



2KG TRAINING

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## A PRACTICAL GUIDE TO PUMP OPERATION & MAINTENANCE

### ABOUT THE PRESENTER: HARRY ROSEN



Harry Rosen has over 30 years of experience in the pumping industry, and his company TAS Online is an international market leader in engineering software and consulting services for both users and manufacturers of pumps

Harry is one of only two International Pump Experts contracted by the United Nations Industrial Development Organisation (UNIDO) to deliver expert pump training programs in South Africa, Malaysia, Indonesia, Thailand, Philippines, Russia and Colombia. He is also the lead facilitator in the 'Train the Trainer' program, whereby groups of pump experts are selected and developed as pump trainers themselves.

Harry recently presented a pumping systems course on behalf of the Massachusetts Energy Efficiency Partnership in Boston and is internationally recognised as one of the leading experts in promoting the system approach to pumping system optimisation.

Harry presents both a 3 day workshop on improving the efficiency and reliability of pumping systems, and a 4 day course on pump operation and maintenance. Drawing on his wealth of experience, both courses address both the theoretical and practical aspects of pumping systems. The courses have been supported by UNIDO, NCPC, Eskom (local power utility) and the National Energy Efficiency Agency as a valuable tool to help industry achieve their targeted 15% savings in electricity.

Harry has presented training courses to groups of delegates in the following industries :

- Water boards
- Petrochemical facilities
- Eskom (power utility) energy advisers
- Agriculture
- Mining process plants
- Process and steel industries

Harry has carried out more than 30 pumping system assessments and scoping studies, both in SA and around the world at industries such as :

- Bulk and municipal water supply
- Iron and steel manufacturing
- Petrochemical and process plants
- Mining (underground, open cast, dune mining) and mineral process plants
- Power stations
- Pulp and sugar

Harry has acted as an expert witness in a number of arbitration cases involving clients in the water industry. He has also performed third party independent design reviews of new pumping systems for pump companies as well as engineering consulting firms.

#### **Background**

Harry studied at Wits University and qualified with a Bsc Mech Eng in 1987, receiving his Pr Eng in 1992. He is past chairman of the SA Institution of Mechanical Engineering, Central Branch and was instrumental in setting up the International Pump User Conference (IPUC) which was held in Johannesburg, bringing together the world's experts in energy efficient pumping systems, regularly attracting over 180 delegates and 20 world class speakers.

Pump manufacturers and suppliers in South Africa and in many countries around the world are using pump selection and graphing software, as well as Testbed automation systems designed by TAS Online.

Through the development and roll out of its TAS PumpMonitor software, his company's products and expertise are well known and accepted by major pump users such as Anglo American, Gold Fields and Harmony Gold.

#### **Current Position : Managing Director TAS Online**

Nature of duties:

- Mechanical engineering software development for the international pump industry
  - Aquatec pump selection software
  - Graftec pump curve graphing software
  - Life cycle costing analysis of pumping systems
- Design and integration of fully automated pump test facilities
- TAS PumpMonitor – real time remote pump performance monitoring system
- Engineering consultancy services to the pump industry, including
  - Witness pump tests
  - Scoping studies and full pump system assessments
  - Implementation of energy savings projects
  - Third party design reviews of new pump station design
  - Life cycle cost analyses of new and existing pumping systems
- Expert witness for projects in the water industry
- Third party design reviews

#### **List of relevant experience**

- **Sibanye Gold / Gold Fields/ Harmony Gold** – Pump systems monitoring and consultancy services to three major gold mining groups. This includes analysis of pump and system efficiencies, system optimization and refurbishment.
- **Lepelle Northern Water** – Assessments at various pump stations with the view to optimize the energy and maintenance costs. Currently involved on a group wide optimization and consultation.
- **Eskom / Johannesburg Water** - Conducted a pilot project at the Johannesburg Water pump station which was audited by Eskom in order to demonstrate the accuracy of TAS PumpMonitor software and savings potential at a typical municipal pumping system.
- Assessments of pumping systems at two **Johannesburg Water** pump stations.
- Midvaal Water – Conducted assessments on two pumping facilities and subsequently assisted in reviewing tender submissions on the company's behalf.
- Exxaro – Conducted a pump systems audit and a number of assessments on water delivery systems at Grootegeluk Coal Mine.
- Anglo Coal – a pumping system improvement project at New Vaal Colliery is in the execution phase following a successful assessment of savings opportunities and subsequent monitoring of pump efficiency. Assessments have also been completed at Goodehoop, Kleinkopje and Greenside.
- Ongoing assessments and project implementation at Arcelor Mittal South Africa steel mills in Vanderbijlpark and Saldanha
- Energy audit of process pumps (Phenosolvan plant) at Sasol refinery in Secunda

**Number of days: 4**

**CPD Points: 4**

## Live Virtual Classroom

2KG Training Live Virtual Courses offer participants the same instructors, training systems, course materials, personal support, and face-to-face engagement with instructors and other participants that they would expect to find in a conventional classroom.

The Pump Operation & Maintenance Live Virtual Course brings participants together in a virtual classroom, where they receive training from an expert via a live video link. Participants are interconnected via audio and video, enabling them to interact both with the instructor and with their classmates. Learners can speak to their instructor at any time to ask questions, request assistance, and instructors can provide hands-on support.

## DISCOVER THE KEY ELEMENTS NECESSARY TO AVOID

- Unnecessary capital costs
- Large long-term energy losses
- Reduced pump reliability
- Elevated maintenance costs
- Reduced operation time
- Poor hydraulic performance

## WHO CAN BENEFIT FROM THIS TRAINING COURSE?

- Pump Operators, Artisans, Technicians, Instrumentation Technicians
- Mechanical Foremen, Maintenance Engineers, Reliability Engineers, Mechanical Engineers
- Operations Managers, Technical Managers, Process Engineers

## SPECIFIC INDUSTRY CLIENTS

- AngloGold Ashanti, BHP Billiton, Exxaro (Mining industry)
- Sasol, BP, Shell, Chevron, Petronas (Refineries)
- Toyota, Mercedes, VW, Proton (car manufacturers)
- Rand water, Lepelle, Midvaal, Umgeni water, Transco, Manila Water (bulk water supply companies)
- TWP, GEC Alston, Murray and Roberts, Aurecon (consulting engineers)
- SAPPI, MONDI (paper mills)
- ILLOVO, BISCOP, Lopez Sugar (sugar mills)
- ESKOM, Lesedi Nuclear Services, BUI (power utility)
- SAB Miller, San Miguel (Breweries)
- BISW, Arcelor Mittal, Steel Asia, Engtex, CADP (Iron and Steel)

## COURSE OUTLINE

### 1. Basic Pump Principles

- How Pumps Work
- Head vs. Pressure
- Absolute and Gauge Pressures
- Work & Efficiency
- Flow & Head, Efficiency, Power

### 2. Pump Classification

- PD, Centrifugal types
- Impellers, Liquids
- ANSI / API
- Specific Speed

### 3. Pump Curves

- Head, Eff. & Power
- NPSHr
- Family Curves
- The Affinity Laws

### 6. Bearings

- Types & Services
- Lubrication
- Maintenance & Seals

### 7. Pump Packing

- Components
- Packing Procedures
- Failure & Leakage

### 8. Mechanical Seals

- Components
- Single & Double
- Support Systems

### 9. Pump- Motor Alignment

- Types of Misalignment
- Alignment Techniques

- Speed & Diameter
- Practical Application

#### 4. System Curves

- Total Dynamic Head
- Elevation, Pressure & Losses
- Static head, friction head curve
- Pumps in Series & Parallel

#### 5. NPSH and Cavitation

- NPSH required
- NPSH available
- Vapor Pressure
- Types of Cavitation
- Effects & Prevention

#### 10. Pump Operation / Pump Reliability

- Definitions
- Operating away from BEP
- Energy savings, Increased MTBF
- Bearing and Seal Life
- Shaft deflection
- Maintenance Operation & Design

#### 11. Troubleshooting

- Why duties change
- Identifying problem applications
- Where do your pumps operate
- Instrumentation (reading from gauges)
- Fault finding and Failure Analysis
- Interpreting the Evidence

## CLIENT TESTIMONIALS

#### Process Engineer, Petrochemical plant

- "The instructor has vast experience in pump operation and troubleshooting. His practical experience and the pictures he showed helped to explain the course content. "

#### Senior Manager, Steel plant

- "The course was extremely valuable, and applicable to my environment. It will assist me as Senior manager, I am in a much better position to challenge my team."

#### Area Manager, Petrochemical Plant

- "Extremely knowledgeable about subject- A Pump expert. Shared a lot of useful tips, processes and case studies relevant to our industry."

#### Mechanical Technician, Power station

- "The Instructor is very knowledgeable not only from a theoretical point but as well from a practical point of view. He could answer all questions and explained them in an easy to understand manner."

## Registration Form

### How to register for the course:

1. Complete this registration form and fax it to Phindi Chauke: Tel: 011 325 0686 Fax: 011 325 0488 Email: [phindi@2kg.co.za](mailto:phindi@2kg.co.za)
2. Acknowledgement will be emailed to you.
3. Final confirmation and details will be faxed or emailed to you approximately 7 days before the commencement of the seminar.

### Cancellation Policy:

By signing and returning the registration form, the authorizing signatory on behalf of the stated company is subject to the following terms and conditions.

- All cancellations must be received in writing
- Any cancellations received less than 3 working days before the date of the event, the full fee will be payable and no refunds or credit notes will be given.
- If a registered delegate does not cancel and fails to attend the Workshop, this will be treated as a cancellation and no refund or credit note will be issued.

### Delegate information:

Title: \_\_\_\_\_ Surname: \_\_\_\_\_ Name: \_\_\_\_\_  
Full Company name: \_\_\_\_\_ Job Title: \_\_\_\_\_  
Postal Address (to which invoice must be sent): \_\_\_\_\_  
Code: \_\_\_\_\_ VAT number: \_\_\_\_\_  
Tel: ( ) \_\_\_\_\_ fax: ( ) \_\_\_\_\_  
Cell: \_\_\_\_\_ Email: \_\_\_\_\_

### Contact/ Accounts information:

Title: \_\_\_\_\_ Surname: \_\_\_\_\_ Name: \_\_\_\_\_  
Tel: ( ) \_\_\_\_\_ fax: ( ) \_\_\_\_\_  
Cell: \_\_\_\_\_ Email: \_\_\_\_\_

Please tick the course that you would like to attend:

#### Conventional Classroom

☐ 2– 5 February 2026 (4 Days)  
**Secunda**  
**R18 480.00 (excl VAT)**

☐ 23 – 26 February 2026 (4 Days)  
**Secunda**  
**R18 480.00 (excl VAT)**

☐ 25 – 28 May 2026 (4 Days)  
**Secunda**  
**R18 480.00 (excl VAT)**

☐ 2 – 5 November 2026 (4 Days)  
**Secunda**  
**R18 480.00 (excl VAT)**

☐ 23 – 26 November 2026 (4 Days)  
**Johannesburg**  
**R18 480.00 (excl VAT)**

☐ **Live Virtual Classroom**  
25 – 28 August 2026  
Live Virtual classroom  
**R14 784.00 (excl VAT)**

I have read and agreed to all the conditions of registration as stipulated in this brochure.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

For more info and to register contact Phindi Chauke on tel: 011 325 0686 or cell: 071 125 6188 and email: [phindi@2kg.co.za](mailto:phindi@2kg.co.za) or visit [www.2kg.co.za](http://www.2kg.co.za)