

KASA Redberg
Engineers & Technical Trainers

Mine Site Water Pumping Stations & Pipelines

*A practical and interactive
2 day course
or*

*4 x 4 hour online/live streamed course
(run over 4 days within a 2-week period)*

Mine Site Water Pumping Stations & Pipelines

Introduction

This training course is a two-day, instructor-led program that provides practical, engineering-focused guidance on the design, analysis and operation of water pipeline systems used across mining and minerals processing sites.

The course addresses the full water pipeline lifecycle, from hydraulic fundamentals and pipeline sizing through to water hammer, air management, pump selection, valve selection and common design and construction issues encountered in mining applications such as pit dewatering, raw water transfer, decant return systems and off-site discharge pipelines.

Emphasis is placed on real-world design considerations, worked examples and case studies drawn from operating mine sites.

Who Should Attend

This course is intended for professionals involved in the design, specification, operation or review of water pipeline systems for mining and minerals processing facilities, including: mechanical and piping engineers, civil and hydraulic engineers, mining engineers involved in dewatering and water transfer systems, project engineers and project managers, water infrastructure designers and reviewers, operations and maintenance engineers responsible for pipeline assets.

Delegate Pre-Requisites

It is a requirement that each delegate has a basic understanding of engineering principles relevant to fluid systems and some prior exposure to pumping systems, pipelines or water infrastructure.

Seminar Objectives

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

- Understand the hydraulic behaviour of water pipelines under steady-state and transient conditions.
- Size pipelines using appropriate hydraulic design methods for mining applications.
- Interpret hydraulic grade lines and identify common pipeline risk conditions such as slack flow, vacuum and cavitation.

- Understand when a water hammer analysis is required and how water hammer can be mitigated.
- Select and apply centrifugal pumps, valves and pipeline materials appropriately.
- Appreciate the interaction between pump curves and system curves.
- Identify common pipeline design, construction and documentation issues encountered on mine sites.
- Apply lessons learned from real project case studies to their own work.

Training Seminar Materials

All delegates receive:

- A comprehensive training manual covering all course topics. This manual is written as a reference book and serves as a handy future reference.
- **Certificate of Attendance** – which states the number of hours of training and serves as documentary proof of attendance.

In-House (Customised) Training

This training course is only delivered as an in-house course. We have been delivering this course since 2023.

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.

Delivery can be arranged as face-to-face, live-streamed or hybrid training, with flexible scheduling options to suit operational constraints.

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



Mine Site Water Pumping Stations & Pipelines

Seminar Synopsis

Day 1 (or Sessions 1 and 2 when delivered online)

BACKGROUND INFORMATION

- Terms and definitions
- Fluid properties (viscosity, density, temperature etc)
- Pressure-head relationships
- Calculating pumping power for a pipeline
- Cavitation in pumps
- Cavitation in piping and valves
- Worked examples – Pumping power

PIPELINE HYDRAULICS - GENERAL

- Pipeline hydraulic grade lines
- Vacuum, slack flow, low point and high point issues
- Pipeline and valve head losses – Newtonian fluids
- Moody, Darcy-Weisbach, Colebrook-White, Swamee-Jain
- Pipeline hydraulic sizing – Allowable velocity
- Pipeline hydraulic sizing – Head loss available
- Pipeline hydraulic sizing – Net present value
- Worked examples – Pipeline analysis (MS Excel calcs)
- Case study – Pipeline analysis (hydraulic modelling)

WATER HAMMER

- Water hammer theory
- When to conduct a water hammer analysis
- Methods of minimising water hammer
- Water hammer analysis software

AIR ENTRAPMENT

- Sources of air
- Avoiding air entrainment
- Air valve types, locations, installations etc.

MISCELLANEOUS PIPELINE TOPICS

- MAOP and PN ratings
- Common materials of construction (e.g. PE and steel)
- Standards and codes
- Above-ground versus below-ground pipelines
- Hydrostatic testing
- Case study – Pipeline design with series booster pumping

Day 2 (or Sessions 3 and 4 when delivered online)

CENTRIFUGAL PUMPS

- Components, Types and Examples
- Affinity Laws and Characteristic Curves
- Reading pump curves
- Matching the System to the Pump
- System Curve Calculations
- Parallel and Series Pumping Circuits
- Worked Example Problems

VALVES

- Classifications, selection parameters, components
- Linear valves – Gate and globe
- Rotary valves – Ball and butterfly
- Non-return valves
- Pressure relief and safety valves
- Pressure reducing, sustaining and altitude valves

SELF-PRIMING PUMPS

- Dry-prime versus wet prime
- Configurations
- Good and bad design practices
- Pontoons versus shore-mount

HIGH WALL PUMPS

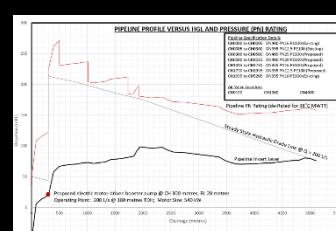
- A focus on high-wall pumps
- Principle of operation
- Friction losses in delivery hose/pipe to booster
- Miscellaneous tips and tricks

PUMP DRIVES

- Direct-on-line
- Soft starters
- Variable speed drives

PIPELINE DESIGN DOCUMENTATION

- Good and above examples of pipeline design documentation



About KASA Redberg

KASA Redberg is a technical training and engineering consulting group.

We have core competencies in pumping systems, piping systems, pipelines, pressure vessels and slurry handling systems. We also act as independent HAZOP workshop facilitators and Safety-in-Design workshop facilitators.

Our portfolio of services includes:

- Tank and vessel design.
- Chemicals plant design.
- Water treatment plant design.
- Pumping and piping systems design.
- Pump station and pipeline design
- Mine dewatering and water supply systems design.
- Pipe stress analysis
- Pipeline hydraulic modelling
- Water hammer analysis
- Slurry piping systems design and slurry pump selection.
- On-site troubleshooting of pumps and piping systems.
- Operator training courses
- HAZOP workshop facilitation
- Safety-in-Design workshop facilitation

Contact Details

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