the client cancelled the booking/s.

PROCESS CONTROL TRAINING COURSE REGISTRATION FORM

Please complete & fax back to us at 086-671-9320 or email to michael.brown@mweb.co.za

Delegate attending the course/s:

Name: _____ Job Title: _____

Name: _____ Job Title: _____

Company: _____

Postal Address: _____

Switchboard Tel. _____ Vat Registration _____

Name & department of contact at site: _____

E-mail _____ Cell No. _____

Tel: _____ Fax: _____

Signature: _____ Date: _____

Course/s Required: Introductory: _____ Part 1: _____ Part 2: _____

Course dates: _____

Venue: _____

Address where Invoices should be sent (if different from above):

CONDITIONS FOR REGISTRATION

Payment: Required 3 weeks prior to the commencement of course. Payment after this will result in a 5% increase in quoted prices.

Cancellations: Bookings for all courses that are cancelled between 21 and 10 days prior to the course are subject to a 50% cancellation fee. Bookings that are cancelled 10 days or less prior to the course are subject to a 100% cancellation fee. We also reserve the right to cancel any course if an insufficient number of delegates have booked. In such an event, fees that have been paid will be refunded in full.