



2KG TRAINING

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Advanced Pumps CENTRIFUGAL PUMP THEORY AND APPLICATIONS

Presenter: Willem van der Westhuizen

ABOUT THE PRESENTER: Willem van der Westhuizen



Willem joined Eskom in 1982 as a Pupil Technician. In 1989 he became a Technologist-in Training and in 1993 he became a Senior Consultant and later a Chief Consultant (Boiler feed pumps and pumps in general).

In 1987 he had the opportunity to gain design and research experience at Sulzer Pumps head office in Switzerland. He joined Sulzer South Africa in January 2000 as a Senior Design Engineer in the pump department. His main responsibilities were to apply his knowledge and experience to pump design, investigations, tests, and research and development activities.

Willem resigned from Sulzer in October 2005 and started his own pump consulting business, OPTIMUM PUMPING SOLUTIONS CC.

Willem lectures in mechanical subjects part-time for candidates enrolled for the GCC course at Eskom College, as well as presenting a two day Pump Course for Industry.

Willem has written 10 National and 5 International papers on various aspects of pumps. He also presented a paper entitled "Predicting Cavitation and Pump Performance Characteristics by Means of Numerical Flow Simulation and CFD Calculation" at the recent International Pump Conference held at Gallagher Estate Midrand in June 2005.

He is presently contracted by Eskom to help with pump specifications for the New Eskom Power Stations.

Number of days:2

Cost:R7 500excl VAT

CPD Points: 2

AIM OF THE COURSE

After successful completion of this course the attendees will have a better understanding of centrifugal pump fundamentals, enabling them to apply the knowledge gained in their daily work.

WHO CAN BENEFIT FROM THIS WORKSHOP

- System engineers involved in improving reliability, plant operators, and maintenance staff.
- Manufacturers and engineering consultants.
- Plant performance department candidates

COURSE OUTLINE

Introduction Diagrams

- Simple End Suction Pump
- Pump Cross Section
- Parts List
- ANSI Pump Curve Sensitivity for Pump Reliability
- API Pump Curve Practices
- High Speed & High Head Pump Curve

Centrifugal Pump Fundamentals

- How Centrifugal Pumps work
- Radial Thrust
- Axial Thrust
- Calculating Pump Total Head
- Typical Centrifugal Pump Performance Curves
- Centrifugal Pump Affinity Laws
- Calculating the power input required by the Pump
- What is NPSH required and NPSH available
- How to deal with unsatisfactory NPSH problems
- Cavitation
- What is Specific Speed – N_s or N_q
- Typical Characteristic Curve Shapes for Centrifugal Pumps
- Flow Control in Centrifugal Pumps
- Examples of Re-circulation Systems

Types of Pumps

- Condensate Extraction Pump
- Circulating Water Pump
- Boiler Feed Pump
- Boiler Feed Booster Pump
- Balance of Plants Pumps

Acceptance, Testing, Operational Manuals and Tender Specs

- Acceptance Testing
- Proper Specifications and Tender Requests
- Evaluation, Selection and Purchase
- Common Design Installation Errors & Omissions
- Common Maintenance Errors
- Common Operating Errors
- Operation & Maintenance Manuals

General

- Power Plant Pump Monitoring
- Vibration Analysis Fundamentals
- API Standard 610

Types of Pumps and Pump Selection

- Pump selection – example 1
- Pump selection – example 2
- Pump similarity Laws
- Specific Speed
- Low Specific Speed Impeller
- Medium Specific Speed Impeller
- High Specific Speed Impeller
- Influence of Specific Speed
- Suction Specific Speed (Nss)
- NPSH Defined
- NPSH Test Procedure
- NPSH Factors
- Calculation of NPSH Vertical Pumps
- Pumps in Series and Parallel
- Variable Speed
- Minimum Flow Required
- Total Pump Lifetime Cost

Case Studies

- Influence of Roughness Estimate on System Performance/Bloemwater
- Inlet Conditions Leading to Problems
 - Knysna - Pump Station
 - Duvha - Condensate Extraction Pump Bearing Failures
- Dynamic Pressure starting from Start Up
 - Case Study 1 – Ash Water Return System
 - Case Study 2 – BosloopWintershoek Water Supply Pipeline
- Complex Vibrations Related to Boiler Feed Pump Barrel Casings – Lethabo EFB 4B
- CPP Vibrations – Lethabo
- LPH Drain Pumps Failure and Half Flow Pump Motor Vibrations/Koeberg
- Ejector Water Pump Bearing Failures – Lethabo
- Cavitation Paper
- NPSH Calculations – Tutuka
- Vibrations in Centrifugal Pumps
- Vibration Guide Line
- Allianz Handbook of Loss Prevention



Registration Form

Number of days: 2
Cost: R7 500excl VAT
CPD Points:2

How to register for the course:

1. Complete this registration form and fax it to Phindi Mbedzi: 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 NOTICE:

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

Delegate Cancellations: All cancellations must be received in writing and are subject to the following conditions:
For any cancellations received less than 7 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: _____

Dietary Requirements: Normal Vegetarian Halaal

Please tick the course that you would like to attend:

13-14 March 2019
Johannesburg, CedarWoods of Sandton

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 Mbedzi on tel: 011 325 0686 or cell: 071 125 6188 and email: phindi@2kg.co.za or visit www.2kg.co.za