

Slurry Pumping & Piping Fundamentals

A practical and interactive three day seminar



KASA Redberg
Engineers & Technical Trainers

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Slurry Pumping & Piping Fundamentals

Introduction

This three day course is an amalgamation of the slurry-related material found in our “Pump Fundamentals” and “Liquid Piping Systems Fundamentals” courses combined with the fundamentals-level material found in our “Advanced Slurry Pumping & Piping” course.

Who Should Attend

Consulting Engineers, Process Engineers, Design Engineers, Project Engineers, Slurry Pump & Piping Sales Representatives and anyone who needs to select, specify, commission, install and/or troubleshoot slurry pumping equipment and slurry piping.

It is a requirement that each delegate has an understanding of mechanical components. Experience with diploma or degree level engineering maths would also be advantageous.

Delegate Pre-Requisites

For the maximum benefit to be obtained, it is recommended that each delegate:

- Has an understanding of mechanical components.
- Has had some previous exposure to slurry systems.
- Is degree or diploma qualified in a relevant technical discipline (e.g. mechanical, chemical or mining engineering).

In-House (Customised) Training

This training course is only delivered as an in-house course.

The content of the course can be customised to suit the specific equipment makes/models that you use at your facilities. Additional material can also be included or non-relevant material can be excluded. In this way, this course can be completely customised to suit your needs.

As this is an in-house course, please contact us via phone or email to arrange a detailed proposal.

Seminar Objectives

At the completion of this seminar, each delegate should be able to:

- Have a greater understanding of hydraulics theory such as pressure-head relationships, cavitation, NPSH, hydraulic grade lines, motor and engine power, and pipe head loss calculations.
- Read and understand pump curves for all pump types.
- Understand how to determine the required pipe wall thickness and flange rating for a given application.
- Understand how the relevant slurry properties are determined in a laboratory environment.
- Understand the principles of determining head loss in both settling and non-settling slurries.
- Be aware of the effects of particle size and solids concentration with respect to de-rating of pump performance for a particular slurry.
- Appreciate the advantages and disadvantages of the more commonly used slurry piping materials so that material selection can be carried out in a more informed manner.
- Be aware of the more common piping operational issues.
- Determine whether a centrifugal slurry pump or a positive displacement pump is a better choice for a particular application.
- Have a greater understanding of the more commonly available centrifugal and positive displacement pumps used for slurries.
- Be aware of various slurry pump operational issues, recommended piping configurations and component choices.

Training Seminar Materials

All delegates receive:

- A Detailed Seminar Manual** – Which provides a reference text of all of the material presented during the seminar. Note: This manual is written as a textbook which allows it to be more useful as a future design reference.
- Certificate of Attendance** – Which states the number of hours of training and serves as documentary proof of attendance.



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Seminar Synopsis

DAY 1

BACKGROUND INFORMATION

- Specific Gravity, solids concentration, particle size analysis, rheograms (aka "flow curves"), viscosity.
- Newtonian and Non-Newtonian slurries
- Non-Newtonian Flow Models
- Homogeneous, heterogeneous, stratified and sliding bed flow profiles.
- Classifications – Settling and Non-Settling slurries.
- Slurry Pump Performance Basics.
- Worked Example Problems.

CENTRIFUGAL SLURRY PUMPS

- Components, types, examples, design features.
- Selecting materials of construction based on wear classes and service classes.
- Envelopes of operation.
- Series and parallel pumping, design & operational Issues.
- A review of the commonly available types of seals and packing.
- Focus on submersible slurry pumps
- Focus on horizontal end-suction slurry pumps.
- Drive Arrangements.
- Maintenance considerations.
- Gland water setups.
- Worked example problems

DAY 2

THE DE-RATING OF SLURRY PUMPS

- Recommended methods of determining the de-rating effects (i.e. Head Ratio, Efficiency Ratio etc) on centrifugal slurry pumps when dealing with settling slurries.
- Dealing with non-settling, non-Newtonian slurries.
- Dealing with frothing slurries.
- NPSHR corrections.
- Worked example problems.

POSITIVE DISPLACEMENT PUMPS

- A review rotary and reciprocating PD pumps for slurry.
- Selection criteria, relative advantages and disadvantages, envelopes of operation.

DAY 2 CONTINUED

POSITIVE DISPLACEMENT PUMPS (CONTINUED)

- Operation and maintenance considerations.
- Recommended suction and discharge piping arrangements.

A FOCUS ON FROTH PUMPING

- Froth pumps
- Centrifugal slurry pumps for froth
- Recommended suction and discharge piping
- Calculations and worked examples for froth pumping

DAY 3

SLURRY PIPING – MATERIALS, EXAMPLES & ISSUES

- A review of common slurry piping materials of construction including: rubber lined steel, ceramic lined steel, plastic lined steel, polyethylene, fibreglass etc.
- Selection criteria, advantages/disadvantages etc of the above-mentioned materials.
- Pipe wear and wear testing methods.
- Valves and instruments for slurries.

PIPING DESIGN FOR NON-SETTLING SLURRIES

- Recommended methods for determining head loss for laminar and turbulent flow from viscosity measurements and/or small-scale pipe flow data.
- Recommended method for determining head loss for Newtonian Non-Settling Slurries.
- Worked example problems.

PIPING DESIGN FOR SETTLING SLURRIES

- Recommended methods for determining head loss.
- Recommended methods for determining the Deposit Velocity.
- Recommendations for pipe diameter and flow velocity.
- Flow in inclined pipes.
- Worked example problems.

