

MINERAL DRILLING ASSOCIATION of AUSTRALIA INC

Current Directors are –

Peter Wright – President
James Colby, Wayne Clohessy, Tim James, Kenneth Macleay, Paul Mander, (Steve Shine), Greg Stagbouer, Brenton Wallace, Graeme Wallis

Contacts President – Tel 9311 5600, peterw@ausdrillnw.com.au
Secretary – Tel 9497 1031, techdrill@bigpond.com

INFORMATION BOX

| | |
|-----------------------|----|
| Contractor Members | 23 |
| Supplier Members | 22 |
| Company Members | 11 |
| Individuals | 8 |
| Other Members | 6 |
| Honorary Life Members | 2 |
| Total | 72 |

FROM THE BOARD

The June Board meeting was held on Friday June 07 and was attended by all Directors except Graeme Wallis who was unable to attend due to business commitments and Paul Mander, who was represented by Steve Shine.

We welcome Drillwest to our membership, represented by Rod Pearce and have received an application from Safety Services WA, with Bob Mulligan as their nominated representative.

A project to investigate the possibility of modification of the rules governing the licensing of heavy vehicles has been initiated.

The President sent out an email detailing project requirements and asked for a response from members and others.

Brenton Wallace advised that this issue had been raised at the ADIA conference at Kalgoorlie in 1996, but no action had followed.

The President said that he felt the issue was an important one and could have an impact on many contractors.

The President asked for support to be on company letterhead and not by e-mail. He believes that headway can be made on this issue and said that the MRD is keen to see changes made along the lines suggested.

James Colby suggested that a national standard was required, but compliance is a state issue.

A committee has been formed to start planning for the next symposium. That committee is –

Kenneth Macleay
David Stevens
Brenton Wallace
Peter Wright

Greg Stagbouer expressed his willingness to assist wherever possible.

Directors were asked to give thought to the key issues listed by the Hon Sec and

provide their thoughts at the next Board Meeting on –

When
Where
Duration
Number of papers
Topics
Theme

Hon Sec had tabled the new accreditation procedures for MDAA approved Assessors and Assessor / Trainers and these were endorsed.

The planned "Road Map" meeting to discuss future directions of the MDAA was held on Friday June 16 and was attended by all 10 Directors.

The outcomes of that meeting will be communicated to members as soon as various initiatives have been further discussed.

There are some issues that will probably require endorsement by all members.

FROM INDUSTRY

There have been some changes at Major Drilling and Rob Liebbrandt, Managing Director of Major Drilling, made the announcement about the departure of Harry Hardy -

"It is with regret that I announce that Harry Hardy has resigned his position as Australian General Manager. Harry will be leaving Major Drilling on June 15th. He has decided to accelerate the completion of his MBA studies and then to pursue a career in another field."

"I have had the privilege of working with Harry for the last 10 of his 18 years service. During this time I have come to know Harry and consider him as a friend as well as a valuable colleague. He will certainly be sorely missed around the place and I trust that you will all join me in wishing him every success in completing his studies and good fortune in his pursuit of a new career. "

Rob Liebbrandt went on to say

"Following the resignation of Harry Hardy, I am pleased to announce the appointment of Ray Baldry to the position of Australian General Manager. Ray is well known to all

of us and over the years has filled many management roles in Pontil and later Major Drilling. Ray will bring a wealth of experience and skills to this role and I am sure you will all join me in congratulating Ray on this appointment and that you will all give him the support needed to ensure his success in his new position"

SANDVIK released a Press Statement about their purchase of the UDR Group –

Sandvik to acquire Australian based UDR Group

Sandvik has signed an agreement with Major Drilling Group International Inc. Canada, to acquire the business and assets of the Australian company UDR Group, including its business units in Australia and Chile.

UDR Group is one of the market's leading manufacturers and suppliers of surface mineral exploration drill rigs.

UDR Group reported sales for the last business year of about SEK 275 M (AUD 48 M) and has approximately 100 employees.

The purchase price for the transaction was AUD 46 M on a cash and debt free basis, subject to customary working capital related post closing adjustments.

The acquisition was completed on 8 June, 2006 (Australia time), immediately after the execution of a definitive purchase agreement, and UDR Group became part of Sandvik Mining and Construction as of that date.

"The acquisition is in line with the Sandvik Group's long-term strategy of continued profitable growth. With this acquisition and the recently concluded acquisitions of SDS Corporation and Hagby-Asahi AB, Sandvik has established itself as a full-service provider to the mineral exploration industry.

UDR is a company with a strong market position, particularly in Australia and Latin America, and we intend to continue our

expansion globally within mineral exploration” says Lars Josefsson, President of the Sandvik Mining and Construction business area. “Particularly, UDR’s strength in multi-purpose exploration drill rigs will be a very strong contributor to Sandvik’s offering within the mineral exploration field.”

As a part of the transaction, Sandvik and Major Drilling has signed a 5 year strategic cooperation and supply agreement. Under this agreement the two parties will cooperate within product development and Sandvik and UDR will remain as a preferred supplier of mineral exploration rigs and consumables to Major Drilling.

Sandviken, 8 June 2006

For further information, contact Lars Josefsson, President Sandvik Mining and Construction, tel +46 26 26 51 51 or Jan Lissåker, Vice President Investor Relations, tel +46 26 26 10 23

Sandvik is a high-technology engineering group with advanced products and world-leading positions in selected areas — tools for metalworking, machinery and tools for rock excavation, stainless steel, special alloys and resistance heating materials and process systems. The Group has 39,000 employees, operations in 130 countries and annual sales of approximately SEK 63,000 M.

Sandvik Mining and Construction is a business area within the Sandvik Group and a world-leading manufacturer of drilling and excavation machinery, tools and service for the mining and construction industries. Annual sales amount to SEK 20,600 M, with about 10,600 employees.

Based in Moncton, New Brunswick, Canada, Major Drilling Group International Inc. is one of the world’s largest drilling service companies serving the mining industry. To support its customers’ varied drilling requirements, Major Drilling maintains operations in Canada, the United States, Portugal, Mexico, South and Central America, and in Australia, Indonesia, Tanzania, Mongolia and China. Major Drilling’s stock trades on The Toronto Stock Exchange under the symbol “MDI”.

www.sandvik.com



A couple of photographs of the new semi trailer mounted KWL 700 rig recently supplied to John Nitschke Drilling in South Australia by KWL Drill Rig Engineering.

Retract force 54,000 Kg (119,000Lb)
Retract speed 800 mm/sec (31.5 in/sec)
Rotation torque 1,5000 Nm (11,000 Ft/Lb)
Table opening 20" (508mm)
Engine Caterpillar 3412E 950 Hp (708 Kw) @1,800 RPM
Hydraulic pump group Triple Denison P16 and P12s
Air Compressor 1,400 CFM x 500 PSI
Haul winch 8,000 Kg (17,600Lb)
Break out size 16" (406 mm) Diam
Break out torque 22,000 Nm (16,244 Ft/Lb)
Safety features , Acoustic cover, Rod spin cage, Hands free mast angle locking system, Deck rails, Heat shielding, Safety hose travelling system, Extending and slewing control console,
Rig weight 31,800 Kg
Length OA 17.9 m
Width 3 m

HERE and THERE

Given the above photographs of the KWL rig, it was thought to be topical to reprint the paper presented by Keith Littlely at the 2006 MDAA symposium.

DRILL RIG DESIGNING AND NEW PRODUCTS

1. DRILL RIG DESIGN AND ENGINEERING CRITERIA

The Engineering Design of Drill Rigs for today’s drilling demands have many varied challenges which present complex problems for the designer, such as the physical envelope that is available. This all begins with the initial parameters that are required for a particular capacity drill rig with further design to suit client’s special requirements.

It is essential you have a clear vision of the final product, maintaining that vision for each individual section of the rig, such as the mast, base, compressor, hydraulic pump group, dump mast system plus more.

Selection of Original Equipment Manufacturers (OEM) products with maximum efficiency and longevity with minimum weight penalty is a must. At times, designers in conjunction with the OEMs, are required to recalculate the specifications of an item to suit the drill rig application, as the original specifications are designed for 24 x 7 operations. Some drill rig components operational time is between 3% to 5% of the 24 x 7 rig

operation. For instance, when winching drill rods from the hole, the initial lift (9m) is the heaviest lift weight, then continues to decrease to zero weight at the top of hole.

The actual weight loadings applied on the rig are critical factors. This is particularly important for Mobile Drill Rigs, which must comply with the relevant Australian State road regulations for weights, lengths and width, height and bridge formulas to suit their statutory laws. We also need to be mindful that the rules in each State/Territory have become very stringent and specific.

Drill rig masts today, due to their load capacities and operating speeds, plus the requirement for them to operate at angles between vertical and at times less than 45 degrees, are ever increasing in mass. This culminates in high loadings of mast and supporting structures. Designers must be able to achieve this without affecting the operations, or causing undue wear that can lead to premature damage of components. During the design phase, it is vital for the designer to ensure maximum efficiency and safety is retained.

Whilst the Designer is focused on the many functions that are individually required of a Drill Rig, he is required to ensure the manufacturer has available accurate detailed drawings, defined assemblage of components, and accurate information for the generating of operator’s and parts manuals. This documentation is essential to the costing and quotation process for subsequent drill rigs, and is a continually changing process. The same information also assists with warranty and product liability issues, and ultimately the end user.

The designer must overcome complexities with specific components, such as the drive head, whose rotational speeds can range from 1 RPM up to 1500 RPM. This component alone has engineering challenges such as heat generation from bearings and gears, the extent of the bearings life, tooth torque loadings, up hole shock loadings and the dreaded unseen harmonics which have the ability to damage both rotation drive heads and drill pipe threads.

Drive heads are capable of producing 230HP when diamond drilling and 450 HP R/C drilling.

The drive head traverse system is capable of travelling the length of the mast at speeds of 1m/sec, or the equivalent to 3.6 kPh. Controlling this rapid speed is a designer’s challenge, particularly in the stopping phase of the hydraulic feed cylinder piston, to prevent impacting into the gland nuts, causing major damage. We now commonly have traverse cylinders with internal oil flows of 895 Lpm or 236 USGPM.

The haul winch is a key component in the drilling process. These winches are required to have a lifting capacity of up to 18 Tonnes running single line, with a travel speed of 1 meter per second. This speed can impose heavy and varied direction

mast loads, in particular when in their braking phase.

Wireline winches have to be designed to carry up to 2 km of high tensile steel wire cable, travelling at a speed of 4 to 6 meters per second or 22 kPh, with level spooling of cable across the drum to maintain its drum to rope capacity and prevent the cable from crossing and causing rope damage. The wire line drum, when spooled with wire rope, develops high inertia loads. During the braking phase this can cause destructive reverse loads through the drive line, often developing greater loading than the actual lifting capacity required of the winch.

Excessive cable travel speed when retrieving an inner tube will result in lifting of the column of fluid in the rods, causing extreme tension of the cable, wedging it tightly against the winch drum cheek plates. This may cause them to flare with the greatest of ease as the cable stack height increases.

Drill Rig base structures can today be fitted with engines of up to 1,000 HP, operating at 1,800 RPM for the large compressor air flows and pressures required for today's R/C drilling requirements.

In addition, a comprehensive hydraulic circuitry is required that will allow low engine RPM for diamond drilling operations and also assist in lowering the noise levels and engine wear is required.

With regards to fuel burn, an 850 HP rated engine at 1 800 RPM, with a power draw of 200 HP, returns a fuel burn rate of 37 l/h, which is only slightly greater than a 300 HP rated engine, developing 200 HP returning a burn rate of 36.5 l/h. This answers that much asked question regarding the use of larger engines, and further confirms you only pay for the HP you draw from the engine.

Hydraulic pump groups must be capable of continuous high pressures, with an allowance for high pressure spikes that can be unreadable on standard gauges. These spikes have the ability to cause pump failures that can be extremely difficult to diagnose.

The engine/ hydraulic coupling drive can be another secretive area regarding harmonics. These harmonics can often be instigated by the engine, and may cause failures in multiple orders of the harmonic in other components. Couplings must also be designed for the rotational loads required, and the designer must protect the engine and the hydraulic system from the unseen harmonics and inertia loadings, plus engine crank end loadings. These couplings must accept any misalignments due to drill rig base flexure, with special design focus applied to critical alignment areas of the base frame and the loaded areas, to ensure alignment problems are minimised.

Heat exchanger systems today are required to dissipate the total engine, compressor and hydraulic inefficiencies, which are generated as heat. Therefore, cooler designers must allow for large heat dissipation (500Kw 12,000Btu/min) plus a

cleanliness/fouling percentage. They are also required for cooling of engine induction air (2,000 CFM) plus diesel fuel on electronic engines. This design must cater for operations in a vast range of ambient temperatures and dirty environments.

2. WHAT HAS HAPPENED and WHAT IS NEW

As a designer and manufacturer back in 1993, I personally took on the challenge of designing a rod handler to make drill rigs a safer machine to operate, and be around.

The inventing of a rod handling system was at that time only spoken about. Reportedly, many were being designed all over the country, but most fell by the wayside for one reason or another.

As an owner of a drill rig manufacturing company during that period, the investment in time and money was a gamble. Being a small company, even people within the organization were critical as to whether the self funded R&D project would ever reach a successful conclusion.

I find it quite odd, when writing this paper today, as the thinking of such a versatile rod handler at that time was quite pie in the sky. It was looked upon as just another expense which the drilling contractors could definitely least afford, due to the level of activity the industry was experiencing.

Today, rod handlers are looked upon as just part of the drill rig. Fortunately, back then, this machine was accepted and has become common on many drill rigs both in Australia and overseas, and is still growing as we are witnessing.

Satisfyingly for me, it has made a huge step in our industry of helping workers go home healthy, and reduce those many aches and pains that appear later in life. Also those thousands of injuries that could have been suffered, now thanks to the rod handler, have never occurred

How do you transfer this to dollars and cents ? There has been an immeasurable saving to the industry both financially and in personnel well being. The great advantage to production is the quantity of drill rods it can handle in a shift.

A rod handler never suffers fatigue over the shift and become accident prone, as humans do, and therefore it has the advantage of maintaining level production across the working shift.

3. ROD HANDLING HAS PROVEN TO BE A MAJOR SAFETY FEATURE OF OUR INDUSTRY

In the quest to improve the first generation rod handler system that I began more than a decade ago and was first displayed at the 1996 Kalgoorlie mining expo, KWL is near completion of a second generation rod handling project.

This has produced a very stable and robust machine. It has been designed to eliminate any accessory equipment for rod to head alignment such as troughs etc, and it has

the ability to make head alignment such as troughs etc, and it has the ability to make and break threads, which is a much desired function of a rod handler.

In addition to this the busy lower section of the mast area, around the work table, is now clear of the rod handler, allowing the easier and safer access to other table operations. It has been designed as a retro fit unit for most drill rigs.

The other item KWL has just competed, is a drill head to suit most mid range RC drilling, having a torque output of 7,000 Nm and a rotation speed of 200 RPM. The Head was designed to suit a narrow mast structure, and can be either supplied for back mounting or central mounting width.

We have a new R & D project, on a diamond drill rod threading machine (nick named do'undo) that will have a large 400 mm clear centre opening, which will allow normal drilling operations through its centre. It is planned to be a semi permanent fixture to the drill work table area, to maintain accurate alignment of the threading process, but more info as we proceed.

4. PERSONAL THOUGHTS ON RIG DESIGN

Many designers place themselves at risk with the challenges to develop new and innovative products for our industry.

A failure of a new product in the field can have serious consequences for the manufacturer and the designer personally. Every designer is very mindful of this, "so why the risk".

Apart from the obvious expected financial rewards (if you get it right) it's a challenge and a provides a sense of achievement. Every designer will also consider methods for minimising the risks, and it would appropriate to take proven experiences into the design concept.

Only a small number of persons undertake innovative design of exploration Drill Rigs and follow it through the manufacturing to the sale and after sale performance of the product.

In the Drill rig manufacturing industry, there are only a handful of companies, which have the knowledge and R&D funds available to achieve this.

What is a concerning issue in our industry today, is the difficulty of gaining access to the working drill rig to follow up on new innovations to assess their performance in the field.

The mining companies, at the end of the day should be encouraging and assisting R&D in the exploration drilling industry, as exploration drilling is their eyes to the future (No drill no mine).

Another issue in the industry which requires resolution, is the question of who is

qualified to shut down multi million dollar drill rig operations and be accountable in some form.

Do unqualified persons, when boarding an aircraft and see an oil streak on an engine cowling immediately try to ground the aircraft, or do they advise a qualified person to make such a decision?

5. THE 880 H CONTAINERISED MULTI PURPOSE DRILL RIG

For many years the Industry has been requiring a large multi - purpose drill rig that will fit in a container. As we know this has always been the luxury of the baby drill rig market.

Advantages are –

1. To minimize the cost of freight and shipping and transporting to different parts of the world.
2. The locked containers reduce pilfering. What the eye can't see is an excellent deterrent.
3. Protection against weather and blatant damage.
4. Transshipment damage eliminated
5. Ease of transporting to sites after final port destination as most countries are equipped for container transportation.
6. At the completion of a drilling contract the storing of the drill rig is much simpler if containerised and locked.
7. It only requires a phone call from anywhere in the world to arrange transport to the next destination.

SOME FEATURES OF THE KWL 880 H

The KWL 880 H was born using our 3 D drafting system. We initially defined the parameters required to enable the drill rig, as complete unit, to be slid into an enclosed hi-bay container.

Starting with our standard KWL 880H Multi-Purpose drill rig design, we narrowed its base by 2.3 m then proceeded to fit all extra components required by the client, which were considerable. The drilling capacities are 1300 m NQ and 300 m of 4 ½" RC drilling

- Engine – Caterpillar 3412 E rated at 950 HP
- Rear bell housing clutch coupled to a Sullair 1350 CFM, 500 psi compressor
- Hydraulically driven on board booster controlled at the operators panel.
- Hydraulic pump group consisting of 6 Denison high pressure pumps.
- Dual 6 " mast raising cylinders.
- Dual air drill break out.
- Rod handler.
- Dual gearbox in overhead winch.
- Dual dump mast cylinders.
- Large low profile heat exchanger.
- R/C boom with winch.
- Rod spinner.
- Front jack leg side slide.
- Heavy duty cyclone arm.
- Alternator driven night lights.
- Extendable and hydraulically adjustable control cabinet.

HISTORICAL



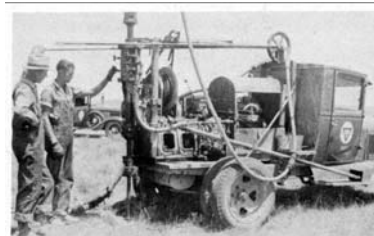
The way it was – Koolyanobbing 1962



Claim peg on Dowds Hill – Koolyanobbing



Ingersoll Rand T3 at Koolyanobbing 1963



An early truck-mounted rig, Colorado, U.S.A.

An early (real early) truck mounted drill rig

VALE JIM TORLACH



Jim Torlach

Photo from MARCSTA Monitor



Contractor in Qld circa 1966



LY 44 under Lee C Moore K Frame derrick near Kambalda 1967 – 60 ft pull

When Jim Torlach passed away on the last day of May, it was a sad day for the mining and drilling industries in Western Australia.

Jim was a good friend to the drilling industry and was committed to the safety and health of our workers.

Jim became the State Mining Engineer in the early 1980's and his Bulletin 31 in 1997 was a timely wake up call to us all to lift our game, and was the catalyst for the MDAA "Recommendations for Safe Working Practice in the Drilling Industry in WA"

He was never too busy to talk to us about safety and his wise counsel will be sadly missed.