VARIABLE SPEED DRIVES

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 recognized 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: 2
CPD Points: 2

WHO SHOULD ATTEND

- Individuals who wish to improve profitability, reduce utility costs, improve product quality, increase operating flexibility, increase plant capacity, improve plant safety, and/or improve plant reliability through the application of variable speed drive technology
- Technicians, engineers, managers, sales persons, marketing persons, consultants, and others involved with the application and justification of variable speed drives for energy cost savings should find this seminar beneficial.

VARIABLE SPEED DRIVES *Cont.*

2KG TRAINING

COURSE DESCRIPTION

This course describes the basics of variable speed drives, plus an in-depth discussion of the control aspects of variable speed drive applications.

Harry will demonstrate how variable speed drives can and should be used instead of traditional control valves to save energy and improve process control performance. He also highlights the advanced uses of variable speed drives to reduce utility costs.

Harry discusses the challenges of implementing variable speed drives into different types of pumping systems, showing examples of both successful and failed installations. The importance of understanding the system and how the variable speed drive affects the pump performance is discussed in detail.

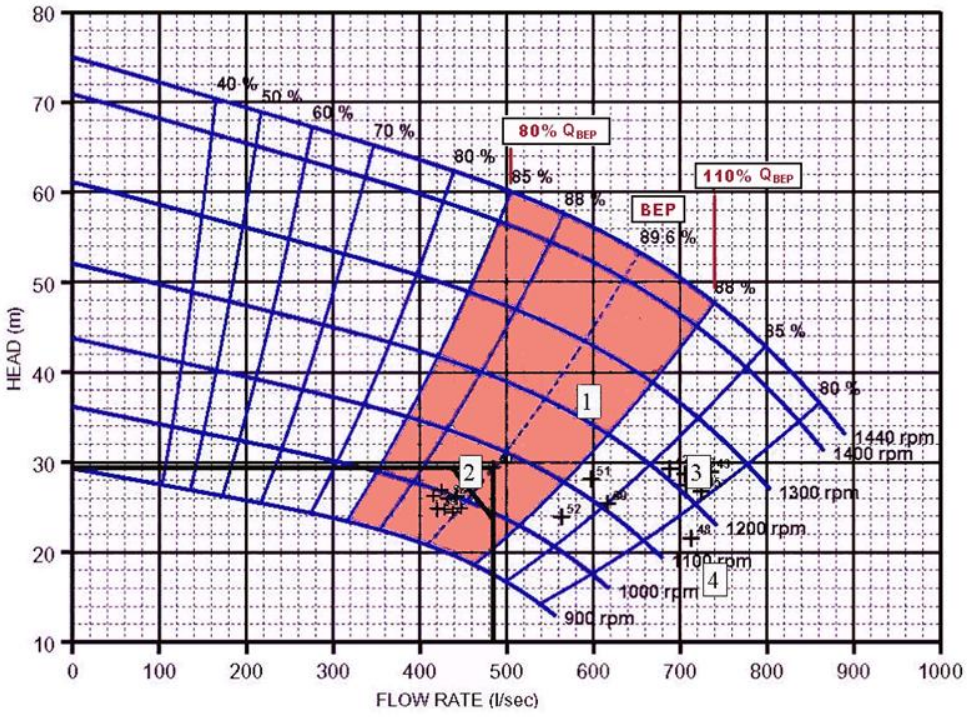
Whether delegates are designing a new facility or re-engineering an existing plant, this course will help you create a more sustainable plant that uses less energy and improves production efficiency. Mechanical equipment operating at a slower speed will also increase reliability (better MTBF), reduce maintenance costs and increase the useful life of the equipment.

AFTER THE COURSE YOU WILL BE ABLE TO

- Understand electrical, hydraulic and instrumentation principles as related to variable speed drives.
- Evaluate the role that variable speed drives can play in overall plant process and energy requirements.
- Identify developments in variable frequency drives.
- Generate energy savings by applying variable speed drives.
- Understand real-world applications that help make the theory clearer and easier to put into practice.
- Develop and economically justify energy-saving projects that incorporate variable speed drives.

Example of Incorrect Application of Variable Speed Drive in Pumping Application

- Pumping water into pressurized water network, downstream pressure used to control drive
- As pump speed increases to meet higher flow demand, pump moves further away from BEP



1 **Pump Best Efficiency Point (BEP)**

2 **Pump operating at BEP during low demand**

3 **Pump operating far right of BEP as demand increases**

4 **Pump cavitating and cannot supply required demand**

COURSE OUTLINE	
Introduction	Overview of Variable Speed Drives technology from the development of steam engines to modern microprocessor based electronic motor controllers
Electrical / Instrumentation Basics	Voltage and Current | Single-Phase and Three-Phase Power | AC Induction Motors | DC Motors | Process Control | Measurement | Control Devices | Final Control Elements | Control Loop | Safety
Pumping System Basics	Types of Pumps | Pump Curves | Static and Friction Head | Parallel Pump Operation | System performance | Centrif / PD Pumps
Plant Utility Costs	Electricity| Natural Gas | Fuel Oil | Coal | Waste Fuels | Energy Cost Summary | Distribution Losses | Plant Air Costs | Steam Costs
Application of Control Valves	Control Valve Components | Typical Control Valve Designs | Control Valve Sizing | Control Valve Characteristics | Control Valve Actuators | Control Valve Accessories | Control Valve Installation | Control Valve Selection | Dampers
Types of Drives	Mechanical Transmission | Fluid Power Drives | Fueled Prime Movers | Drive Couplings | Direct Current Motors | Wound Rotor Motors | Variable Frequency Drives | Alternate Final Control Element Selection
VFD Technology	Solid-State Design | VFDrive Types | HP and Torque | Types of Loads | Power Factor Correction | Efficiency | Motor Requirements | Speed Adjustment | Start/Stop/Reverse | Motor/Drive Protection | Multimotor Operation | Drive Configuration | Networking Drives | Electrical Accessories
Control Valve vs VSD	Control Philosophy | Efficiency and Enviromental Impact | Power Factor | Operating Costs | Operation | Ability to Control
VSD Applications	General Guidelines | Pumping Applications | Fan/Blower Applications | Compressor Applications | Other Applications
Life Cycle Costs	Organization Of Analysis| Scenario Development | Istallation Costs | Operating Costs | Maintenance Costs | Net Operating Costs | Economic Evaluation
Pumping Applications	General Guidelines | Single-User Centrifugal Pumping System | Multiple-User Centrifugal Pumping System | Centrifugal Fan Systems | Slurry Pumping Systems | Pumping in Parallel
Case Studies	Cooling Tower Recirculation Pump | Dense Medium Slurry Pump | Water Supply Pump Pressurised Main | Chiller Recirculation Pump System | Raw Water Pumps in Parallel

VARIABLE SPEED DRIVES

2KG TRAINING

Registration Form

Number of days: 2 **CPD Points:** 2

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
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 7 working days before the date of the event, the full fee will be payable and the delegate can attend the next scheduled training course.
- In case of insufficient applications for the workshop 2KG reserves the right to cancel the seminar. Applicants will be informed and all fees will be refunded immediately.

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:

Live Virtual Classroom

☐ 20 – 21 October 2025, (2 Days)
Live Virtual Classroom
R7 200.00 (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 or visit www