

TECHNICAL DATA REPORT

Pumps designed for 1000-mile transport line



Side liner—very little wear—returned to service; vane liners replaced.

2½ Year operating data

- Taconite service (— 6 mesh total tails)
- Designed for 350–500 psi operating pressure (750 psi tested)
- 1100 LTPH dry tonnage average including initial start up
- 2100 LTPH dry tonnage actual—24 hours
- 2450 LTPH dry tonnage—design

Impeller Wear
New Wt. 5400 lbs.
Worn Wt. 3980 lbs.
Wear 1500 lbs.

Total Maintenance

- 21,800,000 LT total—5-mile haul
- Replaced parts—Partial set only—less than \$600 per ton for a 5-mile haul
- Continuous runs of over 5000 hours on seals and shaft sleeves are possible and established.
- Future inspection schedule once per year after 7200 hours, 15,000 hours projected pump life. Previous competitive pumps would not stand 500-hour continuous service.

Conclusion
The extra-heavy Warman patented design (at 2½ times the weight), with elimination of the critical wearing areas, results in over 10 times the wearing part life as experienced with the best previous pump on the same (or similar) taconite tailings disposal service.

WARMAN INTERNATIONAL, INC.
P.O. Box 7610, Madison, WI 53707
608-221-2261

TOR 32840-485

WARMAN PC pumps



Corrosion and abrasion resistant Process Chemical pumps

The hardest working pumps in the world.



Warman 14/14 Dredge Pump on duty in Holland.



High Head Slurry Pump working against 100m head in Italy.



14/12 GAH Heavy Duty Slurry Pump on Primary cyclone feed duty in Ireland.



16/14 HAH Pump handling tailings at 3000m/h against 50m head in the USA.

Where there's a demand for tough pumping equipment moving highly abrasive slurries and corrosive liquids or high percentages of solid particles, **Warman Pumps** take the lot. They are in continuous use throughout the world regularly specified for their reputation of reliability, economy and high quality service.

For complete details of Warman Heavy and Medium Duty Slurry, Dredge and Gravel Pumps, Solution and Froth Pumps contact:
SIMON WARMAN LIMITED
Toshmorden, Lancashire, England.
Telephone: 070 881 4251
Telex: 63324

SIMON-WARMAN
Unsurpassed Technology in Pumping Equipment

Series 'A' SOLUTION PUMPS

FOR PROCESS LIQUORS — DIRTY WATER —



- EXTREMELY HEAVY DUTY DESIGN
- NO CLOSE CLEARANCES
- HIGH EFFICIENCIES
- PASS SOLIDS WITHOUT DAMAGE
- ALL DRIVE END PARTS INTERCHANGEABLE WITH WARMAN SERIES "A" SLURRY PUMPS
- MINIMUM MAINTENANCE

What are people saying about the heavy-duty slurry pump with the lower initial cost?

Warman EQUIPMENT

Vol. 1, No. 11. MONTHLY BULLETIN November, 1968

A COMPLETE RANGE OF PUMPS for the handling of solids and solutions

WARMAN SERIES 'A' SLURRY PUMPS

Warman Series 'A' Slurry Pumps are heavy duty pumps, designed for slurry and process duties. They range in size from the 1½/1 B-M with a capacity of 90 g.p.m., to the 16/14 H-AH with a capacity of 11,000 g.p.m. They are available in low, medium or high head types, with a maximum head of 180 feet.

For further details refer to Warman Bulletin WAP/1.

WARMAN SERIES 'A' TYPE S.C. SLURRY PUMPS

The Warman Series 'A' Type S.C. Pumps are a union of the Warman Split Casing and Warman Series 'A' Pumps. They are proven performers in the medium head range, and range in size from 1¼ A-S-C with a capacity of 25 g.p.m., to the 10/8 F-S-C, with a capacity of 2800 g.p.m. They will develop a maximum head of 120 feet.

For further details refer to Warman Bulletin WAP/8.

WARMAN SERIES 'A' GRAVEL PUMPS

These pumps have been designed specifically to handle gravel, sand and other abrasive materials, which demand the pumping of particles too large for standard Slurry Pumps. They range in size from the 6/4 D-G with a capacity of 800 g.p.m. to the 24/20 H-G with a capacity of 20,500 g.p.m.

For further details refer to Warman Bulletin WGP/1.

WARMAN SERIES 'A' SOLUTION PUMPS

Warman Series 'A' Solution Pumps have been designed for dirty water duty where ordinary water pumps are not suitable, or the cost of fully lined slurry pumps is not justified. They are available from the 2/1½ B-S with a capacity of 150 g.p.m., up to the 16/14 G-S with a capacity of 5800 g.p.m.

For further details refer to Warman Bulletin WSP/1.

SYDNEY 439-2000 • PERTH 65-2099 • BRISBANE 5-4989 • KALGOORLIE K1066

Warman Scrubber Recycle Pumps

After years of operation:

- no packing problems
- no significant wear

Correct lubrication and preventive maintenance of bearings for slurry pumps could mean the difference between a pump up and running and pump failure. It's important to know about bearing life, bearing lubrication, and some of the most common causes of bearing failure.

Bearing Life

Bearing life is usually termed as B-10 life, which is the number of hours (or revolutions) at some given constant speed that 90% of a group of bearings will complete or exceed before the first evidence of fatigue develops. The B-10 life is a function of the radial and axial forces developed during pumping, and the pump speed. It is also affected by other factors, such as belt loading in the case of a belt drive. For most slurry pumps, a B-10 design life of 30,000 hours can be considered satisfactory, because the pump will usually need dismantling and overhaul much before this time for replacement of wear parts. Selecting a very high B-10 life increases the size of the bearing and the bearing housing. For any given duty, maintenance planning personnel should establish the schedule for bearing replacement, based on experience gained with bearing inspectors during pump maintenance work. Planned replacement of bearings along with other maintenance work on the pump is less costly than replacing failed bearings.

After years of pumping lime slurry with fly ash, Warman 14/12 STAHP pumps show no significant abrasive wear. These heavy-duty pumps operating in parallel are rubber-lined with metal impellers. Warman pumps offer high-flow capabilities up to 30,000 gallons per minute.

Producing Products Today for Tomorrow's Needs.

WARMAN INTERNATIONAL, INC.
P.O. Box 7610 • Madison, Wisconsin 53707-7610
PHONE: 608/221-2261 • TWX: 9102862716

For additional information, write for a completely illustrated, free brochure.

THE HOTWIRE
February 1984 A Warman Utility Group Newsletter Vol. 2 No. 1

Bearing Life!

by Hari Sinha, Senior Application Engineer

Bearing Lubrication

Most slurry pumps run well below 5,000 rpm and are usually fitted with anti-friction bearings. For such applications, grease lubrication is generally adequate and widely used. At speeds above 5,000 rpm, oil lubrication is preferable.

In the speed range where grease lubrication is generally satisfactory, the advantages over oil lubrication are: 1) Grease lubrication is more economical than oil lubrication. 2) Grease lubrication requires less frequent attention. As oil is a liquid, it flows out of a loose seal faster, thereby requiring frequent attention to maintain level. 3) In case of pump gland leakage entering the bearing housing, contamination of oil occurs faster (as compared with grease). 4) In case of stray midships, e.g., loose or broken oil level indicator, loose end cover of bearing housing caused by vibration or poor joint, etc., the oil will leak out faster.

Trouble-Shooting of Bearing Failures

The most common causes of bearing failure are: 1) Lack of lubrication, due to lack of attention, defective grease nipple, or failure of seals, etc. 2) Contamination by dirt, pumped slurry, etc. 3) Excess lubricant. (Grease should fill the bearing cavities and no more than 1/4 to 1/3 of the space in the bearing enclosure area of the housing; oil level should not be higher than the center of the lower-most ball or roller while stationary). 4) Defective assembly (e.g., bearing loose on shaft or in housing bore, bent shaft, etc.). 5) Misalignment of a pump shaft coupled to motor, gear reducer, or fluid drive. 6) Belt tension too high.

(continued on page 4)

Your Introduction to Leadership

We're a leader in the manufacture of heavy-duty slurry pumps because we design them, build them, and service them better.

Warman's leadership in slurry pump design and performance assures you the highest possible return on your investment. Throughout the world, Warman pumps have established records for minimal maintenance. A wide selection of sizes, with several liner and impeller materials, permits Warman pumps to be tailored to meet your specific requirements. This means maximum pump efficiency and productivity for your particular application.

Warman's investment in slurry pump development is your assurance of continued efficiency, dependability and profitability.

WARMAN The Industry's Number 1 Choice

<p>Coal Processing APPLICATIONS:</p> <ul style="list-style-type: none">Raw coal feedHeavy mediaCyclone feedThickener underflowFilter feedSump pumpsClarified waterCoal hoistingCoal slurry pipeline	<p>Mining and Ore Processing ORE TYPES:</p> <ul style="list-style-type: none">CopperMolybdenumIronGoldPhosphatesOil shale <p>APPLICATIONS:</p> <ul style="list-style-type: none">Heavy mediaFilter feedCyclone feedSump pumpsCentrifuge feedMine dewateringFroth	<p>Electric Utilities APPLICATIONS:</p> <ul style="list-style-type: none">Bottom ash removalFly ash removalS20 scrubber systemsSump pumpsSludgeThickener underflowThickener overflowRecycled water	<p>Industrial APPLICATIONS:</p> <ul style="list-style-type: none">Scrubber serviceRecycled waterSig removalSludge removalSump pumpsPulp and paperSugarTobaccoProcess liquor recirculatingParticulate waste slurries
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TOUGH PUMPS FOR TOUGH JOBS

BULLETIN WSP/1

Warman Series 'A' SOLUTION PUMPS

FOR PROCESS LIQUORS — DIRTY WATER —

— EXTREMELY HEAVY DUTY DESIGN
— NO CLOSE CLEARANCES
— HIGH EFFICIENCIES
— PASS SOLIDS WITHOUT DAMAGE
— ALL DRIVE END PARTS INTERCHANGEABLE WITH WARMAN SERIES "A" SLURRY PUMPS
— MINIMUM MAINTENANCE
— TABLE "D" FLANGES

WARMAN FOR PEAK PUMPING PERFORMANCE THROUGHOUT THE LIFE OF THE PUMP

BULLETIN WAP/8

Warman SERIES 'A' TYPE S.C. PUMPS

FEATURE

- Robust Shaft Design
- Larger Bearings
- Indexable Heads
- Centrifugal Seal & Gland Seal Interchangeability

BULLETIN WSP/1

Warman SUBMERSIBLE AND DRY WELL SEWAGE PUMPS

FIXED AND SLIDING ARRANGEMENTS

are people saying about the best wet end in the business?

ALWAYS

Warman

SINCE 1938

pump with the lowest lifetime cost?

WEIR WAGE

Minerals



pump with the lowest lifetime cost?

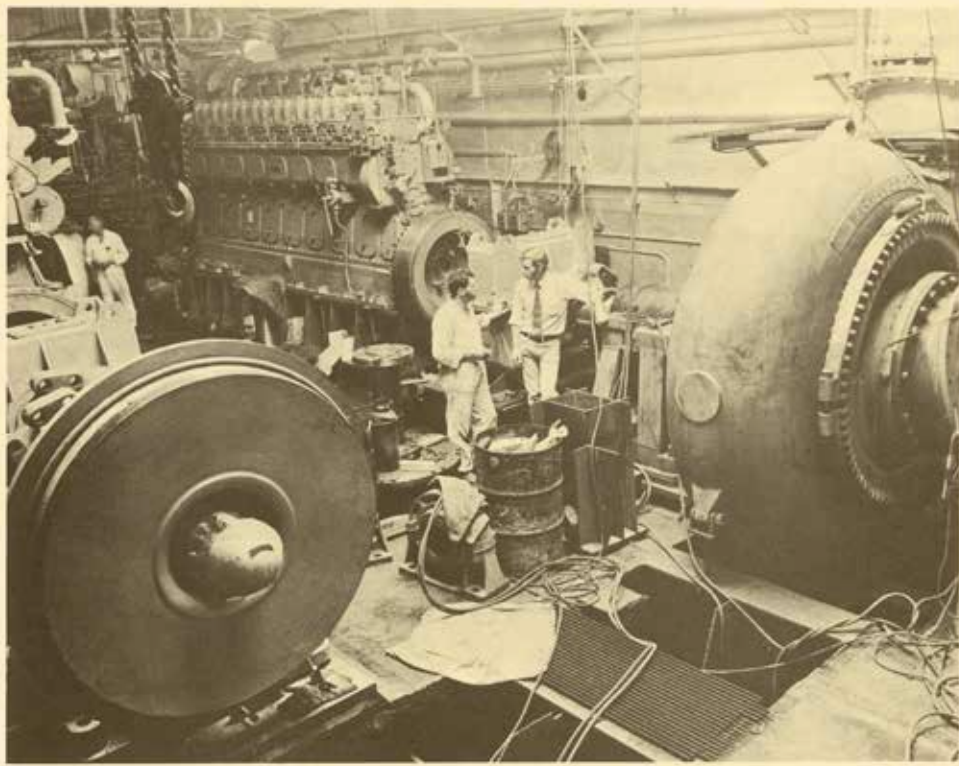


Warman Equipment

MONTHLY BULLETIN

Vol. 6 No. 10
October, 1973

WARMAN EQUIPMENT 36"-H-D DREDGE PUMP



This photograph shows the second Warman 36" Frame H, Type D Dredge Pump being installed in the "Coral" Suction Cutter Dredge owned by Queensland Cement & Lime Company Limited and used for dredging dead coral from the reefs in Moreton Bay, Queensland, for the manufacture of portland cement.

The Pumps replace smaller fabricated steel units and each is driven by an Allen 8 cylinder diesel engine through an air operated automatic clutch and helical speed reducer. Each engine is capable of developing 1,700 h.p. and is normally run at 600 r.p.m. At this speed, each Pump has a design output of approximately 57,000 Imp. g.p.m. against a total dynamic head of 45 feet.

WARMAN EQUIPMENT

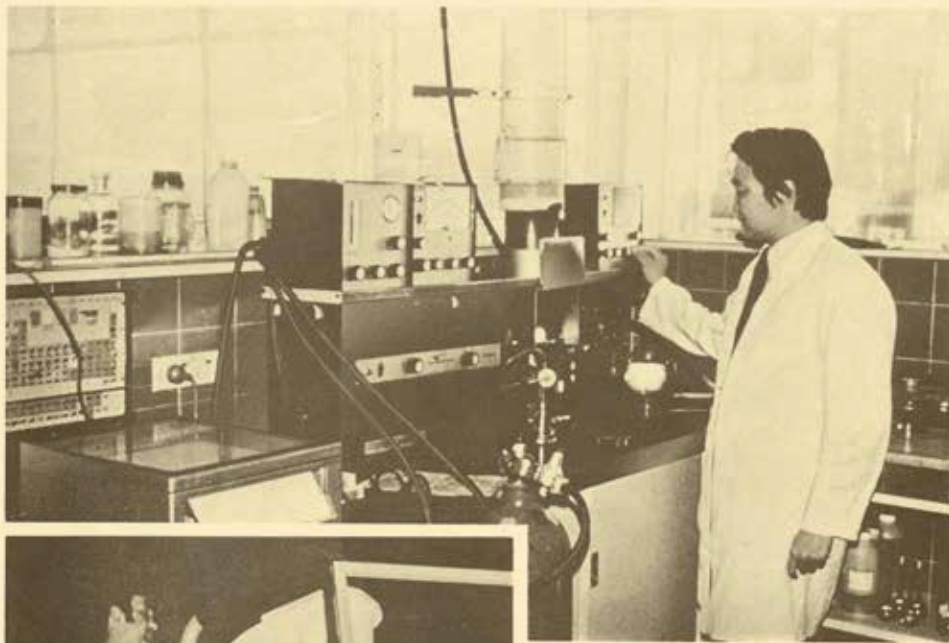
(INTERNATIONAL) LTD.

Warman Equipment

MONTHLY BULLETIN

Vol. 6 No. 11
November, 1973

WARMAN EQUIPMENT LABORATORY FOR ORE TESTING AND FLOWSHEET DEVELOPMENT



Warman equipment operates an extensive and up-to-date laboratory for ore testing and flowsheet development.

Specialist staff members carry out investigations on ore and mineral samples supplied by clients which can lead to the recommendation of treatment methods and preparation of flowsheets for treatment of the ores to produce the desired minerals or concentrates.

WARMAN EQUIPMENT

(INTERNATIONAL) LTD.

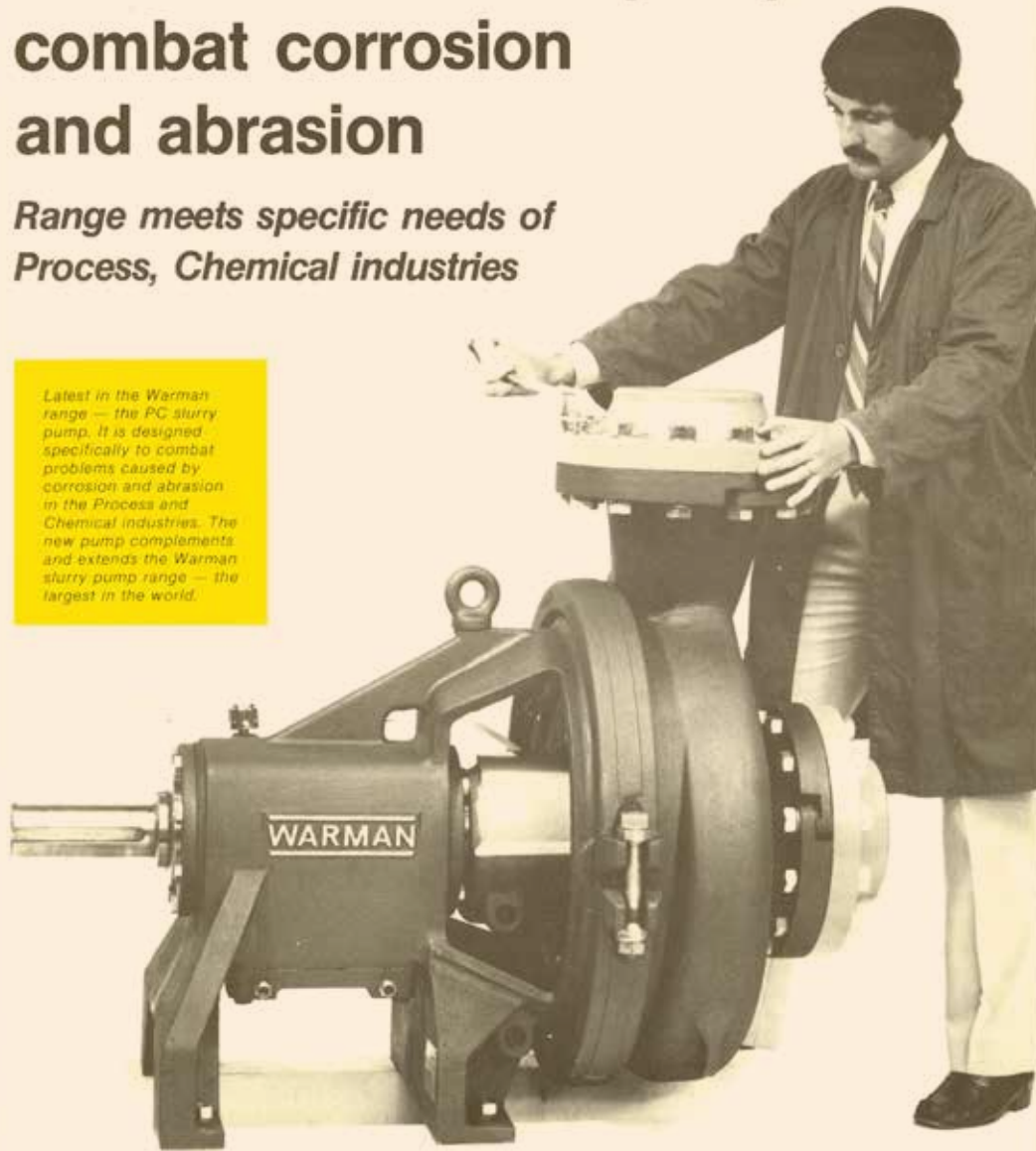
WARMAN News

Vol. 17, No. 2
March 1984

Warman's new PC pumps combat corrosion and abrasion

Range meets specific needs of Process, Chemical industries

Latest in the Warman range - the PC slurry pump, it is designed specifically to combat problems caused by corrosion and abrasion in the Process and Chemical industries. The new pump complements and extends the Warman slurry pump range - the largest in the world.




Warman International Ltd. has developed and is marketing a completely new range of pumps specifically to meet the needs of chemical and mining industries in process liquor and light chemical slurry applications. Designated the PC type, it complements and

Warman Equipment

MONTHLY BULLETIN

Vol. 7 No. 6
June, 1974

ANALYTICAL SERVICES
WARMAN RESEARCH AND DEVELOPMENT DIVISION



For some years now the analytical facilities of Warman International have been expanding to match the Company's widening field of activity. In consequence a comprehensive range of equipment and practical expertise appropriate to the mining, metallurgical and equipment manufacturing industries has been assembled.

While these facilities are primarily intended as an internal service to our Company, they are also available for external analytical work on a similar confidential basis to our ore-testing service.

Early in the development programme, our several analytical Authorities in the field of Chemical Testing. For clients requiring such services, N.A.T.A. endorsed Certificates may now be issued in a number of sections within this field. For example:

Metals and alloys	Water, effluents and trade wastes
Ores and minerals	Electroplating and chemical treatment solutions
Clays and ceramics	Refractories
Cement and concrete	
Sand and glass	

Additionally to composition certification, related investigation topics may be undertaken through the specialist interests and activities of the Warman technical staff. Included in this work are investigations relating to mechanical failures, wear studies and corrosion studies. Several examples of the equipment appropriate to our analytical and investigation service are shown overleaf. Foundries, manufacturers, mineral processors, consultants, etc., having a need for this type of analytical service are invited to direct an enquiry to our Research and Development Division.

WARMAN INTERNATIONAL

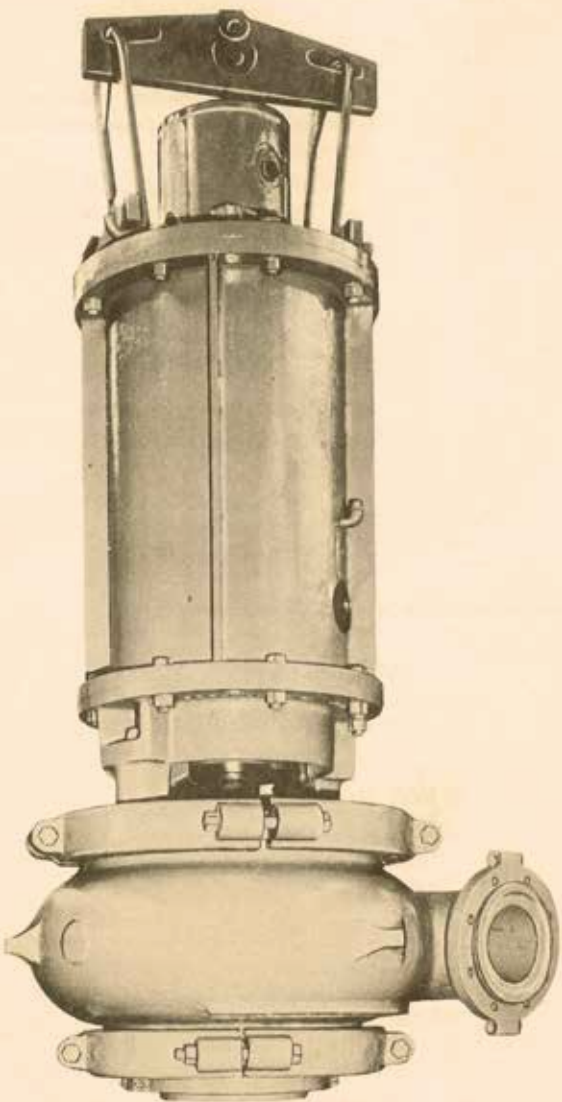
LTD.

Warman Equipment

MONTHLY BULLETIN

December, 1969

SPECIAL WARMAN HYDRAULIC PUMP UNIT FOR ALLUVIAL GOLD DREDGING



This illustration shows a Warman 8/6 Series "A" Frame E, Centrally Sealed Gravel Pump Head, designed for submersible operation and direct coupled to a Lucas Hydraulic Motor.

The unit will be suspended from a pontoon and is for use in alluvial gold dredging.

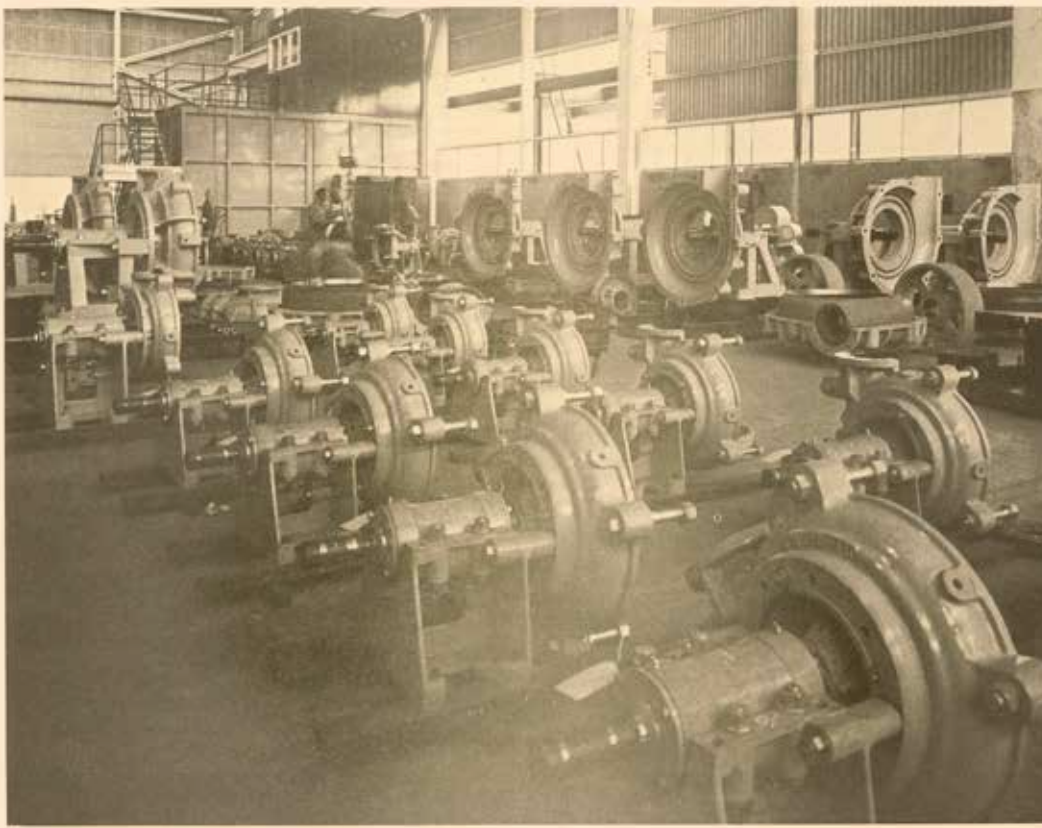
SYDNEY 439.2000 • PERTH 65.2099 • BRISBANE 5.4989 • KALGOORLIE 104

Warman Equipment

MONTHLY BULLETIN

June, 1971

EXPORT ORDER OF WARMAN PUMPS FOR ALUMINA PLANT IN SARDINIA



The photograph shows part of a shipment of Warman Series "A" Slurry Pumps for a new Alumina Plant in Sardinia.

The order for these 85 pumps was obtained against world competition and was recommended by Kaiser Engineers and Constructors Inc.

The pumps, varying in size from 16/14 G-AM down to 2/1 1/2 B-M, are fitted with 28% chrome iron liners and impellers to withstand the abrasive and caustic attacks from the various slurries.

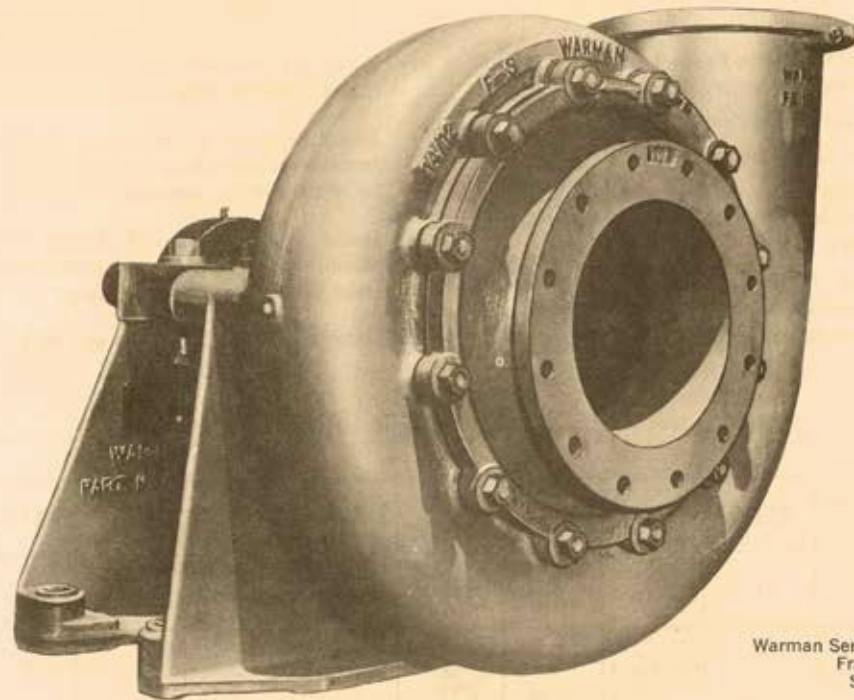
SYDNEY 439.2000 • PERTH 65.4166 • BRISBANE 47.5633 • KALGOORLIE 21.1

Warman Equipment

MONTHLY BULLETIN

February, 1

WARMAN SERIES "A" HEAVY DUTY SOLUTION PUMPS



—EXTREMELY HEAVY DUTY DESIGN
—NO CLOSE CLEARANCES
—HIGH EFFICIENCIES
—PASS SOLIDS WITHOUT DAMAGE
—ALL DRIVE END PARTS INTERCHANGEABLE WITH WARMAN SERIES "A" SLURRY AND GRAVEL PUMPS
—MINIMUM MAINTENANCE—TABLE "D" FLANGES

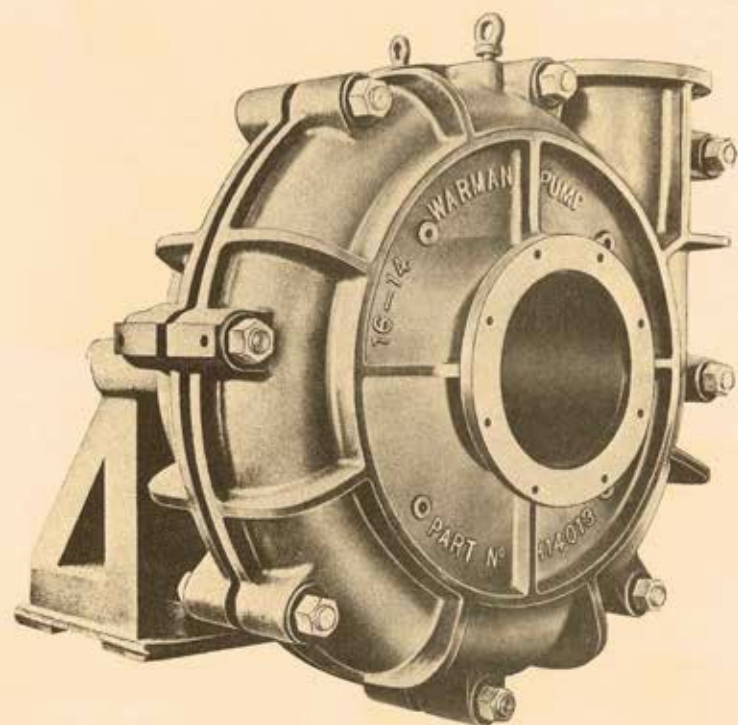
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Warman Equipment

MONTHLY BULLETIN

May, 197

LARGE WARMAN SLURRY PUMPS FOR PHILIPPINE COPPER MINES



The pump shown in this month's bulletin is a 16/14 G-AM Series 'A' Unit. It is fitted with renewable rubber liners and a 41 inch diameter 5 vane Ni-Hard impeller. This pump is one of eleven ordered by Atlas Consolidated Mines Development Corporation as part of their copper mill expansion programme. Each pump will handle 5200 l.g.p.m. of ball mill discharge at 60% solids by weight having an average particle size of 48 mesh. The total head including the cyclone feed pressure is 30 feet.

The sale of these units was negotiated through the Warman Sales Licensee in Manila, Philippines, Messrs. Engineering Equipment Incorporated.


SYDNEY 439.2000 • PERTH 65.2099 • BRISBANE 47.5633 • KALGOORLIE 21.14

Warman Equipment

MONTHLY BULLETIN

Vol. 6 No. 9
September, 1973

WARMAN PLANT DESIGN AND CONSTRUCTION SERVICES ENGINEERING DIVISION.



The Warman Equipment Engineering Division is widely experienced in the design of mineral mining and treatment plants.

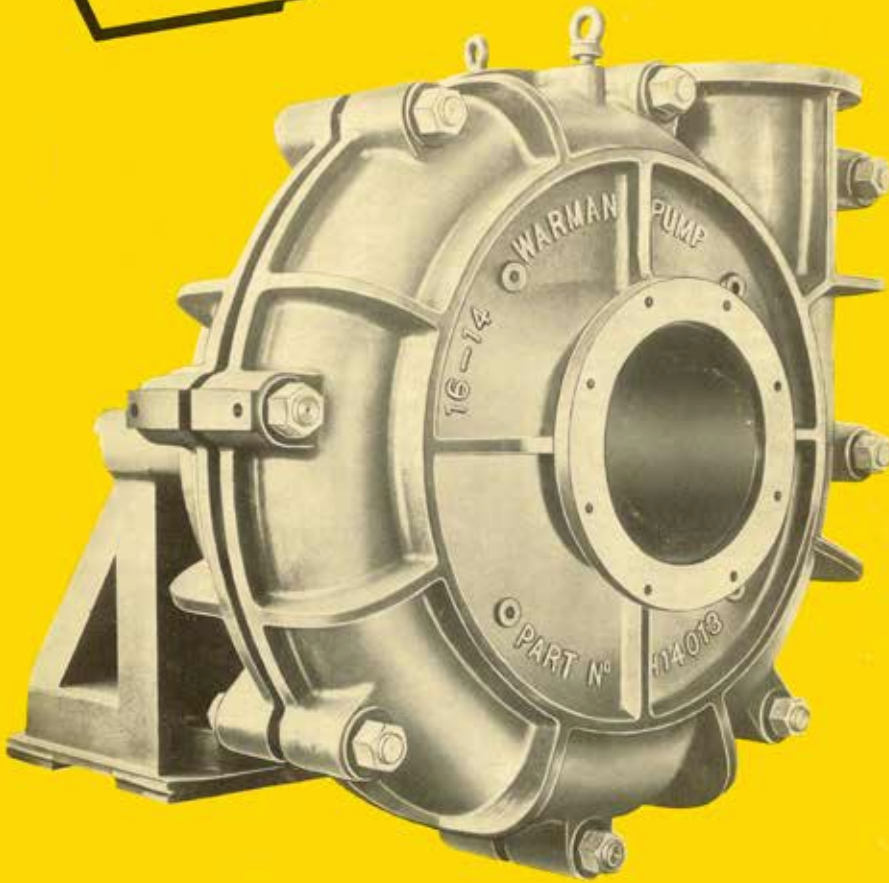
Complete projects are carried out by the Engineering Division, from discussing client's requirements, application of flow sheets to produce a complete plant design, manufacture and erection and then, finally, commissioning of the complete plant.

WARMAN EQUIPMENT • MINING • METALLURGICAL • CHEMICAL

Warman

WAP/2

WARMAN SERIES 'A' HEAVY DUTY SLURRY PUMPS

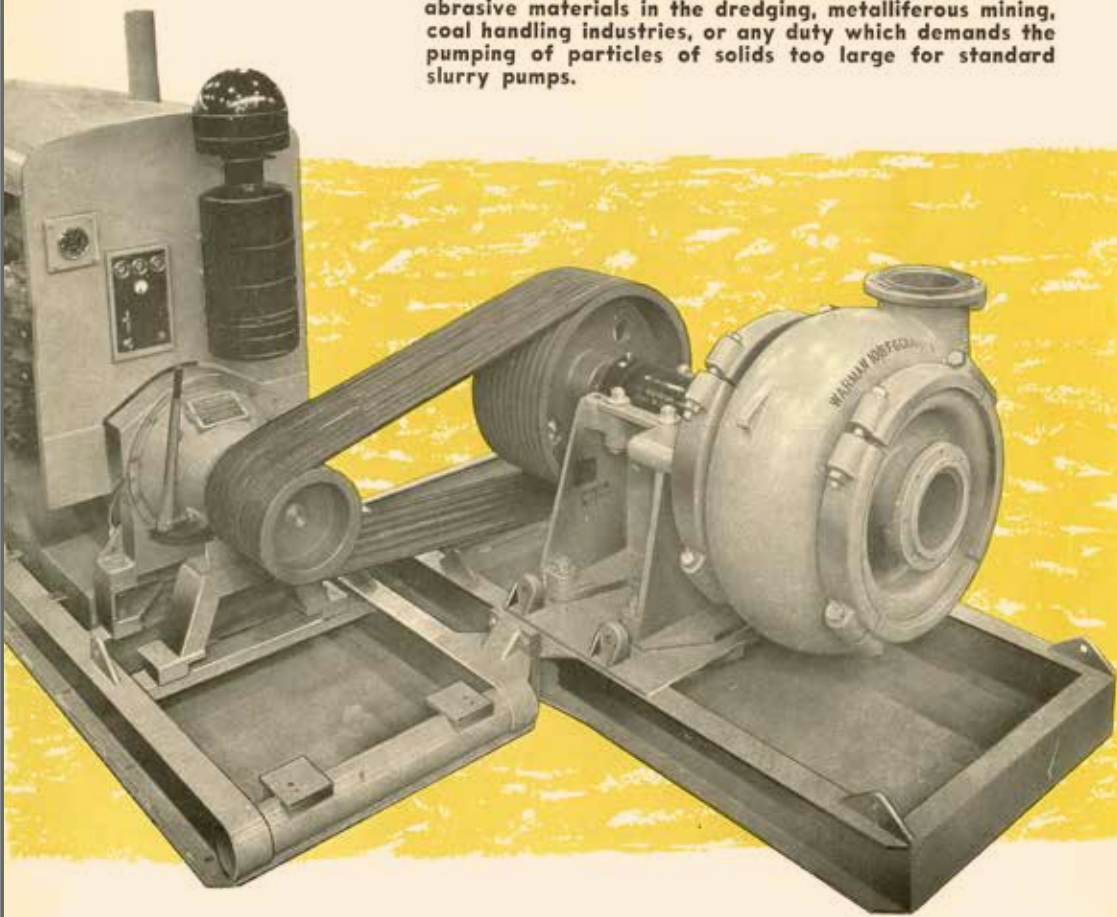


WARMAN EQUIPMENT • MINING • METALLURGICAL • CHEMICAL

BULLETIN WGP/1

WARMAN SERIES 'A' DREDGE AND GRAVEL PUMPS

Designed specifically to handle gravel, sand and other abrasive materials in the dredging, metalliferous mining, coal handling industries, or any duty which demands the pumping of particles of solids too large for standard slurry pumps.



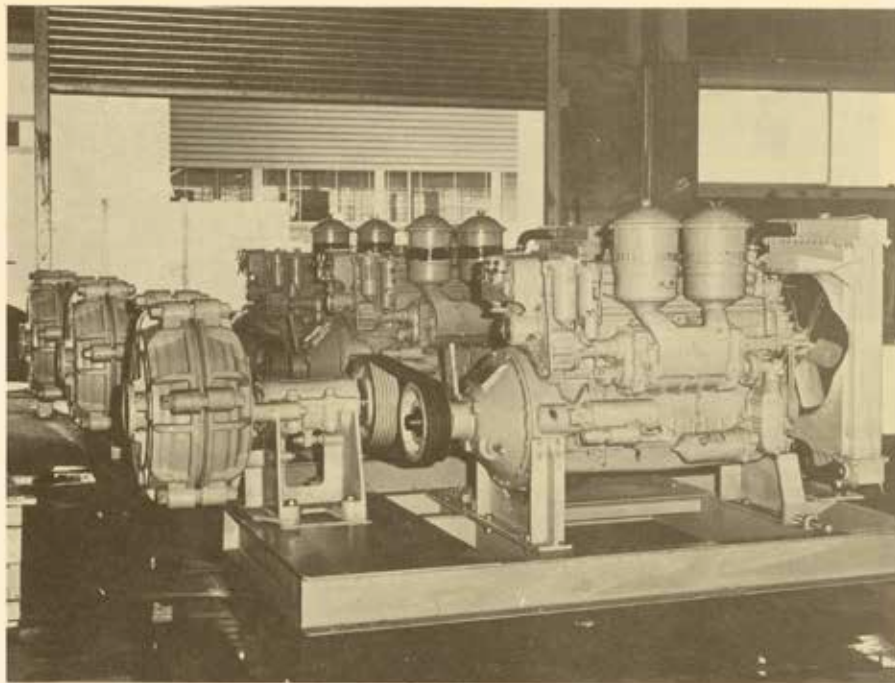
WARMAN EQUIPMENT • MINING • METALLURGICAL • CHEMICAL

Warman Equipment

MONTHLY BULLETIN

Vol. 7 No. 5
May, 1974

PUMPING IRON SANDS IN INDONESIA



Three Warman Pump Sets for use in the pumping of iron sands in Indonesia.

The pumps are Warman Series 'A' 4/2 1/2 E-H High Head Slurry Pumps, vee belt driven by G.M. 6-71 (175 H.P.) diesel engines.

The pumping units are intended for 2-stage operation with the third unit on standby. The 2-stage pump set is designed to handle 606 Imp. G.P.M. of iron sand slurry at 42% solids by weight, with a total equivalent discharge head of 427 feet of water. Pump operating speed is 1,200 R.P.M. with estimated power consumption 117 H.P. per pump.


WARMAN INTERNATIONAL LTD.

Warman Equipment

MONTHLY BULLETIN

May, 197

WARMAN SOLUTION PUMPS FOR GROOTE EYLANDT MANGANESE MINE




WARMAN EQUIPMENT • MINING • METALLURGICAL • CHEMICAL

Warman Equipment

MONTHLY BULLETIN

June, 1971

WARMAN SOLUTION PUMPS FOR GROOTE EYLANDT MANGANESE MINE



The photograph shows part of a shipment of Warman Series "A" Slurry Pumps for a new


WARMAN EQUIPMENT • MINING • METALLURGICAL • CHEMICAL

Warman Equipment

MONTHLY BULLETIN

April, 1972

WARMAN EQUIPMENT INSTALL NEW SILICA MILLING PLANT FOR WUNDERLICH LIMITED




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MONTHLY BULLETIN

September, 1969

WARMAN SOLUTION PUMPS FOR GROOTE EYLANDT MANGANESE MINE



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ALWAYS

Warman

SINCE. 1938

Minerals

MINE & QUARRY

OFFICIAL JOURNAL OF THE MINERALS ENGINEERING SOCIETY

The best slurry pumps to maintain your industry's output

WARMAN INTERNATIONAL LIMITED

Todmorden, Lancashire, England. Tel: 070 681 4251 Telex: 63324

WARMAN EQUIPMENT (INTERNATIONAL) LTD.

1 MARDEN STREET, ARTARMON, SYDNEY, AUSTRALIA
Phone: 439 2000

88 FISHER STREET BELMONT, PERTH
Phone: 625 2957

376 HANNAH STREET CALGOOIE
Phone: 21 1465

IPSWICH ROAD & FRANKLIN STREET ROCKLEIGH, BRISBANE
Phone: 47 5633

Engines and Cables: "WARMANCO", Sydney, Perth, Kalgoorlie and Brisbane

The first of the Series 'A' Gravel Pumps was supplied to Messrs. Farley & Levers Ltd. for sand-dredging duties at their Roseville, N.S.W., plant. The pump was required to suction dredge and deliver over 100 tons per hour of sand through up to 3,000 feet of delivery pipeline. At the same time, it was required that the pump should be efficient in handling shell up to 6" dia. and trash, such as old house bricks, bottles and tins. The pump selected was an 8" Warman Series 'A' Gravel Pump, direct-coupled to a 250 h.p. motor. After many years of trouble-free operation, the average production from the pump has been over 150 tons per hour.

This illustration shows a Warman Series 'A' 20/20 G-D dredge pump engaged in beach sands mining at Titanium & Zirconium Industrial Pty. Ltd., Stradbroke Island, Queensland. This Warman pump is delivering 1,000 G.P.M. at 25% solids by weight, or equivalent to 800 T.P.M. of solids. It is web-built driven by a 350 H.P. motor through a variable-speed drive. All wet-end parts are constructed in Ni-Hard, giving high abrasive resistance and long wearing life.

The WARMAN 6" Suction Dredge operated by Peterson Construction Pty. Ltd., at Woy Woy, N.S.W., on reclamations of "Garden of Eden" estate.

Warman Series "A" 6", Frame F, Type G submersible pump, showing tripod and sluice monitor, engaged in tin-mining operations at Sungai Bera Tin Mines, Malaysia. Refer Bulletin WES/1

world pumps

an international technical review of pumps and their applications

world pumps

une revue technique internationale des pompes et de leurs applications

world pumps

internationale technische zeitschrift für pumpen und ihre anwendungen

AUGUST 1982

Simple s

John Carr & Associates Limited

WARMAN AD Page 2

Selwood pumps haven't got what it takes to go wrong - because every operation in a Selwood Pump is a simple one. Simple because we've eliminated the parts that cause most of the hold-ups in other pumps. Simple because what ever the size of your problem, we've got the equipment to handle it. Our famous award winning Spate, Seltorque and Simplicity pumps have the capacity to keep any operation running smoothly - for years. Pump us for more details - it could be the most effective pumping you'll ever do.

Selwood pumps

Simply designed for lasting efficiency

John R. Selwood Limited, London Road, Eastleigh, Hants, England. Chandler's Ford (04215) 66311

mine and quarry

june 1979 volume 8 number 6 ISSN 0369-1632

WARMAN PUMPS

The world's finest range of solids handling pumps

- Interchangeable Liners and Impellers
- Low Operating Cost ● Greater Capacities
- Higher Heads ● World Wide Service
- Minimum Downtime ● Abrasive Resistant

Dredge & Gravel Pumps
Heads up to 85 m. Capacities up to 14000 m³/h.

Heavy and Medium Duty Slurry Pumps
Heads up to 120 m. Capacities up to 9450 m³/h. Casing Pressure to 10 kg/cm².

Heavy Duty Solution Pumps
Heads up to 110 m. Capacities to 4500 m³/h.

Filtrate Extraction Pumps
With submerged gland. Capacities to 536 m³/h.

For further information including details of Warman Froth and Vertical Sump Pumps, contact: **SIMON-WARMAN LTD** Todmorden, Lancashire, England. Tel: 070-681 4251 Telex: 63324 Agents and Representatives Throughout the World

WARMAN PUMPS

in regular use throughout the world

Two 8.8 FG Gravel Pumps raising 2,000 G.P.M. at a china clay pit. Australian sewage works utilising Warman Solution Pumps.

Cutter Dredge in a gravel pit using a 14" Dredge Pump with an output of 250 cu. yds. per hour.

However difficult the application, Simon-Warman produce a pump with the capacity to deal with it. For literature on Dredge and Gravel, Solution, Slurry, Filtrate Extraction, Froth and Sump Pumps contact: **Simon-Warman Limited**, Halifax Road, Todmorden, Lancs. Telephone: Todmorden 4251 Telex: 63324.

SIMON-WARMAN

WARMAN PUMPS

for high power pumping over a huge range of capacities and applications

Over 1000 Warman Pumps in regular service within the National Coal Board alone!

Dredge & Gravel Pumps
Heads up to 85 m. Capacities up to 8100 m³/h.

Heavy and Medium Duty Slurry Pumps
Heads up to 106 m. Capacities up to 9450 m³/h. Casing Pressure to 10 kg/cm².

Heavy Duty Solution Pumps
Heads up to 110 m. Capacities to 4500 m³/h.

Filtrate Extraction Pumps
With submerged gland. Capacities to 536 m³/h.

From Alumina to Zirconium and virtually every Abrasive Water or Abrasive/Corrosive mixture, Warman Pumps fit the bill. Employing the latest technology against wear with high alloy metals, rubbers, elastomers and interchangeable shaft sealing methods.

For further information including details of Warman Froth and Vertical Sump Pumps, contact: **SIMON-WARMAN LTD** Halifax Road, Todmorden, Lancashire, England. Telephone 070-681 4251 Telex: 63324

COLLIERY GUARDIAN ANNUAL REVIEW, AUGUST 1979 291

WARMAN

HEAVY-DUTY SLURRY PUMPS

WARMAN PUMPS

Cut Operational Costs

Where high head duties are required for long distance pipelines and high static discharge heads, or low head duties such as hopper dredging and barge loading **Warman Dredge and Gravel Pumps** provide trouble-free operation, with heads up to 280 feet and capacities of 30,000 i.g.p.m.

In severe conditions where high density slurries and higher heads are necessary, **Warman Heavy Duty Slurry Pumps** give ultimate performance. Ranging from 1" to 18" with heads up to 350 feet and capacities up to 20,000 i.g.p.m.

For pumping abrasive pulps in the low to medium head range, with sizes from 1" to 8", heads up to 120 feet and with capacities up to 3,000 i.g.p.m. there's the **Warman Medium Duty Split-Casing Slurry Pump**.

A long working life is ensured with unique expeller type shaft seals and interchangeable rubber or metal liners and impellers for pumping abrasives, acids and corrosives.

For details on these and Filtrate Extraction Pumps, Solution, Froth and Sump Pumps, contact: **SIMON-WARMAN LTD** Todmorden, Lancashire, England. Tel: 070-681 4251 Enquiry Card - Circle Enquiries - Adhagatke-209

WARMAN

Heavy Duty Slurry Pumps

Designed specifically for pumping highly abrasive and corrosive slurries.

Warman slurry pumps aiding world resource projects

Winning a number of competitive international tenders, demonstrating that our industry can compete with the world's large foreign resource projects.

Long-Lasting Slurry Pumps from Warman

Warman pumps are used extensively in processing industries such as mining, chemical processing and oil refining. They are also used in the pulp and paper industry, and in the food and pharmaceutical industries.

Warman supplies pumps for giant Curragh coal project

The 1500,000 order to supply pumps for a new 1,000 megawatt power station which has been placed with Warman International Limited by NEI International Combustion Ltd is now in production.

The new power station is being built by NEI for the National Thermal Power Corporation of India at Rihand in North-East India.

Australian pumps win in world competition

Warman International Ltd. has been awarded a major contract to supply pumps for the Keston Gold Mine in Australia.

In the rugged mountains of the Philippines Warman is on duty

A typical duty required of Warman slurry pumps is that at an open cut copper mine in the Philippines where a 16/14-H-AH pump is coping with the task of disposing of the mine's tailings.

Cover: Firms Bob Whitehouse and Lionel Dosh prepare a massive high-pressure slurry pump for testing. This 208 pump weighing 21 tonnes, is among the largest of an extensive range of slurry pumps manufactured by Warman International.

Warman pumps for USSR pipeline

Against fierce international competition, Warman International has won contracts for the supply of heavy duty centrifugal pumps to the USSR.

They are for duty on a 250km Siberian coal pipeline. The pumps are to be installed at the main pumping station and the terminal station.

They will be coping with the highest density coal slurry ever pumped on a commercial basis. Snamprogetti SpA of Italy, the main contractors and designers of the coal slurry technology for the project, selected Warman over other leading pump manufacturers from around the world.

Warman was chosen for their ability to design and manufacture pumps capable of dealing with the demands of latest technology developments and for their wide experience in operating pumps under extreme environmental conditions.

Pumps for flu in Brazil

WARMAN slurry pumps manufactured under licence in Brazil are playing a significant part in a fight to control pollution in the world's largest slurry pipeline.

pollution control campaign devised with water as a diluent. The slurry is pumped through a 2.5m high-pressure pipe to a 1,000 foot deep disposal pond.

World-wide operation wins pump firm major market share

Standardised design, product adaptability and strict quality control through a network of manufacturing operations, licensees and agents in about 40 countries have enabled Sydney-based Warman International Ltd to capture estimated 16 per cent of the slurry pump market.

Big slurry pumps go to Ok Tedi

Two heavy-duty centrifugal slurry pumps for the Ok Tedi gold and copper project in Papua New Guinea have been supplied by Warman International. Each pump is 2.5m high, weighs 21 tonnes and is capable of pumping 2,000 m³ of slurry per hour.

Warman's 25,000th

THE 25,000th slurry pump was made at Warman's International factory in Todmorden, Lancashire, England. The pump is a 14" Dredge Pump, which will be used in a project in Argentina.

WARMAN

AHU Heavy Duty Slurry Pumps

WARMAN

Producing for tomorrow

Warman's plant in Madison, Wisconsin, has undergone several major expansion programs - each time taking advantage of the latest in manufacturing technology.

Our IBM computer processes and stores all manufacturing, inventory, pricing and other vital data.

Warman's stock of parts assures customers of reliable deliveries.

WARMAN

SEWAGE AND SLODGE PUMPS (A)

55 m	25-150mm	470 m ³ /h
85 m	152-914mm	8100 m ³ /h

Sump Pumps

55 m	25-75mm	80 m ³ /h
106 m	38-457mm	4090 m ³ /h

Froth Pumps

67 m	19-200mm	1360 m ³ /h
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PUMP is best for the job?

WARMAN

TOUGH PUMPS

Coal Processing

APPLICATIONS: Raw coal feed, Heavy media, Cyclone feed, Thickener underflow, Thickener overflow

Filter feed, Sump pumps, Clarified water, Coal handling, Coal slurry pipeline

Mining and Ore Processing

ORE TYPES: Copper, Molybdenum, Iron, Gold, Potash, Phosphates, Lead and zinc, Sand and aggregate

Uranium, Silver, Tar sands, Oil waste

Electric Utilities

APPLICATIONS: Bottom ash removal, Fly ash removal, SO₂ scrubber systems, Sump pumps

Sludge, Thickener underflow, Thickener overflow, Recycled water

Industrial

APPLICATIONS: Slaughter service, Recycled water, Slag removal, Sludge removal, Sump pumps

WEIR

Minerals

