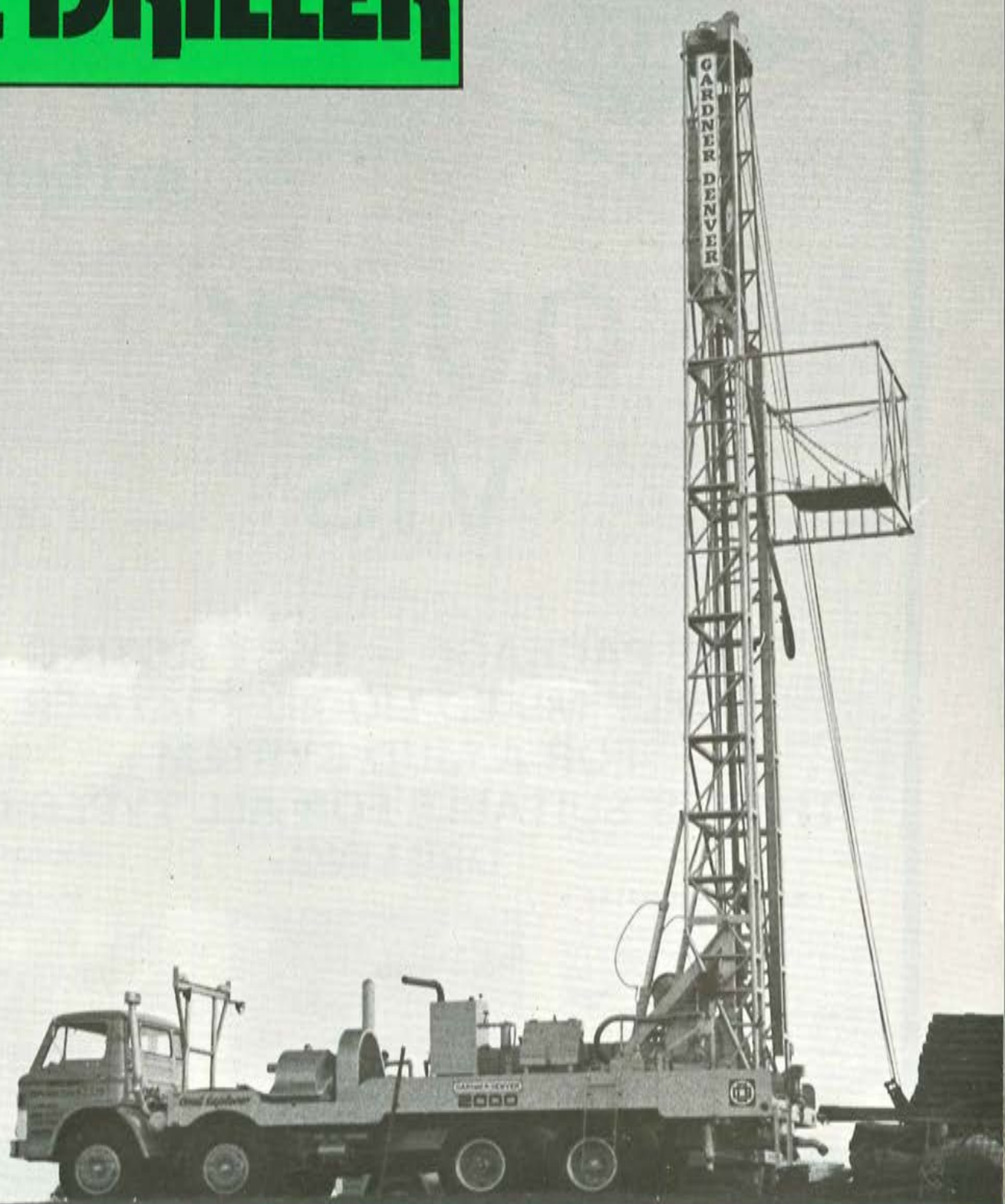


New Zealand
THE DRILLER





THE NEW ZEALAND
DRILLING FLUID COMPANY

QUICK VIS

ONE PACKAGE — FAST ACTING
EASILY MIXED LIQUID POLYMER
FOR A MUD SYSTEM
THAT IS SUITABLE FOR ALL TYPES OF
DRILLING

CONTACT

DRILLING SERVICES AND SUPPLIES LTD.

90 92 Clemow Road, P.O. Box 15, New Plymouth, New Zealand
Telephone: 84397 Telex: NZ 3608 Cable: Drill-Fluid



New Zealand THE DRILLER

The Driller is the official publication of the New Zealand Drillers Federation Inc.

EDITORIAL

All editorial enquiries and articles should be sent to:

The Editor
The Driller
P O Box 1778
Wellington
Ph: (04) 731032

ADVERTISING

Advertising enquiries and material should be sent to:

The Advertising Manager
The Driller
P O Box 1778
Wellington
Ph: (04) 731032

Advertising Rates

Full page	\$200
Half page	\$120
Quarter page	\$75
Two colour	plus \$40
Specified position	plus 20%
Classified	\$3 col cm
Column size 26cm x 13.5 cm	

SUBSCRIPTIONS

Enquiries to:
The Circulation Manager
The Driller
P O Box 1318
Hamilton
Ph: (071) 390069

The Driller is published by Transport News Ltd on behalf of the New Zealand Drillers Federation.
Executive Editor: Lee McKinney
Editor: Alison Murray
The Driller is circulated free of charge to all members, employee members and associate members of the New Zealand Drillers Federation, to selected catchment authorities, territorial local regional water boards and government departments.
Information published in The Driller may be republished, provided that the source is acknowledged.

ISSN 0111-6754

IN BRIEF

Conference dates set

The 1984 New Zealand Drillers Federation Conference will be held in Timaru from July 25-28 July. President of the NZDF and conference organiser Bill Washington says the venue has plenty of display space and a large outside area where it is hoped conference delegates will see a couple of drilling rigs in action. A bus trip to Mt Cook may be included in the proceedings.

Put it in writing

Every job a drilling company undertakes should be covered by a written contract between the driller and client.

Chris Kidd of Groundwater Consultants Ltd will discuss this at the forthcoming Drillers Federation Conference in July and he has prepared a sample copy of what he thinks a job contract should contain.

He believes the drilling industry needs to develop a more professional approach and written contracts should be an automatic requirement of any job.

In waterwell drilling, for example, the client often expected miracles and if a dry well was struck, claims of being "ripped off" and problems with payment could arise. For this reason, the client should be advised before drilling begins of what the driller can or cannot do.

The most efficient way to do this is in a written contract. A contract could also secure payment for the driller.

Drillers selected soon

Drilling companies selected by the Liquid Fuels Trust Board to undertake investigation drilling in Southland and Central Otago as part of the South Island Lignite Programme will be contacted in mid-June and asked to submit statements of proposals.

The programme is expected to begin on ground in Central Otago in September and slightly later in Southland to allow the lambing season to pass uninterrupted. Groundwater Consultants are the project managers.

Treat your feet

If your feet look like battered prunes at the end of a day in the field, chamois socks could be the answer. An Auckland company, Holster Sporting Products have begun marketing the locally-made socks in New Zealand for sports and work. Natural oils in the chamois are said to reduce chafing and blistering.

And if you've got wet feet, the chamois dries quickly and breathes well. So far the internationally-patented sock has been sold mainly in Australia and the US. This year, it's NZ's turn to try them out.

Hiring new staff

IF YOU'RE planning to take on new staff, don't ask potential candidates if they belong to or intend joining a union. If he or she is a union member and doesn't get the job, then you could be accused of discrimination. If they do get the job, the same applies. This advice comes from the Employers' Federation.

FRONT COVER



Drillwell Exploration (NZ) Ltd's largest machine — a Gardner Denver 2000 — at work on a large diameter deep well at Orewa. Drillwell Exploration's story is on page 4 of this issue.

Fearsome fumes

A study is being carried out in the US to determine whether there is any link between lung cancer and diesel fumes.

The National Institute of Occupational Safety and Health has found that members of the Teamsters, the US drivers' union, suffer more lung cancer than other groups.

DRILLER DEADLINES

The next issue of the The Driller will be published on September 6. All editorial contributions and advertising should be sent to the Editor, The NZ Driller, P O Box 1778, Wellington by August 7.

Book early for Timaru conference

The first quarter of another year has now gone. I trust all members have been busy through the summer and have ample forward work.

After five years of hard work by Council Members our Driller Training Programme is now off the ground with the enrolment of 20 members for the two year course. Names were drawn by ballot at the last Council Meeting.

The course is being supervised by Mr Roy Boughen of the Mechanical Engineering Department of the New Zealand Technical Correspondence Institute, Lower Hutt. Special thanks to Mr Jack Hoffman for his invaluable assistance in getting this training programme off the ground.

Our Timaru Conference dates this year have now been set with the official opening on Wednesday 25 July through to our annual dinner on Saturday 28 July. At this early stage of conference organisation, we already have 16 member or associate member firms who have booked trade space in our large display area. And, already we are looking at a record attendance.

We have booked both Trailways Motor Inn and the Grosvenor Hotel for accommodation and any overflow will be placed in central motel units. I would advise all members to book as early as possible and to make their travel arrangements as Timaru is only served by two daily flights from Wellington and these generally have high passenger loadings.



As an alternative, Timaru is only 100 miles by road from Christchurch and frequent air connections are made with all North Island centres. For those of you who are familiar with Timaru, the Conference is to be held at the Chateau Restaurant and conference facility in Wai-iti Road.

Our Conference format will be changed a little this year with both Thursday and Friday on conference topics and the annual examination on

the Friday evening. This in turn will leave Saturday free and we are in the process of organising an all day bus trip that will take us inland from Timaru to Fairlie, Lake Tekapo, past Irishman's Creek Station (the home of the Hamilton Jet Boat) to Pukaki with its magnificent views of Mt Cook on to Twizel and Omarama and return to Timaru, via Lakes Benmore, Aviemore, Waitaki and Waimate.

At this time of the year the Southern Alps are at their unsurpassed best and we also get to see the total Waitaki Power Development Scheme including the biggest earth dam in the Southern Hemisphere, at Benmore.

We look forward to welcoming you all to Timaru in July and Mel Ouston will be posting registration forms to all members as soon as our programme is finalised.

Regards to all

B T Washington

B T Washington

Katikati bore report due

INVESTIGATION drilling in the Bay of Plenty for the region's Catchment Commission has now been completed.

A large diameter production well and five exploratory holes were drilled near Katikati by Rotorua Welldrilling Ltd earlier this year. The investigation holes were turned into multi piezometer holes to measure water and other characteristics at different levels. Although the production well did not live up to expectations, Wayne Russell of Groundwater Consultants said the better high yielding gravels were ignored. The report prepared by Groundwater Consultants should be available this month.

Investigation drilling on the Rangitaiki Plains in the eastern Bay of Plenty has also been completed. Further drilling near Otakiri may commence soon for the MWD and tenders were called for mid April.

Ten tips for top management

Productivity, leadership and innovation are the keys to successful management in the 1980s, this year's Agg Pac conference in Auckland was told.

General Manager of Boral Resources Ltd (Australia) Terry Oakes-Ash offered the check list below as a guide to successful management.

Boral Resources ranks 13th in Australia's top 100 companies and 14 years ago registered an annual profit of \$5 million. Today, the company has sales of \$5 million daily.

- Know how to set priorities.
- Don't delegate the tough problems — handle them yourself. A leader has to make the hard decision, become personally involved in challenging issues and, above all, set the policy.
- Demand standards of excellence in your operation. Set goals to achieve these. Mediocrity is a compromise and a recipe for disaster.
- Develop a sense of urgency. Make a decision, even if not the correct one, or your organisation will drift from lack of

action.

- Pay attention to detail. Get the facts — the key to good decision making.

- Develop commitment. That means taking the early plane, or flying the night before, leaving on a Sunday and not a Monday, and returning in your own time.

- Don't waste time on things you can't do anything about. Try to fix the possible but forget the impossible.

- Know how to fail. Your company must allow you to make mistakes, because that is part of the process of learning to innovate.

- Be tough but fair with your subordinates. The hardest part of being a manager is not to compromise when choosing people for a particular job. If you compromise, you're letting your emotions take control — a recipe for disaster.

- Most important of all: put the fun back into business. You won't achieve the first nine objectives unless you do.

Oil changes may be extended

IN THE struggle to hold maintenance costs to a minimum while simultaneously achieving maximum service life from equipment, the question of optimum oil change intervals frequently has been raised.

Engine manufacturers all recommend that oil be drained and replenished between 13,000 and 19,000kms depending upon engine model.

But while this is the official attitude of engine companies, they have given tacit permission to many major fleets to experiment with oil change intervals ranging from 80,000 to 160,000kms.

Oil companies also have been heavily involved in an effort to reduce substantially lubrication costs of the average heavy duty fleet. Many filter manufacturers have insisted for some time that properly filtered oil can be used much longer.

The impetus for extending oil change intervals has been triggered largely by rising costs and possible shortages of petroleum products. One transport company says that extending oil drain intervals from 19,000 to 77,000kms resulted in a 68 per cent reduction in yearly engine lubrication and filtration costs.

Its fleet uses any brand of oil that meets engine manufacturers' specifications and premium quality filters. The bypass filter used is capable of removing all contaminants in excess of one micron in size.

With more than three years of experience and a large number of trucks with more than 500,000kms of service, there has been no increase in engine repair costs. In fact, make-up oil consumption between changes has dropped.

Wear

It is a recognised engineering fact that oil does not wear out. But in the modern diesel engine, oil additives are necessary to prevent gum and carbon deposits, hold particulate matter in suspension, and preserve a suitable acid/alkalinity balance in the oil.

These additives do wear out. This has led many maintenance experts to believe that oil drain intervals could be extended only at the expense of diminished engine service life and increased repairs.

However, the additives used in oil have steadily improved and since most diesel engines require make-up oil on a regular basis, the additives are replenished between changes.

Filter manufacturers point out that current oil filtration technology removes most of the particulate matter, water, and fuel from the oil. So dispersant additives in the oil actually have

fewer demands placed upon them. A normal full-flow oil filter catches particles over 25-30 microns in size. A relief valve is provided to prevent oil starvation, if the filter is blocked. Some of the newer filtering systems have bypass filters in the 0.6 to 0.8 micron range with full-flow filters rated at five microns or less.

There have also been some unique developments in the lubrication field. Synthetic lubricants used in the aircraft industry have made some slight inroads into other more down-to-earth markets, but are not likely to gain general acceptance due to their high cost. An advantage of synthetic lubricants is a high degree of resistance to changes in viscosity in temperatures ranging from -45.5 to 204.4 degrees C. Other features include a very low coefficient of friction and an affinity for metallic surfaces. These features provide better lubricating qualities.

Polymers

Several companies are formulating lubricants that combine petroleum bases with various polymers and metallic lubricants at a price somewhere between those of pure petroleum and pure synthetic lubricants. This is an alternative for those not willing to pay the higher price for synthetic lubricants.

Many of these lubricants are specifically promoted for long life service. They vary considerably in price and in content of blending agents. Several major oil companies and a few companies that have entered the engine oil market for the first time are marketing the long life oils.

Most of the new lubricants are recommended for a service life of 80,000kms. But it is customary to allow for a comfortable margin of error. In one test case several trucks were driven 170,000kms for each test vehicle. Several brands of oil were used including some of the more expensive types with a high percentage of synthetic blending agents.

Engines were dismantled at the end of that interval; all the oils tested performed satisfactorily, including the competitively-priced 80,000km lubricant of a major oil company. Switching to the 170,000km oil drain interval did not entail the use of bypass filters or other hardware. However, oil specifications might be tightened.

All this activity in the lubrication field has been closely observed by the engine and truck manufacturers. Some engineers have been so impressed with the performance of some new multigrade oils that year-round "all-season" lubricants may soon be permitted or even recommended.

This article by Carl Smiley of Today's Transport International reports on recent research in the United States.

When multigrade lubricants, such as SAE 10W30, were developed for automotive use several years ago, it became apparent that the viscosity index improvers did not have sufficient shear strength to withstand the stress of a heavy duty diesel engine. Other problems included tight control of viscosity and ash content. In the last 20 years, chemical companies have improved their products so that polymers now used as VI improvers are very stable.

Multigrade

Formulating a suitable multigrade oil involves the selection of a base stock which is light, but resistant to volatility. Light stock is much more volatile than heavy stock so a careful line must be drawn between pour point and volatility of light ends.

This has resulted in an entirely new SAE classification, SAE 15W. This classification provides the easy starts and low friction characteristics desired by fleet operators.

Internal engine temperatures have climbed to the point that most engine manufacturers prefer the use of a thicker oil. A new SAE classification, 15W40, is made by adding a polymer VI improver and other additives to the oil. The heavier oil is better suited for use in turbocharged engines, but it can cause starting problems during the cold winter months. Some engine manufacturers require the use of a heavier oil despite the drawback.

Resistant

One oil company executive says that light stock oil blended with polymer VI improvers is more resistant to thinning at high operating temperatures than the thicker, heavy stock oils. He predicts that a few more months of testing will result in the acceptance of the new multigrade oils by most, if not all engine manufacturers.

The 80,000 to 170,000kms oil change interval seems likely to be approved by all facets of the oil, truck, and engine manufacturing industries.

One transport company fleet claims a 45 per cent reduction in lubrication costs based on 170,000km change intervals. A high efficiency bypass filter is changed every 32,000kms, but the lubricant in trucks with up to

Concluded on page 5

Modern equipment pays off for D

Three generations of drillers stand behind Auckland-based Drillwell Exploration (NZ) Ltd, a company which believes in letting modern equipment do the hard work.

Drillwell was set up in 1974 by second-generation driller Len Brown Snr and his sons Martyn and Len. Len Brown Snr was one of the first drillers in New Zealand to hold a petroleum licence and drilled a number of slim holes (stratigraphic oil bores) in the early years of NZ's petroleum exploration.

Today, Len Snr is semi-retired, leaving much of the company work in the hands of his sons and Drillwell manager Geoff Knight. Drillwell Exploration shares its Takanini workshop with associate company, Faulkner Drillwell Ltd.

Faulkner Drillwell began operations 3½ years ago as a joint venture between Drillwell Exploration and Jim and Stephen Faulkner.

The two companies run a combined fleet of over 30 vehicles, including six drill rigs. Regular maintenance is done on a rotating basis and all equipment is serviced annually.

Drillwell currently operates four Gardner Denver drill rigs which were imported new from the US and truck-mounted locally.

The largest machine is a Gardner Denver 2000 with a mast capacity of 75,000 lbs. This has a 5x8 GD mud pump and together with an auxiliary 5x10 GD mud pump, separately truck-mounted, this rig has drilled several holes in excess of 1000 metres on mineral exploration work.

Drillwell specialises in waterwell, site investigation, coal and mineral exploration work.

At least two of the company's rigs usually work over 100 miles away from home base in Takanini and all are equipped with radio telephones.

A new Zetor tractor sits in the yard. This and a trailer with doughnut tyres will be used as workmates to a swamp buggy which Drillwell is building and should be completed mid-year. With wide single (25") tyres on the front and dual (15") tyres on the rear the rig will work on swampy, peaty land — "virtually where a human will walk with a pair of gumboots", says Martyn Brown.

A Ford diesel motor engine, imported diffs, Clark transmission, and the wide singles at around \$1000 each adds up to a \$100,000 machine by the time the buggy is on the road, or, in this case, on the swamp. A drilling machine already in operation will be remounted onto the buggy.

Later, the company plans to look at helicopter and wireline drilling. A computer system is also being considered to process and store administrative and job data.

The drilling industry has become more competitive in recent years, Mar-



Len Brown Snr with a recent addition to the Drillwell fleet — a \$65,000 Ford D2014 truck for carting a water tank and drill rods.

ty Brown says, and in the Auckland area alone at least three new companies have started up in the last three years. "It keeps everyone honest" is his philosophical comment to the increase in competition.

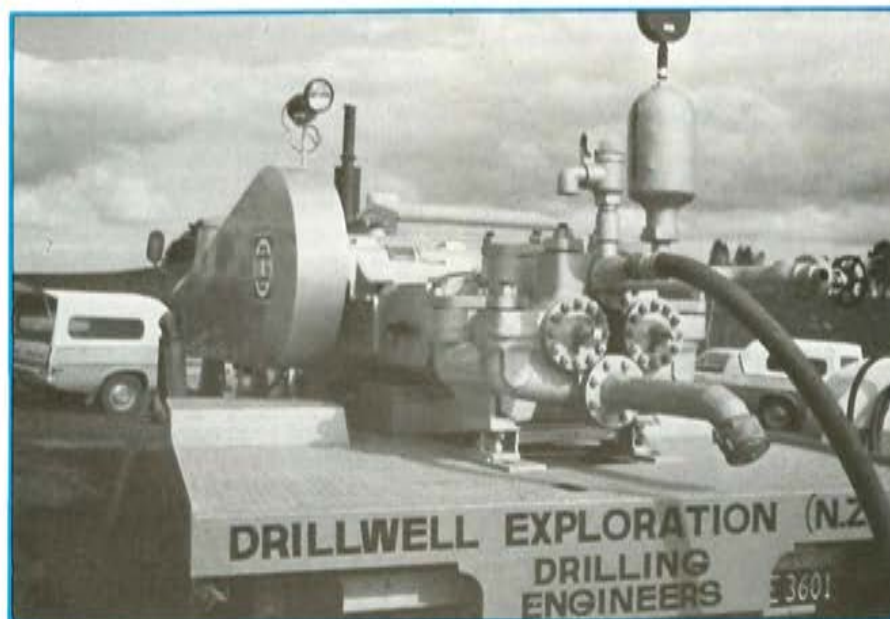
Drillwell's staff appear contented with no significant labour turnover. "We haven't had a driller come or go in four years." The company at times demands a lot from its crews — "on the deep holes, anything over 400m, we work around the clock, 24 hours a day." If you don't, hole problems occur such as holes squeezing and collapsing. Drilling has to be continuous, Martyn

said.

Both Martyn Brown and Jim Faulkner, manager of Faulkner Drillwell, are council members of the New Zealand Drillers Federation.

They fully support the introduction of an NZDF drilling programme and one of Drillwell's senior drillers is among the first student intake.

Drillwell will be sending around four of their team to the '84 Drillers Federation conference in Timaru and other Federation members will be able to take a closer look at Drillwell's operations when Auckland hosts the 1985 conference.



Drillwell's Gardner Denver 5 x 10 high pressure pumping unit used on deep hole work. When fitted with 4½" liners, this unit can pump out 169 gallons per minute at 709 psi.

Drillwell

New editions to Longyear fleet

by Simon Fitzgerald



Drillwell's GD1400 on coal exploration work. Both this rig and the GD2000 are equipped to rack drill rods on the mast using a monkey or finger board.

Oil Changes ... from page 3

402,000kms of service has never been drained.

The maintenance superintendent of the fleet says that the programme has not affected either engine repair costs or make-up oil consumption.

Virtually all experimentation with extended oil drain intervals have been restricted to long distance driving. In short-distance or stop-and-go work, the effects of fuel dilution, varnish and gum buildup, and possible lack of adequate lubrication at idling speeds are expected to restrict oil change intervals to much more modest figures. It is probable that any approval of extending oil drain intervals by engine manufacturers will also include oil analysis as a condition of the warranty.

The use of premium quality oil, increased filtration, or use of conventional lubricants and filters, have left little doubt about extended intervals. However, extended oil change intervals will not eliminate preventive maintenance. One maintenance manager explains, "The rising cost of labour and the increased cost of taking a truck out of service virtually dictates that extended drain intervals be considered as a budget cutting device. In our shop we still bring in the vehicles for an "A" inspection every 19,000kms. Not having to change oil simply means that we do a better job on inspection and the truck goes back into service 30 minutes later rather than two hours later."

The Longyear drill fleet in New Zealand now stands at 22, following the delivery of two HC150 drills late last year.

The drills are operated by the Ministry of Works and Development drilling units in Hamilton and Wanganui. In contrast to the traditional system design popular in Longyears, Mindrills, Sullivans and Failings, these rigs are a new breed featuring long stroke and multiple hydraulic functions.

The hydrostatically-powered Top Head Drive can rotate from 0 to 1000 rpm in either direction, with sufficient torque to make-up and break-out rods. Hoisting is much safer too because the hydrostatic system provides the breaking capacity.

Ideal for soils and foundation investigation, the Ministry of Works and Development units have found the drills easy to operate, compared to conversion rigs and a lot less physical energy is needed by the drilling team.

The compact design is also a big "plus" particularly when it comes to inaccessible sites, like the one shown above at Twin Bridges beside the Manawatu River, just west of Woodville.

The concept of the HC150 is based on flexibility and compactness. The operator can control all the systems from one station, with the assistance of torque and pressure gauges to tell him what is happening in the hole.

The hydrostatic system which powers the top head drive consists of a variable-volume positive displacement pump and a fixed-volume positive displacement motor.

Using a single lever which controls the pump flow, the drill string rotation can be varied from zero to maximum



(around 1000 rpm) both in forward or reverse. The same applies to the hoist.

As far as depth capacity is concerned, the HC150 is rated to 250 metres HQ (i.e. 3 1/2" diameter using wireline coring equipment).

With this size, most down hole tests can be accomplished without withdrawing the drill string. Raymond penetrometer, permeability and packer tests are all performed "through the head" and there is no risk of unconsolidated formations collapsing into the hole.

Hydrostatic systems are dearer than their mechanical equivalents, but the benefits are clear. Hydraulic powered rigs have gained a large slice of the market in only a few years.

As development continues, it will not be long before rigs are available that will be able to run rotary bits and hammers, as well as diamond coring equipment, without any appreciable loss in productivity.



Tractor tyre made locally

DUNLOP are now producing an industrial tractor tyre at its Upper Hutt factory.

The T86 "mutton leg" pattern effectively replaces imported tyres in the 14-28 size, used on tractors in New Zealand for a variety of industrial applications.

The new tyre, designated Dunlop 16.9/14-28 T86, has been designed with a large area of pattern in the tread centre, which makes it suitable for such applications as backhoes, loaders and industrial tractors.

Drilling logs becoming a necessary

INVESTIGATION drilling is becoming big business.

The search for underground water, coal, gold and other minerals is in full swing and skilled drillers with geotechnical and hydrological knowledge are in demand.

As clients, both Government and private sector want more detailed and accurate records of drilling undertaken on their behalf, it's essential that detailed drilling logs are kept.

The following log guide published in the SME Underground Mining Methods Handbook shows the variety of data that may be required for detailed investigation work.

Detailed field logs should be made at a scale of 25mm to .3m (1 inch to 1 foot) of core. Summary logs of the primary features only should be made at a scale of 25mm to 3m (1in to 10ft). It may be necessary to keep a separate structural log if the core has irregular properties that are less than .6m (2ft) apart.

The description of core structure (Item 3, Table 3) includes data on discontinuities such as faults, bedding planes, joints, and foliation.

The angle of any discontinuity or structure should be recorded on a scale of 0° to 360° from the horizontal plane of the core.

Any coatings on the discontinuity surfaces should be recorded, along with their thicknesses. If the coatings can be identified, this should be noted on the logs. All discontinuities that can be identified as faults should be marked clearly.

The length of the core recovered in a drilling programme can indicate fracture planes and the ability of the core to withstand the vibration and bending

applied during drilling, assuming that the driller is competent and able to do a good job. Rock that contains planes of weakness at nearly right angles to the direction of the drilling will tend to separate. As the planes of weakness become more frequent, the mass strength decreases.

The mass strength can be assessed by measuring and recording the maximum, minimum, and most common average lengths of core recovered in a run.

The system of strength classifications for intact pieces of core (Item 6, Table 3), has been used for several

years in the Portland District of the Army Corps of Engineers in the US. The test consists of striking a hand-held sample with the blunt end of a rock hammer on geologist's pick and observing the reaction under the point of impact. The hammer blow results in an index property that can be correlated with strength values from unconfined compression tests. This method is a very quick and inexpensive way to make a first approximation of rock strength.

Table 4 and 5 list groundwater information and other relevant remarks for inclusion on the drilling logs.

TABLE 1: BASIC INFORMATION

Item Description

- 1 Project name
- 2 Drill-hole designation (taking care not to duplicate designations)
- 3 Hole location
- 4 Name of project owner
- 5 Name of drilling contractor
- 6 Elevation of the ground surface at the top of the drill hole
- 7 Attitude of the hole (if inclined, the angle and direction)
- 8 Name of the driller
- 9 Starting and finishing dates for the drilling
- 10 Drill manufacturer and rig type
- 11 Type and size of the bit used to drill the hole

TABLE 2: SPECIFIC DRILLING INFORMATION

Item Description

- 1 Thickness of the overburden
- 2 Total amount of rock drilled
- 3 Total depth of the hole
- 4 Depth and size of the casing used for each casing advancement
- 5 Any changes in the drilling method
- 6 Any changes in the core size
- 7 Drilling time for each run
- 8 Percentage of total recovery achieved

New range of welders available

A NEW RANGE of MIG welders and ancillary equipment has been introduced by Weldwell (NZ) Ltd.

The Steadymig range has interchangeable wire feeds and Binzel guns that can be used with any of the power sources allowing flexibility to meet any requirement, says the company.

The four power sources — the Steadymig 160, 180, 250 and 350 — have similar design and assembly but differ in cabinet size and output.

The weather-resistant cabinets are constructed to withstand rugged working conditions imposed by industrial situations.

Convection cooling, wheels, handle and cylinder rack are standard equipment on each power source.

An automatic slope varies the short

circuit rate of the Steadymigs to correlate with the type and size wire and voltage setting being used. This ensures that excessive splatter or cold lapping is minimised.

All Steadymigs have an on/off switch and indicator so the machines can be isolated at the power source.

The Steadymigs also feature heat sensors on the diode heat sink and on the transformer. If heat build-up reaches an unacceptable pre-set temperature, the automatic overload indicator lights up on the front panel and all output to the wire feeder is cut automatically and only resumes after significant cooling has taken place. Further information from Weldwell (NZ) Ltd, PO Box 749, NAPIER, Ph (070)53 339.



The line-up of new welding equipment available from Weldwell (NZ) Ltd.

part of the job

TABLE 3: GEOLOGICAL INFORMATION

Item	Description
1a	Material colour
b	Material grain size <ul style="list-style-type: none"> — dense mineral grains; less than 0.1mm (0.004in) — fine mineral grains; 0.1 to 1.0mm (0.004 to 0.04) — medium mineral grains; 1.0 to 5.0mm (0.04 to 0.20in) — coarse mineral grains; greater than 5.0mm (0.20in)
c	Material texture
d	Material hardness <ul style="list-style-type: none"> — very soft (VS); rock can be scratched easily with a fingernail — soft (S); rock can be scratched with a knife — hard (H); rock cannot be scratched with a knife
e	Extraneous minerals
f	Rock name
2	State of weathering or alteration <ul style="list-style-type: none"> — fresh (F); no visible signs of weathering — slightly weathered (SW); only superficial staining adjacent to some joint and fracture planes — moderately weathered (MW); partial chemical alteration of component minerals, but sample is not friable — heavily weathered (HW); weathering apparent throughout the rock, with just the relict structure preserved, sample is friable
3	Material structure and continuity <ul style="list-style-type: none"> — massive; discontinuity spacing greater than 2m (6.5ft) — thickly bedded; discontinuity spacing from 0.6 to 2.0m (2.0 to 6.5ft) — bedded; discontinuity spacing from 0.25 to 0.6m (0.8 to 2.0ft) — thinly bedded; discontinuity spacing from 60 to 250mm (2.36 to 9.84in) — very thinly bedded; discontinuity spacing from 20 to 60mm (0.78 to 2.36in) — laminated; discontinuity spacing from 6 to 20mm (0.24 to 0.78in) — thinly laminated; discontinuity spacing less than 6mm (0.24in)
4	Percentage of recovery
5	Maximum, minimum, and most common lengths of core
6	Material strength* <ul style="list-style-type: none"> — crush quality (CQ); mineral grains crush under point of impact and adjacent grains shear — dent quality (DQ); mineral grains compact under point of impact, leaving a depression or dent — pit quality (PQ); mineral grains explosively leave the area under point of impact — rebound quality (RQ); sample shows no reaction in the area under point of impact

*Strength classifications are determined by the reaction of hand-held samples to a blow with the blunt end of a rock hammer or geologist's pick.

TABLE 4: GROUNDWATER INFORMATION

Item	Description
1	Water level in the hole at the beginning of the last shift of drilling on the hole
2	Depth to zones of fluid losses or gains
3	Depth at which water is first encountered
4	Data obtained from pressure testing, including: <ul style="list-style-type: none"> — top and bottom depths of the zone tested — volume of water injected during the test — time duration of the testing — constant pressure used for testing (measured at the top of the hole) — test number
5	Piezometer readings and the dates on which the readings were taken

TABLE 5: RELEVANT REMARKS

Item	Description
1	Type of drill feed used, if other than hydraulic feed
2	Notes on any delays or breakdowns of the equipment
3	Notes on <i>in situ</i> testing
4	Notes on piezometer installations, including: <ul style="list-style-type: none"> — type of sensor used — depth of the zone in which the pressure was measured — method used for insulating the zones
5	Pertinent details on the backfilling of the holes

Moutere Valley investigated

WAIMEA Drilling Co began work on a 300m deep bore early April in the Moutere Valley as part of a groundwater assessment programme for the Nelson Catchment Board.

The Board has commissioned Groundwater Consultants as advisors for the project. Resistivity surveys have already been carried out and by early May the drilling should be completed.

Ken Shirley, Nelson Catchment Board said in the past it had been thought the groundwater resources in the region were insufficient for irrigation purposes. By using modern equipment and methods, the Board hopes to locate water supplies by tapping the narrow lenses of permeable material in the silt and clay-bound glacial outwash overlying the granite basement in the valley.

The Board also believes a substantial groundwater, possibly artesian, source may be located at the base of the gravel, thought to be as deep as 300m.

Ces Woodford, Waimea Drilling, says two rigs will be used on the job — a Joy drilling machine for cable tool and another for the rotary drilling. Tests will be done at 100m intervals.

If a substantial groundwater resource is tapped, current proposals to bring water from the Moutere River for the Lower Moutere Irrigation Scheme will be reviewed.

Leasing still viable option

Many people are still confused about how to finance the purchase of motor vehicles, says finance company Marac.

This confusion has been created by changes to legislation in last year's Budget which significantly altered the two major methods of financing — hire purchase and leasing.

The major points raised by Marac are:

— Although the 1982 Budget removed the tax deferral benefits from advance rental on motorcar leases this did not result in the demise of car leasing as some predicted at the time. Compared with hire purchase, leasing still requires less cash input and provides a longer repayment period.

— With the revocation of the hire purchase and motorcar hiring regulations in September 1983 the cash conservation benefit of leasing was enhanced with the removal of the 50 per cent advance rental requirement. Leases can now be arranged without any front-end payment, apart from the first monthly rental, whereas a deposit of at least 25 per cent is generally required for hire purchase.

— The revocation of the motorcar hiring regulations has also removed obstacles to the renewal of leases and leasees are not prevented from acquiring title to their vehicles at termination of their leases.

Keep fuel flowing through winter

The chilblain season is just around the corner and it's time to look at the ways to stop your diesel turning into cold porridge.

One of the greatest operational problems in winter (apart from getting out of bed in the morning), is with diesel fuel.

Wax, one of the many components of diesel fuel, improves fuel economy and minimises injector wear. A useful ingredient which causes no problems in summer. It doesn't however, behave so well in winter.

Small wax particles in the fuel separate out at very low temperatures and can block fine filters and obstruct pipe-work. The fuel also becomes more viscous and flows less readily which can lead to starting problems, irregular running and stoppages.

The first rule for trouble-free running is to ensure you have enough winter-grade diesel in stock to see you through the cold. Winter diesel has a Cold Filter Plugging Point of minus 9 degrees C maximum, while summer-grade has a CFPP of 0 degrees maximum.

The CFPP is the temperature at which fuel ceases to be efficient. Fuel tested is drawn through a fine mesh filter to simulate actual operation performance.

The fuel is gradually cooled and the tests repeated until a point is reached where performance is inadequate. This is the Cold Filter Plugging Point test which has been adopted as a British Standard and is now used in New Zealand.

A number of additives can be used to alleviate diesel slothfulness — the most common of these is kerosene. Between 10 and 40 percent can be added to the diesel to improve running by around six percent. As a short term answer, the use of kerosene is acceptable. A lower flashpoint, ignition problems, and less efficient lubrication are the longterm effects of kero usage.

Petrol should NEVER be used.

Operators can take these basic precautions:

- Use the correct seasonal grade, and don't mix them.
- Clean out tanks, removing excess water and sludge, before filling up with a different grade.
- Keep the storage tank insulated if possible. Underground tanks are best.
- Don't leave diesel equipment out in the open overnight. If there's no alternative, cover the engine and fuel tank with sacking.

• Before starting, check the crankcase dipstick. If wax is evident, warm the crankcase using an electrical heating device for this purpose. Building a campfire under the crankcase or fuel tank should not be attempted. (This apparently has been tried but reports are understandably secondhand).

• In-line fuel heaters can be installed to prevent wax plugging the filters.

Mud mixing a cinch

One packet does it all.

Drilling Services and Supplies has introduced a new one packet product for building mud. Quick Vis, a liquid polymer product is easy to use and mix, the company says. As well as being a viscosifier, Quick Vis is said to have lubricating properties to reduce torque and encapsulating properties to reduce clay and shale swelling.

Quick Vis can be used for most types of drilling and as only small amounts are required, it is possible to hand-carry your total mud requirements for a well, the New Plymouth-based company says.

PNEUMATIC PACKERS

For groundwater monitoring, permeability testing and pressure grouting

Now available from Longyear New Zealand Limited, packers for holes from 4¼" to 13¾" diameters, these glands are made by the same company whose glands are found in the Longyear Wireline packers used by the Ministry of Works and Development on the Clutha River Investigations.

DEPENDABLE: Gland element construction of steel reinforced rubber assures positive sealing in rough, irregular boreholes and excellent memory in returning to its at-rest diameter.

VERSATILE: The exceptional expansion characteristics of the gland element enables one packer to be set in a wide range of open or cased boreholes.

DURABLE: The steel reinforced gland element features uniform expansion over its entire length and is virtually indestructible in open boreholes.

Wire or call for a detailed brochure:—

LONGYEAR NEW ZEALAND LIMITED
P. O. Box 43030 Mangere, AUCKLAND
Phone: 2754049





SCREEN PRODUCTS PTE LTD



We stand for

- Superior open area per foot of screen,
- Superior strength for both collapse pressure and column load.
- Superior slot tolerance.
- Superior deliveries
- Superior prices mean less cost to you.

We also manufacture oil and gas-well screens, down-hole tools, mining screens and industrial screens.

WE ARE AT YOUR SERVICE !



SCREEN PRODUCTS PTE LTD

Baylis Bros Ltd,
P O Box 5003,
Greenmeadows,
HAWKES BAY
Contact: Dick Baylis
Phone: 442-167 A/H: 447-036
or 447-015 Telex: CPO NA NZ3302

NZ AGENTS

Australasian Diamond Tools,
Grasslands Place,
P O Box 5334,
Frankton,
HAMILTON
Contact: Stan Nicholson
Phone: 77-407 A/H: 69-074
or 64-743 Telex: NZ2536

SINGAPORE

11-A Pandan Crescent, Singapore 0512
Farrer Road, P O Box 244, Singapore 9128
Telephone: 7788323/2562972
Telex: RS 50077 SPRSIN
Contact Ted Brondgeest

AUSTRALIA

Screen Products Pte Ltd
P O Box 307, Gympie, NSW 2227
Telephone: (02) 525-5309 Telex: AA74336
Contact: Terry Halling, Australasian Manager

How to woo clients and goodwill

Many businessmen promote promising employees but few promote themselves.

In these days of fierce competition it is no longer sufficient to merely sit back and wait for the customers to walk in the door. And it is no longer enough to put a simple ad in the local "rag" every now and again.

Promotion through advertising and public relations is a vital part of modern business practice... whether you are a self-employed septic tank cleaner or the managing director of a major company.

Yet, promotion of your business can be very simple. The best rule to follow is just that: keep it simple. But before telling the world how good a job you can do, think carefully.

Decide what exactly you are doing: what services do you offer and, given the equipment you have, what services COULD you offer? Then decide who your customers are. Check your past jobs, check with the local council for upcoming projects, go and see the local government departments to see what is happening.

In promoting a business, information is the key. As the old army saying goes: time spent in reconnaissance is never wasted.

Having found out who your customers are and where they are, try and find out what they read and watch; what they listen to; what shows and field days they attend and how approachable they are to personal visits. If there are only a small number of customers then it would probably be cheaper to call on them individually to make them aware that you exist and what services you offer. Face to face contact is one of the best ways of promoting your business.

Public relations covers everything from the painting of your vehicles and equipment and signwriting, to the overalls your staff wear, to how you answer your telephone, to press releases sent to the local paper.

In fact PR really means how you relate to the public. Even though Joe Public may not use your services, they can affect how you work. Concerned citizens may ask the council to stop you taking your gear through streets or may try to get you moved from a residential area. If you can win their respect and confidence you can make an ally out of them.

On the PR front look at the following:

- * are your buildings clean and businesslike?

- * are your staff courteous to customers and the public?

- * are your staff decently dressed?

- * when you do an unusual job, do you let the local paper know about it? Do you know who the paper's agricultural reporter is?

- * do you loan equipment for charitable causes?

- * how do you and your staff answer the phone/speak to customers?

- * do you participate in local service groups?... a great way to meet people.

- * if you advertise in an advertising feature can you send in some editorial material for it?

- * if your company has bought a special item of plant (perhaps it's new to the country) do you think to call the press?

All these things and more are relatively simple ways to get your name before potential customers. And if your business is sufficiently large have you thought about using a public relations consultant? The advantages are the same as for the using advertising agencies.

And finally, don't forget. Public relations can only help you to publicise the truth. If your business is badly run, inept, and you and your staff are surly and shabby, no amount of advertising or PR can help you. In the end it boils down to making the best of what you are by telling people about it.

Go on, promote yourself.

ROTORUA WELLDRILLING CO LTD



Geothermal and Coldwater Welldrilling Engineers
Tally Ho St, Rotorua
P O Box 727, Rotorua
Ph (073) 87 687

Geothermal energy utilisation specialists
Rural and domestic water supplies
Pumping systems and associated engineering

North Island stockists and agents for Gruner
Williams drilling bits, and Reda deepwell
submersible pumps.

Manufacturers and suppliers of drill rod couplings, screens and fishing tools.

Stockists of Mastport Onga and Davies pumps, Hitachi and Kitizaqa stainless steel valves, bandit stainless steel strapping, preformed clamps and tools, Stocks Camlock couplings, Flexible hoses and G.F. pipe fittings.

H. J. ASMUSS & CO. LTD

Suppliers to the pipeline engineer

17-21 Graham Street, Auckland P.O. Box 213

Telephone 799-520 STD Code (09) Telex NZ 2718 "ASMOLIT"

GASKETS — FLEXITALLIC

Spiral Wound ANSI & BS Range — to API 601 and BS3381 also full range C.A.F. Cut Flange Joints Material Spec. BS2815A and BS1832

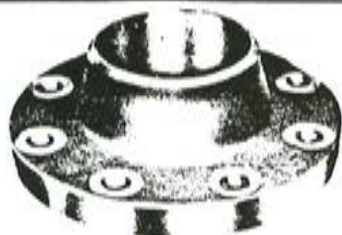


BONNEY FORGE

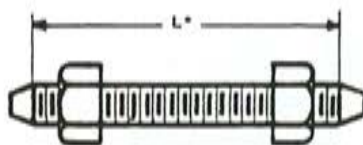


Weldolets
Sockolets
Thredolets
Elbolets
Latrolets

Carbon Steel
A105
Class 3000 and 6000



FLANGES — Slip-on Blind Weld-neck and Orifice ANSI B16.5 150, 300, 600, and BS10. Carbon Steel A105.



STUD BOLTS with nuts ASTM A193-B7 ASTM A194-2H, UNC Thread



("Grafoil" is a registered trademark of Union Carbide Corporation)

GRAFOIL® RIBBON PACK — flexible, all-graphite packing for universal service on valves and pumps —240 deg C to +1650 deg C.



SEAMLESS STEEL PIPE — API 5L Grade B Sch 40 ASTM A106 Grade B Sch 80

TEST CERTIFICATES AVAILABLE FOR ITEMS WHERE APPLICABLE



BUTT-WELD PIPE FITTINGS

A234-WPB ANSI B16.9 and B16.28, Sch 40 and 80.

SOCKET WELD AND N.P.T. FORGED STEEL FITTINGS B16.11 (BS3799) A105 Class 3000—6000.



BONNEY

GATE AND GLOBE VALVES ANSI CLASS 800 N.P.T. and Socket weld API 602

COMPOUND A ANTI SEIZE.

Lead based anti-seize thread sealant.



UNDERWRITERS' LABORATORIES approval for use with propane, butane, gasoline, natural gas, petroleum oils. GAS ASSOCIATION OF NEW ZEALAND, approval no. 235.

Coot's debut fails to live up to specs sheet

HUNTING for a vehicle that will tote your drilling machine through the roughest kind of cowboy country?

The Coot, a go-anywhere, do-anything vehicle on show at this year's Industrial Fieldays in Hamilton might do the trick.

John Burns Manufacturing Ltd, which hopes to assemble Coots for the New Zealand market, says that at least one Coot has been adapted as a portable drilling rig in the US.

Looking like a cross between a Gnat and a Mini Moke the two-seat, four-wheel drive, four-wheel steer machine looked versatile, but the demonstrations at Fieldays didn't really justify the claims of the spec sheet.

The Coot's first practical display was mounted on a special four wheel drive course where the machine rendered itself immobile atop a modest pile of logs, despite the makers' claim that 700mm obstacles could be "stepped over".

Another demonstration later at Mystery Creek's "duck pond" also proved an embarrassment to the driver, a representative of John Burns Manufacturing Ltd.

In this demonstration "Coot the Amphibian" was to manifest its aquatic faculties and an intriguing propeller and tiller arrangement was bolted onto the rear of the little red machine.

In toad-like fashion Coot crawled off down a short, steep bank into the water, only to belly itself in a thick layer of mud concealed just beneath the murky surface.

With its nose partially submerged, Coot's water tight driving module quickly filled with a mixture of mud and



water and the mid-mounted 18 horse power Tecumseh four stroke motor spluttered and died.

A later attempt at flotation also failed but provided the perfect opportunity to illustrate the vehicle's capacity for self-recovery when it pulled itself out of the mud effortlessly with an on-board electric winch.

The NZ distributors, Hololilo Farm Equipment, say the vehicle capitalises on a high 280mm ground clearance and claim a maximum ascent angle of 60 degrees is possible under ideal conditions.

A roll bar is provided should this pro-

ve too much and a 6.5 metre turning circle is possible using the 4-wheel-steer principle. The machine will float in just 700mm of water while supporting a 225 kilogram load, assuming one can get the beast wet in the first place!

Coots' twin articulated steel hulls allow it to go almost anywhere, carry a load of up to 544 kilos and it can attain a speed of 50kph.

Coot is likely destined for farm use in this country and hopefully a more successful demonstration will be arranged at the National Agricultural Fieldays in June.



Above: Coot and driver take time out to plot a dignified descent from their grandstand view of Fieldays. Top and right: Bugged down again, but self-help is at hand.



DON'T BUY ANOTHER PUMP...



...UNTIL YOU'VE SEEN THE SPECIALISTS— **Brown Brothers Engineers Ltd**

They guarantee to give you expert service and advice tailored
to suit your own pumping requirements.

NZ DISTRIBUTORS FOR:

GRUNDFOS

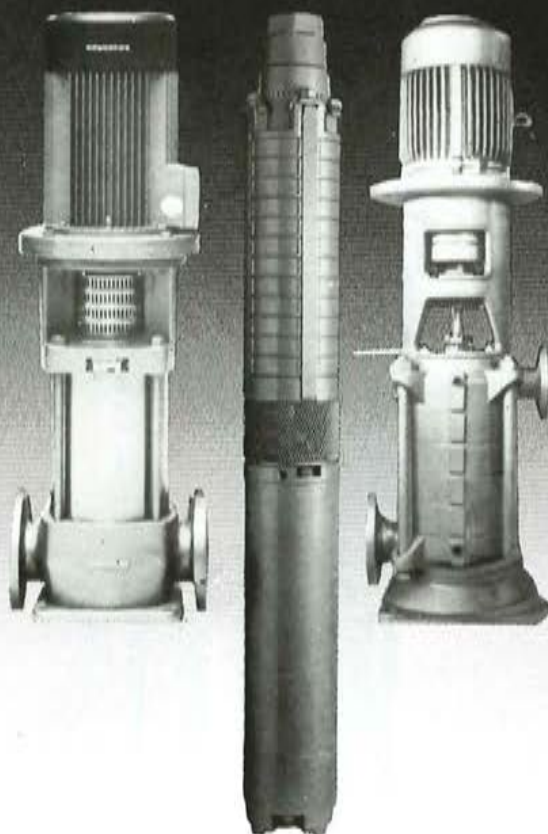
Submersible borehole pumps. Vertical
multi-stage centrifugal pumps. Hot
water accelerators. In line
centrifugal pumps.


ATURIA

Submersible borehole pumps.

OSNA

Vertical & horizontal multi-stage
centrifugal pumps.



 **Brown Brothers
Engineers Ltd**
PUMPS

Celebrating 75 years of service to the pumping industry

CHRISTCHURCH
18-20 Brisbane Street
PO Box 548
Phone 50-279
Telex NZ4941

AUCKLAND
477 Great South Road
PO Box 12-807
Penrose
Phone 599-093

PETONE
94 Sydney Street
PO Box 30-733
Lower Hutt
Phone 688-235

A Mace Group Company

13222

Are you sure you want to go with less than the best?



A CHEAP SCREEN SUBSTITUTE can let you down. Hard. Poor slot control can turn your good work into a sand pumping well. Less open area can mean your well's efficiency is nowhere near what it could be. Low grade materials and poor design can aggravate problems with plugging and corrosion. Why jeopardize your first-class work with third class screens? Go with Bisleys. They have Johnson Screens to let your wells be first class all the way to the bottom.

Bisleys

A.M. Bisley & Co. Ltd
P.O. Box 487
Hamilton
Phone: 56-179

A.M. Bisley & Co. Ltd
P.O. Box 16-044
Hornby, Christchurch
Phone: 499-009