



KASA Redberg

Engineers & Technical Trainers

ABOUT KASA REDBERG PTY LTD

KASA Redberg is a technical training and engineering consultancy specialising in the areas of fluid pumping, piping and storage systems.

We began operation in January 2004 as a specialist training company running public seminars in the area of pumping equipment. Our portfolio of technical seminars quickly increased due to the positive response of our seminar attendees and also their consistent message that *"there is limited short-course training available for fluids related processes in Australia"*.

Due to "word-of-mouth" recommendations, many large engineering consultancies, minerals processing organisations and public utilities now utilise KASA Redberg for the in-house training of their engineering personnel. In particular, some organisations now have our seminars included as part of their "Graduate Development Programs".

CURRENT SEMINAR PORTFOLIO

We offer three tiers of training seminars, all of which relate to fluids pumping, piping and storage. These are:

- **Pump Basics:** This seminar is only provided as a private (i.e. in-house) seminar to companies wishing to train their trades staff, technicians and plant operators in the pumping equipment they use on their own sites. It is typically run over one day.
- **Pump Fundamentals:** This is a two day seminar specifically for engineers, higher level technicians and managers who are new to the area of pumps or are seeking to formalise their "on the job" learning. Both centrifugal and positive displacement pumps are covered and examples are taken from all industry sectors such as: minerals processing, water/wastewater, chemicals, manufacturing and hydrocarbons.
- **Liquid Piping Systems Fundamentals:** This is a two day seminar which compliments our "Pump Fundamentals" seminar. It is designed for engineers, technicians and managers who want to understand how to design piping and pipelines for size, wall thickness, materials of construction and end connections. Guidance is also provided on the specification of valves and instrumentation as well as calculations relating to pipe stress analysis and design loads.

- **Advanced Slurry Pumping and Piping:** This two-day seminar is publically offered twice per year in Brisbane and Perth, with limited availability in other states as a private seminar. In 2010, the presentation of this seminar will be shared between KASA and RMIT. It is specifically designed for those who need higher level knowledge in the design and/or operation of slurry systems including non-Newtonian, time dependent slurries, as well as simple settling and non-settling slurries.

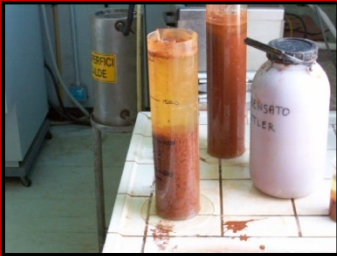
Apart from these standard seminars, we regularly provide customised versions for private clients. For example, we have developed and presented customised two-day "Water/Wastewater Pumping & Pipelines" seminars as well as two-day "Slurry Pumping Fundamentals" seminars. Details are available on request.

NEW SEMINARS ROLLING OUT IN 2010

With our current seminar offering being so well received by our clients and public seminar attendees, we have been requested to increase our training topics. We are currently working on the development of two more seminar topics which are due for roll-out in the second half of 2010. These are:

- **Piping Design to AS4041 & ASME B31.3:** This two day seminar is targeted towards engineers who design piping to the requirements of AS4041 and ASME B31.3. The focus of this seminar is the interpretation and use of the above-mentioned standards and codes for process piping design, in particular – pipe stress analysis and flexibility analysis.
- **Pressure Vessel Design to AS1210:** This two-day seminar is for engineers involved in the design of pressure vessels utilising AS1210 "Pressure Vessels". Some comparison with ASME Section VIII is also included.
- **Gas Piping Systems Fundamentals:** This seminar compliments our existing "Liquid Piping Systems Fundamentals" seminar so that by attending just two KASA "fundamentals" seminars, an attendee can gain a full appreciation of compressible and incompressible fluids. Fuel gas, steam, compressed air and nitrogen gases are covered in some detail.





CONSULTING CAPABILITIES

After establishing our credibility as technical trainers, we started to branch into the area of consulting in early 2006. This was once again based on demand from those who had benefited from our training seminars. Initially we provided on-site troubleshooting for complex pumping or piping systems. From there, we provided plant design and commissioning services. We have now re-structured our consulting services so we have a more clearly defined portfolio. In-fact, we have trimmed the number of services we provide so we can be even more focused on providing high-level and specialised expertise that is not typically found in most organisations. Our range of consulting services is now limited to the following niche areas:

- **Plant Troubleshooting:** We can provide either “over-the-phone” or on-site troubleshooting services. We are typically engaged after our clients have found little satisfaction with either their equipment suppliers or their existing (preferred) design/construct consultants. Typical work has included: pump troubleshooting relating to cavitating slurry pumps, froth pumping leading to air-locks, motor tripping occurrences, water hammer and “bogging” slurry pipelines.
- **Design Reviews:** We have been used as an independent third-party in design reviews by experienced organisations who want to make sure that their design has met their client’s expectations. Typical areas include slurry systems, chemicals storage and water treatment plants.
- **Tank, Vessel & Piping Design:** This service is generally provided for organisations who do not have in-house expertise in vessels or pipe stress analysis. These projects are generally completed quickly with a minimum of fuss as the scope of work can be easily and clearly defined prior to starting work.
- **Slurry, Mud and Sludge Systems Design:** We can select pumping equipment and/or provide de-rating factors for pumps such as Head Ratios, Efficiency Ratios and Froth Factors from either test-work or previous data. We can also provide pressure drop estimates, Deposition Velocities and recommended pipe sizes, materials of construction and end-connection design based on our test-work or empirical calculations.

FLUIDS TESTING – SLURRY & SLUDGE LABORATORY

Our favourite area of consulting is related to complex fluids such as slurries, sludges and mud. We have the in-house capability to advise on pump selection, pump de-rating factors, NPSHR correction, piping and pipeline sizing and expected pressure drops for these particular fluid types.

Sometimes, the design of such systems requires us to perform test work. In many instances, only a few litres of sample is required for testing at our laboratory in Sydney. However, if the fluid rheology is dependent on time, all test-work must be carried out on site. We have the capability to provide an on-site testing service through the use of our purpose designed test-rigs and portable laboratory equipment. We like to refer to this service as the “KASA Mobile Slurry Laboratory”.

We can provide test results such as:

- **Material Property Data:** Solids Specific Gravity, Carrier Fluid Specific Gravity, Mixture Specific Gravity, Concentration by Volume, Concentration by Weight and Particle Size Distribution.
- **Viscosity Data:** Fluid viscosity versus temperature for the purposes of determining pipeline pressure drops and pump de-rating factors.
- **Rheograms:** Plots of shear stress versus shear rate as well as plots of pseudo shear stress versus pseudo shear rate for the purposes of determining pipeline pressure drops for particular flow rates.
- **Yield Stress Analysis:** Yield stress data for the purposes of determining pipeline start-up pressures.
- **Aeration Data:** The content of air in a particular slurry leads to defining a “Froth Factor” which can be used for froth pump sizing and selection.
- **Settling Test Data:** Settling test data of either flocculated or unflocculated fluids can be used for pipeline design as well as solids-liquid separation processes such as thickeners, belt-presses and dewatering screws etc.

Our major equipment items include: A “bob-and-cup” style viscometer; a sieve shaker; various purpose-built tube viscometers and a purpose-built, transportable, fully instrumented pump/pipe-loop test rig for on-site work.

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